

**LINDA LINGLE**  
Governor



State of Hawaii  
**DEPARTMENT OF AGRICULTURE**  
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Chairperson, Board of Agriculture

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**TESTIMONY OF SANDRA LEE KUNIMOTO  
CHAIRPERSON, BOARD OF AGRICULTURE**

**BEFORE THE HOUSE COMMITTEE ON AGRICULTURE  
WEDNESDAY, MARCH 4, 2009  
9:00 A.M.  
ROOM 312**

**HOUSE BILL NO. 1663  
RELATING TO TARO SECURITY**

Chairperson Tsuji and Members of the Committee:

Thank you for the opportunity to testify on House Bill No. 1663. The purpose of this bill is to prohibit the development, testing, propagation, release, importation, planting, or growing of genetically modified taro in the State of Hawaii. The Department respects that the growing of taro is an integral part of the Hawaiian culture. However, this issue seems to have a broader implication reaching beyond the Hawaiian culture. Due to the risks to taro from invasive species, serious concerns that this measure may be used as a means to prevent research and use of biotechnology for other important crops and lack of enforcement authority over taro imported from foreign sources, we must oppose this measure as proposed.

The Taro Security and Purity Task Force was established with the signing of Act 211 in July 2008. This taskforce, comprised of taro farmers, cultural practitioners, regulatory agencies, and the scientific community is finally moving forward with meaningful discussion in hopes that satisfactory non-GMO solutions can be found to address many of the issues concerning taro farming in Hawaii.

Taro plants in Hawaii continue to remain vulnerable to the introduction of foreign pests and disease. Due to federal preemptions, the Department is not provided notification of arrivals or information on the origins of foreign taro that is allowed to enter Hawaii without State inspection. The Department will continue to work with our Congressional Delegation to

overcome federal policies even as we continue efforts to build and secure joint federal-state inspection facilities to deal with both foreign and domestic imports. Only then, will the department have the ability to inspect imported taro from foreign origins. These solutions will not happen quickly and given that the threats to taro and other crops are very real, we caution against limiting the tools available to combat these threats. Attached to this testimony is information received from the USDA reporting the pests intercepted on taro at U.S. ports-of-entry. Taro is grown throughout the world and imported into the U.S. and distributed domestically to the various states, including Hawaii.

Agriculture, from its beginning to present, has suffered from pest and disease infestation causing enormous, unpredictable losses in food production. Biotechnology is a critical tool used in many countries to combat crop threatening insects and diseases. Without the biotech development of the ringspot virus resistant papaya, all papaya production in Hawaii, both conventional and organic would have been devastated by the disease. There is a perception, promoted by opponents to biotechnology, that there is something inherently wrong with the technology which is contrary to what is widely accepted by the scientific community.

The loss of taro or any major industry in agriculture, by any means, would be devastating to Hawaii. However, advancements in biotechnology exist only through continued research. Passage of this bill will take away a valuable tool available to us which may prevent industry losses. Some threats have already arrived, while others are knocking at the door. We hope that serious consideration is given to the known threats of diseases and pests to taro versus the perceived fears of biotechnology.

The department acknowledges and respects the testimony of the Kauai Taro Growers Association, that in deference to the Hawaiian culture, no genetically engineered research should be done on stated Hawaiian cultivars and that research done on non-Hawaiian cultivars shall be limited to approved facilities with consultations with the Hawaiian community.

Agriculture is already at a critical state as battles rage over water, land and limited resources. Instead of undermining ongoing efforts to seek alternative solutions, let us continue to support co-existence among all agricultural sectors.

# Commodity Risk Assessment

## Commodity: Colocasia esculenta

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Insect	Aleurodicus dispersus Russell (Aleyrodidae)	Y	Hawaii	HI Honolulu PIS PPQ	1
Insect	Anomala sp. (Scarabaeidae)	Y	Costa Rica	PR San Juan PIS PPQ	1
Insect	Anthomyiidae, species of	Y	Dominica	VI St. Thomas CBP	1
Insect	Aphididae, species of	Y	Antigua and Barbuda	PR San Juan PIS PPQ	1
Insect	Aphis gossypii Glover (Aphididae) *Non-Rep*	N	Trinidad and Tobago	NY JFK PIS PPQ	1
Insect	Cicadellidae, species of	Y	Cook Islands	HI Honolulu PIS PPQ	1
Insect	Cyclocephala sp. (Scarabaeidae)	Y	Costa Rica	FL Ft. Lauderdale PPQ	1
Insect	Delphacidae, species of	Y	Cook Islands	HI Honolulu PIS PPQ	1
Insect	Delphacidae, species of	Y	Tonga	HI Honolulu PIS PPQ	1
Insect	Diptera, species of	Y	Brazil	NJ Newark Sea CBP	1
Insect	Eurychilella sp. (Miridae)	Y	Costa Rica	FL Miami PIS PPQ	1
Insect	Ferrisia virgata (Cockerell) (Pseudococcidae) *Non-Rep*	N	Jamaica	FL Orlando PIS PPQ	1
Insect	Fulgoroidea, species of	Y	Cook Islands	HI Honolulu PIS PPQ	1
Insect	Gryllus sp. (Gryllidae)	Y	Costa Rica	PA Philadelphia PPQ	1
Insect	Hoplandrothrips flavipes Bagnall (Phlaeothripidae) *Non-Rep*	N	India	GA Atlanta PIS PPQ	1
Insect	Lepidoptera, species of	Y	India	GA Atlanta PIS PPQ	1
Insect	Melanodermus sp. (Pentatomidae)	Y	Costa Rica	DE Dover (AFB) CBP	1
Insect	Noctuidae, species of	Y	Trinidad and Tobago	FL Miami PIS PPQ	1
Insect	Paraputo sp. (Pseudococcidae)	Y	Fiji	HI Honolulu PIS PPQ	1
Insect	Pentatomidae, species of	Y	Trinidad and Tobago	FL Miami PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Cook Islands	HI Honolulu PIS PPQ	2
Insect	Pseudococcidae, species of	Y	Fiji	HI Honolulu PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Nigeria	TN Memphis PPQ	1
Insect	Pseudococcidae, species of	Y	Trinidad and Tobago	FL Miami PIS PPQ	1
Mollusk	Opeas sp. (Subulinidae)	Y	Hong Kong	CA Long Beach PPQ	1
Weed	Mikania micrantha Humboldt Bonpland, Et Kunth. (Asteraceae)	Y	Dominican Republic	FL Miami PIS PPQ	1

**Report Search Criteria**

<b>Host Genus:</b>	Colocasia	<b>Host Part:</b>	
<b>Host Species:</b>	esculenta	<b>Origin:</b>	
<b>Date Range:</b>	01/01/1997	<b>thru</b>	01/01/1998

01-02

# Commodity Risk Assessment

## Commodity: Colocasia esculenta

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Disease	No identifiable pathogen found *Non-Rep*	N	Trinidad and Tobago	FL Miami PIS PPQ	1
Insect	Acrolophidae, species of	Y	Ecuador	FL Miami PIS PPQ	1
Insect	Aleuroglandulus malangae Russell (Aleyrodidae) *Non-Rep*	N	Dominica	VI St. Thomas CBP	1
Insect	Aleyrodidae, species of	Y	Hawaii	HI Honolulu PIS PPQ	1
Insect	Amnestus sp. (Cydnidae)	Y	Costa Rica	FL Ft. Lauderdale PPQ	1
Insect	Anaxipha sp. (Gryllidae)	Y	Ecuador	FL Miami PIS PPQ	1
Insect	Aphididae, species of	Y	Dominican Republic	FL Miami PIS PPQ	1
Insect	Aphididae, species of	Y	Trinidad and Tobago	FL Miami PIS PPQ	1
Insect	Camptomyia sp. (Cecidomyiidae) *Non-Rep*	N	Iran	GA Atlanta PIS PPQ	3
Insect	Ceraspis sp. (Scarabaeidae)	Y	Ecuador	FL Miami PIS PPQ	1
Insect	Cicadellidae, species of	Y	Hawaii	HI Honolulu PIS PPQ	1
Insect	Cicadidae, species of	Y	Dominican Republic	FL Ft. Lauderdale PPQ	1
Insect	Conoderus falli Lane (Elateridae) *Non-Rep*	N	Brazil	FL Miami PIS PPQ	1
Insect	Cylas sp. (Curculionidae)	Y	Cameroon	KY Erlanger PPQ	1
Insect	Dallasiellus alutaceus Froeschner (Cydnidae)	Y	Brazil	FL Miami PIS PPQ	1
Insect	Delphacidae, species of	Y	Philippines	CA San Francisco PIS PPQ	1
Insect	Diaphorina citri Kuwayama (Psyllidae)	Y	Cameroon	KY Erlanger PPQ	1
Insect	Dysmicoccus sp. (Pseudococcidae)	Y	Jamaica	MO St. Louis PPQ	1
Insect	Faustinus sp. (Curculionidae)	Y	Samoa	HI Honolulu PIS PPQ	1
Insect	Geococcus coffeae Green (Pseudococcidae)	Y	Fiji	HI Honolulu PIS PPQ	1
Insect	Geometridae, species of	Y	Mexico	FL Miami PIS PPQ	1
Insect	Gryllus sp. (Gryllidae)	Y	Costa Rica	DE Dover (AFB) CBP	1
Insect	Gryllus sp. (Gryllidae)	Y	Ecuador	FL Miami PIS PPQ	1
Insect	Limonia sp. (Tipulidae) *Non-Rep*	N	Dominican Republic	PR San Juan PIS PPQ	1
Insect	Lygaeidae, species of	Y	Hawaii	HI Honolulu PIS PPQ	1
Insect	Manduca sp. (Sphingidae)	Y	Hawaii	HI Honolulu PIS PPQ	1
Insect	Miridae, species of	Y	Philippines	CA San Francisco PIS PPQ	1
Insect	Noctuidae, species of	Y	Hawaii	HI Honolulu PIS PPQ	1
Insect	Noctuidae, species of	Y	Philippines	CA San Francisco PIS PPQ	1
Insect	Noctuidae, species of	Y	Trinidad and Tobago	FL Miami PIS PPQ	1
Insect	Paragonatas divergens (Distant) (Rhyarochromidae)	Y	Ecuador	FL Miami PIS PPQ	1
Insect	Phelacridae, species of *Non-Rep*	N	Philippines	CA San Francisco PIS PPQ	1

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Insect	Spoladea recurvalis (Fabricius) (Crambidae) *Non-Rep*	N	Jamaica	NJ Newark Sea CBP	1
Insect	Spoladea recurvalis (Fabricius) (Crambidae) *Non-Rep*	N	Jamaica	NY JFK PIS PPQ	1
Insect	Thrips fuscipennis Haliday (Thripidae) *Non-Rep*	N	Philippines	CA San Francisco PIS PPQ	1
Mollusk	Achatina (Lissachatina) fulica Bowdich (Achatinidae)	Y	Hawaii	HI Honolulu PIS PPQ	1
Mollusk	Veronicella sp. (Veronicellidae)	Y	St. Kitts and Nevis	VI St. Thomas CBP	1

#### Report Search Criteria

Host Genus:	Colocasia	Host Part:	
Host Species:	esculenta	Origin:	
Date Range:	01/01/2000	thru	01/01/2001

# Commodity Risk Assessment

## Commodity: Colocasia esculenta

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Insect	Aleurodicus dispersus Russell (Aleyrodidae)	Y	Hawaii	HI Honolulu PIS PPQ	1
Insect	Aphididae, species of	Y	Dominican Republic	FL Miami PIS PPQ	1
Insect	Araecerus fasciculatus (De Geer) (Anthribidae) *Non-Rep*	N	Panama	FL Miami PIS PPQ	1
Insect	Clinodiplosis sp. (Cecidomyiidae) *Non-Rep*	N	Panama	FL Miami PIS PPQ	1
Insect	Colaspis sp. (Chrysomelidae)	Y	Costa Rica	FL Miami PIS PPQ	1
Insect	Cyclocephala sp. (Scarabaeidae)	Y	Costa Rica	FL Miami PIS PPQ	1
Insect	Dyscinetus sp. (Scarabaeidae)	Y	Costa Rica	FL Ft. Lauderdale PPQ	1
Insect	Dyscinetus sp. (Scarabaeidae)	Y	Costa Rica	FL Miami PIS PPQ	1
Insect	Dysmicoccus brevipes (Cockerell) (Pseudococcidae) *Non-Rep*	N	Costa Rica	FL Miami PIS PPQ	1
Insect	Eubulus sp. (Curculionidae)	Y	Costa Rica	FL Miami PIS PPQ	1
Insect	Heteroderes amplicollis (Gyllenhal) (Elateridae) *Non-Rep*	N	Dominican Republic	FL Miami PIS PPQ	1
Insect	Muscidae, species of *Non-Rep*	N	Cyprus	MA Boston PPQ	1
Insect	Mycetophilidae, species of *Non-Rep*	N	Costa Rica	CA Long Beach PPQ	1
Insect	Noctuidae, species of	Y	Jamaica	NY JFK PIS PPQ	1
Insect	Noctuidae, species of	Y	Trinidad and Tobago	NY JFK PIS PPQ	1
Insect	Plusiinae, species of (Noctuidae)	Y	Dominican Republic	FL Miami PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Fiji	HI Honolulu PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Nigeria	CA San Francisco PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Nigeria	TN Memphis PPQ	2
Insect	Pseudococcidae, species of	Y	Portugal	MA Boston PPQ	1
Insect	Tenebrionidae, species of *Non-Rep*	N	Fiji	CA Los Angeles PIS PPQ	1
Weed	Tridax procumbens Linnaeus (Asteraceae)	Y	Dominican Republic	FL Miami PIS PPQ	1

### Report Search Criteria

Host Genus:	Colocasia	Host Part:	
Host Species:	esculenta	Origin:	
Date Range:	01/01/1998	thru	01/01/1999

00-01

# Commodity Risk Assessment

## Commodity: Colocasia esculenta

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Insect	Aphididae, species of	Y	Trinidad and Tobago	FL Ft. Lauderdale PPQ	1
Insect	Aphis gossypii Glover (Aphididae) *Non-Rep*	N	Hawaii	HI Hilo PPQ	1
Insect	Argyrogramma verruca (Fabricius) (Noctuidae) *Non-Rep*	N	Dominican Republic	NY JFK PIS PPQ	1
Insect	Aspidiella hartii (Cockerell) (Diaspididae)	Y	Nigeria	IL Chicago PPQ	1
Insect	Aulacaspis tubercularis Newstead (Diaspididae)	Y	Dominican Republic	FL Miami PIS PPQ	1
Insect	Conoderus sp. (Elateridae)	Y	Dominican Republic	FL Ft. Lauderdale PPQ	1
Insect	Crambidae, species of	Y	Dominican Republic	FL Ft. Lauderdale PPQ	1
Insect	Curculionidae, species of	Y	Fiji	HI Honolulu PIS PPQ	1
Insect	Cyclocephala sp. (Scarabaeidae)	Y	Costa Rica	FL Miami PIS PPQ	1
Insect	Delphacidae, species of	Y	Philippines	CA San Francisco PIS PPQ	1
Insect	Diaspididae, species of	Y	Laos	CA San Francisco PIS PPQ	1
Insect	Dipropus sp. (Elateridae)	Y	Dominican Republic	FL Miami PIS PPQ	1
Insect	Dynastinae, species of (Scarabaeidae)	Y	Costa Rica	DE Dover (AFB) CBP	1
Insect	Eurychilella sp. (Miridae)	Y	Costa Rica	DE Dover (AFB) CBP	1
Insect	Heteroderes amplicollis (Gyllenhal) (Elateridae) *Non-Rep*	N	Jamaica	FL Miami PIS PPQ	1
Insect	Lepidoptera, species of	Y	Viet Nam	IL Chicago PPQ	1
Insect	Ligyris sp. (Scarabaeidae)	Y	Costa Rica	FL Ft. Lauderdale PPQ	2
Insect	Listronotus sp. (Curculionidae)	Y	Panama	FL Miami PIS PPQ	1
Insect	Nitidulidae, species of *Non-Rep*	N	Fiji	HI Honolulu PIS PPQ	1
Insect	Noctuidae, species of	Y	Dominican Republic	FL Ft. Lauderdale PPQ	1
Insect	Noctuidae, species of	Y	Dominican Republic	FL Miami PIS PPQ	2
Insect	Odontomachus troglodytes Santschi (Formicidae) *Non-Rep*	N	Nigeria	MI Detroit CBP	1
Insect	Paragonatas divergens (Distant) (Rhyarochromidae)	Y	Panama	FL Miami Sea CBP	1
Insect	Paraputo sp. (Pseudococcidae)	Y	Fiji	HI Honolulu PIS PPQ	2
Insect	Pheidole sp. (Formicidae)	Y	Fiji	HI Honolulu PIS PPQ	1
Insect	Phyllophaga sp. (Scarabaeidae)	Y	Nicaragua	PR San Juan PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Fiji	HI Honolulu PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Grenada	FL Ft. Lauderdale PPQ	1
Insect	Pseudococcidae, species of	Y	St. Kitts and Nevis	VI St. Thomas CBP	1
Insect	Psyllidae, species of	Y	Korea, South	AK Anchorage PPQ	1
Insect	Pyraustinae, species of (Crambidae)	Y	Jamaica	NY JFK PIS PPQ	1

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Insect	Pseudococcidae, species of	Y	Puerto Rico	PR San Juan PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Trinidad and Tobago	FL Miami PIS PPQ	1
Insect	Sciaridae, species of 'Non-Rep'	N	Costa Rica	DE Dover (AFB) CBP	1
Insect	Tineidae, species of	Y	Cameroon	IL Chicago PPQ	1
Insect	Tipulidae, species of	Y	Costa Rica	NJ Newark Sea CBP	1
Insect	Typophorus sp. (Chrysomelidae)	Y	Costa Rica	FL Ft. Lauderdale PPQ	1

#### Report Search Criteria

<b>Host Genus:</b>	Colocasia	<b>Host Part:</b>	
<b>Host Species:</b>	esculenta	<b>Origin:</b>	
<b>Date Range:</b>	01/01/1999	thru	1/01/2000

02-03

# Commodity Risk Assessment

## Commodity: Colocasia esculenta

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Insect	Adetus sp. (Cerambycidae) *Non-Rep*	N	Ecuador	FL Miami PIS PPQ	1
Insect	Aphididae, species of	Y	Dominican Republic	FL Miami PIS PPQ	2
Insect	Aphididae, species of	Y	Hawaii	HI Hilo PPQ	1
Insect	Blapstinus sp. (Tenebrionidae)	Y	Panama	FL Miami PIS PPQ	1
Insect	Cerambycidae, species of	Y	Dominican Republic	VI St. Thomas CBP	1
Insect	Cicadellidae, species of	Y	Philippines	CA San Francisco PIS PPQ	1
Insect	Cicadellini, species of (Cicadellidae)	Y	Ecuador	FL Miami PIS PPQ	1
Insect	Curculionidae, species of	Y	Costa Rica	NJ Linden PIS PPQ	3
Insect	Cyclocephala sp. (Scarabaeidae)	Y	Dominican Republic	FL Miami PIS PPQ	1
Insect	Dyscinetus sp. (Scarabaeidae)	Y	Dominican Republic	FL Miami PIS PPQ	2
Insect	Dysmicoccus brevipes (Cockerell) (Pseudococcidae) *Non-Rep*	N	Cameroon	KY Erlanger PPQ	1
Insect	Gryllus sp. (Gryllidae)	Y	Ecuador	FL Miami PIS PPQ	2
Insect	Lepidoptera, species of	Y	Trinidad and Tobago	NY JFK PIS PPQ	1
Insect	Metamasius sp. (Dryophthoridae)	Y	Dominican Republic	PA Philadelphia PPQ	1
Insect	Miogryllus sp. (Gryllidae)	Y	Ecuador	FL Miami PIS PPQ	1
Insect	Molytinae, species of (Curculionidae)	Y	Costa Rica	DE Dover (AFB) CBP	2
Insect	Myodocha sp. (Rhyparochromidae)	Y	Ecuador	FL Miami PIS PPQ	1
Insect	Noctuidae, species of	Y	Dominican Republic	FL Miami PIS PPQ	1
Insect	Noctuidae, species of	Y	Dominican Republic	NY JFK PIS PPQ	1
Insect	Norape argynorrhoea Huebner (Megalopygidae)	Y	Costa Rica	FL Ft. Lauderdale PPQ	1
Insect	Ozophora sp. (Rhyparochromidae)	Y	Dominican Republic	FL Miami PIS PPQ	1
Insect	Pentatomidae, species of	Y	Dominican Republic	NY JFK PIS PPQ	1
Insect	Pentatomidae, species of	Y	Trinidad and Tobago	FL Miami PIS PPQ	1
Insect	Phyllophaga sp. (Scarabaeidae)	Y	Costa Rica	DE Dover (AFB) CBP	1
Insect	Platynola sp. (Tortricidae) *Non-Rep*	N	Ecuador	FL Miami PIS PPQ	1
Insect	Plectris sp. (Scarabaeidae)	Y	Ecuador	FL Miami PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Puerto Rico	PR Mayaguez Pre-Departure PPQ	1
Insect	Pseudococcidae, species of	Y	St. Vincent and the Grenadines	FL Miami PIS PPQ	1
Insect	Pseudococcus sp. (Pseudococcidae)	Y	Cameroon	KY Erlanger PPQ	1
Insect	Rhizoecus sp. (Pseudococcidae)	Y	Cameroon	KY Erlanger PPQ	3
Insect	Scapteriscus sp. (Gryllotalpidae)	Y	Ecuador	FL Miami PIS PPQ	1
Insect	Scarabaeidae, species of	Y	Dominican Republic	FL Miami PIS PPQ	1
Insect	Scatopsidae, species of *Non-Rep*	N	Cameroon	KY Erlanger PPQ	1

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Insect	Spodoptera latifascia (Walker) (Noctuidae) *Non-Rep*	N	Dominican Republic	NY JFK PIS PPQ	1
Insect	Spodoptera sp. (Noctuidae)	Y	Dominican Republic	NY JFK PIS PPQ	1
Insect	Tominolus unisetosus Froeschner (Cydniidae) *Non-Rep*	N	Costa Rica	FL Ft. Lauderdale PPQ	1
Insect	Xyleborus ferrugineus (Fabricius) (Scolytidae) *Non-Rep*	N	Costa Rica	DE Dover (AFB) CBP	1
Mollusk	Achatina (Lissachatina) fulica Bowdich (Achatinidae)	Y	Hawaii	HI Honolulu PIS PPQ	1
Mollusk	Pomacea sp. (Ampullariidae)	Y	Dominican Republic	FL Miami PIS PPQ	2
Nematode	Ditylenchus sp. (Anguinidae)	Y	Japan	CA San Francisco PIS PPQ	1
Nematode	Dorylaimus sp. (Dorylaimidae) *Non-Rep*	N	Dominican Republic	FL Miami PIS PPQ	1

#### Report Search Criteria

Host Genus:	Colocasia	Host Part:	
Host Species:	esculenta	Origin:	
Date Range:	01/01/2002	thru	01/01/2003

03-04

# Commodity Risk Assessment

## Commodity: Colocasia esculenta

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Disease	Fusarium sp. (Hyphomycetes)	Y	Jamaica	GA Atlanta PIS PPQ	2
Disease	No identifiable pathogen found *Non-Rep*	N	Dominican Republic	NJ Newark Sea CBP	1
Disease	No identifiable pathogen found *Non-Rep*	N	Sierra Leone	NC Raleigh PPQ	1
Insect	Amphiacusta caraibeae Saussure (Gryllidae)	Y	Brazil	PA Philadelphia PPQ	1
Insect	Anurogryllus sp. (Gryllidae)	Y	Costa Rica	CA San Diego PIS PPQ	1
Insect	Aphis gossypii Glover (Aphididae) *Non-Rep*	N	Trinidad and Tobago	SC Charleston PPQ	1
Insect	Atta sp. (Formicidae)	Y	Costa Rica	FL Miami PIS PPQ	1
Insect	Cacographis osteolalis (Lederer) (Crambidae)	Y	Costa Rica	DE Dover (AFB) CBP	1
Insect	Collembola, species of *Non-Rep*	N	Azores	MA Boston PPQ	1
Insect	Conoderus sp. (Elateridae)	Y	Dominican Republic	FL Miami PIS PPQ	1
Insect	Curculionidae, species of	Y	Costa Rica	NJ Linden PIS PPQ	6
Insect	Curculionidae, species of	Y	Costa Rica	NJ Newark Sea CBP	1
Insect	Curculionidae, species of	Y	Venezuela	FL Miami PIS PPQ	1
Insect	Cyclocephala sp. (Scarabaeidae)	Y	Ecuador	FL Miami PIS PPQ	1
Insect	Dysmicoccus brevipes (Cockerell) (Pseudococcidae) *Non-Rep*	N	Costa Rica	CA San Diego PIS PPQ	1
Insect	Eurychilella sp. (Miridae)	Y	Costa Rica	DE Dover (AFB) CBP	1
Insect	Gelechiidae, species of	Y	Nigeria	NY JFK PIS PPQ	1
Insect	Gryllus sp. (Gryllidae)	Y	Brazil	FL Miami PIS PPQ	1
Insect	Gryllus sp. (Gryllidae)	Y	Dominican Republic	FL Miami Sea CBP	1
Insect	Insecta, species of	Y	Jamaica	NJ Newark Sea CBP	1
Insect	Lepidoptera, species of	Y	Nigeria	GA Atlanta PIS PPQ	1
Insect	Miogryllus sp. (Gryllidae)	Y	Ecuador	FL Miami PIS PPQ	2
Insect	Myrmicinae, species of (Formicidae)	Y	Nigeria	CA San Francisco PIS PPQ	1
Insect	Noctuidae, species of	Y	Dominican Republic	NY JFK PIS PPQ	3
Insect	Paraputo sp. (Pseudococcidae)	Y	Fiji	HI Honolulu PIS PPQ	1
Insect	Pentatomoidea, species of	Y	Dominican Republic	FL Miami PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Bangladesh	GA Atlanta PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Cameroon	KY Erlanger PPQ	1
Insect	Pseudococcidae, species of	Y	Nigeria	GA Atlanta PIS PPQ	1
Insect	Spodoptera exigua (Hubner) (Noctuidae) *Non-Rep*	N	Dominican Republic	FL Miami PIS PPQ	1
Insect	Thysanoptera, species of	Y	Bangladesh	GA Atlanta PIS PPQ	1
Insect	Tortricidae, species of	Y	Ghana	NY JFK PIS PPQ	1

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Insect	Tortricinae, species of (Tortricidae)	Y	Nigeria	NY JFK PIS PPQ	1
Mollusk	No identifiable mollusca found 'Non-Rep'	N	Dominican Republic	NJ Newark Sea CBP	1
Mollusk	Praticolella griseola (Pfeiffer) (Polygyridae) 'Non-Rep'	N	Dominican Republic	NY JFK PIS PPQ	1

#### Report Search Criteria

Host Genus:	Colocasia	Host Part:	
Host Species:	esculenta	Origin:	
Date Range:	01/01/2003	thru	01/01/2004

04-05

# Commodity Risk Assessment

## Commodity: Colocasia esculenta

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Insect	Aphididae, species of	Y	Dominican Republic	FL Miami PIS PPQ	2
Insect	Aphididae, species of	Y	Jamaica	FL Miami PIS PPQ	1
Insect	Aphididae, species of	Y	Philippines	CA San Francisco PIS PPQ	1
Insect	Blapstinus sp. (Tenebrionidae)	Y	Colombia	FL Ft. Lauderdale PPQ	1
Insect	Carabidae, species of *Non-Rep*	N	Dominican Republic	PA Philadelphia PPQ	1
Insect	Cecidomyiidae, species of	Y	Costa Rica	NJ Linden PIS PPQ	1
Insect	Chrysomelidae, species of	Y	Colombia	FL Ft. Lauderdale PPQ	1
Insect	Cicadellidae, species of	Y	Hawaii	HI Honolulu PIS PPQ	2
Insect	Curculionidae, species of	Y	Costa Rica	NJ Linden PIS PPQ	5
Insect	Delphacidae, species of	Y	Philippines	CA San Francisco PIS PPQ	1
Insect	Eurychilella sp. (Miridae)	Y	Costa Rica	PR San Juan PIS PPQ	1
Insect	Galerucinae, species of (Chrysomelidae)	Y	Colombia	FL Miami PIS PPQ	1
Insect	Galerucinae, species of (Chrysomelidae)	Y	Nicaragua	FL Miami PIS PPQ	1
Insect	Gryllus sp. (Gryllidae)	Y	Dominican Republic	FL Miami PIS PPQ	1
Insect	Gryllus sp. (Gryllidae)	Y	Dominican Republic	PA Philadelphia PPQ	1
Insect	Lepidoptera, species of	Y	Hawaii	HI Honolulu PIS PPQ	1
Insect	Margarodidae, species of	Y	Philippines	CA San Francisco PIS PPQ	1
Insect	Melolonthinae, species of (Scarabaeidae)	Y	Ecuador	FL Miami PIS PPQ	1
Insect	Miridae, species of	Y	Philippines	CA San Francisco PIS PPQ	1
Insect	Nitidulidae, species of *Non-Rep*	N	Dominican Republic	PA Philadelphia PPQ	1
Insect	Noctuidae, species of	Y	Dominican Republic	NY JFK PIS PPQ	1
Insect	Noctuidae, species of	Y	Jamaica	FL Miami PIS PPQ	1
Insect	Otitidae, species of *Non-Rep*	N	Costa Rica	NJ Linden PIS PPQ	1
Insect	Paraputo leverii (Green) (Pseudococcidae)	Y	Fiji	HI Honolulu PIS PPQ	1
Insect	Rastrococcus spinosus (Robinson) (Pseudococcidae)	Y	Philippines	CA San Francisco PIS PPQ	1
Insect	Rutelinae, species of (Scarabaeidae)	Y	Colombia	FL Ft. Lauderdale PPQ	1
Insect	Stenocrates sp. (Scarabaeidae)	Y	Brazil	PA Philadelphia PPQ	1
Insect	Thripidae, species of	Y	Jamaica	FL Miami PIS PPQ	1
Insect	Typhaea stercorea (Linnaeus) (Mycetophagidae) *Non-Rep*	N	Colombia	FL Ft. Lauderdale PPQ	1
Mite	Tetranychus sp. (Tetranychidae)	Y	Hawaii	HI Kahului CBP	1
Weed	Colocasia esculenta (Linnaeus) Schott (Araceae) *Non-Rep*	N	Mexico	AZ Nogales PIS PPQ	1

**Report Search Criteria**

<b>Host Genus:</b>	Colocasia	<b>Host Part:</b>	
<b>Host Species:</b>	esculenta	<b>Origin:</b>	
<b>Date Range:</b>	01/01/2004	thru	01/01/2005

25-06

# Commodity Risk Assessment

## Commodity: Colocasia esculenta

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Insect	Alegoria dilatata Laporte (Tenebrionidae) *Non-Rep*	N	Costa Rica	DE Dover PPQ	1
Insect	Aleurodicus dispersus Russell (Aleyrodidae)	Y	Hawaii	HI Honolulu PIS PPQ	1
Insect	Aleurodicus dispersus Russell (Aleyrodidae)	Y	Hawaii	HI Kahului CBP	1
Insect	Aphididae, species of	Y	Trinidad and Tobago	NY JFK PIS PPQ	1
Insect	Aphis gossypii Glover (Aphididae) *Non-Rep*	N	Trinidad and Tobago	NY JFK PIS PPQ	2
Insect	Blapstinus sp. (Tenebrionidae)	Y	Ecuador	FL Miami PIS PPQ	1
Insect	Cecidomyiidae, species of	Y	Dominica	VI St. Thomas CBP	1
Insect	Curculionidae, species of	Y	Costa Rica	NJ Linden PIS PPQ	7
Insect	Curculionidae, species of	Y	Costa Rica	TX Houston PIS PPQ	1
Insect	Cyclocephala sp. (Scarabaeidae)	Y	Costa Rica	PR San Juan PIS PPQ	1
Insect	Cyclorhapha, species of *Non-Rep*	N	Cameroon	KY Erlanger PPQ	1
Insect	Diaspididae, species of	Y	Grenada	PR San Juan PIS PPQ	1
Insect	Euxesta sp. (Otilidae) *Non-Rep*	N	Costa Rica	NY JFK PIS PPQ	1
Insect	Gryllidae, species of	Y	Costa Rica	DE Dover PPQ	1
Insect	Gryllus sp. (Gryllidae)	Y	Ecuador	CA Port Hueneme CBP	1
Insect	Gryllus sp. (Gryllidae)	Y	Unknown	FL Miami PIS PPQ	1
Insect	Heilipodus sp. (Curculionidae)	Y	Panama	FL Miami PIS PPQ	1
Insect	Heilipus sp. (Curculionidae)	Y	Nicaragua	PR San Juan PIS PPQ	1
Insect	Heteroptera, species of	Y	Dominican Republic	NY JFK PIS PPQ	1
Insect	Histeridae, species of *Non-Rep*	N	Ecuador	FL Port Everglades CBP	1
Insect	Lepidoptera, species of	Y	Unknown	IL Chicago PPQ	1
Insect	Neoparnera bilobata (Say) (Rhyparochromidae) *Non-Rep*	N	Ecuador	FL Miami PIS PPQ	1
Insect	Opogona sp. (Tineidae)	Y	Azores	MA Boston PPQ	2
Insect	Opogona sp. (Tineidae)	Y	Costa Rica	NJ Linden PIS PPQ	1
Insect	Paratrechina longicornis (Latreille) (Formicidae) *Non-Rep*	N	Dominican Republic	PA Philadelphia PPQ	1
Insect	Plusiinae, species of (Noctuidae)	Y	Costa Rica	PR San Juan PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Cameroon	KY Erlanger PPQ	1
Insect	Pseudococcidae, species of	Y	Ecuador	CA San Diego PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Puerto Rico	PR San Juan PIS PPQ	2
Insect	Pteronemobius sp. (Gryllidae)	Y	China	CA Long Beach PPQ	1
Insect	Stenocrates sp. (Scarabaeidae)	Y	Costa Rica	NJ Linden PIS PPQ	1
Insect	Typhlocybinae, species of (Cicadellidae)	Y	St. Lucia	FL Miami PIS PPQ	1

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Insect	Wasmannia auropunctata (Roger) (Formicidae) *Non-Rep*	N	South Africa	GA Atlanta PIS PPQ	1
Insect	Zopheridae, species of *Non-Rep*	N	Costa Rica	DE Dover PPQ	1
Mollusk	Deroceras sp. (Agriolimacidae)	Y	Azores	MA Boston PPQ	1

#### Report Search Criteria

Host Genus:	Colocasia	Host Part:	
Host Species:	esculenta	Origin:	
Date Range:	01/01/2005	thru	01/01/2006

06-07

# Commodity Risk Assessment

## Commodity: Colocasia esculenta

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Insect	Aphis gossypii Glover (Aphididae) *Non-Rep*	N	Honduras	FL Ft. Lauderdale PPQ	2
Insect	Bemisia tabaci Gennadius (Aleyrodidae) *Non-Rep*	N	Unknown	WA Blaine PPQ	1
Insect	Blapstinus sp. (Tenebrionidae)	Y	Dominican Republic	FL Miami PIS PPQ	1
Insect	Brachypnoea sp. (Chrysomelidae)	Y	Costa Rica	FL Miami Sea CBP	1
Insect	Cecidomyiidae, species of	Y	Costa Rica	NJ Linden PIS PPQ	1
Insect	Cistalia sp. (Rhyparochromidae)	Y	Ecuador	FL Miami Sea CBP	1
Insect	Clinodiptosis sp. (Cecidomyiidae) *Non-Rep*	N	Costa Rica	NY JFK PIS PPQ	2
Insect	Copitarsia sp. (Noctuidae)	Y	Brazil	FL Miami Sea CBP	1
Insect	Curculionidae, species of	Y	Costa Rica	NJ Linden PIS PPQ	9
Insect	Dyscinetus sp. (Scarabaeidae)	Y	Nicaragua	FL Miami Sea CBP	1
Insect	Dysdercus mimus (Say) (Pyrrhocoridae) *Non-Rep*	N	Ecuador	FL Miami Sea CBP	1
Insect	Dysmicoccus brevipes (Cockerell) (Pseudococcidae) *Non-Rep*	N	Costa Rica	NY JFK PIS PPQ	1
Insect	Gryllus sp. (Gryllidae)	Y	Costa Rica	DE Wilmington CBP	1
Insect	Gryllus sp. (Gryllidae)	Y	Ecuador	FL Miami Sea CBP	2
Insect	Heteroptera, species of	Y	Hawaii	HI Honolulu Pre-Departure PPQ	2
Insect	Homoptera, species of	Y	Hawaii	HI Honolulu Pre-Departure PPQ	1
Insect	Insecta, species of	Y	Trinidad and Tobago	NY JFK PIS PPQ	1
Insect	Isoptera, species of	Y	Hawaii	HI Honolulu Pre-Departure PPQ	1
Insect	Metamasius sp. (Dryophthoridae)	Y	Costa Rica	DE Dover PPQ	1
Insect	Miogryllus sp. (Gryllidae)	Y	Ecuador	FL Miami Sea CBP	2
Insect	Nasutitermes sp. (Termitidae)	Y	Nicaragua	PR San Juan Sea CBP	1
Insect	Nitidulidae, species of *Non-Rep*	N	Bangladesh	OH Cincinnati CBP	1
Insect	Nitidulidae, species of *Non-Rep*	N	Costa Rica	NJ Linden PIS PPQ	1
Insect	Noctuidae, species of	Y	Costa Rica	PR San Juan Sea CBP	1
Insect	Noctuidae, species of	Y	Dominican Republic	NY JFK PIS PPQ	1
Insect	Opogona sp. (Tineidae)	Y	Dominican Republic	FL Miami Sea CBP	1
Insect	Prytanus oblonga (Stal) (Rhyparochromidae) *Non-Rep*	N	Dominican Republic	FL Miami PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Dominica	VI St. Thomas CBP	1
Insect	Pseudococcidae, species of	Y	Hawaii	HI Honolulu PIS PPQ	1
Insect	Pseudococcidae, species of	Y	India	TX Dallas/Ft. Worth PPQ	1
Insect	Pseudococcidae, species of	Y	Jamaica	NY JFK CBP	1
Insect	Pseudococcidae, species of	Y	Nigeria	CA San Francisco PIS PPQ	1

Pest Type	Pest	Rprt?	Origin	Location	Interceptions
Insect	Pseudococcidae, species of	Y	St. Vincent and the Grenadines	NY JFK CBP	1
Insect	Pseudococcidae, species of	Y	United Kingdom of Great Britain and N. Ireland	FL Miami PIS PPQ	1
Insect	Pseudococcidae, species of	Y	Unknown	WA Blaine PPQ	1
Insect	Pteroneroebius sp. (Gryllidae)	Y	Ecuador	FL Miami Sea CBP	1
Insect	Tenebrionidae, species of 'Non-Rep'	N	Dominican Republic	FL Miami PIS PPQ	1
Insect	Tortricidae, species of	Y	Dominican Republic	NY JFK PIS PPQ	1
Mite	Steneotarsonemus furcatus Deleon (Tarsonemidae) 'Non-Rep'	N	Costa Rica	NY JFK PIS PPQ	3
Mollusk	Achatina (Lissachatina) fulica Bowdich (Achatinidae)	Y	Hawaii	CA San Francisco PIS PPQ	1
Nematode	Rhabditidae, species of 'Non-Rep'	N	Unknown	WA Blaine PPQ	1

#### Report Search Criteria

Host Genus:	Colocasia	Host Part:	
Host Species:	esculenta	Origin:	
Date Range:	01/01/2006	thru	01/01/2007



**HB 1663, RELATING TO TARO SECURITY**  
House Committee on Agriculture

March 4, 2009

9:00 a.m.

Room: 312

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The Office of Hawaiian Affairs (OHA) **SUPPORTS** House Bill 1663, which would prohibit any individual from developing, testing, propagating, releasing, importing, planting or growing genetically modified taro in Hawai'i. OHA supports this measure as an important recognition of a plant that has genealogical, spiritual and cultural links with Native Hawaiians and Hawai'i. Furthermore, kalo is integral to the identity of Native Hawaiians and, thus, the State of Hawai'i as a whole.

The traditional mo'olelo of Wākea and Papahānaumoku explains that the first kalo plant, Häloanakalaukapalili, is the elder brother of Native Hawaiians. As the elder sibling, Häloa provides sustenance to Native Hawaiians, and in return, we, the younger sibling, care for him and ensure that he flourishes. The bond that connects Native Hawaiians to kalo remains a sacred one, and our kuleana dictates that we preserve that bond and protect Häloa. A living entity of this eminence cannot be modified or scientifically "improved." He must be honored and left alone.

OHA recognizes that Häloa is facing many challenges today, including diseases, invasive species and a dearth of water and farmable land. However, we believe that there are natural alternatives to genetic engineering - such as fallowing lo'i, restoring stream flows and improving the overall health of the environment - that have yet to be fully explored. We suggest scientists work with kalo farmers and the Native Hawaiian community to conduct a complete and comprehensive examination of these natural methods, which are neither intrusive nor offensive to Häloa or our culture.

OHA respectfully urges the committee to PASS H.B. 1663, and we thank the committee for the opportunity to testify.



# UNIVERSITY OF HAWAII SYSTEM

## Legislative Testimony

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Testimony Presented Before the  
House Committee on Agriculture  
March 4, 2009 at 9:00 a.m.

by  
James R. Gaines  
Vice President for Research, University of Hawaii'i

### HB 1663 RELATING TO TARO SECURITY

The University of Hawaii opposes HB1663 as written and offers amendments.

The University of Hawaii (UH) is sensitive to and mindful of the spiritual and cultural significance of taro in Hawaii. By releasing its patents on non-Hawaiian, disease resistant, traditionally cross-bred, hybrid taro into the public domain and entering into an agreement to consult with the Hawaiian community before conducting any research on genetically engineered Hawaiian taro, the University has demonstrated not only its respect for the cultural significance of Hawaiian taro, but also its desire to expand and enhance its interactions with Hawaiian taro farmers and the native Hawaiian community.

UH is working on many fronts to establish trust with the Hawaiian community, including, among other efforts, its participation on the Taro Task Force. That Task Force, created by the Legislature as Act 211 in 2008, is currently meeting and driving positive dialogue to address the multitude of threats to taro in Hawaii. We believe it would be prudent for this Legislature to examine the outcomes of the Taro Task Force's efforts before supporting any further legislation regarding restrictions on taro research in our state.

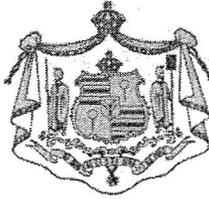
Although the UH is a publically funded university, its research obligations reach around the world. Our expertise in ocean sciences, tropical ecology and Asian & Pacific languages not only make us the most prominent research institution in the state, but one of the most highly respected universities in the Pacific region. We believe that research on Hawaiian taro in Hawaii should only be done at the invitation of the Hawaiian community. We also believe that the research expertise of the UH and the use of the most modern and cutting edge tools of genetic engineering should not be legislated away from solving real problems of real people in developing nations, some of whom are confronted by the loss of their staple taro crops due to the invasion of new diseases, the effects of global warming and the pressures of overpopulation. These challenges and others like them are not cultural issues, but ones of humanity in the global community.

Should this bill be passed out of your committee, the UH proposes that it be amended such that research and development of non-Hawaiian taro varieties can be conducted in Hawaii within certain limits. These limits would allow laboratory and greenhouse development of new, non-Hawaiian, taro varieties, but would prohibit the testing of these varieties in unsecured facilities or release into the environment of Hawaii. Field testing and commercial propagation of successful new varieties would only be done outside of the state.

The UH strongly believes that any legislation should use accurate and scientifically accepted definitions of terms. The definition of "genetic modification" as provided in this bill is scientifically inaccurate and serves only to add confusion to this issue. Furthermore, the term "release" is defined only in terms of genetic engineering. We suggest that the term "genetic engineering" and an appropriate definition replace the term "genetic modification" in this bill as we believe the restriction of genetic engineering in taro is the accurate intent of this legislation.

In closing, UH reiterates that it is not now, nor does it have plans to genetically engineer Hawaiian taro. The university does not want to impose its science on the Hawaiian community, but wishes only to reserve the ability to use the best science available to address imminent agricultural issues in the global community. UH has an agreement in place with the Hawaiian community regarding research on Hawaiian taro and UH has every intention of upholding the terms of that agreement. We look forward to continuing to participate in the Taro Task Force in order to both build trust and keep communication with the Hawaiian taro farmers clear and open. We firmly believe that by working together we can find a mutually respectful middle ground where culture is embraced and honored and where science progresses in a complementary way.

Thank you for the opportunity to testify on this bill.



Association of Hawaiian Civic Clubs  
P. O. Box 1135  
Honolulu, Hawai'i 96807

TESTIMONY OF LEIMOMI KHAN, PRESIDENT  
IN SUPPORT OF TARO FARMERS REGARDING

**HB 1663, RELATING TO TARO SECURITY**

**Committee on Agriculture**

**Hearing date and time: Wednesday, March 4, 2009, 9:00 a.m., Room 312**

Aloha Chairperson Tsuji, Vice Chair Wooley, and Members of the House Committee on Agriculture. Thank you for this opportunity to testify on House Bill 1663, which recognizes the importance of the kalo, or taro, in the heritage of the State and which prohibits the development, testing, propagation, release, importation, planting, or growing of genetically modified taro in the State of Hawaii.

The Association is a growing national confederation of fifty-five Hawaiian Civic Clubs, located throughout the State of Hawai'i and in the States of Alaska, California, Colorado, Illinois, Nevada, Utah, Virginia, Washington State, and Tennessee. It initiates and works to support actions that enhance the civic, economic, educational, health and social welfare of our communities, and in particular, the culture and welfare of the Native Hawaiian community.

The Association supports taro farmers in their efforts to protect and preserve Native Hawaiian traditional cultural practices as it relates to kalo.

This position is supported by several resolutions passed by delegates at annual conventions that express concerns relating to genetic modification of native natural resources.

On November 2, 2002, the Association passed a Resolution which urged the State of Hawai'i to place a moratorium on all bioprospecting expeditions currently being undertaken on public lands, submerged lands, and natural resources under the State's jurisdiction until such time as an appropriate legislation can be enacted.

On November 15, 2003, the Association passed three Resolutions. Resolution 2003-38, expressed concern that multinational corporations were misappropriating Hawaiian natural resources such as Hawaiian healing plants for commercial purposes with no compensation to the State of Hawai'i or to the Hawaiian people;

Resolution 2003-14, urged the University of Hawai'i to cease development of the Hawaiian Genome Project or other patenting or licensing of Native Hawaiian genetic material until such time as the Native Hawaiian people have been consulted and given their full, prior and informed consent to such project; and

Resolution 2003-13 urged the State legislature to enact legislation, in consultation with Native Hawaiians, that recognizes and protects the Native Hawaiian peoples' collective traditional knowledge, cultural expressions, art forms and intellectual property rights, including requiring that all cultural content that has been acquired under free prior informed consent; reserving the right to refuse to participate or authorize use of intellectual property rights; requiring that all cultural content has been reviewed for accuracy and appropriateness; retaining copyright authority over all indigenous knowledge that is shared with others for documentation purposes; insuring controlled access for sensitive cultural information that has not been explicitly authorized for general distribution, as determined by members of the local community; and arranging for benefit sharing agreements.

On October 5, 2005, the Association passed Resolution 2005-23, which resolved that the legislature of the State of Hawai`i and the University of Hawai`i be asked to impose policies to safeguard and protect Hawai`i's public trust resources from genetically engineered and bioprospecting threats, in consultation with Native Hawaiian organizations.

On November 30, 2007, the Association passed Resolution 2007-091, which urged the State of Hawai`i to require labeling of all products containing GMO substances.

Thank you for this opportunity to testify in support of taro farmers in their efforts to protect and preserve Native Hawaiian traditional cultural practices as it relates to kalo.



# Food Company Hawaii

1116 Whitmore Avenue Wahiawa, Hawaii 96786

March 3, 2009

**HB 1663, Taro Security**  
**Hs AGR, Weds, March 4, 2009**  
**9:00 am – Room 312**  
**Position: Oppose**

## **Chair Tsuji and Members of the House Agriculture Committee:**

**My name is Michael Conway. I am the Director of Agriculture for Dole Food Company Hawaii.**

Dole Food Company manages 3,000 acres of pineapple, 155 acres of Waialua Estate Coffee on Oahu's North Shore and 20 acres of the nation's only commercial cacao crop producing world class Waialua Estate Chocolate.

We see the value of genetic engineering research and development when it is done responsibly and under federal regulations. Bans or moratoriums of such research tools should not be legislated. It ties the hands of farmers when other solutions are not possible. Sometimes, conventional or organic methods of pest and disease management simply do not work. Simply put we require genetic engineering as a necessary tool for survival.

I oppose this bill because I believe that genetic engineering research and development, done responsibly and under federal regulations, is something that all farmers should have the option of using. What people forget is that research is a long-term process and costs millions of dollars. When disease destroys a crop, it is too late to begin research to find a solution. Research of this magnitude will not take place unless the end-users and growers want it. If they don't want it and there is no profitable commercial market for such a product, it will not happen.

This bill calls for a ban of genetic engineering research and development on all taro. We do not support that because there are many other varieties that could benefit from the option of using genetic engineering breeding technologies if needed.

Thank you for the opportunity to present testimony. I can be reached at (808) 622-3206



## Hawaii Agriculture Research Center

92-1770 Kunia Road

Kunia, Hawaii 96759

Ph: 808-621-1350/Fax: 808-621-1359

### TESTIMONY BEFORE THE HOUSE COMMITTEE ON AGRICULTURE

#### HOUSE BILL 1663

#### RELATING TO TARO SECURITY

March 4, 2009

Chair Tsuji and Members of the Committee:

My name is Stephanie Whalen. I am the Executive Director of the Hawaii Agriculture Research Center (HARC). I am testifying today on behalf of the center and its research and support staff.

**HARC strongly opposes House Bill 1663, Relating to Taro Security** which proposes a ban on genetically modified taro in the state as unnecessary. The research community has already agreed to limit research in this area with respect to Hawaiian taro **but most significant** is that the process to commercialize an engineered plant requires grower commitment and involvement.

With all due respect to the Hawaiian culture the intent of this measure to include any variety of taro is without basis. If one wants to go back in time, all crops were brought to these islands and came from other islands outside the Hawaiian chain. Making this claim could should then logically be extended to any of the canoe plants including sugarcane. Should we then say that all the currently developed sugarcane varieties are native or any of the other improved food crops that were brought to the islands with the original voyagers.

Research and its purpose and process seems to be getting lost in this emotional philosophical debate. Once again review the R&D process.

#### **Research and Development**

Research does not produce instant results. New technologies are developed for major markets and take decades to be developed if ever for smaller markets. In this technology the process includes determining how to grow a plant in a tissue culture system from plant cells. This process often differs from plant to plant. Other steps are to determine what part of a plant is receptive to gene insertion, to acquire a useful gene and get it into a usable form, to insert the gene, to grow and select cells that acquired the inserted gene, to use the tissue culture system to develop leaves, stalk and roots, to test the selected plants for the presence and functionality of

HB 1663-March 4, 2009

HARC

the gene, to successfully transfer selected plants to potting material, to test the material to determine effectiveness and stability of the inserted gene and finally to safely determine effectiveness and stability under field conditions.

In the early stages to set up a system a researcher practices with different plant parts of several varieties and an easily recognized gene. Like color or fluorescence. The regrowth process can take several months and years can be dedicated to trying to reduce this time lag. Decades have passed in the development of systems for some of Hawaii's crops. Because of the exploratory nature of this part of the process it may be financed through public funds. For the most part research on minor crops is done by the public sector: colleges, universities or non-profit research centers funded by foundations or competitive federal grants.

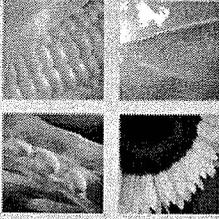
### **Commercialization**

Assume the research community has developed a new plant. Before this plant becomes commercially available industry /farmers have to be willing to go through any intellectual property licensing process if applicable and any applicable regulatory process before a new plant will progress further. This is what is commonly referred to as technology transfer: from the research community to the user community and is applicable to all new products developed not just agriculture. It is not uncommon for products for any economic sector to be dropped at this stage. The reason for this is there needs to be some compelling economic outcome associated with a product to justify its adoption. The present national agricultural grant system focuses on basic research of wide and/or regional applicability and not on the commercialization of individual products. Private sector involvement and resources are required for commercialization.

The point here is that just because there is research on a particular product does not mean that it will end up as a commercial product. This is as true for an agriculture product as well as for any other product in our society. For Hawaii for genetically modified plants, the affected industry sector will have to step up to the plate just like the papaya industry did. If they do not step forward to participate in the later stages of product development, intellectual property right's acquisition and deregulation, there will be no commercial product.

HARC, a non-profit scientific organization, can not support this proposed legislation because the system for product development and commercialization as it already exists addresses the concerns raised, making this proposed legislation unnecessary. In addition the research organizations have already agreed to consult with the Hawaiian community on this subject. Political solutions are not appropriate nor permanent solutions to controversies as has been demonstrated by the national selective ban on stem cell research.

Thank you for this opportunity to provide comments for your consideration.



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# Hawaii Crop Improvement Association

*Growing the Future of Worldwide Agriculture in Hawaii*

Testimony By: Adolph Helm  
HB 1663, Relating to Taro Security  
House AGR Committee  
Wednesday, March 4, 2009  
Room 312, 9:00 am

Position: Strong Opposition

Chair Tsuji, and Members of the House AGR Committee:

My name is Adolph Helm. I am a Molokai resident and Project Manger at Dow Agro-Science, a seed corn research and production company on Molokai. The Hawaii Crop Improvement Association (HCIA) is a nonprofit trade association representing the agricultural seed industry in Hawaii. Now the state's largest agricultural commodity, the seed industry contributes to the economic health and diversity of the islands by providing high quality jobs in rural communities, keeping important agricultural lands in agricultural use, and serving as responsible stewards of Hawaii's natural resources.

As stated in previous years, HCIA member companies do not grow taro nor do we have an interest in taro as a commercial research and development crop. We consistently affirm and respect the cultural meaning of Hawaiian taro. However, this bill goes too far in calling for a ban on research for all varieties of taro, Hawaiian and non-Hawaiian taro.

Further, the world has seen the decimation of taro in Samoa, Puerto Rico, the Dominican Republic, and the Solomon Islands from diseases, pests, and global warming. Ironically, these countries continue to seek the expertise of Hawaii's researchers and see value in the tools of biotechnology to address the many agricultural challenges in their communities.

We stand firmly on the thousands of science-based and peer reviewed studies and 3,400 scientists around the world that attest to the safety of agricultural biotechnology. (The Safety of Agricultural Biotechnology study listing is available upon request) Plant research using this technology is not only safe but has the advantage of being more efficient. It requires significantly less time to produce new cultivars and is more precise than traditional plant breeding. As a result, varieties can be developed which are more productive and better adapted to local needs. It is an option or tool for plant breeding when other methods fail.

Thank you for the opportunity to present testimony.

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## TESTIMONY

### RE: HB 1663 RELATING TO TARO SECURITY

Chair Tsuji and Members of the Committees:

Hawaii Farm Bureau Federation is Hawaii's general agriculture advocacy organization. We represent commercial farmers and ranchers across the State. HFBB is in strong opposition of HB 1663 which prohibits the development, testing, propagation, release, importation, planting, or growing of genetically modified taro in the State of Hawaii. We have a commercial taro industry in Hawaii that deserves to be protected and encouraged to expand.

As we discuss this measure, it is important that there be an understanding of the differentiation between growing taro for cultural reasons and commercial taro production. Commercial taro production – that which puts taro on the table for you and me – respects the cultural significance of taro. It is very important that one understands that you can grow taro commercially while respecting the cultural aspects of taro. This debate is currently focused in an “or” context. As Farm Bureau we would like to see it discussed in the context of “and”.

Commercial farmers and ranchers are in constant search of new technologies to advance the long term sustainability and viability of their operations. Genetic modification of crops is the latest technology that has advanced the development of new varieties providing farmers with a tool to outpace the increasing costs faced by the industry. Contrary to frequent statements, GM crops are among the most tested to be introduced into the fields. They are subjected to experiments and analysis far beyond that for conventional or mutational breeding processes. For us in Hawaii, the results are tangible. Despite rhetoric to the contrary, without GM, the papaya industry would not exist and the pockets of organic papaya would not be possible due to the prevalence of the Ringspot virus.

All of these technologies take time. When one recognizes the urgency to develop the technology because of a problem it will be too late. We urge the committee to consider all of the

ramifications as decision on this measure is made. What is the decision between having a GM taro or having no taro?

Despite statements to the contrary techniques are available to protect the genetic integrity of culturally important varieties and we strongly support the implementation of those practices for cultural plantings in contrast to commercial plantings.

Hawaii Farm Bureau is in support of our commercial taro farmers and respectfully urges that HB1663 be held. Thank you for this opportunity to provide comment on this measure.



**HB1663: RELATING TO TARO SECURITY**

DATE: March 4, 2009  
TIME: 9:00AM  
PLACE: Conference Room 312

TO: Committee on Agriculture  
Representative Clift Tsuji, Chair  
Representative Jessica Wooley, Vice Chair

FROM: Lisa Gibson  
President  
Hawaii Science & Technology Council

**RE: Testimony In Opposition to HB1663**

Aloha Chair, Vice Chair, and Members of the Committee,

The Hawaii Science & Technology Council (HISciTech) stands in opposition to HB1663. HISciTech opposes any legislation that restricts scientific discovery. This bill prohibits the development, testing, propagation, release, importation, planting, and growing of genetically modified taro in the State of Hawaii.

- We value and respect the spiritual and cultural significance of taro to native Hawaiians. However, this bill goes too far in calling for a ban on research of ALL varieties of taro (Hawaiian and non-Hawaiian).
- We have seen the decimation of taro in Samoa, Puerto Rico, the Dominican Republic and the Solomon Islands from diseases, pests, and global warming. These countries continue to seek out the expertise of Hawaii's researchers and see value in the tools of biotechnology to address the many agricultural challenges in their communities.
- HISciTech does not believe legislation is the appropriate process to address concerns having to do with research.

*The Hawaii Science & Technology Council (HISciTech) is a 501(c)6 industry association with a 28-member board. HISciTech serves Hawaii companies engaged in ocean sciences, agricultural biotechnology, astronomy, defense aerospace, biotech/life sciences, information & communication technology, energy, environmental technologies, and creative media.*

Thank you for the opportunity to testify.

Sincerely,

Lisa H. Gibson  
President

## **wooley1-Christopher**

---

**From:** Hilo Coffee Mill [coffee@hilocoffeemill.com]  
**Sent:** Tuesday, March 03, 2009 1:02 PM  
**To:** AGRtestimony  
**Subject:** Testimony

To the Committee on Agriculture

Rep. Clift Tsuji, Chair

Rep. Jessica Wooley, Vice Chair

### **Oppose HB 1663**

This bill prohibits the development, testing, propagation, release, importation, planting, and growing of genetically modified taro in the State of Hawaii (**HB 1663**).

- We value and respect the spiritual and cultural significance of taro to native Hawaiians. However, this bill goes too far in calling for a ban on research of ALL varieties of taro (Hawaiian and non-Hawaiian).
- We have seen the decimation of taro in Samoa, Puerto Rico, the Dominican Republic and the Solomon Islands from diseases, pests, and global warming. These countries continue to seek out the expertise of Hawaii's researchers and see value in the tools of biotechnology to address the many agricultural challenges in their communities.
- Activists have said: "Hopefully this moratorium will lead to not only a BAN on GMO taro, but ALL GMOs in Hawaii and elsewhere." Do not let them use the Hawaiian culture to further their own extreme anti-GMO which is based on ideological and philosophical positions rather than scientific research.

### **Support HB 1226 with amendments**

This is a **compromise** bill that preempts state and county regulatory actions relating to genetically modified plant organisms if those crops are grown with a valid permit from the relevant federal agency - also known as federal preemption (**HB 1226**). The bill does **not** preempt the existing ban enacted on the big island and bans research on genetically engineered taro.

- It is in our state's best interest to ensure that biotech research and development continue here - governed by science-based, consistent regulatory systems that encourage responsible innovation while also ensuring that products on the market are safe for people, animals and the environment.
- HB 1226 reinforces the important role of our federal agencies that utilize scientific evidence and prudent risk assessment to address legitimate public policy concerns and eliminates redundant regulations that hinder the growth and benefits of biotechnology.
- Federal agencies with the appropriate expertise and resources - in collaboration and coordination with our state agencies - can oversee agricultural biotechnology in Hawaii more consistently than at the county level.

- Continued county legislation inappropriately circumvents the federal government's role, creates a patchwork of regulations, and inhibits investment in agricultural biotechnology statewide. They lack the resources and expertise to appropriately regulate the science.
- HB 1226 also respects the rights of farmers to select organic, conventional or biotechnology growing practices, and ensures the academic freedom of researchers to solve some of our world's most pressing food security challenges.
- **Amendment to the bill:** Although the bill offers a compromise to ban research on kalo, research on non-Hawaiian varieties of taro must be allowed to continue to address real human needs.

Aloha,

Jeanette Baysa

**Hilo Coffee Mill**

*Paradise In Your Cup*

PO Box 486

Kurtistown, HI 96760

Phone: 808.968.1333

Fax: 808-968-1733

[www.HiloCoffeeMill.com](http://www.HiloCoffeeMill.com)

Hilo Coffee Mill works diligently to bring East Hawai'i coffee to the forefront of the world market and to add East Hawai'i to the list of 'Best Coffee Growing Regions Worldwide'. For more information or orders, visit [www.hilocoffeemill.com](http://www.hilocoffeemill.com), email [coffee@hilocoffeemill.com](mailto:coffee@hilocoffeemill.com), or call (808) 968-1333, or toll-free (866) 982-5551.

**wooley1-Christopher**

---

**From:** bryna@kahea.org on behalf of Kahu Haloa [nakahuohaloa@gmail.com]  
**Sent:** Tuesday, March 03, 2009 11:00 AM  
**To:** AGRtestimony  
**Subject:** HB1663- Public Testimony in SUPPORT  
**Attachments:** Catholic Healthcare West GMO Press Release 1.09.pdf; Health Risks of Genetically Modified Foods, KAMAKAU Testimony 2009.pdf; Soil Association- GMO American Consumer Report 10.08.pdf

TESTIMONY for House Committee on Agriculture  
HEARING ON HB1663, FRIDAY, March 4, 2009, 9:00am, Rm. 312

Aloha mai kakou- Members of the House Committee on Agriculture,

Included in this letter I respectfully submit 6 volumes of testimony collected over the past month, representing over 1,000 individual letters from across Hawaii nei and abroad, all in support of a ban on all GMO-taro. I also submit 7 published articles to substantiate the statements made below.

I ask you to please consider these important points:

**Please do not amend the bill to only protect Hawaiian taros.**

Taro is a very resilient plant that can grow, spread, flower, seed and get all mixed up in the taro patch, in the wild, and even in the lab. Even a tiny left over piece of root can grow into a full size plant. ALL GMO-taro in Hawaii would put farmers and consumers at risk of contamination as it would be inherently uncontrollable. Chinese taro, or Bun Long, is a very popularly consumed taro that is prized for lu'au leaf and taro chips, and is grown on most if not all taro farms in Hawaii. Cross-contamination of natural Bun Long by the look-alike GMO-taro of this highly consumed and farmed variety of taro, raises enormous liability concerns for farmers and producers of taro-products.

**The broader public's concerns about GMO-taro are in fact, real**

Numerous scientific studies point to very serious health and allergy problems with GMOs, and lack of proper scientific protocols or tests of released GMOs. The biosafety dangers are real and present in this GMO experimentation and the cultural implications are already inflicting true pain in our community. There is simply no proof nor potential that such technology will be truly beneficial to consumers and to taro farming. Beyond just a business investment this issue is paramount to our community livelihood and environmental health, and for that we continue to advocate for democratic representation in the legislature, and notification and informed consent about these biosafety issues in our communities.

SEE ATTACHED:

- "Catholic Healthcare West GMO Press Release 1.09"
- "Health Risks of Genetically Modified Foods, KAMAKAU Testimony 2009"

**The few taro businesses and poi companies that are opposing this ban are unwisely doing so against the grain of their own customer base.**

Poi consumers take the safety and quality of poi very seriously! Poi consumers are also overwhelmingly local families with strong cultural ties to taro.

Allowing GMO-taro also severely threatens our ability to expand the value-added market for organic and uniquely hypo-allergenic taro products, as GMO-taro could never be guaranteed to be

allergy-free and could cause allergic reactions. GMO-taro can never be certified organic. This is why GMO-taro contamination and related allergy concerns cause such great alarm to other taro businesses, as well as consumers.

SEE ATTACHED:

- "Soil Association- GMOs- American Consumer Report 10.08"

**There are now well over 8,000 individuals and local organizations that have been supporting the intention of this legislation since 2007.**

Community support for this initiative only continues to grow, uniting consumers and farmers.

SEE ATTACHED:

- 6 volumes of testimony collected over the past month, representing over 1,000 individual letters from across Hawaii nei and abroad, all in support of a ban on all GMO-taro.

- Public testimony in support from 2008 can be found online at:

<http://www.capitol.hawaii.gov/session2008/lists/getstatus.asp?query=SB958&showtestimony=on&currpage=1>

**There are ways to apply ethical science without making a new hybrid plant or genetically mutating a new organism.**

The state recognized the importance of addressing these issues and projects by establishing the Taro Purity and Security Task Force in 2008.

Farmers and scientists must exercise due diligence in researching and developing all other options before resorting to such an extreme as creating a new organism. For example, eradication of the apple snail (another business venture gone wrong) would increase taro production by at least 25%. Assisting industrial farmers in transitioning to multi-cropping and organic fallowing techniques would also drastically increase yields. Establishing the scientific basis to explain the high yields of taro in Hawaii before industrialized farming, such as potential of kukui tree composting for fungus control.

**There exist many safe methods of advancing taro farming- without GMOs.**

Following the taro blight that wiped out Samoan taro production in the early 1990s, in-depth studies found that such blights can be prevented by multi-cropping of taro varieties and improved farming techniques such as fallowing, wider row spacing, more careful huli selection, etc. In addition, organic methods produce remarkable increases in yields and nutritional value per acre, reflecting a true abundance of efficiency, biodiversity and advancement of soil science-- especially compared to the declines often experienced in industrialized mono-cropped fields that are treated with chemicals and are not fallowed.

SEE ATTACHED:

- "Taro Industry Back on its Feet- Samoa Observer 12.08"

- "Bibliography of Taro Leaf Blight"

- "TaroGen Publications"

**There are other technologically advanced ways to create new taro plants without putting public safety at risk.**

For example, one cutting edge technology is called Marker Assisted Selection, which speeds up the plant breeding process- "MAS makes it possible to select traits with greater accuracy and to develop a new variety quicker than in the past." SEE ATTACHED ARTICLE: - "FAO study on Marker-Assisted Selection 7.07"

In this GMO debate it is certainly crucial to recognize that there do exist safer and more advanced emergency options for plant breeding. *However*, it is just as crucial to heed local taro industry concerns about introducing new varieties into Hawaii. Taro farmers across Hawaii do not

now find this MAS technology necessary as there exists in Hawaii already a vast wealth of genetically diverse taro varieties. The introduction of new hybrids is not only unnecessary and costly but also a threat to the preservation and propagation of the existing native taro biodiversity. Additionally, due to taste and texture complaints recently introduced hybrid taros have already been rejected for poi production by local poi mills-- at great cost to the farmers who had been convinced by researchers to plant those new hybrids and who then had to replant their farms with the traditional Hawaiian taros.

The FAO article explains also that the MAS hybrid technology should only be used "*where there is a clear advantage over traditional selection techniques.*" In this case, the value of the technology is superficial and short term compared to the many unique and invaluable native heritage taros of Hawaii- the fortified and proven results of 1,200 years of traditional selection techniques- fine tuned to the many climates and conditions in Hawaii and to poi production. It with this native biodiversity and improved farming techniques that we can protect our farms from blights.

***Please, Representatives, if you aren't absolutely and proof positive that GMO-taro is better for Hawaii than natural taro and safely advanced farming techniques then please don't allow this to continue, please support HB1663 without any amendments. If you have substantial and scientific proof that GMO-taro will provide a safe and secure benefit to Hawaii please make it publicly available.***

**It is easy to grow an experiment, but impossible to control.  
There is no liability held, but our EVERYTHING is at stake.**

Thank you for considering all this testimony, it comes from the heart and soul of Hawaii.

Me ka mahalo piha,  
Bryna Rose Storch

contact- 349-4324

Na Kahu O Haloa  
KAHEA: The Hawaiian-Environmental Alliance

## **Catholic Healthcare West Presses Suppliers to Prohibit Animal Cloning and Genetically Engineered Foods**

Marketwire News Releases

Published: 01/06/09 01:13 PM EST



### **Leading Catholic Hospital System Takes Action for Sustainable Food Production**

SAN FRANCISCO, CA -- (Marketwire) -- 01/06/09 -- Catholic Healthcare West (CHW) announced today that its food purchasing dollars will be focused on promoting sustainable food production practices, in part by seeking alternatives to foods produced with genetically engineered sugar, as well as meat and dairy produced with animal clones. The CHW position was developed in recognition of the serious health and environmental concerns these technologies raise and the threat they pose to healthier and more sustainable food production options. Among the concerns CHW is raising about genetically engineered and cloned foods are genetic contamination, increased pesticide use, animal cruelty, and the deep ethical and moral issues associated with these untested new technologies.

CHW recently asked eight of its largest food suppliers for their policies on genetically engineered sugar beets, which are being planted for commercial use for the first time this year. Results from the survey found that its suppliers would prefer non-genetically engineered sugar beets. Only Diamond Crystal indicated their intent to avoid buying genetically engineered sugar and that they will seek out suppliers that do not use genetically engineered foods through a validation process. CHW intends next to survey its meat and dairy suppliers on their potential use of animal cloning since the U.S. FDA recently decided to allow marketing of food from animal clones.

"We are working with our purchasing organization, Premier, and developing relationships with allied healthcare partners in looking for food companies that will provide us with meat and dairy products that are not from animal cloning, and foods that are made without genetically engineered sugar beets," stated Pat Burdullis, CHW's administrator of non-clinical supply chain contracts. "If these same food companies can provide foods that are natural and non-genetically engineered for their European customers, we believe they should provide us with the same level of service."

Genetic engineering and animal cloning are controversial in food production, since the technologies have not been subject to long-term safety testing and could create irreversible environmental damage. Genetically engineered crops can contaminate natural foods and have promoted the use of herbicides that may be harmful to human health and natural systems. Scientists say that animal clones are often abnormal and suffer from a host of often painful defects. A New England Journal of Medicine article stated that, "[It] may be exceedingly difficult, if not impossible, to generate healthy cloned animals."

"Genetic engineering and animal cloning are in direct conflict with our sustainable food service vision and corporate sustainability goals," stated Sr. Mary Ellen Leciejewski, CHW's ecology program coordinator. "We have numerous unanswered concerns about the imminent introduction of genetically engineered sugar beets and marketing of food from animal clones. Previous genetically engineered crops have increased pesticide use, and animal cloning is a cruel and unnecessary technology in meat and dairy production. Our aim is to promote alternative approaches that produce foods that are safer and healthier for our patients, staff, and visitors and that can sustain the farmers and food producers in our communities."

CHW has successfully advocated with its suppliers for safer, more environmentally friendly products, most recently with regard to its PVC/DEHP-free IV products now being provided by B.Braun.

With respect to food production, CHW is advocating for public policies that meet the following safeguards:

- Before marketing, genetically engineered food or food from animal cloning must be fully evaluated through independent, peer-review for any effects on animal welfare, human health, and the environment.
- Foods with genetically engineered ingredients and foods from animal cloning (including foods from the offspring of clones) must be labeled as such.
- Genetically engineered seeds and plants are rigidly separated from other seeds and plants so that natural foods (those produced by non-genetically modified techniques) are protected from contamination; cloned animals and their offspring must be rigorously tracked throughout the food chain.
- Genetic engineering patent holders are held legally liable for contamination of non-genetically engineered crops and growers are protected when their crops are contaminated by genetically engineered crops.

#### About Catholic Healthcare West

Catholic Healthcare West (CHW), headquartered in San Francisco, CA, is a system of 41 hospitals and medical centers in California, Arizona and Nevada. Founded in 1986, it is one of the nation's largest not-for-profit healthcare systems and the largest Catholic healthcare system based in the Western United States. CHW is committed to delivering compassionate, high-quality, affordable health care services with special attention to the poor and underserved. The CHW network of nearly 10,000 physicians and approximately 53,000 employees provides health care services to more than five million people annually. In 2008, CHW provided \$967 million in charity care and unsponsored community benefit. For more information, please visit our website at [www.chwHEALTH.org](http://www.chwHEALTH.org).

Contact:  
Tricia Griffin  
(415) 438-5524

# Ke Kula 'o Samuel M. Kamakau, LPCS

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*E mālama 'ia ana ka mauli ola o kākou mai kēlā hanauna a i kēia hanauna.  
Our spirit of being is nurtured from generation to generation.*

Testimony in SUPPORT of HB1663, and in OPPOSITION TO HB1226

March 4, 2009

Aloha kakou elected lawmakers,

Ke Kula O Samuel Manaiakalani Kamakau is a Hawaiian immersion charter school located in Kane'ōhe Hawai'i. Our school focuses on educating our future leaders and community members with an emphasis on some key principles and Hawaiian values including: Malama 'Aina, Stewardship of the Land, Malama Kino, Health and Wellness. 'Ai Pono, Healthy Diet.

We the 'Uo Mamo, or Board of Directors comprised of representatives consisting of school faculty including school director, teachers, support staff, parents, students and community members of Ke Kula O S.M. Kamakau firmly request that you, the lawmakers elected to represent us, **support legislation imposing a ban on Genetically Modified and Genetically Engineered taro of ALL varieties of taro (colocasia esculenta) in Hawaii, and oppose any legislation preempting genetic modification at any level in Hawai'i.**

Our request is validated on several levels.

1. Genetically engineered taro has not been proven safe for our environment and cross contamination will pose unnecessary risks to our 'aina as well as to our native varieties of taro.
2. Genetically modified and engineered products have not been proven safe for human consumption and also poses a threat to the well known hypoallergenic properties of taro (see reference attached).
3. Genetic engineering of kalo or taro is disrespectful to Hawaiian values and beliefs.

As an educational organization that utilizes taro farming, preparation and consumption as key components of our curriculum, our concerns are great regarding this issue. As an educational program that has hopes to restore one of the largest know lo'i or wetland taro patches in the area of Ha'iku, our recognition as taro farmers and exponential amounts of future taro farmers are undeniable. The purity and integrity of taro is extremely valuable if not vital to the future of many of our lessons to be taught.

We SUPPORT legislation as indicated in HB1663 banning genetic modification of ALL taro varieties in Hawai'i, and OPPOSE legislation as indicated in HB1226 gmo preemption bill, for the same reasons listed above.

Mahalo Piha,  
Ke Kula O Samuel Manaiakalani Kamakau  
'Uo Mamo

*SEE ATTACHED REFERENCE*

Dona, A. and I.S. Arvanitoyannis. 2009. Health Risks of Genetically Modified Foods. Critical Reviews in Food Science and Nutrition. 49:2,164-175

**Health Risks of Genetically Modified Foods**  
**Dona, A. and I.S. Arvanitoyannis. 2009.**  
***Critical Reviews in Food Science and Nutrition.***  
**49:2,164-175**

Overview  
Need for testing  
Effects on animal growth  
Effect on gastrointestinal tract  
Effects on the liver  
Effect on pancreas  
Effect on the blood  
Effects on the immune system  
Effect on biochemical parameters  
Mortality  
Developmental effect on fetus, babies  
Pleiotropic and insertional effects (when genes influences multiple traits, thus one mutation such as from gmos can affect all traits)  
Gmo growth hormone in milk, effect on host animal  
Gmo growth hormone in milk, IGF effect on human health  
Pigs expressing human growth hormone  
GM pigs  
On antinutrients  
On potential transfer to the gut  
Allergic responses  
Bt expressed in many crops, farm workers exposed to

## **OVERVIEW**

First, the authors challenge the concept of "substantial equivalence," which was used as a justification by the FDA to deregulate several key GM crops: "Substantial equivalence" may provide some theoretical points background in predicting toxicity, but in practice the only reliable way to evaluate the toxicity of a GM food is through toxicity tests on animals.

Furthermore, it has been argued that GM foods should be subjected to the same testing and approval procedures as medicines (i.e., clinical trials) since they must be adequate to ensure that any possibility of an adverse effect on human health from a GM food can be detected. "On the premise that GM crops are safe because no evidence exists to the contrary this article indicates that: "In the absence of adequate safety studies, the lack of evidence that GM food is unsafe cannot be interpreted as proof that it is safe."

Also: "The results of most of the rather few studies conducted with GM foods indicate that they may cause hepatic, pancreatic, renal, and reproductive effects and may alter hematological, biochemical, and immunologic parameters the significance of which remains unknown. The above results indicate that many GM food have some common toxic effects. Therefore, further studies should be conducted in order to elucidate the mechanism dominating this action."

Also: "Small amounts of ingested DNA may not be broken down under digestive processes and there is a possibility that this DNA may either enter the bloodstream or be excreted, especially in individuals with abnormal digestion as a result of chronic gastrointestinal disease or with immunodeficiency"

### **Need for testing**

“The toxicity tests should comply with the guidelines for toxicity testing of drugs. It should be emphasized that since these GM foods are going to be consumed by every human being they should be tested even more thoroughly than drugs and more experiments are required in order to study the possible toxicity and make any conclusions.”

Also: “postmarketing surveillance should be part of the overall safety strategy for allergies, especially of high-risk groups such as infants and individuals in “atopic” families”

### **Effects on animal growth**

Body weight might be significantly altered as it has been shown with the consumption of Mon863 corn (Seralini et al., 2007) and GM rice on rats (Li et al., 2004).

### **Effect on gastrointestinal tract**

Stomach erosion and necrosis were reported in rats fed with flavr-savr GM tomatoes, while GM potatoes expressing *Galanthus nivalis* (GNA) lectin induced proliferative growth in their stomach which is of particular importance if one takes into consideration that glomerular stomach erosions can lead to life-threatening hemorrhage, especially in the elderly and patients on nonsteroidal anti-inflammatory agents (Pusztai et al., 2003).

Intestines may also be affected by GM food consumption as it has already been shown with GM potatoes expressing Bt toxin which caused the disruption, multinucleation, swelling, and increased degradation of ileal surface cells in rats (Fares and El-Sayed, 1998), GM potatoes expressing gna which induced proliferative growth in the small-large intestines (Ewen and Pusztai, 1999a) and GM soybean type Roundup Ready R which caused moderate inflammation in the distal intestine of salmon (Bakke-McKellep et al. 2007). “Also: “Binding to surface carbohydrates of the mouse jejunum was also revealed with CryIAc protoxin of the Cry genes, the most common terminators applied in currently approved crops (Vazquez-Padron et al., 2000).

According to Pusztai et al. (2003) since it is the genetic manipulation process itself which led to toxicity, similar hazards might be seen in animals or humans fed genetically-manipulated soya, canola, and corn over a long period of time (i.e., years or decades). The chronic inflammation and proliferative effect that may be caused by some GM plants on the gastrointestinal tract may lead after years to cancer.

### **Effects on the liver**

As for the effects of GM food on liver there are only a few long-term studies. It has been found that GM soya can alter the cell structure and functioning of the liver in mice reversibly (Malatesta et al., 2002; 2003; 2005) and can cause changes in histomorphology (Ostaszewska et al., 2005) and the protein profile of the liver in rainbow trout (Martin et al., 2003).

Alterations have also been observed in hepatic enzymes after consumption of raw rice expressing GNA lectin (Poulsen et al., 2007), GM Bt with vegetative insecticidal protein gene (Peng et al., 2007) and in DuPont’s subchronic feeding study in rats fed diets containing GM corn 1507 (MacKenzie et al., 2007). These alterations in hepatocyte cells and enzymes may be indicative of hepatocellular damage. Consumption of Mon863 corn in rats led to increase in triglycerides in females (Seralini et al., 2007).

### **Effect on pancreas**

GM soybean has also an impact on pancreas, since changes occurred in pancreatic acinar cells

of mice and a high synthetic rate of zymogen granules containing low amounts of  $\alpha$ -amylase (Malatesta et al., 2003). "Effect on kidneys" Another target organ of some GM crops is the kidney. Smaller kidneys were developed in DuPont's study in rats fed diets containing GM corn 1507 (MacKenzie et al., 2007), whereas consumption of Mon863 corn in rats led to lower urine phosphorus and sodium excretion in male rats. There were also small increases in focal inflammation and tubular degenerative changes characteristic of a classic chronic progressive nephropathy (Seralini et al., 2007). Rats fed GNA rice had elevated creatinine plasma concentration either due to some kind of renal effect or the increased water consumption in order to excrete the excess iron in the GNA rice diet (Poulsen et al., 2007).

Salmons fed GM soybean had higher head kidney lysozyme and higher acid phosphatase activities (Bakke-McKellep et al., 2007).

### **Effect on the blood**

Response variables were observed in animals fed with GM crops. DuPont's study in rats fed diets containing GM corn 1507 showed a decrease in red blood cell count and hematocrit of females (MacKenzie et al., 2007) while GM corn Mon863 affected the development of blood with fewer immature red blood cells (reticulocytes) and changes in blood chemistry in rats (Seralini et al., 2007). Bt with VIP insecticidal protein gene caused a decrease in platelets, monocytes ratio in female rats, and an increase in the granulocytes ratio in male rats (Peng et al., 2007).

### **Effects on the immune system**

As for the effects of GM crops on the immune system an increase in the production of Cry9C-specific IgG and IgG1 in rats and mice fed with GM heat-treated corn CBH351 was observed (Teshima et al., 2002) because the Cry gene possesses immunogenic properties as it was shown by Vazquez-Padron et al. (1999). Serum IgG mediates the inhibition of serum-facilitated allergen presentation. The presence of enhanced IgG Abs activates the IgG response (van Neerven et al., 1999) thereby indicating the occurrence of an allergic reaction having occurred, although Germolec et al. (2003) suggest that antigen specific IgG does not correlate to clinical allergy. Moreover, GM corn Mon863 caused higher white blood cell levels in male rats (Seralini et al., 2007). DuPont's sub chronic feeding study in rats fed diets containing GM corn 1507 showed that eosinophils concentration in females was decreased (MacKenzie et al., 2007).

Rats given a diet based on GNA rice showed enlargement of the lymph nodes, and decreased weight of the mesenteric and of the female adrenal lymph nodes which may be indicative of an immune toxic response (Poulsen et al., 2007).

### **Effect on biochemical parameters**

Subchronic feeding of GNA rice in rats resulted in decrease in glucose, while cholesterol, triglyceride, and HDLD concentration were higher (Poulsen et al., 2007).

### **Mortality**

An increased mortality was observed in rats fed with GM tomatoes since seven out of forty rats died within two weeks without any explanation (Pusztai et al., 2003).

### **Developmental effect on fetus, babies**

Food-ingested M13 DNA fed to pregnant mice, was detected in various organs of fetuses and newborn animals, suggesting a possible transfer through the transplacental route (Doerfler and Schubbert, 1998). Maternally ingested foreign DNA could be a potential mutagen for the developing fetus. Birthrates of piglets fed GM corn in Iowa country displayed an 80% fall due to high levels of Fusarium mold (Strieber, 2002), although it has been claimed that Bt corn expressing Cry proteins is

less contaminated with mycotoxins (Weil, 2005). A Russian rat study reported very high death rates in the young of rats fed GM soya (56% died) in stunted growth in the surviving progeny (Ermakova, 2005). A study of GM rice expressing Xa21 on the development of rat embryos showed that there was an increase in the body weight gain of pregnant rats, the body weight, body length, and tail length of fetal rats (Li et al., 2004) whereas GM rice expressing cowpea trypsin inhibitor caused an increase in the male rats' body length and in the female rats' red blood cell number, hemoglobin, and monocyte number (Zhuo et al., 2004)."

**Pleiotropic and insertional effects (when genes influences multiple traits, thus one mutation such as from gmos can affect all traits):**

"Concern has been expressed about the above potential effects which might cause the silencing of genes, changes in their level of expression or, potentially, the turning on of existing genes that were not previously being expressed (Conner and Jacobs, 1999). This interaction with the activity of the existing genes and biochemical pathways of plants, may lead to disruption of metabolism in unpredictable ways and to the development of new toxic compounds or an increase of the already existing ones as it happened with two genetically produced foods, tryptophan and g-linolenic acid (Hill et al., 1993; Sayanova et al., 1997).

Moreover, research into epigenetics has also revealed that genes account for only a part of the control of the biochemistry of organisms, and organisms have a level of control above genes that interact with genes explaining why genetic engineering is so unpredictable, with different results produced by each attempt and why the products are often unstable. The possibility that an unidentified compound may be present in the GM food makes crucial that each transgenic food as whole food and not as a single protein should be tested directly for toxicity in animals, although as Kuiper et al. (2004) state there are limitations in establishing dose-response relationships."

**Gmo growth hormone in milk, effect on host animal**

The use of rbGH in dairy cattle in order to increase milk yield has caused large controversy. Problems occurring such as an increase in mastitis may pose a risk to human health since the increased antibiotic use leads to antibiotic residues in milk (Epstein, 1996). Adverse effects in cows have been observed including lameness, mastitis, subclinical ketosis, an increase in embryonic loss and abortion, a decrease in final pregnancy rates, as well as a decrease in birth rate (Dohoo et al., 2003). It should be noted that lameness has also been reported in studies with transgenic pigs genetically engineered to carry human and bovine growth hormone genes (Pursel et al., 1989).

**Gmo growth hormone in milk, IGF effect on human health**

The consumption of milk from cows injected rbGH leads to an increase in IGF-I in humans, since IGF-1 survives digestion (Xian et al., 1995). The oral free IGF-1 feeding studies in rats sponsored by Monsanto and Elanco looked at by the Joint Expert Committee on Food Additives (JECFA) in 1992 had ambiguous results since neither used IGF-1 associated with its binding proteins, which are resistant to acidic conditions and may enable IGF-1 to survive digestion in the stomach. Moreover, IGF-1 is protected from digestion by the major milk protein casein (Hansen et al., 1997) and the milks buffering effect (Xian et al. 1995). Moreover, Monsanto's 90-day rat study which had previously shown that rbGH "is not orally active in rats" was re-examined and it was found that rbGH elicited a primary antigenic response meaning that rbGH was absorbed intact from the gut (Eppard et al., 1997). The full significance of human exposure to rbGH and IGF-1 is unknown, particularly in the neonate, the subpopulation at greatest risk (Morris, 1999). According to Chan (1998), at least some of the absorbed IGF-I can effectively stimulate the proliferation of cancer cells. The increased levels of IGF-I in humans predict increased rates in colon, breast, and prostate cancer, since they stimulate the indolent

slowly growing tumor cells that appear in an aging individual resulting in clinical cancer necessarily old. On the other hand, FDA states that this potential does not exist since any increase of IGF-I in milk is much lower than the physiological amount produced in the organism. These concerns about the consumption of milk from cows injected rbGH may be carried also to other animals such as pigs expressing human GH, pigs injected recombinant porcine somatotropin (rpST), and GH transgenic salmon.

### **Pigs expressing human growth hormone**

Transgenic pigs expressing human GH showed dramatic effects in growth rates, feed conversion, and body composition, but exhibited serious side effects that were attributable to the high level of GH expression (Pursel et al., 1989). Repeated injections of rpST can also produce altered lipid composition similar to that of the GH transgenic pigs (Solomon et al., 1997). Growth hormone on fish However, when the fish growth hormone (GM) gene is introduced in salmon may GH circulation may elevate by 40-fold, leading to enlarged skulls and impair feeding and respiration (Dunham and Devlin, 1999). Experiments should be conducted in animals being fed GH transgenic salmon and other fish in order to examine whether the consumption of GH transgenic fish expressing high levels of GH will increase the levels of IGFI and lead to the same health risks as rbGH milk. It should be emphasized that as in milk there is a possibility that the presence of other proteins in the fish tissue may protect IGF- 1 from digestion, which remains to be demonstrated in animal studies.

### **GM pigs**

The experiment of Saeki et al. (2004) with pigs containing spinach desaturase gene which converts saturated fat into the unsaturated fat linoleic acid resulted in a high degree of mortality in founders and the F1 generation. Increased mortality might have been due to a random integration process where the transgene can insert in and damage any active gene locus (insertional mutagenesis) or to the significant alteration in the embryonic lipid profile caused by the transgene. The porcine embryo is unique in its high intracellular lipid content, which is associated with its sensitivity against freezing or in vitro production (Niemann and Rath, 2001). We strongly believe that the same toxicity could occur if the pregnant pigs were fed only the new source of glinolenic acid obtained from transgenic canola or of any future modified crop, since it alters the percentage of 18:2n-6 in liver (Palombo et al., 2000). We should be aware that any change in the lipidprofile of liver can also result in changes in metabolism with unexpected consequences.

### **On antinutrients**

“The insertion of a new gene can sometimes lead to increase in existing levels of anti-nutrients, some of which cannot be reduced with heat treatment (Bakke-McKellep et al., 2007). One of the most widely available commercial GM products nowadays glyphosate-resistant Roundup Ready\_R soybean may display an increase in anti-nutrients (Padgett et al., 1996). Heat-stable anti-nutrients such as phytoestrogens, glucinins, and phytic acid were also found to cause infertility problems in sheep and cattle (Liener, 1994), allergenic reactions and binding to phosphorus and zinc thereby making them unavailable to the animal respectively (Adams, 1995). An increase in the anti-nutrient level should not be accepted since a GM food may be consumed as raw material.”

### **On potential transfer to the gut**

“short DNA fragments of GM plants have been detected in white blood cells and in milk of cows and in chicken and mice tissues that had been fed GM corn and soybean, respectively (Beever and Kemp, 2000; Einspainer et al., 2001; Hohlweg and Doerfler, 2001; Phipps and Beever, 2001). Furthermore, fragments of recombinant cry1Ab gene were detected in the gastrointestinal tract of

*Bacillus thuringiensis* (Bt)11 corn-fed pigs but not in the blood (Chowdhury et al., 2003). Therefore, it seems plausible that small amounts of ingested DNA are not broken down under physiological digestive processes. The fact that fragments of transgenic genes may not be detected in blood but can be detected in tissues of animals by PCR, underlies that they are in quite low levels in circulation and more sensitive methods of detection are needed (Puztai 2001).

Moreover, Murray and his coworkers (2007) showed that not all PCR assays can detect DNA in extractions of shortly cooked corn, making the interpretation of the results from PCR even more difficult. These limitations in the detection of GM DNA should make us reconsider the view that gene transfer cannot occur, which falls in agreement with the findings of Netherwood et al. (2004) that transgene from GM soya survived passage through the small bowel in human ileostomists. According to Flachowsky (2005) the uptake of GM DNA into cells of the gastrointestinal tract will normally have no biological consequences because the DNA will be degraded in the cell. The question is whether it can be degraded in patients with severe gastrointestinal diseases. In the unlikely event that the DNA is recombined into a host chromosome, the probability that it will exert any biological effect on that cell remains unknown.”

### **Allergic responses**

“The introduction of novel proteins into foods such as a GM soybean variety expressing methionine from Brazil nut (Nordlee et al., 1996) and GE corn variety modified to produce a Bt endotoxin, Cry9C (Bernstein et al., 2003) may elicit potentially harmful immunological responses, including allergic hypersensitivity (Conner et al., 2003; Taylor and Hefle, 2002).

Moreover, according to Prescott et al. (2005) the introduction of a gene expressing nonallergenic protein such as GM field pea, expressing alpha-amylase inhibitor-1, may not always result in a product without allergenicity. This study underlines the need to evaluate new GM crops on a case-to-case basis and to improve the screening requirements for GM plants. Brassica juncea, another GM plant, expressing choline oxidase gene caused low IgE response in mice and a cross-reactive epitope search showed a stretch similar to Hev b 6 having some antigenic properties although according to Singh et al. (2006) it had no allergenicity. These findings should be more carefully interpreted and repeated in other animal series in order to elucidate whether IgE response may play a role in toxicity.

### **As for Bt expressed in many crops, farm workers exposed to**

Bt pesticide may develop skin sensitization and IgG antibodies to the Bt spore extraction (Bernstein et al., 2003).”Effects on animal growthBody weight might be significantly altered as it has been shown with the consumption of Mon863 corn (Seralini et al., 2007) and GM rice on rats (Li et al., 2004).

Dona, A. and I.S. Arvanitoyannis. 2009. Health Risks of Genetically Modified Foods. *Critical Reviews in Food Science and Nutrition*. 49:2,164-175

# Land of the GM-Free?

How the American public are starting to turn against GM food



# Land of the GM-Free?

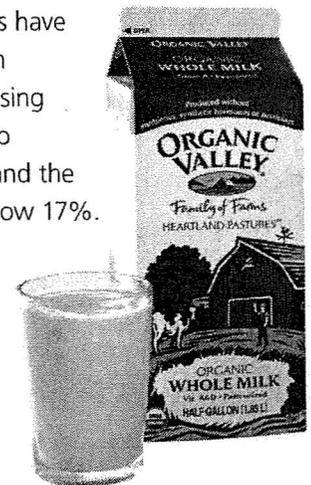
## Executive summary

Despite the fact that 87 per cent of Americans believe that their food should carry a label telling them whether Genetically Modified (GM) products have been used in it or not, almost none do. As a result GM food has been sold widely and for many years in the USA – without consumers being aware of what they are buying. The powerful pro-GM lobby in the USA has used this as evidence that the public accept, or are at least neutral, on the issue of GM food. But given a choice, over 50 per cent of Americans say they would not eat GM.

The GM industry has managed to keep US consumers in the dark about the food they are eating for more than a decade, through lobbying the US Food and Drug Administration (FDA) and state governments to ensure that foods do not legally have to be labelled as GM. But some major new developments in the US market suggest that the tide may finally be turning against the GM lobby. This briefing is not intended to be comprehensive, but it highlights some significant developments that are being ignored in the current UK debate about GM.

In 1994 Monsanto produced a genetically engineered bovine growth hormone (rBGH) that is injected into dairy cows to increase the yield of milk. This GM hormone has faced criticism internationally since its launch on the grounds of both human health risks and animal welfare concerns. While the EU and Canada rejected it, it was deemed safe by the US Food and Drug Administration and the World Trade Organisation (WTO), and has been used widely in the US dairy industry, without any labelling of the milk as 'GM-produced'. Monsanto worked very hard to ensure that consumers have no way to make a choice – getting some US states to ban dairies from selling their milk with 'no artificial growth hormone' labels. But increasing consumer awareness of rBGH in the US has caused sales of the milk to plummet. Between 2002 and 2007 use of the hormone fell by 23% and the proportion of US cows being injected with rBGH fell from 25% to below 17%.

Understanding their customers wishes, many major retailers, processors and producers have recently moved to ban rBGH from their products, with Walmart, Safeway, Starbucks, Kraft and many more ensuring that their customers can buy GMO free dairy products for themselves and their families. Opposition to the use of this hormone has grown so much that Monsanto announced last

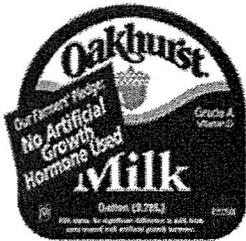


normal level. This substance is identical in both cattle and humans, and increased levels of IGF-1 in humans have been linked to cancer of the prostate, breast and colon. Indeed, an inquiry by the UK Veterinary Products Committee in 1999 stated that the likely increase of IGF-1 in the gut lumen following consumption of rBGH treated milk raised concerns about enhanced cell proliferation of the gut mucosa and therefore increased risk of cancer of the colon.

## Regulation

The drug was approved for full distribution in the United States in 1993 by the US Food and Drug Administration (FDA), on the basis of one 90 day study on 30 rats that had been carried out by Monsanto.

Regulators in the EU and Canada were not convinced. Health Canada (the Canadian equivalent of the US FDA) stated that the results of Monsanto's rat trial showed cause for concern, and, following a detailed safety review, made the decision to ban the use of rBGH on the basis of unacceptable risks to animal health. EU regulators also refused approval for the drug, and launched an in-depth scientific study on the risks of using artificial hormones in farm animals. Their research led to a ban on rBGH use in the EU in 1989, made permanent in 2000, and the additional decision to ban imports of hormone-treated beef, which effectively blocked the majority of imports of beef from North America. In 1996 the USA complained to the World Trade Organisation, which eventually ruled in its favour, stating that the EU had not provided enough significant proof of danger. In contrast to its position on GM crops, the EU stated that it was the product's safety that should be conclusively proven, not its risks. The EU stood firm on its health concerns, and rather than allow synthetic hormones into the European food supply, it endured US trade sanctions amounting to 116.8 million USD per year on such items as Roquefort cheese and Dijon mustard. These sanctions are still in effect today.



FDA states:  
No significant difference  
in milk from cows  
treated with artificial  
growth hormone.

Currently, rBGH is not approved for use in Japan, New Zealand, Australia, Canada or the European Union.

## Use in US – widespread and unlabelled but not without controversy

Despite the international controversy, Monsanto's GM hormone was launched in 1994 in the US, and by 2002, around a quarter of cows in the country were being treated with rBGH.

The FDA stated that since the recombinant, or genetically engineered form of BGH looks virtually identical to a cow's natural somatotropin, there is no significant difference between milk from treated and untreated cows. The FDA also concluded that it did not have the authority to require special labelling for milk and dairy products from rBGH-treated cows. While permitting dairies to label milk as 'from cows not treated with rBGH/artificial growth hormone', they stated that producers have no basis for claiming that milk from cows not treated with rBGH is safer than milk from rBGH-treated cows.

Despite these assurances, the American public were not as easily pacified as Monsanto might have hoped. Consumer groups were active in raising awareness of the risks of rBGH and while hormone-treated dairy products had become the norm in supermarkets and the food service sector, increasing numbers of smaller dairies chose to advertise their non-use of rBGH to their customers. Monsanto went on the offensive and sued a number of these dairies, alleging that they were illegally suggesting that non-rBGH milk was superior. In several cases, dairies were forced to add text to their labels echoing the FDA's statement of rBGH's safety.

This didn't fool the American public. The campaign against rBGH continued, scientists and doctors spoke out in the media about their concerns, and at their annual conference in June 2008 the American Nurses Association voted to work to "eliminate the use of rBGH in the US by appealing to those who make purchasing decisions within the institutions where we work".

Since Monsanto introduced rBGH to the dairy industry in 1994, demand for milk produced without synthetic hormones has increased by 500%. Many consumers switched to organic milk as, in the absence of reliable information, it was the only label they trust enough to give to their children. Between 2002 and 2007 use of the hormone fell by 23% and the proportion of US cows being injected with rBGH fell below 17%.

### Desperate measures

Last year, Monsanto appealed to the FDA to block all labelling that refers to production without rBGH, and to the Federal Trade Commission to block any advertising of milk that mentioned non-use of the synthetic hormone. Both bodies dismissed Monsanto's complaint, stating that they would only intervene where fraudulent claims were made.

Since Monsanto failed to get federal support to impose a blanket ban on references to rBGH-free production, it started to campaign to restrict labelling information on a state-by-state basis. With the backing of a few of the most intensive dairy farming companies, Monsanto have been exerting pressure on state governments but have faced strong opposition from consumer groups and farmers.

In both Ohio and Utah laws are being considered that would ban 'rBGH-free' labels as 'misleading' on the basis that this couldn't be verified by a simple compositional test of the milk. Utah are proposing to ban all statements about production methods, while in Ohio any mention of rBGH on a label would have to be accompanied by the statement "FDA says no significant difference has been shown between milk derived from rBST-supplemented and non-rBST supplemented cows" in a specified font, size and package location. Both the International Dairy Foods Association and the Organic Trade Association are currently pursuing legal challenges against this.

# Monsanto's GM bovine growth hormone

## What is it and what does it do?

In 1994 Monsanto released a new GM product onto the market: recombinant Bovine Growth Hormone (rBGH), trade name Posilac (also known as rBST). It is an artificial, genetically modified version of bovine somatotropin, a hormone produced in the pituitary gland of cattle that stimulates growth in young cattle and lactation in adult cows. When the GM protein is injected into dairy cows (they have to be repeatedly injected every two weeks), it has the effect of increasing milk production by 7-15%.

## Health

The use of rBGH has been controversial primarily due to its negative effects on animal health and concern has also been expressed by scientists over its potential effects on human health.

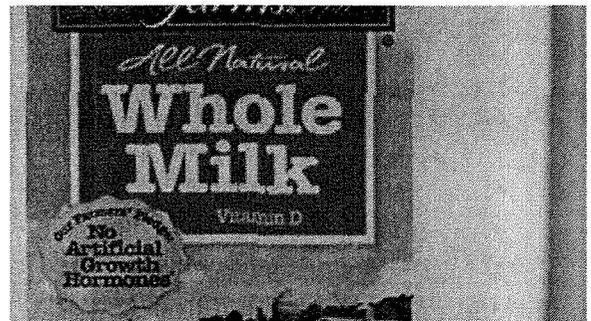
Meta-analyses of the scientific evidence published by the Canadian Veterinary Medical Association and the EU Scientific Committee for Animal Health and Animal Welfare have concluded that the use of rBGH causes 'substantially and very significantly poorer welfare in cows'. Their findings indicated that cattle receiving rBGH injections suffer from:

- 50% increased incidence of lameness
- 25% increased incidence of mastitis, a painful infection of the udder
- 18% increased incidence of infertility, an indicator of overall poor health
- infection at the site of injection, with lesions exacerbated by repeat injections
- substantial increase in multiple births which can lead to welfare problems

As well as these serious negative impacts on the welfare of cows, there are risks to human and animal health:

- the routine use of antibiotics to combat the elevated levels of disease in cows contributes to the development of resistant disease strains and thus reducing the available drugs for both human and animal use
- veterinary drugs found in milk
- elevated levels of pus in the milk from infected udders

Scientists have raised the possibility of several other human health risks resulting from consumption of milk produced with rBGH. While there does not appear to be a higher level of bovine growth hormone in milk from treated cows, levels of insulin-like growth factor 1 (IGF-1) are significantly elevated to at least 5 times the



month that they would be selling off the failing product.

As well as this growing consumer rejection of GM food in America, GM companies have had to face opposition by US farmers and regulatory authorities to a series of new

GM products. Both GM rice and GM wheat faced such strong opposition from farmers that they never made it out of field trials, and have never been grown commercially in the USA. Hardly any GM sweet corn<sup>1</sup> for human consumption is grown either (as opposed to maize grown for animal feed), for the simple reason that it tastes so bad that consumers won't buy it.

Attempts to launch GM alfalfa, America's fourth most widely grown crop, have also fallen flat. Farmers took legal action against the release of the crop and won. In 2007 the USDA was ordered to withdraw its approval of the GM alfalfa, a ban was placed on all planting of the crop and the sale of GM alfalfa seeds has now been prohibited throughout the USA. There is also evidence that US plant breeders are rejecting GM technology in favour of more reliable and effective methods such as marker assisted selection. Despite soya being one of the most widely grown GM crops, the newest high-yielding soya strains are non-GM.

For the first time in the USA, a major labelling initiative is underway that will finally provide consumers with the option of choosing a wide range of non-GM foods. The biggest companies in the natural and organic industry have united to develop a non-GMO label scheme that offers consumers the choice they clearly wish for, backed up by a robust verification system to ensure that it is a claim they can trust. This new 'Non-GMO Project' will be launched next year. It is led by a group of companies with combined annual sales of at least \$12 billion – equivalent to almost 10% of the entire UK food and drink industry. Around four hundred companies across the US and Canada have pledged their support, and at the outset around 28,000 different products are likely to be covered by the scheme.

With US consumers, farmers and politicians losing their enthusiasm for GM crops, it is not surprising that the GM industry has scaled up its efforts to find a new market in the EU. But in Europe, over 175 regions and over 4,500 municipalities and local areas have declared themselves GMO-free. Major countries that once supported GM, like France and Germany, no longer do so, and the Republic of Ireland, Northern Ireland, Scotland and Wales are all committed to GM-free policies. It is just the strongly pro-GM English Government that looks increasingly out of touch with what consumers really want.



<sup>1</sup> This report uses English terminology for crop names. We use 'maize' not 'corn' (for the crop used as animal feed), and 'sweet corn' for the maize people eat. 'Oilseed rape' is used instead of the North American 'canola'. Note that 'alfalfa' is also called 'lucerne' in the UK.

# First major GM labelling initiative in USA: the Non-GMO Project

In a recent poll, 53% of Americans said that they would not eat GM foods. This shows a significant disparity between what consumers in the US want from their food system and what that food system is actually delivering. It also demonstrates a lack of consumer knowledge about the proportion of food in America that contains GM. The majority of this 53% will already be unwittingly consuming GM food every day against their wishes, because GM food is currently not labelled in the US, despite the fact that 87% of Americans believe that it should be.

The US Government's opposition to telling American consumers that some of their food is GM stems from the greatest coup by the GM companies, which was to ensure no GM food had to be tested for safety. The concept of "substantial equivalence" means that if a GM crop looks like its non-GM equivalent and grows like it, then it is assumed to be the same, and no safety testing is needed before people eat it. GM maize may have added virus and antibiotic resistance genes, and a gene that makes it express an insecticide in every leaf, stem and root – but to the US government it looks and grows like maize, so it is safe to eat.

*"I think that consumer rejection of GMOs is growing, and that giving the public here a choice will be a significant catalyst for continuing that trend"*

Megan Thompson,  
Executive Director, the  
Non-GMO Project

This has meant that GM foods don't have to be labelled, and has resulted in widespread ignorance among consumers about the presence of GM in their food. Keeping consumers in the dark has prevented them from making real choices about the food they eat. Without labels the principles of supply and demand are no longer in effect as consumers can't send a message to farmers and manufacturers about what they do, and don't, want to eat.

## Barriers to non-GM status for companies

Even though general consumer knowledge of GMOs is low in the US, there are still consumers who are well-informed and want to feed themselves and their families non-GM foods. North America has a thriving natural products industry and many organic and natural food companies. These companies have made a number of attempts to maintain non-GM status, however:

- companies can only control their own operating systems, with limited influence over others in the supply chain
- working in isolation companies do not have the market clout to secure clean supplies of ingredients, in some cases having to discontinue some product lines

Another attempt to limit consumer information was made in Pennsylvania last year. The Secretary of Agriculture proposed a law in October 2007 that banned non-rBGH labelling. Following an outcry by consumers and the dairy industry, this was overturned by the Governor in January 2008.

Monsanto have tried to push similar labelling restrictions through in Indiana, Missouri, Kansas, Vermont and New Jersey, but in each case the ban has so far failed to make it through the state legislature.

A further last ditch move to save the drug's image was the attempt to rebrand rBGH as environmentally friendly. Jumping on the green bandwagon, the company saw an opportunity to trivialise the drug's welfare issues by presenting them as a necessary sacrifice to be made in a time of climate change crisis, where global food shortages and carbon emissions could only be solved by the production efficiencies rBGH provided.

A study led by a former Monsanto-employed consultant and co-authored by the company's rBGH technical project manager proposed that rBGH use provides a way to reduce greenhouse gases, as the same quantity of milk can be produced by fewer cows. But as the journal Scientific American pointed out, the study hinged on the assumption that the cows injected with the GM hormone produced more milk for a given amount of feed – a claim specifically disallowed by the FDA when the drug was approved in 1993. In fact an rBGH herd would be consuming the same amount of feed – land, oil-based fertiliser and fuel for intensive cereal production – as a slightly larger non-rBGH herd producing the same amount of milk. The rBGH cows would need more veterinary drugs and produce lower quality milk. Both the US National Academy of Sciences and the US Environmental Protection agency have dismissed claims that rBGH could have any environment benefits.

## **Market defeat**

2007 represented a turning point in consumer rejection of Monsanto's GM hormone. Demand for clean milk reached a critical mass, and major American brands paid attention. Knowing the importance of meeting their customers' demands, the country's biggest supermarket chains rushed to ban rBGH from their milk. By 2008 Costco, Kroger, Publix, Safeway and, most significantly, Wal-Mart have all removed rBGH from their own-brand milk. This has had a major impact all the way down the supply chain, ultimately pushing the nation's biggest dairy, Deans Foods, and their near-exclusive supplier Dairy Farmers of America, to phase out use of the drug. Starbucks announced in January 2008 that they had gone entirely rBGH-free, as did Chipotle, a national restaurant chain. Manufacturing giant Kraft is now producing an rBGH-free version of its cheese products. At the end of July this year, in what has been hailed as a major victory for consumers, Monsanto announced that it would be selling off the failing product.

among consumers is reflected by the steady growth in sales of natural and organic food. In 2007, the US natural products industry was worth \$62 billion and growing at 10%, while the organic sector was worth \$20 billion and growing at 21%. With the uproar over rBGH dairy products finally making GM a prominent consumer issue, American consumers are beginning to ask more questions about where their food comes from.

The project is anticipating registration of around 28,000 unique products from the organic and natural industry in the verification scheme over the next few years, representing 70% of the sector. By implementing the non-GMO standard, the project aims to keep new GM crops from gaining dominance and build a resilient non-GM food sector within the United States.

*"The industry is fairly integrated as far as production facilities and ingredient supplies, and by gaining agreement about what "non-GMO" means we finally have the opportunity to really change things and take a united stand against unwanted GM contamination."*

Megan Thompson,  
Executive Director, the  
Non-GMO Project



Good Earth Natural Foods

[www.goodearthnaturalfoods.net](http://www.goodearthnaturalfoods.net)



Above: the founding leaders of the Non-GMO Project

- as they could no longer secure guaranteed non-GM ingredients
- it is costly to devise and regulate a GMO traceability system, maintain a testing regime, market non-GM status, and educate and inform consumers
  - the lack of one recognised label that guarantees non-GM status led to distrust of non-GM claims among consumers, exacerbated by a number of high profile incidents in which foods labelled GM-free were found to contain GMOs after all.

This has been a particular threat to organic businesses. In the US, the Government's organic standards say that certified foods should not be produced with GM ingredients, but a certain level of 'unavoidable' GM contamination is tolerated. This is seen by some as the thin end of the wedge, and as the GM crop acreage rises, organic companies have decided to take action to safeguard the future against the possibility of losing non-GM supplies of corn and soy in the next few years.

### The Non-GMO Project

In 2005, two natural food retailers started the 'Non-GMO Project', to develop a robust, industry-wide non-GMO verification system that would provide consumers with a trustworthy and recognisable non-GMO label to look for on products. The project would provide efficiencies of scale and would enable certification to be done in a simple low-cost way. The companies' united front could send a message to suppliers about non-GMO demand. They ensured the project would have robust scientific backing, and by 2007 the project expanded its board of directors to include representatives from all stakeholder groups in the natural products industry.

*"By giving people here an informed choice, the Non-GMO Project is going to help align the food production in North America with what people here really want."*

Megan Thompson,  
Executive Director, the  
Non-GMO Project

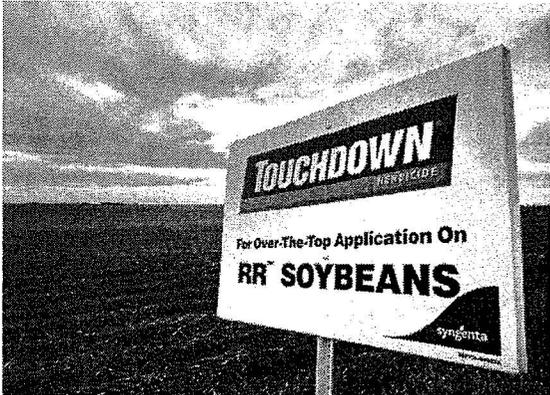
The project is now supported by the biggest companies in the North American natural and organic sector, an industry worth over \$62 billion in the US alone. Well-known brands such as Whole Foods, Seeds of Change and Nature's Way are supporting the campaign, along with around 400 companies across the US and Canada, representing annual sales of around \$12 billion.

The Non-GMO verification scheme has just opened (summer 2008) for product registration. Already several hundred products have been enrolled and it is anticipated that several thousand will be registered in the coming months. The project has also set up an ingredient supplier database to help manufacturers find uncontaminated ingredients through access to a list of verified non-GM suppliers. As increasing numbers of processors and distributors get their products verified, the database of trusted sources is growing.

The Non-GMO seal will be launched on labels in October 2009 in conjunction with a major consumer awareness campaign. Several things indicate that the US market is ready for this sort of initiative. Greater interest in healthy food

# Rejection of new GM crops by farmers, regulators and plant breeders

On top of the growing consumer rejection of existing GM food in America, GM companies have faced rejection of a series of new products by US farmers and regulatory authorities. GM wheat, rice and alfalfa have all failed to get off the ground, as has GM sweet corn, which consumers simply refused to eat because it tastes so bad. In fact, after the first handful of GM crops were introduced in America in the late 1990s, US farmers and consumers have stopped any more commercialisation of GM crops. This suggests that the claim from the pro-GM lobby that GM crops have been welcomed by US farmers deserves scrutiny.



The US regulatory approval process is also increasingly questioned. Proposed field trials of several new GM crops, such as drug-producing maize and sugar cane and herbicide tolerant bentgrass, have been subject to federal court cases. In each case the court ruled that the United States Department of

Agriculture (USDA) had broken the law in granting the trials approval without adequate safety data. In 2007 a federal district judge ruled that the USDA must halt approval of all new GM field trials until more rigorous environmental reviews are conducted.

## GM Wheat

Following the widespread introduction of Monsanto's Roundup Ready GM maize, soybeans and oilseed rape (all engineered to be resistant to the weed-killer Roundup, which usually kills all plants), the company soon produced a Roundup Ready GM wheat variety. Monsanto expected their new wheat to get the same easy ride that greeted the first GM crops. However, several years experience of the first GM crops resulted in enormous opposition to GM wheat from the food and farming industries. American farmers had learned the hard way that their export markets did not want GM food, and the benefits for farmers that GM companies claim were obviously not enough to make the risk worth running. As GM varieties of maize, soybeans and oilseed rape gained in dominance, initially through deliberate plantings but accelerated by cross-contamination, US farmers had watched helplessly as huge international customers from Europe, Japan and other countries rejected their grain in preference to non-GM crops.

Studies predicted that GM wheat would fare no better. An economic report by Iowa State University produced in 2003, and updated in 2005, estimated that the commercial introduction of a GM variety of wheat could result in the loss of one third to one half of the US export market and that the price of spring wheat would plunge by a third. In part there was heightened opposition to GM wheat both within the US and internationally because, while existing GM crops are primarily grown for animal feed, wheat is used both for animal feed and for human food. The idea of GM daily bread

was a step too far for consumers. The mainstream farming industry in the US lobbied against this new GM crop, saying that the introduction of GM wheat would be a serious threat to the economy, and the Canadian Wheat Board produced a damning report showing that, based on their country's experience of herbicide tolerant GM crops thus far, Monsanto's GM wheat should also be banned on environmental grounds.

In the face of such categorical rejection, Monsanto abandoned its field trials of Roundup-Ready wheat in 2004, stating that it was more profitable for the company to concentrate its efforts on soya, maize and oilseed rape.

## GM Alfalfa

Alfalfa, a grass used for animal feed, is the fourth most widely grown crop in the USA, behind corn, soybeans and wheat, and it is the third most economically valuable. More than 20 million acres of alfalfa are grown in the United States and it is the most important forage crop, providing feed for the nations beef and dairy cattle in particular.

In 2005, a GM strain of alfalfa was approved by United States Department of Agriculture (USDA). It had been developed by Monsanto in partnership with America's largest alfalfa seed company, Forage Genetics International. This alfalfa was engineered to withstand Monsanto's trademark glyphosate herbicide 'Roundup'. However, despite regulatory approval, a large number of American farmers also rejected the introduction of this new GM crop.

Alfalfa is an open-pollinated crop and pollen grains can travel long distances in the wind or via pollinating insects. This poses a serious contamination risk for conventional and organic growers, and cross-pollination could quickly reduce and even wipe out the US supply of non-GM alfalfa. Not only are those growing non-GM alfalfa unprotected from the economic damage that GM contamination causes, but they are also vulnerable to harassment and lawsuits from Monsanto if GM alfalfa is found on their land. Monsanto sues farmers with GM crops growing on their farms for patent violation, even if they have never actually planted any GM seeds themselves. In addition, many farmers currently produce normal alfalfa with minimal, if any, use of weed-killers. The introduction of a GM herbicide tolerant variety would not only encourage the use of far greater quantities of glyphosate, but also speed the growing development of glyphosate resistance in weeds, meaning that ever more toxic herbicides would need to be applied to all alfalfa crops to control them.



In February 2006, a coalition of alfalfa producers filed a lawsuit against the USDA claiming that GM alfalfa was a threat to both the environment and to farmers' livelihoods. The case was heard a year later, and in a landmark decision, the court ruled in their favour, declaring that the USDA had violated the law and had been "cavalier" in deciding that a full environmental impact statement was not necessary. The judge stated that "A federal action that eliminates a farmer's choice to grow non-genetically engineered crops, or a consumer's choice to eat non-genetically engineered food, is an undesirable consequence". The USDA was ordered to withdraw its approval of the GM alfalfa, a ban was placed on all planting of the crop and the sale of GM alfalfa seeds has now been prohibited throughout the USA. Despite an appeal by Monsanto, their GM alfalfa remains illegal until they can prove through a full environmental review that farmers and consumers will be protected, and non-GM crops will not be affected by their product.

### GM Rice

Despite the development and USDA approval of several strains of GM rice, not one type is grown commercially in the United States. The US rice industry has consistently opposed the growing of GM rice, aware that there is no market for it. A number of key events have ensured that they are in no hurry to change their minds. In the last two years, catastrophic GM contamination incidents have put the entire US long-grain rice industry in crisis and cost the sector over \$1 billion. In 2006 it was discovered that Bayer CropScience, a giant biotechnology firm, had accidentally contaminated over 30% of the entire US long-grain rice supply with three of their GM varieties, two of which had not been approved for cultivation or consumption anywhere in the world. None of the contaminant strains had ever been grown commercially, and the only possible source of contamination was traced to field trials carried out years earlier, between 1998 and 2002. It has not been established whether the contamination occurred through cross-pollination or through a post-harvest mix-up, but there should have been no route to the food supply for these experimental crops. The incident had powerful global consequences. The EU, Japan, Korea and the Philippines imposed strict testing requirements and effectively shut down rice trade with the US, halting shipments, cancelling orders and recalling rice from supermarket shelves. Several other countries imposed bans on US rice or demanded non-GM certification before purchase, and soon the major rice-importing countries had switched to suppliers such as Thailand or Vietnam, who quickly pledged to remain GM-free. Furious US rice farmers and traders filed multi-million dollar class action lawsuits against Bayer CropScience, but even compensation for their harvests will not undo the serious and continuing damage to the US rice industry.

A second serious contamination incident occurred just one year later, in early 2007. It was announced that 'Clearfield 131', one of the most popular non-GM long-grain rice seeds had become contaminated with an unapproved GM

strain, again from Bayer CropScience. Sale of the seed was quickly banned by the USDA, and some farmers were forced to destroy crops already sown. Combined with the ban on rice seed that had been contaminated in the Bayer incident of 2006, this new discovery had the effect of seriously cutting the amount of available rice seed for farmers to plant, and led to reduced harvests with some farmers abandoning rice growing altogether. BASF, who produce Clearfield 131 lost up to \$9 million dollars in the incident.

Bayer's clear inability to control contamination has led to rice producers calling for a ban on all experimental outdoor plantings of GM rice, and it seems that the commercialisation of any GM rice varieties is unlikely to happen in America in the foreseeable future.

### **Highest yielding soya strains are non-GM**

With pressure to develop higher yielding varieties of food crops, US plant breeders are rejecting GM technology in favour of more reliable and effective methods. Soya farmers have been frustrated for years by the slow pace of increases in soya yields. This has been due in part to the dominance of Monsanto's Roundup Ready soya over the last decade. This GM soya has been shown to yield less than non-GM varieties. However, Pioneer, a branch of biotech giant DuPont, have finally had some success. Ignoring unreliable GM techniques that disrupt the plant's biology, Pioneer have instead used marker-assisted selection (MAS) breeding. MAS uses knowledge of the genome to speed up the selection process, but uses conventional cross-breeding that allows the plant to maintain its own safe-guards on gene expression. MAS is a technique long supported by environmentalists and organic farmers. Results of crop trials demonstrate a 5-10% yield advantage for this MAS soya over competitive varieties. This approach echoes the latest rice breeding research taking place in South East Asia, as scientists pursuing the ideal of flood and drought resistant varieties have left GM techniques behind and are concentrating on the more successful application of MAS methods to meet these goals.

# Conclusion

Since the introduction of GM food, probably the biggest selling GM food product bought by consumers in the US has been GM hormone-treated milk. Dairy products produced with Monsanto's GM growth hormone achieved huge market penetration following their launch in 1994, but are now on their way out due to consumer resistance. This resistance to GM-produced milk started when consumers began to see non-GM labelled milk in their shops.

Labelling milk as 'GM hormone free' has been the only significant move to label any food as 'non-GM' until now. Just open for product registration, the Non-GMO Project is a major new market-led initiative in North America that will provide the sort of labelling that killed GM food in the EU, Japan and other countries. Every attempt to pass laws on GM labelling in the US has been fought fiercely by Monsanto and other GM companies, but there is now strong support from companies with combined sales of \$12 billion to give consumers accurate information about GM in their food.

Even though US consumers are turning against GM, the GM industry has always claimed that US farmers love GM crops. But in fact farmers rejected genetically modified wheat, one of the largest commodity crops in the world, and no GM wheat is grown in North America. Farmers have also rejected GM alfalfa, the fourth most widely grown crop in the US. Following a court victory for farmers, the USDA was ordered to withdraw its approval of the GM alfalfa, a ban was placed on all planting of the crop and the sale of GM alfalfa seeds has now been prohibited throughout the USA. Despite the development of many commercial strains of GM rice, no GM rice is being grown commercially in the US, and even in the case of soya, one of the most widely grown GM crops, the newest high-yielding varieties being developed are non-GM rather than GM.

These developments, combined with the possibility of Democrat Presidential Candidate Barack Obama's pledge to support legislation to label GM food if he should get elected, suggest that GM companies are in for a difficult few years in the USA. The increasing focus on the climate change impacts of farming, to which GM crops offer no solution, and expensive oil driving up the cost of nitrogen fertiliser, on which GM crops are dependent, also suggest the environmental and economic pressures on GM will increase.

With consumers, farmers and politicians in America losing their enthusiasm for GM crops, it is not surprising that the GM industry has scaled up its efforts to find a new market in the EU. Major European farming countries, like the previously enthusiastically pro-GM French and German governments have gone cold. Other EU countries, like Greece, have always resolutely opposed GM crops, and among the newer EU member states, many, such as Poland, have already adopted non-GM policies. Over 175 regions and over 4,500 municipalities and local areas in Europe have declared themselves GMO-free.

The Irish Republic, Northern Ireland, Scotland and Wales are all committed to GM-free policies. This has left just the present English government ministers on an increasingly lonely and desperate pro-GM quest, as consumers in their main pro-GM ally, the United States, increasingly reject this uncertain, risky and unproductive technology.

**Kathleen Hewlett and Peter Melchett**

The Soil Association  
October 2008



## Soil Association

The Soil Association is the UK's leading environmental charity campaigning for a global shift to sustainable, organic food and farming practices.

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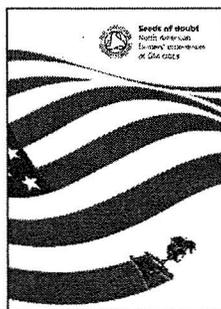
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Taro is Samoa's main staple food as well as a lucrative cash crop. When taro leaf blight (TLB) hit the country in 1993, taro exports were worth \$T20 million annually.

TLB wiped out the entire taro industry in a matter of months, it raised food security concerns and export revenues nose-dived thus upsetting the nation's comfortable level of foreign reserves.

Across the food sector, taro was soon replaced by less nutritious starchy staples in the form of instant noodles and rice.

Samoa's taro industry is now slowly getting back on its feet after the devastating outbreak of TLB caused by the fungus *Phytophthora colocasiae*.

New taro cultivars recently released have been assessed for their production qualities and closely studied in trial plots in various locations around the country.

This approach has allowed farmers to have direct input to the assessment of the cultivars, which passed the acid test for taro production in Samoa post-TLB.

Their assessments - good tasting, high yielding and, most importantly they're TLB-tolerant.

"They are very similar to the kind of taro we used to have where taste was the top priority," the CEO for the Ministry of Agriculture Asuao Kirifi Pouono said.

"These new varieties all have the taste we Samoans prefer," he reminisced about the so-called highly favoured taro Niue.

This was the main variety grown before 1993 but was highly susceptible to TLB.

"We call it mapo or firm to bite. They are also red, similar to the taro grown throughout Samoa pre-TLB."

In October, three new taro cultivars were launched by the Minister of Agriculture Taua Kitiona.

One of the varieties named Taua after him. The other two, taro So'o and taro Tonu, are named after researchers who worked on the breeding programme at Nuu Crop Development.

Asuao said more than 20 new varieties have so far been released to farmers since the breeding programme started.

The main push now is to bulk up these new cultivars to provide adequate planting material for farmers.

In response to the TLB outbreak in Samoa, and in recognition of the continuing loss of taro genetic diversity throughout the Pacific, the Australian government, through AusAID, funded a regional project entitled Taro Genetic Resources: Conservation and Utilisation (TaroGen).

One component of the project focused on breeding and was based at the Alafua Campus of the University of the South Pacific (USP). The Taro Improvement Programme was designed to work

with national programmes run by MAFF and with farmers around the country to develop a national strategy for taro improvement.

The first stage of the project evaluated taro diversity in regional collections and in other cultivars sent to Samoa in response to a request for help. Initially, new TLB-tolerant varieties from the Federated States of Micronesia, Palau and the Philippines were introduced, both to maintain taro production and to assess their susceptibility to TLB in Samoa.

Taro Fili (from the Philippines) became the first TLB-tolerant variety that local consumers liked. When boiled, it had the right firmness and taste but developed too hard a texture when baked in the umu (Samoan earth oven).

A variety from Palau with good tolerance to TLB, good taste and reddish in colour was also well received. Polo voli, (so called because of its volley ball shape) became a winner with farmers and consumers.

The Taro Improvement Programme put a participatory breeding project in place to work with farmers to screen and select new clones, initially from the Pacific.

The active participation of taro growers has been the key to the success of the programme, which has continued work on breeding and selecting superior taro varieties since the TaroGen project concluded.

Funding and technical assistance is being maintained with support from the Secretariat of the Pacific Community (SPC) and USP.

The recent release of the new cultivars shows the importance of agencies working together to tackle a problem. It also highlights the benefits of a participatory approach to variety selection and breeding.

The need to take into account different growing conditions within a country, and changes in these conditions, becomes even more important with the increasing impact of climate change. The programme has recently developed crosses (lines) between taro from the Pacific and from Asia, which are receiving excellent feedback from farmers in Samoa.

Donors are often concerned about the sustainability of a project once their funding support has ceased.

The fact that the Taro Improvement Programme is still active and is supported nationally and regionally is convincing evidence of the project's sustainability.

*• For more information, please contact the helpdesk of SPC Land Resources Division:  
lrdhelpdesk@spc.int.*

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AusAID/SPC TARO GENETIC RESOURCES:  
CONSERVATION AND UTILISATION

# **A Bibliography of Taro Leaf Blight**

Prepared by

Julia Brunt, Danny Hunter and Charles Delp

**April 2001**

SECRETARIAT OF THE PACIFIC COMMUNITY  
NOUMEA, NEW CALEDONIA

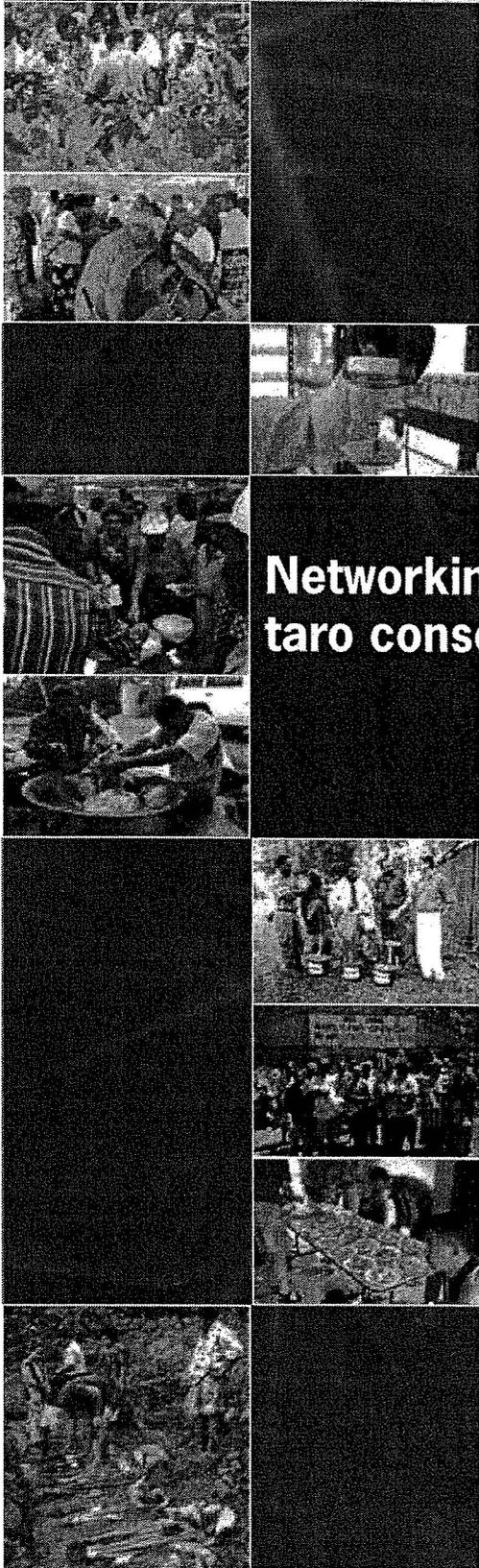
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# Tarogen

Taro Genetic Resources: Conservation and Utilisation



**Networking and learning together for taro conservation and improvement**

A list of publications from Tarogen and partners



## Impact of the TaroGen project

The TaroGen project, which ran for five years from 1998, was a unique initiative for the Pacific region highlighting the benefits of networking and collaboration to tackle the problem of taro conservation and improvement in light of the leaf blight outbreak in Samoa in 1993. Although implemented by SPC, the project was a significant partnership between regional and international organisations to assist and support Pacific Island countries. This partnership involved organisations (Biodiversity International (formerly IPGRI), SPC, National Agricultural Research Institute-PNG and HortResearch), universities (University of the South Pacific, University of Technology-PNG, Queensland University of Technology and University of Queensland) and non-governmental organisations (Planting Materials Network and Farm Support Association). Funding for this collaboration was provided by AusAID, ACIAR and NZAID.

The main impacts of the project included:

- Development of a regional strategy to collect and describe taro which resulted in a database of over 2,000 taro accessions;
- Technical assistance from UQ and IPGRI scientists in analysis of morphological and molecular data which allowed the identification of 220 taro accessions as a core collection, representative of the broad diversity of taro in the region;
- Assistance provided to SPC to establish the Regional Germplasm Centre as a centre of excellence for research on conservation methods and germplasm distribution;
- Regional NGOs, PMN and FSA, providing important information on the in situ conservation of taro which illustrated that on-farm conservation of taro is a feasible method for some countries;
- Advances in taro virus characterisation and diagnostics by scientists at QUT which now allow the safe international transfer of taro germplasm;
- Crop improvement programmes established at NARI and USP-Alafua which have resulted in the production and distribution of leaf blight resistant taro varieties to farmers;
- Enhanced skills and capacity of many Pacific Island scientists through on-going mentoring with scientists of international repute. This included the completion of 10 postgraduate programmes; and
- Finally, through its many diverse activities and collaborations the Project has significantly added to the body of knowledge that exists on taro conservation and improvement as evident from the list of publications included in this document.



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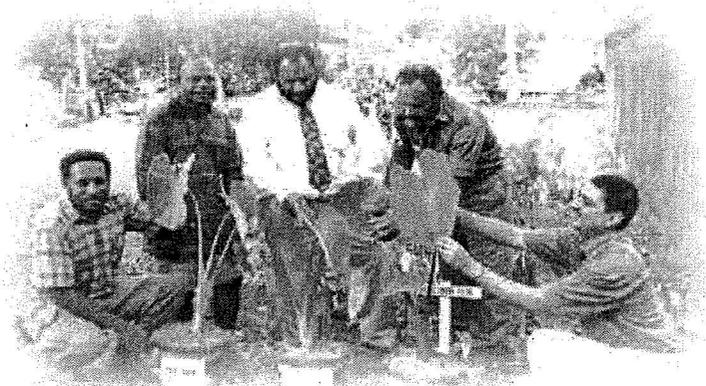


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## Further information

### Project website

The TaroGen website includes a vast array of information related to the project and its components: taro conservation and improvement. Some of the above publications are available to download at this site.

Go to: <http://www.spc.int/tarogen/>

### Project-related website

#### *Third Taro Symposium*

In 2003, the collaborating partners involved in TaroGen organised the Third Taro Symposium at Nadi, Fiji, which brought together scientists from all over the world to review progress in taro research and development and explore options for future directions.

Go to: <http://www.spc.int/cis/tarosym>

#### *Regional Germplasm Centre*

The website of the SPC Regional Germplasm Centre contains information on conservation methods and current research. Data sheets also exist on some of the TaroGen breeding lines as well as accessions held in the taro core collection.

Go to: <http://spc.int/rgc/>

#### *The Pacific Agricultural Plant Genetic Resources Network (PAPGREN)*

Website contains much information related to taro and TaroGen.

Go to: <http://spc.int/pgr/>

#### *Genetic Resources Thematic Group*

This is one of the thematic groups within Land Resources Division of SPC dealing specifically with agricultural genetic resources.

Go to: [http://www.spc.int/lrd/genetic\\_resources.htm](http://www.spc.int/lrd/genetic_resources.htm)

## Contacts

Many of the scientists who collaborated on TaroGen continue to work in their respective areas of expertise and will be happy to discuss technical aspects of the project with those interested. They can also provide updates on project-related activities and copies of the publications listed above.

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Benefits and limits of an important biotech tool  
**FAO publishes study on marker-assisted selection**

<http://www.fao.org/newsroom/en/news/2007/1000630/index.html>

**24 July 2007, Rome** -*The biotechnology tool of marker-assisted selection (MAS) has raised high expectations for increasing genetic progress through breeding. Some experts have even argued that the application of MAS could "revolutionize" the way varieties and breeding stock are developed.*

*In a new comprehensive assessment (Marker-Assisted Selection, Rome 2007), FAO emphasizes that MAS has enormous potential but notes that the technology has not yet delivered its expected benefits to farmers in developing countries. Shivaji Pandey, Chairperson of the FAO Working Group on Biotechnology, gives his view on MAS.*

**What is marker-assisted selection (MAS)?**

MAS is a biotechnology tool that could greatly accelerate conventional breeding of crops, livestock, farmed fish and trees. Scientists are using MAS to genetically improve certain characteristics or traits (productivity, disease resistance, quality etc.) that are important for farmers. MAS makes it possible to select traits with greater accuracy and to develop a new variety quicker than in the past.

**What is the difference between MAS and genetically modified organisms (GMOs)?**

MAS and genetic modification are different biotechnologies. MAS allows desirable genes to be "marked" or tagged so they can be selected within the breeding population, while GMOs are the result of the transfer of a desirable gene or genes from one species to another.

New plant varieties or improved animal breeds resulting from MAS do not require a specific legislative framework. The complicated approval process required for GMOs does not apply for MAS - its costs of release are therefore lower.

In addition, the technology is not controversial so there is no problem with public acceptance. Indeed, one of the drawbacks of the intense debate that has taken place in recent years over the benefits and risks of GMOs is that it has overshadowed the potential role that other, non-GMO, biotechnologies, such as MAS, may play for food and agriculture.

**What is the potential of MAS?**

Since MAS first became a practical reality about 20 years ago, it has now gone past the research and development stage and is being applied in the field. For example, it is currently being used in dairy cattle breeding programmes in France and Germany, and rice varieties with improved bacterial blight resistance have been developed using MAS approaches and released in India and Indonesia.

However, initial enthusiasm and optimism have been tempered by the realization that it is more difficult and takes longer than originally thought before genetic improvement of traits using MAS can be realized. The considerable resources invested in this technology have been mainly concentrated in the industrialized world, and MAS has not yet delivered its expected benefits to farmers in developing countries.

### **What are the costs associated with MAS?**

MAS requires quite a sophisticated infrastructure and considerable investments: including specialized equipment, electricity, laboratory design and management, data handling and statistics, and Internet connectivity. Efficient and effective application of MAS also requires well-qualified staff and good funding. It should therefore be used where there is a clear advantage over traditional selection techniques.

### **What are the constraints countries are facing applying MAS?**

Apart from the investments required, a serious constraint that most countries face in applying MAS is the lack of a national policy on science and technology and on biotechnology. This is essential to provide guidance on the strategic planning, monitoring and evaluation of biotechnologies, including MAS, for food and agriculture. In addition, MAS should only be applied when well-structured breeding programmes are already in place, which is often not the case in many developing countries.

### **How could the application of MAS contribute to hunger and poverty reduction?**

Most of the around 820 million hungry people in developing countries live in rural areas where people's livelihoods depend on agriculture. This means that investing in agriculture, and more broadly in rural development, must be at the heart of any strategy for hunger and poverty reduction. While the measures needed certainly go well beyond the issue of producing more food and agricultural products, achieving greater yields and higher value products from the same plot of land or enterprise, through, for example, appropriate application of technologies such as MAS, must be a key ingredient for the great majority of developing countries.

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**TARO FARMERS & CONSUMERS  
IN SUPPORT OF HB1663 (with NO amendments)  
House Committee on Agriculture, March 4, 2009, 9:00am, Rm. 312**

First Name	Last Name	City	Zip	County	State	District
Justin	Michelson	Kula	97690		HI	
Ephrosine	Daniggelis	Honolulu	96839		HI	
Ann	Egleston	Honolulu	96839		HI	
Kapa	Oliveira	Honolulu	96839		HI	
Rosemary	Cuccia	Honolulu	96830	Honolulu	HI	Senate District 12
Mark Alapaki	Luke	Honolulu	96828	Honolulu	HI	Senate District 12
Noel	Barrett-Tau	Honolulu	96826		HI	
Saw	Ching	Honolulu	96826		HI	
Garid	Faria	Honolulu	96826	Honolulu	HI	Senate District 10
suzanne	garrett	honolulu	96826		HI	
Carol	Murry	Honolulu	96826		HI	
Suzanna	Ohoiner	Honolulu	96826	Honolulu	HI	Senate District 10
Gordon	walker	honolulu	96826		HI	
William	bryant	honolulu	96825		HI	
Vickie	Innis	Honolulu	96825		HI	
Dwynn	Kamai	Honolulu	96825		HI	
B.A.	McClintock	Honolulu	96825	Honolulu	HI	Senate District 8
Sherryl	Royce	HONOLULU	96825		HI	
Carol	Viquelia	Honolulu	96825		HI	
Molly		Honolulu	96822		HI	
Harvey	Arkin	Honolulu	96822	Honolulu	HI	Senate District 10
Dayle	Bethel	Honolulu	96822		HI	
Diana	Bethel	Honolulu	96822		HI	
Alana	Bryant	Honolulu	96822	Honolulu	HI	Senate District 10
carla	buscaglia	Honolulu	96822		HI	
Sandra	Chun	Honolulu	96822		HI	
Stephen	Dinion	Honolulu	96822	Honolulu	HI	Senate District 11
Pete Shimazaki	Doktor	Honolulu	96822	Honolulu	HI	Senate District 9
Christy Rose	Ferreira	Honolulu	96822		HI	
Fred	Flores	honolulu	96822		HI	
Mark	fontaine	Honolulu	96822	Honolulu	HI	Senate District 10
Caroline	Ginnane	Honolulu	96822		HI	
Regina	Gregory	Honolulu	96822	Honolulu	HI	Senate District 11
Alison	Hartle	Honolulu	96822	Honolulu	HI	Senate District 10
Raphael Kealoha	Kaliko	Honolulu	96822	Honolulu	HI	
paahana	kincaid	Honolulu	96822		HI	
Cindy	Lance	Honolulu	96822	Honolulu	HI	Senate District 10
Spencer	Leineweber	Honolulu	96822	Honolulu	HI	Senate District 10
Claudia	Portocarrero	Honolulu	96822	Honolulu	HI	Senate District 10
Evan	Silberstein	Honolulu	96822		HI	
Christine	Walters	Honolulu	96822		HI	
Liza	Williams	Honolulu	96822	Honolulu	HI	Senate District 11
mary	Manley	honolulu	96821		HI	
Brandie	Markos	Honolulu	96821		HI	

Kekoa	Wong	Kuliuouou	96821	Honolulu	HI	Senate District 8
J.	Hakuole	Honolulu	96819		HI	
Ka'ohua	Lucas	Honolulu	96819		HI	
Aida	San Miguel	Honolulu	96819		HI	
Teri	Skillman-Kashyap	HONOLULU	96819	Honolulu	HI	Senate District 14
Sarah	White	Honolulu	96819		HI	
Haunani	Francisco	Honolulu	96818		HI	
Kapua	Francisco	honolulu	96818		HI	
Kuuleilani	Reyes	Honolulu	96818		HI	
shanelle	Solomon	Honolulu	96818		HI	
Kimo	?	honolulu	96817		HI	
Cathie	alana	honiolulu	96817		HI	
Cristian	Ellauri	honolulu	96817		HI	
Heidi	Ho	Honolulu	96817		HI	
Kamaka	Jingao	Honolulu	96817		HI	
kehaulani	kea	honolulu	96817		HI	
Brenda	Kwon	Honolulu	96817		ID	
miwa	tamanaha		999 96817		HI	
John	Witeck	Honolulu	96817		HI	
Karsten	Zane	Honolulu	96817		HI	
Rosemary	Bak	Honolulu	96816		HI	
Eric	Brandt	Honolulu	96816		HI	
Victor	Brandt	Honolulu	96816		HI	
Jeremai	Cann	Honolulu	96816		HI	
Deanna	Chang	Honolulu	96816	Honolulu	HI	Senate District 8
Chris	Derauf	Honolulu	96816		HI	
joel	fischer	honolulu	96816	Honolulu	HI	Senate District 8
Barb	Forsyth	Honolulu	96816		HI	
Rino	Geremen	honolulu	96816		HI	
Moses	Goods	Honolulu	96816		HI	
Blossom	Hoffman	Honolulu	96816	Honolulu	HI	Senate District 9
Kalani	Kalima	Honolulu	96816	Honolulu	HI	Senate District 13
Johnette	Kaluna	Honolulu	96816		HI	
Pualani	Kauila	Honolulu	96816	Honolulu	HI	Senate District 10
clavz	lee	hon	96816		HI	
Leiana	Lobre	Honolulu	96816		HI	
Valerie	Loh	Honolulu	96816		HI	
Kanoa	Nelson	Honolulu	96816		HI	
Gordon	Noice	Honolulu	96816		HI	
Sheila	O'Malley	Kaimuki	96816		HI	
jamie	oshiro	honolulu	96816		HI	
Sharlynn	Paet	Honolulu	96816	Honolulu	HI	Senate District 9
Ikaika	Pestana	Honolulu	96816		HI	
Cha	Smith	Honolulu	96816	Honolulu	HI	Senate District 8
A. Ku'u lei	Snyder	Honolulu	96816		HI	
Brett	Thomas	Honolulu,	96816		HI	
Kehaulani	Wong	Honolulu	96816		HI	
Rose	Benjamin	Honolulu	96815		HI	
Marie	Brown	Honolulu	96815	Honolulu	HI	Senate District 12
Michael	Daly	Honolulu	96815		HI	

Kim	Morishige	Honolulu	96815		HI	
Alea	Schechter	Honolulu	96815		HI	
Evern	Williams	Honolulu	96815		HI	
Janelle	Williams	Hilo	96815		HI	
Renee	Hampton	Honolulu	96814		HI	
Rachel	Winkler	Honolulu, HI	96814		HI	
Malia	Acohido	Honolulu	96813		HI	
Iokepa	Casumbal-Salazar	Honolulu	96813		HI	
Jaime	Ferreira	honolulu	96813		HI	
Juanita	Kawamoto	Honolulu	96813		HI	
Edward	Kenney	Honolulu	96813		HI	
nainoa	Kuna	Honolulu	96813		HI	
Clayton	Lee	Honolulu	96813		HI	
Joan	Matsukava	Honolulu	96813		HI	
Malama	Minn	Honolulu	96813		HI	
Julia	Morgan	Honolulu	96813		HI	
Laura	Quintal	Honolulu	96813		HI	
Diane	Texidor	Honolulu	96813		HI	
PALANI	VAUGHAN	Honolulu	96806		HI	
Shawn	White	Honolulu	96804	Honolulu	HI	Senate District 12
Janelle	Akiona	Waipahu	96797		HI	
Mimi	Forsyth	Waipahu	96797		HI	
Felicia	Waialae	Waipahu	96797		HI	
clayton	falvey	waimea	96796		HI	
Lisette	Langlois	Waimea	96796		HI	
Kane	Turalde	Waimea	96796		HI	
Meghan	Au	Waimanalo	96795	Honolulu	HI	Senate District 25
Mary	Baker	Waimanalo	96795		HI	
Karen	Holman	Waimanalo	96795	Honolulu	HI	Senate District 25
Laurie	Kahiapo	Waimanalo	96795		HI	
CHRISTINE	Kauahikaua	Waimanalo	96795	Honolulu	HI	Senate District 25
Curt	Sumida	Waimanalo	96795		HI	
Virginia	Walden	Waimanalo	96795	Honolulu	HI	Senate District 25
Alyson	Barrows,	Wailuku	96793	Maui	HI	Senate District 4
Barbara	Best	Wailuku	96793		HI	
marti	buckner	wailuku	96793		HI	
Michelle	Hillen	Wailuku	96793		HI	
vincent	mina	Wailuku Maui	96793		HI	
Victor	Pellegrino	Waikapu	96793		HI	
Daphne O.	Sing	Wailuku	96793		HI	
paul	strauss	Wailuku	96793		HI	
Daniel	Tanaka	Wailuku	96793		HI	
Gary	Wiseman	Wailuku	96793		HI	
Bill	Akiona	Waianae	96792		HI	
Lidia	Alfapada	Waianae	96792		HI	
Sheldon	Brown	Wailuku	96792		HI	
Eva Kapelaonaalii	Collins	Wai'anae	96792		HI	
Britany	Edwards	Wai'anae	96792	Honolulu	HI	Senate District 21
Florence	Eli-Adam	Waianae	96792		HI	
Kapua	Keliikoa-Kamai	Waianae	96792		HI	

P	Ling	Waianae	96792		HI	
TammyLeigh	Mahuka	Waianae	96792		HI	
chaunnel	salmon	Waianae	96792		HI	
Shane	Silva	Waianae	96792		HI	
kimo	stowell	Honolulu	96792		HI	
Natashja	Tong	Waianae	96792		HI	
ANN	Walenta	Waianae	96792	Honolulu	HI	Senate District 21
Scott	Foster	Waialua	96791	Honolulu	HI	Senate District 10
Nina	Puhipau	Waialua	96791	Honolulu	HI	Senate District 22
Barbara	Bogorad	Kula	96790		HI	
Hilary	Harts	Kula	96790	Maui	HI	Senate District 6
Bentley	Kalaway	Kula	96790		HI	
Faith	Rose	Kula	96790		HI	
julie	signore	kula	96790		HI	
stephen	skogman	kula	96790		HI	
melody	Zeitler	kula	96790		HI	
Chana	Dudoit	Mililani	96789		HI	
Warren	Kundis	Mililani	96789		HI	
Christine	Putzulu	Wahiawa	96786		HI	
Mahealani	Carvalho	Volcano	96785	Hawaii	HI	Senate District 2
Robert	Frutos	Volcano	96785		HI	
Cynthia	Gillette-Wenner	Volcano	96785		HI	
katharine	madjid	volcano	96785	Hawaii	HI	Senate District 2
kamuela	Moraes	volcano	96785	Hawaii	HI	Senate District 2
David	Johnston	Puuhene	96784	Maui	HI	Senate District 4
Raphiell	Nolin	Puunene	96784		HI	
Haley Ann	Bufile	Pepeekeo	96783		HI	
Camillia	Elayyan	Pepeekeo	96783		HI	
Summer	Faria	Pearl City	96782	Honolulu	HI	Senate District 16
David M. K.	Inciong, II	Pearl City	96782		HI	
Pono	Kealoha	Pearlcity	96782		HI	
pono	kealoha	Pearlcity	96782	Honolulu	HI	Senate District 18
john	maple	Papaikou	96781		HI	
katherine	Ross	Papaikou	96781		HI	
Harvest	Edmonds	Papa'aloa	96780		HI	
hannah	bernard	paia	96779		HI	
Miranda	Camp	Paia	96779	Maui	HI	Senate District 4
Tia	Christensen	Paia	96779		HI	
June	Davis	Paia	96779		HI	
gabriel	donihi	paia	96779		HI	
Eliza	Goodhue	Paia	96779		HI	
Marie-Eve	Hobeika	paia	96779		HI	
Arnold	Kotler	Paia	96779		HI	
Bobbi	Lempert	Paia	96779	San Juan	HI	Senate District 40
Nai`a	Newlight	Pa`ia	96779		HI	
Airielle	Pearson	Paia	96779		HI	
JASON	SCHWARTZ	PAIA	96779		HI	
Kim	Young	Paia	96779		HI	
I	AM	Pahoa	96778		HI	
aaron	ANDERSON	pahoa hi,	96778		HI	

Satya	Anubhuti	Pahoa	96778		HI	
Theodore	Banta	Pahoa	96778		HI	
Janet	Codispoti	Pahoa	96778		HI	
Luella	Crutcher	Pahoa	96778		HI	
DALE	DAY	PAHOA	96778		HI	
normand	dufresne	pahoa	96778		HI	
Donna	Fischer	Pahoa	96778		HI	
Paulette	Grube	Pahoa	96778		HI	
Roger	Harris	Pahoa	96778		HI	
Dana	Keawe	Pahoa	96778	Hawaii	HI	Senate District 2
Diane	Koerner	Pahoa	96778		HI	
Gemma	Lila	Pahoa	96778		HI	
Elizabeth	McCormick	Pahoa,	96778		HI	
Catherine	Okimoto	Pahoa	96778	Hawaii	HI	Senate District 2
Deva	Sage	Pahoa	96778		HI	
Rene	Siracusa	Pahoa	96778		HI	
Robin	Stetson	Pahoa	96778		HI	
Justin	Wagner	Pahoa	96778		HI	
David	Webb	Pahoa	96778		HI	
Jason	Winnett	Kalapana	96778		HI	
barton	susan	O'okala	96774		HI	
Joan	Lander	Naalehu	96772	Hawaii	HI	Senate District 2
james	patitucci	naalehu	96772		HI	
Richard	Powers	Naalehu	96772	Hawaii	HI	Senate District 2
Leilani	Resureccion	Naalehu	96772		HI	
alison	yahna	na'alehu	96772	Hawaii	HI	Senate District 2
Rev. Susan	Sanford	Mountain View	96771	Hawaii	HI	Senate District 2
Richard	Harder	Maunaloa	96770		HI	
mark	jacobs	maunaloa	96770		HI	
Steve	Morgan	Maunaloa	96770		HI	
Cheryl	Sakamoto	Maunaloa	96770		HI	
darlene	toth	maunaloa	96770		HI	
Barnaby	Benton	Makawao	96768		HI	
courtney	Bruch	Makawao	96768		HI	
Chasity	Cadaoas	Pukalani	96768		HI	
Maha	Conyers	Makawao	96768		HI	
Rosa	Enriques	makawao	96768		HI	
Susan	Goldberg	Makawao	96768		HI	
Suzzana	Goodwin	Makawao	96768		HI	
Teri	Holter	Makawao	96768		HI	
Momi	Kaikala	Pukalani	96768		HI	
Jennifer	Kane	Makawao	96768		HI	
randy	keller	Makawao	96768		HI	
pete	sayer	makawao	96768		HI	
Sydney	Seaver	Makawao	96768		HI	
Albert	Sikirdji	Makawao	96768		HI	
Kathleen	Soule	Makawao	96768		HI	
Tristen	Wanke	makawao	96768		HI	
Judith	Waters	Makawao	96768		HI	
patricia	westbrook	Makawao	96768		HI	

David	Yoshida	Pukalani	96768		HI	
Nameaaea	Hoshino	Lahaina	96767		HI	
Judy	Dalton	Lihue	96766	Kauai	HI	Senate District 7
elaine	durban	puhi	96766		HI	
danitza	galvan	lihue	96766		HI	
Donald	Heacock	Lihue	96766		HI	
Miki	kaipaka	Lihue	96766	Kauai	HI	Senate District 7
Walter	Maza	Puhi	96766		HI	
Richard	Miller	Lihue	96766		HI	
Nina	Monasevitch	Lihue	96766		HI	
U'ilani	Nakagawa	lihue	96766		HI	
Lynlie	Waiamau	Lihue	96766		HI	
robert	mceldowney	laupahoe	96764		HI	
Ronna	McEldowney	Laupahoe	96764		HI	
ronna	mceldowney	laupahoe	96764		HI	
Randy	Bartlett	Lahaina	96761		HI	
ELLE	COCHRAN	lahaina	96761		HI	
wayne	cochran	lahaina	96761		HI	
Kathy	Corcoran	Lahaina	96761		HI	
Deborah	DiPiero	Lahaina	96761		HI	
Judith	Epstein	Lahaina	96761		HI	
Lori	Fernandez	Lahaina	96761		HI	
Sophie	Foulkes-Taylor	Lahaina	96761		HI	
Stuart	Kahan	Lahaina	96761		HI	
Vicki	McCarty	Lahaina	96761	Maui	HI	Senate District 5
Jane	Saeger	Lahaina	96761		HI	
Jim	Albertini	Kurtistown	96760		HI	
Kristie	Nakasato	Kurtistown	96760	Hawaii	HI	Senate District 2
Lori	Buchanan	Kualapuu	96757	Maui	HI	Senate District 6
anita	cook	koloa	96756		HI	
Tommy	Cook	Koloa	96756		HI	
Jeri	Di Pietro	Koloa	96756		HI	
Friends of	GMO Free Kaua'i	Koloa	96756		HI	
Ken	Posney	Koloa	96756		HI	
Pamela	Day	Kapaau	96755		HI	
Dana	Moss	Kapaau	96755		HI	
JIM	PEDERSEN	KAPAAU	96755		HI	
Beryl	Blaich	Kilauea	96754	Kauai	HI	Senate District 7
Aimee	Brown	Kilauea	96754		HI	
Blake	Drolson	Kilauea	96754		HI	
Val	Hertzon	Kilauea	96754		HI	
Mary Hunter	Leach	Kilauea	96754	Kauai	HI	Senate District 7
Jorgen	Lien	Kilauea	96754		HI	
sue	lindequist	kilauea	96754		HI	
Lila	Mortell	Kilauea	96754		HI	
Jeannie	Pheasant	Kilauea	96754		HI	
demetri	rivera	kilauea	96754		HI	
Caitlin	Ross Odom	Kilauea	96754		HI	
Kelly	Sato	Kilauea	96754		HI	
Monika	Seiz	Kilauea	96754		HI	

Michal	Stover	Kilauea	96754	Kauai	HI	Senate District 7
Bridget	Tampus	Kilauea	96754		HI	
robin	Torquati	Kilauea	96754		HI	
Wandalea	Walker	Kilauea	96754		HI	
Lee	Altenberg	Kihei	96753	Maui	HI	Senate District 5
Andrea	Baer	Kihei	96753	Maui	HI	
Marguerite	Beavers	Kihei	96753		HI	
MARGO	Cruse	kihei	96753		HI	
Susan	Douglas	KIHEI	96753		HI	
zach	franks	kihei	96753		HI	
Cynthia Unmani	Groves, Groves,Health C	Kihei	96753		HI	
naima	hills	kihei	96753		HI	
Bettina	Jones	Kihei	96753		HI	
Skye	Loe	Kihei'i	96753		HI	
Mayumi	Marks	Kihei	96753		HI	
Alison	Miller	Kihei	96753		HI	
pamela	Palencia	Kihei	96753		HI	
Frances	Pitzer	Kihei	96753		HI	
kelly	prince	kihei	96753		HI	
Elaine	Starrett	Kihei	96753		HI	
Susan	Walsh	Kihei	96753		HI	
Donna	Werner	Kihei	96753		HI	
anita	wintner	kihei	96753		HI	
mark	young	kihei	96753		HI	
Barbara	Childers	Kekaha	96752		HI	
CC	Peyton	Kekaha	96752		HI	
Susan L.	Gierman	Kealakekua	96750		HI	
Bobbie	Alicen	Kea'au	96749	Hawaii	HI	Senate District 2
Guadalupe	Ojeda	Keaau	96749		HI	
Tutabelle	Ojeda	Keaau	96749	Hawaii	HI	Senate District 2
Anthony	Olayon	Kea'au	96749		HI	
Elin	Sand	Kea'au	96749		HI	
John	Schinnerer	Kea'au	96749		HI	
esther	szegegy	Kea'au	96749		HI	
wainani	teixeira	keaaau	96749		HI	
Ingrid	Tillman	Kea'au	96749		HI	
Valerie	Tweiten	Keaau	96749		HI	
Vicki	Vierra	Keaau	96749		HI	
Leimomi	Wheeler	Keaau	96749	Hawaii	HI	Senate District 2
Catherine	Aki	Kaunakakai	96748		HI	
Malia	Akutagawa	Kaunakakai	96748		HI	
Ella	Alcon	Kaunakakai	96748		HI	
Kevin	Brown	Kaunakakai	96748		HI	
Kawika	Estrella	Kaunakakai	96748		HI	
phil	kay	Kaunakakai	96748		HI	
Napua	Leong	kaunakakai	96748		HI	
Nancy	McPherson	Kaunakakai	96748		HI	
Bridget	Mowat	Kaunakakai	96748		HI	
Sharon	Naehu	Kaunakakai	96748		HI	
Shirlee	Newman	Kaunakakai	96748		HI	

PohakamalalamaPalmer		Kaunakakai	96748		HI	
Penny	Rawlins-Martin	Kaunakakai	96748		HI	
walter	ritte	kaunakakai	96748		HI	
Jamie	Ronzello	kaunakakai	96748		HI	
Gandharva Mahina Ross		Kaunakakai	96748		HI	
Ann	Van Eps	Kaunakakai	96748		HI	
Faye	Wallace	Kaunakakai	96748		HI	
Harmonee	Williams	Kaunakakai	96748		HI	
Matt	Yamashita	Kaunakakai	96748		HI	
Tiffany	Anderson	Kapaa	96746	Honolulu	HI	Senate District 10
Karena	Biber	Kapa'a	96746	Kauai	HI	Senate District 7
Kaeo	Bradford	Kapaa	96746		HI	
Carrie	Brennan	Kapaa	96746		HI	
Laura	Espailat	Kapaa	96746		HI	
Limor	Farber	kapaa	96746		HI	
Margery	Freeman	KapaA-a	96746		HI	
Rosemarie	Grassa	Kapa'a	96746		HI	
Fern	Holland	Kapa'a, Kauai	96746	Kauai	HI	Senate District 7
Jennifer	Ire	Kapa'a	96746		HI	
lisa	jobson	kapaa	96746		HI	
Joan	Levy	Kapaa	96746	Kauai	HI	Senate District 7
tracy	lyman	kapaa	96746		HI	
Paul	Massey	Kapaa	96746		HI	
Kaitlyn	McKee	Kapaa	96746		HI	
Beverly	Montel	Kapa'a	96746		HI	
ashley	osler	Kappa -	96746		HI	
Puanani	Rogers	Kapaa	96746	Kauai	HI	Senate District 7
Annlia	Russell	kapaa	96746	Kauai	HI	Senate District 7
Marissa LeimakanalSperry		Kapaa	96746		HI	
Ken	Taylor	Kapaa	96746		HI	
james	trujilloq	Kapaa	96746	Kauai	HI	Senate District 7
Karen	Alvarado	Kailua Kona	96745		HI	
Marjorie	Erway	Kailua-Kona	96745	Hawaii	HI	Senate District 3
Adele	Henkel	Kailua Kona	96745	Hawaii	HI	Senate District 3
Lydia	Hooser	Kailua-Kona	96745		HI	
Lei	Kihoi	Kailua-Kona	96745	Hawaii	HI	Senate District 3
Mark	schuster	Kailua-Kona	96745	Hawaii	HI	Senate District 3
Melinda	Ahn	Kaneohe	96744	Honolulu	HI	Senate District 23
Kuuleianuhea	Awo-Chun	Kaneohe	96744		HI	
trond	borg	kaneohe	96744		HI	
celeste	borges	kaneohe	96744		HI	
Mara L. B.	Chang	KAne'ohe	96744		HI	
Donald	Cooke	Kaneohe	96744	Honolulu	HI	Senate District 23
Liam Gray	Gray	Kaneohe	96744		HI	
mike	irvine	Kaneohe	96744		HI	
Kamuela	Kala'i	Kaneohe	96744		HI	
Annette	KaohelauiA-i	KaneA-ohe	96744	Honolulu	HI	Senate District 24
Dave	Kisor	Kaneohe	96744		HI	
royce	kovacich	kaneohe	96744		HI	
Anitra	Pickett	Kaneohe	96744		HI	

LorrieAnn	Santos	Kaneohe	96744		HI	
LorrieAnn	Santos	Kane`ohe	96744		HI	
Pilipo	Souza	Kaneohe	96744		HI	
Laulani	Teale	Kaneohe	96744		HI	
Marti	Townsend	Kaneohe	96744		HI	
Amy	Wiecking	Kaneohe	96744	Honolulu	HI	Senate District 23
Waimea	Williams	Kaneohe	96744		HI	
Thomas	Young	Kaneohe	96744		HI	
Rosemary	Alles	Kameula	96743		HI	
Michelle	Baydo	Kamuela	96743		HI	
Janice	Brencick	Kamuela	96743	Hawaii	HI	Senate District 3
Kauanoelehua	Chang	Kamuela	96743		HI	
Michele	Chavez-Pardini	Kamuela	96743	Hawaii	HI	Senate District 3
lisa	Damon	Kamuela	96743	Hawaii	HI	Senate District 3
Lani Loring	Howell	Kamuela	96743		HI	
Haunani	Kalama	Kamuela	96743		HI	
Sara	McCay	Kamuela	96743	Hawaii	HI	Senate District 3
Mahina	Patterson	Kamuela	96743		HI	
Douglas	Phillips	Kamuela	96743	Hawaii	HI	Senate District 3
Tony	Rich	Kamuela	96743	Hawaii	HI	Senate District 3
Jeff	Sacher	Kamuela	96743	Hawaii	HI	Senate District 3
Billie	Dawson	Kalaheo	96741		HI	
Mary Lu	Kelley	Kalaheo	96741	Kauai	HI	Senate District 7
Susan	Bender	Kailua-Kona	96740		HI	
Brucella	Berard	Kailua-Kona	96740	Hawaii	HI	Senate District 3
Gwen	Ilaban	Kailua-Kona	96740	Hawaii	HI	Senate District 3
Lorraine	Kohn	Kailua Kona	96740		HI	
Kamuela	Meheula Naihe	Kailua Kona	96740		HI	
janice	palma-glennie	kailua-kona	96740	Hawaii	HI	Senate District 3
Ho'ala	Rivera	Kailua Kona	96740		HI	
claire	Sanders	Kailua Kona	96740	Hawaii	HI	Senate District 3
Deborah	Sevy	Kailua-Kona	96740		HI	
Aggelige	Spanos	Kailua-Kona	96740	Hawaii	HI	Senate District 3
Cynthia	Cynthia Taylor	Keauhou	96739	Hawaii	HI	Senate District 3
Miranda	Watson	Keauhou	96739		HI	
Lehua	Kaulukukui	Waikoloa	96738	Hawaii	HI	Senate District 3
Nancy	Scarola	Waikoloa	96738		HI	
Bob	Zeller	Ocean View	96737		HI	
Jacques	Bargiel	Kailua	96734		HI	
Kristin	Bathen	Kailua	96734		HI	
Alanna	Bender	Kailua	96734		HI	
Patricia	Blair	Kailua	96734	Honolulu	HI	Senate District 24
Patricia	Blair	Kailua	96734		HI	
Maile	Bryan	Kailua	96734		HI	
Roland	Chang	Kailua	96734		HI	
Mele	Coelho	Kailua	96734		HI	
Sephera	Dandurand	Kailua	96734		HI	
Neil	Frazer, PhD	Kailua	96734	Honolulu	HI	Senate District 25
christina	Gauen	kailua	96734		HI	
Carlton Kalani	Handley JR.	kailua	96734		HI	

Andrea	jepson	Kailua	96734		HI	
Kory	Payne	Kailua	96734		HI	
Kim	Payton	Kailua	96734		HI	
Jenn	Perell	Kailua	96734		HI	
becky	robison	kailua	96734		HI	
Thomas	Tizard	Kailua	96734		HI	
Nicholas	Wilhoite	Kailua	96734		HI	
Leslie	Yee Hoy	Kailua	96734		HI	
Frances	Yoshimitsu	Kailua	96734		HI	
CarolLee	Averill	Kahului	96732		HI	
Marie Elena	Juario	Kahului	96732		HI	
Ramon	Mitra	Kahului	96732		HI	
Ramon	Mitra	Kahului	96732		HI	
Kiope	Raymond	Kahului	96732		HI	
Cynthia Kahaulani	Sablas	Kahului	96732		HI	
Jessica	DelaCruz	Kahuku	96731		HI	
Margaret	Primacio	Kahuku	96731		HI	
Noyita	Saravia	Kahuku	96731	Honolulu	HI	Senate District 23
lauren	achitoff	Kaaawa	96730		HI	
Lia	Cain	honokaa	96727		HI	
Sunee	Campbell	honokaa	96727		HI	
william	hardisty	honokaa	96727		HI	
Susan	James	Honokaa	96727		HI	
Z	Johnson	Honokaa	96727		HI	
Nalei	Kahakalau	Honokaa	96727		HI	
Miranda	Lewitsky	Honokaa	96727		HI	
hillary	marsh	honokaa	96727		HI	
Maureen	McGraw	Honokaa	96727		HI	
cynthia	McKean	Honokaa	96727		HI	
susan	sanders	Paaauhau	96727		HI	
leilea	satori	honoka'a	96727	Hawaii	HI	Senate District 1
Raymond	Tokareff	Honokaa	96727		HI	
Ru	Carley	Honaunau	96726		HI	
Kathleen	Carr	Honaunau	96726		HI	
douglas	fox	honaunau	96726		HI	
Esta	Marshall	Honaunau	96726		HI	
Dana YK	Shim-Palama	KALAHEO	96726		HI	
Walter	Andrade	Holualoa	96725		HI	
Jeri	Baumgardner	Holualoa	96725		HI	
Craig	Elevitch	Holualoa	96725		HI	
clare	loprinzi	holualoa	96725		HI	
Shannon Taylor	Monkowski	Holualoa	96725		HI	
Jane	Rubey	Holualoa	96725		HI	
Shannon	Rudolph	Holualoa	96725	Hawaii	HI	Senate District 3
Terry	Tokuda	Holualoa	96725	Hawaii	HI	Senate District 3
Ron	Dixon	Princeville	96722		HI	
heidi and gary	garcia	princeville	96722		HI	
Kathleen	Luiten	Princeville	96722		HI	
jeani	martin	princeville	96722		HI	
Brad	Parsons	Princeville	96722		HI	

Ina	Roessler	princeville	96722		HI	
Andrea	Slevin	Princeville	96722		HI	
Dharma	Wease	Princeville	96722		HI	
noel	al-khatib	hilo	96721		HI	
David	Bishaw	Hilo	96721	Hawaii	HI	Senate District 1
Amy	Cutler	Hilo	96721	Hawaii	HI	Senate District 1
Cory (Martha)	Harden	Hilo	96721	Hawaii	HI	Senate District 1
Kanoe	Kapu	Hilo	96721	Hawaii	HI	Senate District 1
Mark	Lewis	Hilo	96721		HI	
Odette	Rickert	Hilo	96721		HI	
Marcia	Timboy	Hilo	96721	Hawaii	HI	Senate District 1
J.	Zender	Hilo	96721		HI	
Julie	Alessio	Hilo	96720		HI	
Sharol	Awai	Hilo	96720		HI	
Mariah	Bath	Hilo	96720		HI	
nohealani	casperson	hilo	96720		HI	
Victoria	Fiore	Hilo	96720		HI	
Jesse	Fujimoto	Hilo	96720		HI	
Ronald	Fujiyoshi	Hilo	96720		HI	
Mahealani	Jones	Hilo	96720	Hawaii	HI	Senate District 1
Keoki	Kahumoku	Hilo	96720		HI	
Keani	Kaleimamanu	Hilo	96720	Hawaii	HI	Senate District 1
Linda M.	Karr	Hilo	96720	Hawaii	HI	Senate District 1
Rebecca Kapolei	Kiili	Hilo	96720	Hawaii	HI	Senate District 1
Akeamakamae	Kiyuna	Hilo	96720		HI	
Jeffrey	Lagrimas	Hilo	96720	Hawaii	HI	Senate District 1
Viviane	Lerner	Hilo	96720	Hawaii	HI	Senate District 1
Prana	Mandoe	Hilo	96720		HI	
John	Maxwell	Hilo	96720		HI	
Randal	McEndree	Hilo	96720		HI	
James	Pili	Hilo	96720		HI	
Ellen	Posner	Hilo	96720		HI	
Deirdre Moana	Tavares	Hilo	96720		HI	
Leona	Toler	Hilo	96720		HI	
Millilani	Trask	Hilo	96720		HI	
Wendy	Wells	Hilo	96720		HI	
Ron	Whitmore	Hilo	96720	Hawaii	HI	Senate District 1
Avis	Yoshioka	Hilo	96720		HI	
josiane	beauvais	hawi	96719		HI	
Richard	Benton	Hawi	96719		HI	
Michal	Carrillo	Hawi	96719		HI	
Natalie	Young	Hawi	96719		HI	
Linda Louise	Harmon	Hanapepe	96716	Kauai	HI	Senate District 7
Linda	Pascatore	Hanapepe	96716		HI	
Tim	Andres	hanalei	96714		HI	
Lynda	Davis	Hanalei	96714		HI	
Lauryn	Galindo	hanalei	96714		HI	
Miguel	Godinez	Hanalei	96714	Kauai	HI	Senate District 7
Claudia	Herfurt	Hanalei	96714		HI	
Jason	Ito	Hanalei	96714		HI	

Scott	Jarvis	Hanalei	96714	Kauai	HI	Senate District 7
rachel	kattlove	hanalei	96714		HI	
Diane	Krieger	Hanalei	96714		HI	
Sylvia	Partridge	Hanalei	96714	Kauai	HI	Senate District 7
susan	patner	hanalei	96714		HI	
Samantha	Shetzline	Hanalei	96714		HI	
kathy	valier	Hanalei	96714		HI	
Kathryn	Childs	Hana	96713		HI	
Cee	Elbert	Hana	96713		HI	
Theodore	Firestone	Hana	96713		HI	
Mililani	Hanchett Krause	Hana	96713		HI	
Seth	Raabe	Hana	96713		HI	
aerie	WATERS	hana	96713		HI	
Sara	Bartlett-Valente	Haleiwa	96712	Honolulu	HI	Senate District 22
Tinker	Blomfield	Haleiwa	96712		HI	
Mary	Brewer	Haleiwa	96712	Honolulu	HI	Senate District 22
Patrick	Doyle	Haleiwa	96712		HI	
Zenna	Galagaran	Haleiwa	96712	Honolulu	HI	Senate District 22
Gary	Gunder	Haleiwa	96712		HI	
Mary	Lacques	Haleiwa	96712	Honolulu	HI	Senate District 22
Michael	Saiz	Haleiwa	96712		HI	
Jeff	Haun	Hakalau	96710		HI	
andrew	binstock	haiku	96708		HI	
Ralph	Boomer	Haiku, Maui	96708		HI	
Dawn	Boucher	Haiku	96708		HI	
Margaret	Campbell	Haiku	96708		HI	
Shay	Chan Hodges	Haiku	96708		HI	
Sharon	Fairclo	Haiku	96708		HI	
Bernard	Fickert	Haiku	96708		HI	
Laura	Giubardo	Haiku	96708		HI	
Mary C.	Goodman	Haiku	96708		HI	
Joan	Heartfield	Haiku	96708		HI	
Steven	Hookano	haiku	96708		HI	
jennifer	jensen	HAiku	96708		HI	
Lisa	Kasprzycki	Haiku	96708		HI	
Barb	Kay	Haiku	96708		HI	
Barb	Kay	Haiku	96708		HI	
Naia	Kelly	Haiku	96708		HI	
Angela	Kepler	Haiku	96708	Maui	HI	Senate District 6
Mahina	Lenta	haiku	96708		HI	
Ernest	Messersmith	Haiku	96708		HI	
madeleine	migenes	Haiku	96708		HI	
Sodengi	Mills	Haiku	96708		HI	
Robert	Mitnick	Haiku, Maui	96708		HI	
Kyle	Nakanelua	Haiku	96708		HI	
Anne	Pierce	Haiku	96708		HI	
Heaven	Pua	Keanae	96708		HI	
Valentine	Redo	Keanae	96708		HI	
Robin	Reinhart	Haku	96708		HI	
Helen anne	Schonwalter	Haiku	96708	Maui	HI	Senate District 4

Suzanne	Villeneuve	Haiku	96708		HI	
Jan	Celebrado	Kapolei	96707		HI	
EVELYN	SOUZA	Kapolei	96707		HI	
Keoki	Baclayon	Ewa Beach	96706	Honolulu	HI	Senate District 20
pauahi	hookano	ewa beach	96706		HI	
Carolyn	Norman	Ewa Beach	96706	Honolulu	HI	Senate District 20
Linnea	Heu	Ele'ele	96705		HI	
Deborah	Anapol	Captain Cook	96704		HI	
Christine	Makahilahila	Captain Cook	96704		HI	
Owen	Moore	Captain Cook	96704		HI	
Anna	Subiono	Captain Cook	96704		HI	
gia	baiocchi	Anahola	96703		HI	
Andrea	Brower	Anahola	96703		HI	
Andrea	brower	Anahola	96703	Kauai	HI	Senate District 7
Selina	Heaton	Anahola	96703	Honolulu	HI	Senate District 23
Lorilani	Keohokalole-Torio	Anahola	96703		HI	
Lindyl	Lanham	Anahola	96703		HI	
Rebecca	Miller	Anahola	96703		HI	
Abilynn	Rita	Anahola	96703		HI	
Leonard W	Rita jr	Anahola	96703		HI	
Tracey	Schavone	Anahola	96703		HI	
Vicki	Spina	Anahola	96703		HI	
Erica	Taniguchi	Anahola	96703		HI	
Debi	Wilson	Anahola	96703		HI	
Pualani	Baptista	Aiea	96701		HI	
Alexis	Horio	Aiea	96701		HI	
Jenna	Byrne	Willits	95490		CA	
PHYLLIS	FLOWERS	WILLITS	95490		CA	
FREDDIE	LONG	WILLITS	95490		CA	
MABEL	LONG	WILLITS	95490		CA	
beverlea	weaver	willits	95490		CA	
Kerry	Beck	Sebastopol	95472	Sonoma	CA	Senate District 2
Dixie	van der Kamp	Santa Rosa	95404		CA	
Peter	Sanderson	Santa Rosa	95401		CA	
Leslie	Santos	Merced	95340		CA	
Alexander	Jelinek	San Jose	95136	Santa Cla	CA	Senate District 11
Karen	Affonso	San Jose	95130		CA	
Earlene	Cuelho Alexiou	Soquel	95073		CA	
Alexa	Watson	Santa Cruz	95062		CA	
Patricia	Matejcek	Santa Cruz	95060		CA	
Dennis	Lynch	Felton	95018		CA	
Toni A.	Wolfson,RN	Felton	95018		CA	
Joseph	Nu'uauu, S.M.	Cupertino	95014		CA	
Laura	Lee	Larkspur	94939		CA	
Tara	Cornelisse	San Rafael	94903	Marin	CA	Senate District 3
Lisa	Chipkin	San Rafael	94901		CA	
Kim	Hahn	San Rafael	94901		CA	
Marcia	McDuffie	El Sobrante	94803		CA	
Amy	Marsh	Albany	94706	Alameda	CA	Senate District 9
Marcia	Kervit	Berkeley	94702		CA	

Kathryn	Letkey	Oakland	94610	Alameda	CA	Senate District 9
norbert	farrell	oakland	94602		CA	
sandra	morey	oakland	94602	Alameda	CA	Senate District 9
Aura	Lane	Oakland	94601		CA	
Stepahine	Eike	Orinda	94563		CA	
Marcia	McDuffie	Martinez	94553		CA	
Donna	Weilenman	Martinez	94553		CA	
William	Golove	El Cerrito	94530	Contra Cc	CA	Senate District 7
Claire	Cummings	Angwin	94508		CA	
jennifer	beck	foster city	94404		CA	
Maya	Moiseyev	Palo Alto	94306	Santa Cla	CA	Senate District 11
Diane	Marshall	Hilo	94270		HI	
Isao	Kaji	honolulu	94121		HI	
Timothy	Johnston	San Francisco	94117	San Franc	CA	Senate District 3
Kathleen U'ilani	Campana	San Carlos	94070	San Mateo	CA	Senate District 11
Karen	Rudolph	Los Altos	94022		CA	
Linda	Evans	Monterey	93940	Monterey	CA	Senate District 15
Kaela	Gallagher	San Luis Obispo	93401		CA	
Mary	Elliott	Santa Barbara	93130		CA	
Jaime and Cheryl	Snyder	Santa Barbara	93130	Santa Bar	CA	Senate District 19
Elisha	Belmont	Westminster	92683	Orange	CA	Senate District 35
Cynthia	Simms	Laguna Niguel	92677		CA	
Katie	Winchell	Huntington Bea	92649	Orange	CA	Senate District 35
Jacqueline	Judd	Huntington Bea	92646		CA	
robin	Rabens	Idyllwild	92549	Riverside	CA	Senate District 37
Lea	Lea Padilla	Redlands	92373	San Berna	CA	Senate District 31
Cindy	Williams	Yucca Valley	92284		CA	
dinda	Evans	San Diego	92177	San Diego	CA	Senate District 39
John	Monte	San Diego	92154	San Diego	CA	Senate District 40
Theodora	Furtado	San Diego	92115		CA	
Wendi	Faria	San Diego	92101		HI	
Merle	O'Neill	Vista	92081	San Diego	CA	Senate District 38
Dolly Keahiolalo	Crawford	El Cajon	92021		CA	
Malia	Hall	San Diego	91911		CA	
Chelice	Gilman	Bonita	91910	San Diego	CA	Senate District 36
Anita	Arconado	San Dimas, CA	91773	Los Ange	CA	Senate District 29
jackie	Raines	Ontario	91762	San Berna	CA	Senate District 32
Carolyn	Lunel	Etiwanda	91739		CA	
roy	lunel	etiwanda	91739		CA	
Angela	Spirrison	reseda	91335		CA	
Cindy	Crawford	Long Beach	90815		CA	
Shien-lu	Stokesbary	Long Beach	90804		CA	
Dona	van Bloemen	Santa Monica	90403	Los Ange	CA	Senate District 23
Corey Ann	Lewin	West Hollywoo	90069		CA	
Ken	Ng	LA	90066		CA	
Saran	Kirschbaum	Los Angeles	90035		CA	
glory	dassi	El Prado	87529		NM	
Nancy	London	Santa Fe	87505		NM	
Richard	Welker	Santa Fe	87505		NM	
Rose	Zellers	Albuquerque	87112	Bernalillo	NM	Senate District 18

Carrie	Rex	Albuquerque	87105	Bernalillo	NM	
Tricia	Egger	Sedona	86336		AZ	
Desdra	Dawning	Sun Lakes	85248	Maricopa	AZ	
Brooke	Lind	Queen Creek	85242		AZ	
Carolyn	Moore	Mesa	85215	Maricopa	AZ	Senate District 19
jesse	soto	phoneix	85021		AZ	
Martina	Roels	Sint Niklaas-Be	84635		ot	
Joseph	Joseph Bateman	Salt Lake City	84103	Salt Lake	UT	Senate District 2
Kathy-Lyn	Allen	Pueblo	81003	Pueblo	CO	Senate District 3
Pumehana	paisner	Boulder	80301	Boulder	CO	Senate District 18
tom	jackson	denver	80219	Denver	CO	Senate District 34
Shannon	Dodge	Centennial	80122		CO	
Diana	Lopez	Wheat Ridge	80033		CO	
mikel	Athon	cedar hill	75104	Dallas	TX	Senate District 2
James	Lopez	Topeka	66614		KS	
Cheryl	Rosenfeld	Columbia	65202	Boone	MO	Senate District 19
Sara	Schmidt	Arnold	63010		MO	
Ravi	Grover	Chicago	60680	Cook	IL	Senate District 5
Diana	Fischer	Darien	60561		IL	
Mel S	Stark	Sandwich	60548	La Salle	IL	Senate District 35
Amy	Young	Bigfork	59911		MT	
Paul	Moss	White Bear Lak	55110	Ramsey	MN	Senate District 53
Jeffrey	Smith	Fairfield	52556		IA	
Ramona	Fernandez	East Lansing	48823		MI	
Susie	Pearson	DeWitt	48820		MI	
Joan	VanSelous	Highland	48356		MI	
Will	Ware	Detroit	48226	Wayne	MI	Senate District 1
Nancy	Langeneckert	Canton	48187		MI	
DIANA(ANIMALS	Martz - Animalspirit	INDIANAPOLI	46217	Marion	IN	Senate District 36
Forrest	Hurst	Westfield	46074	Hamilton	IN	Senate District 21
Cathy	Robinson	Mobile	36695	Mobile	AL	Senate District 34
April	Esterly	Sarasota	34234		FL	
greg	moser	naples	34114		FL	
Mary	Detrick	St. Petersburg	33710		FL	
Anna	Reycraft	North Miami	33181	Miami-Dc	FL	Senate District 35
donald	stevens	winter park	32792	Orange	FL	Senate District 22
Robert	Wagner	Lawrenceville	30044	Gwinnett	GA	Senate District 5
Deborah Lynn	Dickerson	Easley	29642		SC	
Hallie	Van Patton	Asheville	28804		NC	
Leimamo	Lind	Alexandria	22314		VI	
Maria	Gallo	Lothian	20711		MD	
Royelen Lee	Boykie	Washington	20016	Washingt	DC	Ward 3
Andrew	Benson	Lewes	19958		DE	
tina	horowitz	philadelphia	19143	Philadelp	PA	Senate District 7
daniel	greider	lancaster	17601		PA	
Cynthia	Nadalín	Felton	17322		PA	
Raenette	Rogers	Delta	17314		PA	
Margaret	Rydant	Northborough	15321	Worcester	MA	First Worcester Ser
isobel	storch	Pittsburgh	15206		PA	
Bobbi	Aqua	Sag Harbor	11963		NY	

Tibor	Weinreb	Brooklyn	11236		NY	
Jonathan	Schwartz	Brooklyn	11231		NY	
Bryan	Milne	Brooklyn	11211	Kings	NY	Senate District 17
Verbeke	Dominique	Izegem, Flander	8870		ot	
Denise	Lytle	Fords	8863	Middlese:	NJ	Senate District 19
Frederika	Ebel	Flemington	8822	Hunterdo	NJ	Senate District 23
David	Storch	Brick	8723		NJ	
donnalene	sing	honolulu	96816		HI	
Å...se	Borg	Arendal	4848		ot	
Faith M.	Willcox	Westport	4578	Sagadah	ME	Senate District 19
Danielle	Ledward	Jamaica Plain	2130		MA	
Marc	Albert	Sudbury	1776		MA	
Raechel	Doughtyq	North Adams	1247		MA	
Sheila	Ward	San Juan	927		PR	
Glen	Venezio	San Juan	911		PR	
Carmen	L	Madrid	Spain		ot	
Doreen	Redford	Aiea		Honolulu	HI	Senate District 16
Lindsay	McDougall	Toronto	Canada		ON	
Leimomi	Martin	Juneau	99901	Juneau	AK	Senate District B
Judith	Lyon	Anchorage	99511		AK	
Janet	Smith	Vancouver	98666		WA	
Den Mark	Wichar	Vancouver	98660	Clark	WA	Senate District 49
Katy	Fogg	Olympia	98501	Thurston	WA	Senate District 22
Pam	Haight	Olympia	98501		WA	
Forest	Shomer	Port Townsend	98368	Jefferson	WA	Senate District 24
Loralee	Jacobson	Arlington	98223		WA	
David Adam	Edelstein	Seattle	98125	King	WA	Senate District 46
Victoria	Hanohano-Hong	Seattle	98122		WA	
Beverly	Mendheim	Seattle	98122	King	WA	Senate District 43
Zachary	Klaja	Seattle	98102	King	WA	Senate District 43
Charles	Lawson	Kent	98042	King	WA	Senate District 47
Wanda	Brown	Bend	97702		OR	
Joy	bannon	ashland	97520		OR	
Lila	Liebmann	Portland	97219		OR	
Nancy	O'Harrow	Lake Oswego	97068	Clackama	OR	Senate District 19
Ralph	davis	Scappoose	97056	Columbia	OR	Senate District 16
Charles	Alger	Sandy	97055		OR	
sandra	phillips	OREGON CITY	97045	Clackama	OR	Senate District 26

## wooley1-Christopher

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**From:** mailinglist@capitol.hawaii.gov  
**Sent:** Monday, March 02, 2009 3:41 PM  
**To:** AGRtestimony  
**Cc:** hspoehr@papaolalokahi.org  
**Subject:** Testimony for HB1663 on 3/4/2009 9:00:00 AM  
**Attachments:** HB 1663.doc

Testimony for AGR 3/4/2009 9:00:00 AM HB1663

Conference room: 312  
Testifier position: support  
Testifier will be present: No  
Submitted by: Hardy Spoehr  
Organization: Papa Ola Lokahi  
Address: 894 Queen Street Honolulu, HI  
Phone: 808-597-6550  
E-mail: [hspoehr@papaolalokahi.org](mailto:hspoehr@papaolalokahi.org)  
Submitted on: 3/2/2009

### Comments:

The mission of Papa Ola Lokahi is to improve the health and wellness of Native Hawaiians, their families and others by advocating for, initiating and maintaining culturally appropriate strategic actions.

`Imi Hale Native Hawaiian Cancer Network, is a program of Papa Ola Lōkahi, operating on the principles of community-based participatory research and empowerment theory.

## TESTIMONY IN SUPPORT OF TARO FARMERS REGARDING

### HB 1663 RELATING TO TARO SECURITY

**Hearing date, time and place:**

**Wednesday, March 4, 2009 9:00 a.m. Conf. Rm. 312**

Aloha Chairperson Tsuji, Vice-Chair Wooley and House Committee on Agriculture Members. Thank you for this opportunity to testify on House Bill 1663, which prohibits the development, testing, propagation, release, importation, planting, or growing of genetically modified taro in the State of Hawai'i.

Papa Ola Lokahi and `Imi Hale Native Hawaiian Cancer Network, a program of Papa Ola Lokahi, joins communities across Hawaii in rejecting the genetic modification of -ALL- taro varieties, by supporting a ban on all GMO-taro. We are deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds--without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

Taro is a nutritious food crop, especially cherished as a baby food and staple dish in Hawaii for centuries; and around the world as an important medicinal food for diabetes, cancer, autism and serious food allergies. Taro is the world's only hypo-allergenic, or allergy-free, carbohydrate. GMO-taro, on the other hand, is not the same as natural taro. GMO-taro has never been in the human food supply before, and has NOT been scientifically tested on humans to prove that it is safe to eat. Moreover, the unnatural genetic mutations of GMO-taro can never be guaranteed to be hypo-allergenic, thus threatening consumers of this uniquely important medicinal food source. In fact, numerous scientific studies on laboratory animals show that GMOs can cause toxic, allergic, and even deadly reactions. Unnatural gene mutations introduced through GMO-taro may harm insects, birds, fish, and soil health. Risks and damages to Hawaii's people and lands could be irreversible.

Cultivated throughout centuries to be abundantly grown on Hawaii's diverse agricultural lands, taro is the sacred foundation of our unique local agriculture, society, traditions and family

structure. Genetic modification of taro is an affront to the sacred Hawaiian tradition that respects the taro plant as a family member, an older brother to humanity. This family tradition is rooted in honoring the relationship of mankind with the very plants we depend on for healthy nourishment, and establishes a unique genealogical connection between taro and the Hawaiian people. The wisdom of such healthy community values must be encouraged, not disrespected or desecrated. Despite the unique and utmost importance of this plant to our community, GMO-taro has been developed without any informed community consent, raising serious ethical science concerns. Hawai'i lawmakers must require informed community consent and review, particularly because it is our communities who will be most affected by GMO activities.

The right to grow taro naturally and traditionally belongs to the public, and should never be owned by a corporation or university. Private patents and control of our public food resources would cripple our food security, taro economy and violate our inherent public rights. GMO-taro experiments and patents cannot help taro farmers with the real problems that they face, e.g. water rights, land shortage and use, and commercialization of our natural and inherent resources.

In "exchange" for a ban on GMO-taro, the biotech/GMO industry may attempt to turn our community's intentions to protect taro into unfair "preemption" legislation which would prohibit state or county oversight, and public notice of all other GMOs and biotech activities in Hawaii. We do not support any such attempts to preempt legitimate local government regulations to protect public health. Preempting local efforts to protect public health raises serious legal, ethical, and scientific concerns-- our public and environmental safety, as well as our local-governance authority, must be prioritized over private investment concerns and high-risk experiments.

There is no actual need to permanently change the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

As strong supporters of traditional taro farming in Hawaii, we ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

ʻO wau iho no.

Hardy Spoehr, Executive Director  
Papa Ola Lōkahi

Clayton Chong, M.D., Principal Investigator  
ʻImi Hale Native Hawaiian Cancer Network  
a program of Papa Ola Lokahi



# SIERRA CLUB

## HAWAI'I CHAPTER

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### HOUSE COMMITTEE ON AGRICULTURE

March 4, 2009, 9:00 A.M.

### TESTIMONY IN SUPPORT OF HB 1663

Chair Tsuji and Members of the Committee:

The Sierra Club, Hawai'i Chapter, with nearly 5500 dues paying members statewide, supports HB 1663, prohibiting the development, testing, propagation, release, importation, planting, or growing of genetically modified taro plants in the State of Hawai'i.

Genetically modifying organisms—the practice of splicing DNA from bacteria, viruses and other organisms into plants to lend them certain traits, like resistance to chemical weedkillers—poses extreme risks to our common environment. Manipulation of genetic material by inserting bacteria, plant, animal, and human genes into food products is a radical departure from traditional breeding techniques and represents an unprecedented break with natural processes.

In Hawai'i, such genetically modified organism (GMO) biotechnology is mainly experimental. Most of the experiments are taking place not in a laboratory, but in the open air, in locations concealed from the public. In fact, Hawai'i has had more plantings of experimental biotech crops than anywhere else in the nation—or the world.

Hawaii's small size, its close proximity of agricultural and populated areas, and its unique, sensitive, natural environment combine to dramatically raise the stakes of testing GMO crops here. A December 2005 report from the Inspector General of the US Department of Agriculture (USDA), found that USDA's inadequate safeguards "increase the risk that genetically engineered organisms will inadvertently persist in the environment before they are deemed safe to grow without regulation."

While decision makers are just beginning to understand the magnitude of the problem in Hawai'i, Taro is an important, cultural crop that is immediately at risk. This crop is primarily grown by small, local farmers. It also has significant cultural importance. To adequately protect the environment and the Hawai'i taro industry, we should put an immediate halt to continued development of GMO Taro.

Thank you for the opportunity to testify.



P. O. Box 210  
Keaau, Hawaii 96749  
Phone (808) 966-7435  
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TESTIMONY BEFORE THE HOUSE COMMITTEE  
ON AGRICULTURE

HOUSE BILL 1663  
(HSCR573)

RELATING TO TARO SECURITY

PRESENTED TO THE TWENTY-FIFTH LEGISLATURE  
STATE OF HAWAII

MARCH 2009

Dear Chairman Tsuji & Members of the Committee:

**VERY STRONGLY OPPOSE.**

Tropical Hawaiian Products (THP) opposes HB 1663 (HSCR573) prohibiting the development, testing, propagation, release, importation, planting, or growing of genetically modified taro in the State of Hawaii and urges your committee to vote against it.

My name is Loren Mochida, General Manager of THP in Keaau, Hawaii. THP is a processor and exporter of Hawaiian Premium papayas to CONUS and Japan and represents over 50 papaya growers. I am also a Director on the Hawaii Papaya Industry Association (HPIA) Board.

Research and approvals of all biotechnology crops takes years to complete. This is done to ensure the integrity of the crop and insure that it is safe to the environment and consumers. Should a virus or disease devastate a crop in Hawaii, a resistant variety could be standing by to continue the production.

Common sense will show that stopping all research and testing of biotech crops can be injurious to those particular commodities. It would not be practical for research and testing to be done when devastation of a crop takes place. It is not a smart business decision.

Should research and test plantings show the positive results of the new variety, then growers will then have a choice whether to grow these GMO variety or not. Papaya Growers in the state have already chosen whether they want to produce by biotechnology, conventional, or organic. They have a choice.

Agencies, Legislators, and specialty groups are sometimes pressed to "pick sides" among Biotech, conventional, and organic production methods, but I do believe all three production systems are critical to the economic viability and sustainability of Hawaii. Instead of more Bills in the legislature to ban GE crops, I believe that attention should now be focused on how farmers oppose to the technology and those in favor of it can step back from the controversy and successfully produce and market their crops as they see fit.

We urge the committee to seriously consider the consequences of prohibiting advancement of any crops in the State of Hawaii.

Thank you for the opportunity to testify on HB 1663 (HSCR 563).

**wooley1-Christopher**

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**From:** mailinglist@capitol.hawaii.gov  
**Sent:** Tuesday, March 03, 2009 6:00 AM  
**To:** AGRtestimony  
**Cc:** shanti108@hawaii.rr.com  
**Subject:** Testimony for HB1663 on 3/4/2009 9:00:00 AM

Testimony for AGR 3/4/2009 9:00:00 AM HB1663

Conference room: 312  
Testifier position: support  
Testifier will be present: No  
Submitted by: William Bailey  
Organization: Individual  
Address:  
Phone:  
E-mail: [shanti108@hawaii.rr.com](mailto:shanti108@hawaii.rr.com)  
Submitted on: 3/3/2009

**Comments:**

Please protect all varieties of Hawaiian taro from genetic modification. This is a very important plant in Hawai`i—culturally, nutritionally and commercially—and should not be subject to any genetic changes. Please pass HB1663. Mahalo.

**wooley1-Christopher**

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**From:** Colehour Bondera [colemel@kanalanifarm.org]  
**Sent:** Monday, March 02, 2009 5:57 PM  
**To:** AGRtestimony  
**Subject:** SUPPORTING HB 1663 Taro Bill

Agriculture Committee Hearing  
HB 1663 Taro Bill  
Hearing Wednesday March 4, 2009 at 9:00 a.m. in Room 312  
Chair: Clift Tsuji

Dear Chair Clift Tsuji,

I am writing in SUPPORT of HB 1663. Please pass this bill through your Agriculture Committee. I grow taro certified organically for market and to feed my family. If genetically engineered taro is allowed to be tested in the field or commercially grown on Hawaii Island, it will contaminate my crop. I won't be able to sell it certified organic at the Keahou Farmers Market. I won't want to feed it to my children as GMO crops do not have an adequate health safety testing regulatory structure in place in the United States.

Finally I would feel that I was violating the trust of the Native Hawaiian planters who have cultivated and saved these varieties for generations in order for me to have the honor of growing and selling them today- please, don't allow the genome of this sacred plant to be violated by foreign genes.

Sincerely,

Melanie Bondera  
Kanalani Ohana Farm

Honaunau, HI  
Hawaii Island

Representative Clift Tsuji, Chair  
Representative Jessica Wooley, Vice Chair  
House Committee on Agriculture

Opposition of HB 1663, relating to Genetically Modified Plant Organisms

**Room:** 312

**Hearing Date:** Wednesday, March 4<sup>th</sup>

**Time:** 9:00 AM

Position: **Oppose**

Dear Representative Tsuji,

My name is Ryan Braun, I live in Kekaha on the island of Kauai and I oppose the passage of HB 1663. This bill goes too far by banning research of all varieties of taro (Hawaiian and non-Hawaiian). It is possible that in the future Hawaii could face a disease or insect pest that would destroy the taro production we have left in the State. If we limit the tools we can use to fight future diseases and pests we will regret it later.

Thank you for this opportunity to testify.

Ryan Braun  
[Ryan.braun@syngenta.com](mailto:Ryan.braun@syngenta.com)

Kekaha, HI  
96752

## GMO TARO—A TARO FARMER'S PERSPECTIVE

Aloha, my name is Jim Cain, my family and I farm taro in Waipi'o Valley, island of Hawai'i. We also own and operate a family-run poi shop, King Laulau Brand Poi, where we process the taro we grow on our 6 acre farm, as well as taro we obtain from other farmers, providing poi for our Big Island community. I stand united with all the farmers of Waipi'o and strongly oppose the genetic modification of taro. My opposition to genetic engineering of taro is based on cultural, economic, and nutritional concerns.

The cultural concerns relating to the genetic manipulation of kalo cannot be overstated. Kalo's position as a high ranking family member in Hawaiian cosmology reflect deep rooted cultural values. These values, reinforced by kalo's role as a kinolau of Kane, show reverent respect for the natural world and kalo's ability to sustain and nourish people. These sacred family relationships can be traced back centuries to the very beginnings of Hawaiian culture, and every week when I deliver poi to my loyal customers, I am reminded of the importance of this ancestral food and its ability to nourish physically as well as spiritually. Genetic manipulation of Haloa shows utter disrespect for Hawaiian culture. In addition, recent attempts to patent and own taro hybrids derived from Hawaiian cultivars of taro are a cultural violation of these precious gifts that have been handed down to us generation to generation and are a direct link to our past.

Economically, genetic modification poses several risks to taro farmers and the poi industry. In recent years, there have been efforts to hybridize new varieties of taro in an attempt to produce disease resistance and increased yields. Cultivars of taro have been brought to Hawai'i from many places in the taro growing world to hybridize with Hawaiian varieties. After showing some initial promise, extensive testing by poi processors has shown that these hybrids produce inferior quality poi. Also, foreign cultivars of taro such as Palauan have been introduced into lo'i all around the state. While high-yielding, these varieties produce a low quality poi. Farmers have been left with no market for their crop, which takes over a year to produce, as poi millers universally reject these inferior taros. Subsequently, the availability of huli of the preferred Hawaiian varieties has been reduced. This has created both short-term and long-term economic hardships for taro farmers and poi processors and has contributed to the recent shortage of poi.

Of primary concern is the very real danger of contamination. A genetically engineered taro huli will look identical to the original Hawaiian variety from which it is derived. Once released into the lo'i, either controlled or by accident, recall will be impossible. Should problems arise, the effects of this contamination would be devastating to our industry. A history of contamination of other food crops world-wide by GE varieties has proven that containment, despite the reassurances of the bio-tech industry, is impossible.

Another economic concern of taro farmers is the issue of patenting of taro varieties. The traditional system of sharing huli between farmers is a proven way of ensuring the availability of planting material. The introduction of GE taro would seriously disrupt the ability of farmers to share huli and reduce the availability of suitable planting material.

Recent attempts by the University of Hawai'i to patent and sell huli to farmers is seen as an unacceptable precedent to make money off those who can least afford it. The bio-tech industry is not here for community service, but is predicated on the goal of controlling the incredibly profitable seed supply.

Nutritionally, poi has a world-wide reputation as a pure and healthy complex carbohydrate. There are no known allergies to poi, it is a food that can be assimilated by anyone. As a poi maker, I am honored to provide this nutritious food to babies whose parents use our poi as the first food to nourish their children, to elders who have been eating poi all their life, and to a wide range of people in between. Also, poi plays such an important role in celebrating families' life events such as baby lu'aus, graduations, weddings and funerals. A lu'au is not complete without poi on the table. Genetic engineering of taro consists of imposing genes from other plants such as rice and wheat into taro's DNA. The resulting changes could have untold effects on the hypo-allergenic qualities of taro and poi. When researchers are asked if they can guarantee the safety of their work, they honestly answer no. The dangers posed to the nutritional quality of this ancestral staff of life are completely unacceptable.

From my perspective as a Waipi'o taro farmer and poi processor, the disagreement over this issue is really a clash of values. University researchers value and are concerned about their perceived right to academic freedom. The bio-tech industry values and is concerned about their perceived right to unregulated free-market economics. Waipi'o, where I come from, is a very traditional Hawaiian valley. The still intact protocols and values that have been handed down are based on the value of Kuleana—rights that are based in the concept of responsibility. While moving forward, it is important to remember our connection to the past. That is why, in Waipi'o, the titles that garner the most respect are not Dr. or Professor, but begin with Auntie or Uncle or Tutu. It is important to note that the UH researcher responsible for the GE research on taro has never even been to Waipi'o Valley. Technology is seen as a tool not as a guiding principle. Science can be a wonderful tool for advancement, but science without a conscience, without the guidance of the precautionary principle, can wreak havoc. There must be a balance. In other words, Go easy. Be respectful.

In these troubled times of global warming, resource depletion, and world-wide unrest, the buzz word in Hawai'i has become sustainability. Reducing our dependence on off-island petro-chemical control, and becoming self-sufficient in food production are of huge concern. The proven methods of producing taro and poi can be seen as a model for the future of sustainable agriculture in Hawai'i. Producing taro with little or no outside resources, and providing food for our local population is a practice that has a track record that is centuries old in Hawai'i and stretches back many thousands of years in the history of mankind. It is vitally important that we support farmers who are feeding our local population.

The decline of taro production can be seen as a mirror duplicating the problems of self-sufficient food production in Hawai'i. The problems are rooted in availability of land and water and re-elevating the job of farmer to a viable occupation and way of life. Claims made by the bio-tech industry of impending devastating diseases are seen as scare tactics. Any good farmer knows that the key to crop health is soil fertility and it is in this direction we should be focusing our policies and research efforts. These are not new concepts, but lessons handed down to us from our kupuna. We just need to listen.

There is nothing wrong with our Hawaiian taros. They were developed over centuries by some of the most respected farmers the world has ever known. The sad decline in the number of varieties of taro that was grown by our ancestors has nothing to do with disease, but lies in the fact that, over the last century, people have moved off the land and instead of growing their food, are now buying all their food. In the interest of Hawai'i's long term security we need to reverse this practice.

Support for the passage of HB 1663 and SB709 that calls for a ban on the genetic engineering of taro in Hawai'i has swelled as people have become educated about this issue. The Hawaiian community, the taro farming community, and the poi eating community will continue to be passionately vocal in their efforts to protect Haloa. This will not go away because this is ohana. Precedence for the careful regulation of biotechnology has been established at every level of government world-wide, and it is important that the decision makers in Hawai'i educate themselves about the risks associated with this potentially dangerous technology.

In conclusion, I advise people that the best way to identify a taro farmer is to look at their feet. No can help, us taro farmers have ugly feet, it's an occupational hazard. So when someone claims to be speaking in the interest of the taro farmers, look at their feet. Look at who they represent. Please support our local farmers. Please malama Haloa.

Jim Cain, Waipi'o Valley

[kinglaulau@hotmail.com](mailto:kinglaulau@hotmail.com)

Caren Diamond  
P. O. Box 536  
Hanalei, Hi. 96714  
March 2, 2009

**Testimony in Strong Support HB 1663,**

AGR

Room: 312  
Hearing Date 3/4/2009  
9:00:00 AM

Aloha Committee Members,

Please support HB 1663. Our Aina, translated as that which feeds us, needs your help. Taro, is different than other crops, providing a living link to our history, and ancestors, as each huli planted reaches back in time to our ancestors and past farmers who sustained their families farming taro, caring for the land.

Taro is often synonymous with Hanalei. Our verdant green valley is home to many varieties of taro. As a resident of Kauai's North Shore, our community and culture is steeped in taro, it is both historically very significant, and crucial for our future.

Variety and diversity is the key to life, and in this time of high food insecurity, all taro should remain "natural", not modified by science. No other plant has the very same beginnings as in the past. Taro is an amazing plant, where the future and past are one. There is no reason for biotechnology to enter this sacred dance of nature. Truly, taro, in all its varieties, belong to the Hawaiian People. Why mess with a staple crop of the Hawaiian people? Each Taro plant has its history rooted with the ancestors, and it should remain that way.

Both the unknown risks and unintended consequences of genetic engineering of taro are unacceptable. The loss of

taro's natural genetic integrity may compromise the plants ability to naturally adapt. Biodiversity is the key to plant life and Hawaii's agriculture , necessary for our sustainability into the future .

If researchers insert genes from corn, wheat, rice and other organisms, you don't know what is in it and it's not taro anymore. The genetic manipulation of taro is undesirable and unnecessary. There are many traditional means of building good soil health and improving crop quality that should be utilized, rather than the use of genetic manipulation of such an important staple to the people of Hawaii.

Please support this important bill.

Mahalo for your support, Caren Diamond

## wooley1-Christopher

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**From:** DILL JR, GERALD M [AG/2111] [gerald.m.dill.jr@monsanto.com]  
**Sent:** Tuesday, March 03, 2009 11:21 AM  
**To:** AGRtestimony  
**Subject:** Opposition to Bill HB 1663 and Support of Bill HB 1226

I would like to voice my opposition to HB 1663. Banning research on any crop is a bad decision indeed. I respect the place that Taro holds to Hawaiian people and its culture and support the grower's free choice to select and grow organic varieties of all crops. However, legislation that stops research will stop development of tools and solutions to future problems that may arise from disease and pest pressure. Biotechnology is responsible for some of the most impactful plant diagnostic tools ever developed. The adoption of the tools and advances developed in this industry should be used to help improve genetics and crop performance in all crops.

All research done in accordance with and under valid permit from relevant federal agencies should be allowed to proceed. I ask you to join me in opposing HB 1663 and support the alternative HB 1226.

Sincerely,

Gerry Dill

Kapolei, HI

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## wooley1-Christopher

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**From:** Martin Donohoe [martindonohoe@phsj.org]  
**Sent:** Tuesday, March 03, 2009 10:48 AM  
**To:** AGRtestimony  
**Cc:** Rep. Clifton K. Tsuji; Rep. Isaac W. Choy; Rep. Cindy Evans; Rep. Joey Manahan; Rep. James Tokioka; Rep. Barbara Marumoto  
**Subject:** re opposition to HB 1226, support of HB1663

3/3/09

I am a physician who volunteered with Americares on Kauai after Hurricane Iniki. I have since made over 10 trips to vacation (and sometimes work) at the old Garden Island Medical Group in Waimea and at KVMH. I am also the Chief Science Advisor for Oregon Physicians for Social Responsibility's Campaign for Safe Food, which is concerned about the spread of GMOs and biopharmed crops. Given the increasing data on contamination of native crops by GMOs and the adverse environmental and health consequences of GMOs, it would be a shame (and potentially harmful to Hawaii's economy and even tourism) for the islands to permit farming of GM coffee and taro. I hope you will do whatever it takes to prevent planting of these GM crops. Thus I hope you will not support HB 1226, and that you will pass HB 1663 without any changes. Slide shows and articles covering GM crops can be found on the food safety page of my website at [http://phsj.org/?page\\_id=14](http://phsj.org/?page_id=14). The web address for the entire website is below.

Thanks for listening.

Sincerely

Martin Donohoe, MD, FACP  
Adjunct Associate Professor, School of Community Health  
Portland State University  
Chief Science Advisor, Campaign for Safe Foods and  
Member, Board of Advisors  
Oregon Physicians for Social Responsibility  
Senior Physician, Internal Medicine, Kaiser Sunnyside Medical Center  
<http://www.publichealthandsocialjustice.org>  
<http://www.phsj.org>  
[martindonohoe@phsj.org](mailto:martindonohoe@phsj.org)

Representative Clift Tsuji, Chair  
Representative Jessica Wooley, Vice Chair  
House Committee on Agriculture

Opposition of HB 1663, relating to Genetically Modified Plant Organisms

**Room:** 312

**Hearing Date:** Wednesday, March 4<sup>th</sup>

**Time:** 9:00 AM

**Position:** **Oppose**

Dear Representative Tsuji,

My name is Robert Gandia I live in Kekaha on the island of Kauai and I oppose the passage of HB 1663. This bill goes too far by banning research of all varieties of taro (Hawaiian and non-Hawaiian). It is possible that in the future Hawaii could face a disease or insect pest that would destroy the taro production we have left in the State. If we limit the tools we can use to fight future diseases and pests we will regret it later.

Thank you for this opportunity to testify.

Robert Gandia,  
P.O. Box 115 Kekaha, Hi, 96752  
bitos1@yahoo.com

## wooley1-Christopher

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**From:** mailinglist@capitol.hawaii.gov  
**Sent:** Tuesday, March 03, 2009 8:58 AM  
**To:** AGRtestimony  
**Cc:** veronica.r.garcia@hawaii.gov  
**Subject:** Testimony for HB1663 on 3/4/2009 9:00:00 AM  
**Attachments:** HB1663.doc

Testimony for AGR 3/4/2009 9:00:00 AM HB1663

Conference room: 312  
Testifier position: support  
Testifier will be present: No  
Submitted by: Veronica Garcia  
Organization: Individual  
Address:  
Phone:  
E-mail: [veronica.r.garcia@hawaii.gov](mailto:veronica.r.garcia@hawaii.gov)  
Submitted on: 3/3/2009

Comments:

Please support the ban on GMO taro. It will be a destroyer of the history, purposes, and health benefits of taro. It will reduce local governance of this unique crop and outsource to the huge biotechnical industry. Hawaii already imports over 60% of its food and is the state most dependent on petroleum. Please keep what we can sustainable and for the sake of Hawaii and our people.

**TESTIMONY ON HB 1663  
HOUSE COMMITTEE  
ON  
AGRICULTURE**

**CHAIRPERSON:** Representative Cliff Tsiji  
**BILL NO:** HB 1663 GE Taro Growing Prohibition  
**TITLE:** Prohibits the Growing of Genetically Modified Taro in Hawaii  
**HEARING DATE & TIME:** Wednesday, March 4, 2009 at 9:00 A.M.  
**HEARING LOCATION:** Room 312 Room

**Chairperson Cliff Tsiji and Members of the Committee:**

My name is Don Gerbig, a retiree from the agricultural industry, a private citizen, and an advocate of sound science and the use of biotechnology (genetic engineering) to improve our crops and fight hunger in the world.

I am opposed to this very short sighted legislation that is not based on scientific study.

The taro varieties brought and bred in Hawaii, over the years, have gone from over 300 varieties down to a little more than 80 varieties. This should indicate to somebody that there is problem with the taro being grown in Hawaii. Such a reduction in varieties indicates that our varieties slowly being eliminated by disease and pests.

A major part of solving this problem is taro plant research, not a prohibition of certain types of research i.e. genetic engineering. This is the same as saying we can cross breed taro flowers, but we can't use yellow flowers in our research because the state legislature says so.

Scientific research using genetic engineering may not be the complete answer, but it surely may part of the solution in the prevention of the complete demise of the Hawaiian taro industry.

In 1996 Taro Leaf Blight disease almost wiped out the entire taro industry in Samoa. Very few of the Samoan taro varieties were resistant to this disease. The current taro varieties grown in Hawaii are susceptible to this same disease. It's just a matter of time.

Susan Miyasaka an agricultural scientist at the University of Hawaii-Manoa has pointed out on several occasions, that there is a deadly viral complex in the South Pacific that would kill all Hawaiian taro varieties if it ever reached Hawaii.

If our taro industry is eventually wiped out from these plant diseases, it will be dozens of years before we eat any Hawaiian grown taro again. To stop any kind of taro research at this point in time is like shooting yourself in the foot.

Approving this bill is like signing on to the future elimination of the Hawaiian taro industry in Hawaii.

I strongly urge the committee not to pass Bill HB 1663 out of committee.

Don Gerbig

Lahaina, HI 96761-8322

**wooley1-Christopher**

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**From:** Michael Gibson [michaelgibson111@gmail.com]  
**Sent:** Monday, March 02, 2009 7:28 PM  
**To:** AGRtestimony  
**Subject:** Support of HB 1663

Aloha,

I think it is very sad that the compromise of our culturally sacred Taro continues to be threatened by the interests of genetic modification. Is there no room for sacredness? We as residents of Hawaii have done relatively well in progressive legislation over the years, and it is appalling to me that the GMO industry has inserted itself so thoroughly over the interests of Hawaii's residents that even Taro is on the block. PLEASE SUPPORT HB 1663 and disallow, once and for all, the tampering with one of our culture's bedrock symbols.

Thank you,  
Michael Gibson

HB 1663, Relating to prohibition of genetically modified taro  
House Committee on Agriculture  
Hearing: March 4, 2009 at 9:00 a.m.  
Room 312

**Position: Oppose bill 1663**

Chairman Tsuji, Vice Chair Wooley, and members of the House Agriculture committee,

My name is Cindy Goldstein and I live on the island of Oahu in Aiea. I oppose House bill 1663 because I do not support legislation that bans genetic engineering research.

I work for a seed company and understand the benefits that come about when genetic engineering and biotechnology research are used for crop improvement. While I respect the spiritual and cultural significance of kalo to native Hawaiians, I cannot support legislation that bans plant breeding and crop improvement tools that could save kalo varieties from a virus or other type of plant disease epidemic. There have been diseases that have seriously impacted or destroyed taro in Samoa, and in time these diseases could easily come to our islands.

Taro is grown on many Pacific Islands, and researchers in Hawaii have often taken a leadership role in projects that benefit Hawaii as well as other Pacific Islands. Hawaii can be a leader in agriculture, but not by banning research tools.

Thank you for the opportunity to provide written testimony in opposition to this bill.

Representative Clift Tsuji, Chair  
Representative Jessica Wooley, Vice Chair  
House Committee on Agriculture

Opposition of HB 1663, relating to Genetically Modified Plant Organisms

**Room:** 312

**Hearing Date:** Wednesday, March 4<sup>th</sup>

**Time:** 9:00 AM

Position: **Oppose**

Dear Representative Tsuji,

My name is Laurie Goodwin, I live in Kekaha on the island of Kauai and I oppose the passage of HB 1663. This bill goes too far by banning research of all varieties of taro (Hawaiian and non-Hawaiian). It is possible that in the future Hawaii could face a disease or insect pest that would destroy the taro production we have left in the State. If we limit the tools we can use to fight future diseases and pests we will regret it later.

Thank you for this opportunity to testify.

*Laurie Goodwin*

P.O. Box 994

Kekaha, Hawaii

96752

u142520@gmail.com

Testimony Presented Before the  
House Committee on Agriculture  
Wednesday, March 4, 2009  
by  
Andrew G. Hashimoto

HB 1663 - RELATING TO AGRICULTURE

Chair Tsuji, Vice Chair Wooley, and Members of the Committee:

My name is Andrew Hashimoto, and I serve as Dean and Director of the University of Hawaii at Manoa College of Tropical Agriculture and Human Resources (CTAHR). I am pleased to provide personal testimony on HB 1663. This testimony does not represent the position of the University of Hawaii or CTAHR.

The purpose of HB 1663 is to prohibit the development, testing, propagation, release, importation, planting, or growing of genetically modified taro in the State of Hawaii.

I am opposed to HB 1663. As written, the measure is too restrictive. It proposes a broad-scale ban not only Hawaiian taro but bans on all transgenic taro research in the State.

Out of respect for the cultural significance of Hawaiian taro, CTAHR agreed not to conduct any transgenic research on Hawaiian taro. We have honored the terms of the May 24, 2005 agreement and will continue to do so.

There are other places in the Pacific Basin, however, that are concerned with the effects disease and other threats to non-Hawaiian taro. We would like to continue to provide aid to and research on these non-Hawaiian taro varieties. To be prevented from conducting any research on taro would be a great disserve to our clients and to our obligations as a land grant university, and may eventually affect the future availability of taro.

I recommend that amendments proposed by the University in separate testimony be considered to improve this bill.

Thank you for the opportunity to testify on this bill.

Testimony Presented Before the  
House Committee on Agriculture  
Wednesday, March 4, 2009  
by  
Ching Yuan Hu

HB 1663 - RELATING TO AGRICULTURE

Chair Tsuji, Vice Chair Wooley, and Members of the Committee:

My name is Ching Yuan Hu, and I serve as Associate Dean and Associate Director of the University of Hawaii at Manoa College of Tropical Agriculture and Human Resources (CTAHR). I am pleased to provide personal testimony on HB 1663. This testimony does not represent the position of the University of Hawaii or CTAHR.

The purpose of HB 1663 is to prohibit the development, testing, propagation, release, importation, planting, or growing of genetically modified taro in the State of Hawaii.

I oppose to HB 1663. As written, the measure is too restrictive. It proposes a broad-scale ban not only Hawaiian taro but bans on all transgenic taro research in the State.

Out of respect for the cultural significance of Hawaiian taro, CTAHR agreed not to conduct any transgenic research on Hawaiian taro. We have honored the terms of the May 24, 2005 agreement and will continue to do so.

There are other places in the Pacific Basin, however, that are concerned with the effects disease and other threats to non-Hawaiian taro. We would like to continue to provide aid to and research on these non-Hawaiian taro varieties. To be prevented from conducting any research on taro would be a great disserve to our clients and to our obligations as a land grant university, and may eventually affect the future availability of taro.

I recommend that amendments proposed by the University in separate testimony be considered to improve this bill.

Thank you for the opportunity to testify on this bill.

**Personal Testimony to the  
House Committee on Agriculture  
Wednesday, March 4, 2009**

**John Hu**

**HB 1663 - RELATING TO AGRICULTURE**

**Chair Tsuji, Vice Chair Wooley, and Members of the Committee:**

**My name is John Hu. I am a plant pathologist at the University of Hawaii at Manoa. This testimony is my own opinion, which does not represent the position of the University of Hawaii.**

**The HB 1663 is proposed to prohibit the development, testing, propagation, release, importation, planting, or growing of genetically modified taro in the State of Hawaii.**

**I am opposed to HB 1663 because it is too restrictive. It proposes to a ban on all transgenic taro research in the State. There are several taro diseases, which may limit or eliminate taro production in the Pacific Basin. We as plant pathologists use many approaches to control plant diseases; transgenic approach is just one of them. When taro does not have any resistant genes to a certain pathogen, transgenic approach might be essential for the future of the taro industry.**

**Mahalo!**

Testimony Submitted to the House Agriculture Committee  
in **Strong Support of HB 1663**  
Relating to Prohibition on Genetic Modification of Taro

Hearing: Wednesday, March 4, 2009, 9:00 am  
House Conference Room 312

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Aloha Chair Tsuji, Vice-Chair Wooley and Committee Members,

I urge you to support HB 1663.

I do not oppose GMO research per se. As an engineer, much of my career has been involved in research. However, I am strongly opposed to the irresponsible manner in which GMO research is being carried out in Hawaii, with no notification to the public regarding the location and nature of experimental GMO field sites; no effective assignment of liability to those who grow GMO crops for consequential health, environmental or other damages associated with those crops; and inadequate controls against the contamination of non-GMO crops from the open air growing of GMO crops.

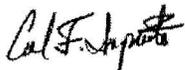
While we should not take risks with any of our food crops, it is doubly important that we not take such risks in the case of taro, which is both culturally significant to many of Hawaii's residents and a mainstay of the Hanalei environment.

For these reasons, I believe it is environmentally prudent and culturally necessary to prohibit the development, testing, propagation, release, importation, planting and growing of genetically modified taro in the state of Hawaii.

If at some time in the future: (i) it can be affirmatively proven that all of the controls and legal mechanisms have been put into place to fully address all of the potential problems that I have noted above, and (ii) the Hawaiian community's cultural concerns and objections can be satisfactorily addressed, legislation could easily be enacted at that time to responsibly modify this HB 1663's prohibitions.

In the meantime, please support responsible science and support cultural rights. Please support HB 1663.

Thank you for this opportunity to testify.



Carl Imparato

Hanalei, HI 96714  
808-  
carl.imparato@juno.com

Testimony Presented Before the  
House Committee on Agriculture  
Wednesday, March 4, 2009  
by  
Charles Kinoshita

HB 1663 - RELATING TO AGRICULTURE

Chair Tsuji, Vice Chair Wooley, and Members of the Committee:

My name is Charles Kinoshita, and I serve as Associate Dean for Academic and Student Affairs of the University of Hawaii at Manoa's College of Tropical Agriculture and Human Resources (CTAHR). I am providing written testimony against HB 1663 as a private citizen -- this testimony does not represent the position of the University of Hawaii or CTAHR.

HB 1663 proposes to prohibit the development, testing, propagation, release, importation, planting, or growing of any genetically modified taro in the State of Hawaii. I believe that the bill, which applies to all varieties of taro, not just Hawaiian varieties, goes too far.

As you know, out of respect for the spiritual and cultural significance of taro to native Hawaiians, CTAHR agreed to not conduct any transgenic research on Hawaiian taro varieties. We have seen the decimation of taro in Samoa, Puerto Rico, the Dominican Republic and the Solomon Islands from diseases, pests, and other factors. These locations continue to seek the expertise of Hawaii's researchers and see value in the tools of biotechnology to address the many agricultural challenges in their communities. We would like to continue to provide aid to and research on non-Hawaiian taro varieties. To prevent the use of the tools of biotechnology on all varieties of taro would be a great disservice to the State and could negatively impact the future availability of taro in Hawaii.

In summary, I believe that HB 1663 goes too far and is not in the best interest of the State. I recommend that amendments proposed by the University of Hawaii in separate testimony be considered to improve this bill.

Thank you for the opportunity to present my views.

*Kawaihapai Ohana*  
*c/o Thomas T Shirai Jr*  
*P O Box 601*  
*Waialua, HI 96791*  
*Email: [Kawaihapai@hawaii.rr.com](mailto:Kawaihapai@hawaii.rr.com)*

House Committee on Agriculture (AGR)  
Representative Clift Tsuji (Chair) / Representative Jessica Wooley (Vice Chair)  
Notice of Hearing  
Wednesday, March 4, 2009  
9:00AM / State Capitol Conference Room 312

March 2, 2009

RE: Testimony Supporting HB 1663 (Relating to Taro Security)

*Aloha* Chair Tsuji, Vice Chair Wooley & Committee Members,

The *Kawaihapai Ohana* is a Recognized Native Hawaiian Organization (NHO) by the Department of Interior (<http://www.doi.gov>) and its *kuleana* includes cultural and historical preservation applicable to *Kawaihapai Ahupua'a*. Some of the *Kupuna of Kawaihapai* were *Taro (Kalo) mahiai (farmers)* and were Cultural Informants for Bishop Museum who provided information about *Waialua Moku*:

*The Hawaiian Planter by E. S. Craighill Handy (1940) – Page 85*

*“Kaaïmoku Kekulu (sic: Kaaemoku Kakulu), native of the district says that the name of spring and the terrace section noted above is Kaaiea.”*

*Kawaihapai. “There is a sizable area of terraces in the lowlands (now surrounded by sugar cane), watered by Kawaihapai Stream. These terraces have evidently been lying fallow for some time, though several were being plowed for rice or taro in the summer of 1935. At the foot of the cliffs, watered by a stream the name of which was not learned, are several small terraces in which taro is grown by David Keaau (sic: David Keao).”*

It's not needed to improve taro (*kalo*) thru *Genetically Modified Organism (GMO)* because our ancestors had a more traditional, effective and respectful way regarding this matter for many generations. Growing *GMO Taro*, has a direct affect upon an entire *Ahupua'a System* when the water from the *lo'i* goes in the *kahawai (stream)*, *muliwai (head water)* and *kahakai (ocean)* affecting our seafood subsistence including all marine life. This has quietly and potentially affected *Mokule'ia*.

Verse 2 of the chant entitled *Kalena Kai* ([http://huapala.org/KAL/Kalena\\_Kai.html](http://huapala.org/KAL/Kalena_Kai.html)) composed by King *Liholiho* in 1820 which describes the agricultural productivity of *Mokule'ia* was not meant to be interpreted as *Genetically Modified Crops*:

*Kalena Kai by King Liholiho (1820) – Verse 2*

*'O ka ehu' ehu o ke kai – The sea spray*

*Ka moena pawehe o Mokule'ia – Geometric designs of the plains of Mokule'ia*

Thank you for the opportunity to provide testimony supporting HB 1663. *Malama Haloa.*  
*Thomas T Shirai Jr*  
*Kawaihapai Ohana – Po'o*

**wooley1-Christopher**

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**From:** langberg@roadrunner.com  
**Sent:** Monday, March 02, 2009 8:07 PM  
**To:** AGRtestimony  
**Cc:** Kim; Pam; Rolando; Wayne  
**Subject:** HB1266 &HB1663 Testimony

To: [agrtestimony@capitol.hawaii.gov](mailto:agrtestimony@capitol.hawaii.gov)

Regarding:

- > Agriculture Committee Hearing
- > HB 1226 Preemption
- > Hearing Wednesday March 4, 2009 at 9:00 a.m. in Room 312
- > Chair: Clift Tsuji
- > OR:
- > Agriculture Committee Hearing
- > HB 1663 Taro Bill
- > Hearing Wednesday March 4, 2009 at 9:00 a.m. in Room 312
- > Chair: Clift Tsuji

Dear Ladies and Gentlemen:

Please vote no on these bills! It is again a travesty that anyone would want to alter the genetic make up of two of Hawaii's most renown and precious crops; Kona Coffee and Taro. These bills are a threat to the livelihood of us farmers and the agriculture of Hawaiian coffee and taro. Quoting from an article by Amanda Spaur from The Big Island Weekly Feb. 25, 2009: "After explaining the technical process involved with genetic engineering, how little is known about the likelihood of error, and how there is no technology that could reverse the effects of releasing GMO into the environment." The article also discusses the health affects occurring in India from Monsanto and that safety evaluations are not required by the FDA in order to release GMO foodstuffs into the market.

We are Kona Coffe, avocado, mango, and various fruit farmers in Kealakekua, Hawaii and are grateful for your vote to keep Hawaiian agriculture GMO free!

Mahalo,

Maureen and Frederick Langberg

Kealakekua, HI 96750

**wooley1-Christopher**

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**From:** John McClure [jmclure@hawaii.rr.com]  
**Sent:** Tuesday, March 03, 2009 12:18 PM  
**To:** AGRtestimony  
**Subject:** GMO's

Gentelmen;

Its my understanding that you are considering a bill to allow GMO coffee on the Big Island.  
What are the GMO modifactions of the coffee to be tested;  
What assurance to you have that it will or will not cross fertilize with existing plantations;  
What is the necessity of testing on the Big Island.

I am a Kona coffee farmer and might be adversely affected by your decisions.

Respectfully,

John McClure  
McClure Farms  
[jmclure@hawaii.rr.com](mailto:jmclure@hawaii.rr.com)

## wooley1-Christopher

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**From:** mailinglist@capitol.hawaii.gov  
**Sent:** Tuesday, March 03, 2009 11:38 AM  
**To:** AGRtestimony  
**Cc:** seabass428@yahoo.com  
**Subject:** Testimony for HB1663 on 3/4/2009 9:00:00 AM

Testimony for AGR 3/4/2009 9:00:00 AM HB1663

Conference room: 312  
Testifier position: oppose  
Testifier will be present: No  
Submitted by: Michael Melzer  
Organization: Individual  
Address: 938 Ahuwale St Honolulu, HI  
Phone: 808  
E-mail: [seabass428@yahoo.com](mailto:seabass428@yahoo.com)  
Submitted on: 3/3/2009

**Comments:**

The decision on whether we should develop, propogate, release, import, plant, and grow genetically modified taro, or any other plants in Hawaii must be based on the best available science, and never on the interests of misinformed activists nor profit-hungry corporations. Overwhelming scientific evidence indicates GMOs that have passed through regulatory oversight pose no more risk than crops bred through traditional crossing. They probably pose even less risk than crops that have undergone mutation breeding, which includes many of the products you find on the shelves of organic foodstores.

Testimony: Against HB 1663 (ban against genetically modified taro)

Committee: The House Agriculture Committee  
Representative Clifton Tsuji, Chair

Name: My name is Dr. Susan C. Miyasaka. I am an Agronomist and Interim County Administrator, College of Tropical Agriculture & Human Resources, University of Hawaii – Manoa, but I am testifying today as a private citizen. I was the lead scientist in a now-completed research project to genetically engineer Chinese taro Bun long for improved disease resistance. I was born and raised in Hawaii. I grew up eating laulau and poi, and I respect all the diverse cultures found in Hawaii.

Reasons to vote against HB 1663:

1. Research to improve disease resistance of taro using all available technologies is needed:

House Bill 1663 would unnecessarily restrict research to improve disease resistance of taro in Hawaii. This bill states “Over 300 kalo varieties may have existed at the time of the arrival of European explorers. Today, there are approximately 70 varieties of taro...” *Why* did this loss of taro varieties occur?

One major factor was probably invasive pests and diseases, such as Taro Leaf Blight that was introduced into Hawaii during the 1910s. This disease can result in crop losses up to 50% in Hawaii due to loss of leaf area. During the 1990s, when Taro Leaf Blight was introduced accidentally into Samoa, it decimated production of susceptible Samoan taro varieties, causing a 95% loss of yield.

My research team has found that insertion of an oxalate oxidase gene from wheat into Chinese taro Bun long resulted in genetically engineered (GE) lines that completely stopped the spread of Taro Leaf Blight under tissue-culture conditions. These are very promising results; however House Bill a663 would require that these promising transgenic lines be destroyed without allowing further testing. More information on this now-completed research project is attached.

In addition, new pests and diseases enter Hawaii all the time. It may just be a matter of time before the Alomae-Bobone viral complex found in the Solomon Islands reaches Hawaii. Hawaiian taro varieties were tested in the Solomon Islands and all were killed by this viral complex. The insect vector required to transmit this viral complex is found in Hawaii. Imagine what it would do to our taro production if it reaches Hawaii. It would be foolish to throw away any potential tools that could help to sustain taro production in Hawaii.

2. There is little risk that traditional Hawaiian taro varieties will lose their genetic purity due to GE Chinese taro.

Traditional Hawaiian taro varieties are grown by vegetative propagation (‘hulis’). They are not grown from seed. It would be easy to maintain traditional taro varieties

without a high risk of accidental transfer of disease-resistance genes from GE Chinese taro.

In order for transgenes to move from GE Chinese taro to Hawaiian taro varieties, Chinese taro Bun long would need to flower and produce healthy pollen (rare event in Hawaii), then the pollen would need to move via wind or insects to a female flower in a Hawaiian taro variety, then seed capable of growing into whole plants would need to develop (rare event – I have read or heard of only 3 incidences in 70 years in Hawaii). These two rare events would need to happen simultaneously with plants in close proximity, resulting in a risk that is almost nil. In order to produce conventional crosses of taro, breeders must hand-pollinate Hawaiian taro varieties to produce seed capable of growing into whole plants.

3. There is little risk of food safety problems or increased allergic reactions if GE Chinese taro is commercialized.

The federal government requires extensive testing that would identify and eliminate problems prior to commercialization. I am not an expert in food safety of GE crops; I defer to the experts. “It is the position of the American Dietetic Association that agricultural and food biotechnology techniques can enhance the quality, safety, nutritional value, and variety of food available for human consumption and increase the efficiency of food production, food processing, food distribution, and environmental and waste management. The American Dietetic Association encourages the government, food manufacturers, food commodity groups, and qualified food and nutrition experts to work together to inform consumers about this new technology and encourage the availability of these products in the marketplace.”

**Based on scientific evidence, I believe that it is possible to have a win-win situation here. Allow pro-active research using all available technologies including biotechnology on Chinese taro Bun long to ensure the sustainability of taro production in Hawaii. As a compromise, place a ban against genetic engineering of Hawaiian taro varieties (but not all taro varieties).**

## Update on Genetic Engineering of Chinese Taro (variety Bun long) for Increased Disease Resistance

Susan C. Miyasaka

Dec. 14, 2006

### Why utilize genetic engineering (GE) of taro to increase disease resistance?

Conventional breeding of taro is being conducted at the University of Hawaii, and new hybrids have been developed with increased resistance to *Phytophthora* leaf blight. However, under weather conditions suitable for this disease organism, this resistance can break down. The taro variety shown above with leaf blight is one of the new hybrids conventionally bred for greater disease resistance.

Genetic engineering offers the possibility of increased disease resistance beyond the level found within the taro germplasm. And, the taro variety remains the same genetically except for the few new genes engineered into it.

The greatest success of genetic engineering of crops for increased disease resistance has been to improve viral disease resistance in plant species without any known natural resistance. For example, genetic engineering of papaya for resistance to *Papaya ringspot virus* has helped to save the papaya industry in Hawaii.

The Alomae-Bobone viral complex is found in the Solomon Islands today, where it has wiped out 96% of the native taro varieties there and decreased taro production by 95%. Hawaiian taro varieties were tested in the Solomon Islands and all were found to be susceptible to this virus complex<sup>1</sup>. The insect vector required to transmit this virus complex is found in Hawaii. Imagine if that virus reaches Hawaii - what would it do to our taro production?



Alomae, a lethal viral disease of taro, is spread by taro planthoppers.



<sup>1</sup> S. Pacific Commission., 1978, Advisory Leaflet.

In the Solomon Islands, “it is by no means certain that the crop [taro] can be reinstated to its former abundance and usage. Its day may have gone forever, as has happened in many parts of coastal Melanesia.”<sup>2</sup> Could this viral disease decimate taro production in Hawaii in the future?

Is the movement of genes across species unnatural?

No. Conventional breeding of plants and animals have moved genes across species for specific purposes, such as increased hardiness. For example, mules are the offspring of a female horse and a male donkey. And triticale is a hybrid of wheat and rye. In addition, all organisms, including humans, carry genes inserted from different species. For example, all humans carry genes that have been incorporated from viral infections.

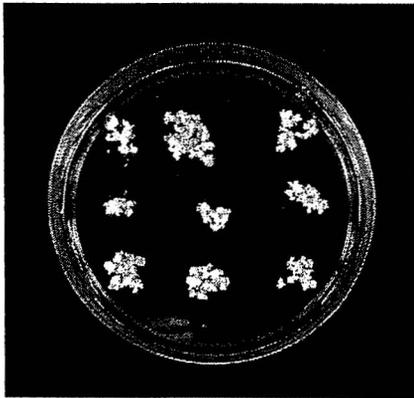
The bacterium *Agrobacterium tumefaciens* transfers its DNA (genetic material) into woody or herbaceous plants and causes crown gall disease. In our project, we are utilizing this naturally occurring bacterium to transfer disease resistance genes into Chinese taro.

What is the progress of our project on genetic engineering of Chinese taro to increase disease resistance?

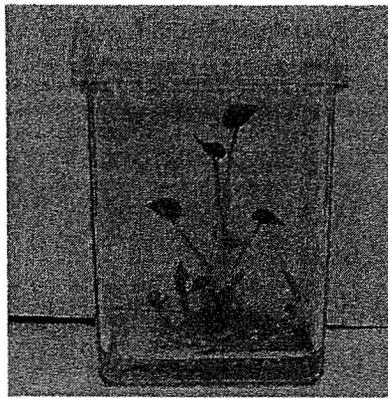
Three disease resistance genes have been transferred into Chinese taro variety Bun long:

1. Oxalate oxidase gene from wheat;
2. Chitinase gene from rice; and
3. Stilbene synthase gene from grapevine.

Each disease-resistance gene was transferred separately into callus (undifferentiated tissue) of variety Bun long in tissue-culture. Then, we manipulated plant hormones to produce shoots and then whole plants from the callus.



Taro calli (undifferentiated tissue)



Taro plantlets in tissue-culture

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<sup>2</sup> Kastom Gaden Association, Solomon Islands, 2005., People on the Edge, [www.terracerircle.org.au](http://www.terracerircle.org.au).

Do these disease resistance genes help Chinese taro resist pathogens?

Yes, in preliminary tests using small, tissue-cultured plants.



Untransformed Chinese taro (NT) infected with *Phytophthora colocasiae* at 12 days after inoculation. Note plant is almost dead.

Chinese taro transformed with oxalate oxidase gene (g5) shows complete arrest of *Phytophthora colocasiae* without any diseased lesions spreading to the leaves.

Chinese taro transformed with an oxalate oxidase gene completely arrested the spread of the pathogen *Phytophthora colocasiae* which is the organism responsible for leaf blight. In comparison, untransformed Chinese taro was almost dead at 12 days after inoculation with the pathogen. Other preliminary tests showed that Chinese taro transformed with an oxalate oxidase gene or a chitinase gene slowed the spread of the fungal pathogen *Sclerotium rolfsii* but the disease eventually killed the plants.

How do the products of these disease resistance genes work?

Oxalate oxidase catalyzes the breakdown of oxalate to produce hydrogen peroxide which inhibits growth of pathogens. Remember the hydrogen peroxide your mother used to cleanse your skinned knees?

Chitin is a hard, semitransparent material that's found in the cell walls of some fungi and molds. Chitinases degrade the chitin found in the cell wall of fungal pathogens, causing the fungi to die.

Stilbene synthase catalyzes the production of resveratrol, a compound that is found naturally in grapes and peanuts. Resveratrol stops the growth of fungal pathogens.

Could these disease-resistance genes accidentally move from GE Chinese taro?

Not likely. First, Chinese taro variety Bun long rarely flowers under the environmental conditions of Hawaii. Second, traditional Hawaiian taro varieties rarely

produce viable seed in Hawaii without human intervention. Taro breeders must manually move the pollen from one taro flower to another flower when its female part is ready because the insect that naturally pollinates taro flowers is not found here. Also, since taro is vegetatively propagated, it would be easy to maintain traditional taro varieties without a high risk of accidental transfer of disease-resistance genes from GE Chinese taro.

How might these disease-resistance genes affect the nutrition of taro?

The health risk of GE food is so low that after more than 10 years of experience, GE crops have been grown on more than a billion acres and been consumed by millions of humans without a single negative health issue<sup>3</sup>. The federal government requires intensive testing of genetically engineered crops for possible health and environmental hazards prior to approval.

The official position of the American Dietetic Association is that “Agricultural and food biotechnology can enhance the quality, safety, nutritional value, and variety of food available for human consumption and increase the efficiency of food production, food processing, and food distribution, and environmental and waste management”<sup>4</sup>. Did you know that if you eat cheese made in the United States, almost certainly you are eating the product of a genetically modified organism?

The anti-microbial compounds produced in GE Bun long should have little negative effect on its nutrition. For example, oxalate oxidase possibly might improve the digestibility of taro, because it breaks down oxalate, a known anti-nutritive compound that contributes to the ‘itchiness’ of taro. Chitinases should have little effect on humans when consumed, because chitins are found in true fungi and insects but not in plants or mammals. Resveratrol is found in the skin of red grapes and it might *improve* the nutrition of GE Chinese taro due to its anti-cancer, anti-viral, and anti-inflammatory effects. Of course, prior to any potential commercialization of GE Chinese taro, federal government regulations require intensive food safety tests.

What are the plans for GE Chinese taro when this project terminates?

The early results for increased disease resistance of GE Chinese taro appear promising, but much more research is needed. Obviously, researchers cannot state that GE Chinese taro is more disease resistant without testing plants in the greenhouse and ultimately in the field. In addition, the federal government would require tests of GE Chinese taro for food safety and environmental concerns prior to commercialization.

This federally funded project on genetic engineering of Chinese taro for increased hardiness will run out of funds in early 2007. As a result of the current controversy about genetic engineering and taro, it isn’t likely that future funding will be available without support from the taro industry and/or consumers in Hawaii. Without further funding, the GE Chinese taro lines either must be discarded or sent to other cooperators in the world who are willing to conduct further tests. We will lose the opportunity in Hawaii to test these promising lines for increased disease resistance.

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<sup>3</sup> International Service for the Acquisition of Agri-Biotech Applications, 2006, Brief No. 34-2005.

<sup>4</sup> Journal of the American Dietetic Association, Feb. 2006, p. 285-293.

This brief summary presents the scientific facts about potential benefits such as increased hardiness of GE Chinese taro and an evaluation of possible risks. You, as taro consumers, need to weigh the possible risks against potential benefits of GE Chinese taro. Ask yourselves what risks are acceptable to ensure that taro is here for future generations to enjoy?

**wooley1-Christopher**

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**From:** mailinglist@capitol.hawaii.gov  
**Sent:** Tuesday, March 03, 2009 1:04 PM  
**To:** AGRtestimony  
**Cc:** brock002@hawaii.rr.com  
**Subject:** Testimony for HB1663 on 3/4/2009 9:00:00 AM

Testimony for AGR 3/4/2009 9:00:00 AM HB1663

Conference room: 312  
Testifier position: oppose  
Testifier will be present: No  
Submitted by: Diana Montgomery-Brock  
Organization: Syngenta  
Address: ! Mililani, HI  
Phone: (808)  
E-mail: [brock002@hawaii.rr.com](mailto:brock002@hawaii.rr.com)  
Submitted on: 3/3/2009

Comments:

**wooley1-Christopher**

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**From:** Nadine Newlight, Director [nadine@mauilearningcenter.com]  
**Sent:** Monday, March 02, 2009 2:42 PM  
**To:** AGRtestimony  
**Subject:** HB 1226 Preemption and HB 1663 Taro Bill

Agriculture Committee Hearing  
HB 1226 Preemption  
Hearing Wednesday March 4, 2009 at 9:00 a.m. in Room 312  
Chair: Clift Tsuji

Aloha reps;

Please do not take this important decision away from local control. Maui County is vehemently opposed to further GMO experimentation on our `aina. Vote NO! Mahalo.

Nadine Newlight

Pa`ia 96779  
808-

and

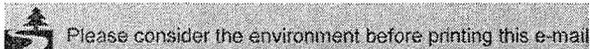
Agriculture Committee Hearing  
HB 1663 Taro Bill  
Hearing Wednesday March 4, 2009 at 9:00 a.m. in Room 312  
Chair: Clift Tsuji

Aloha reps;

Please prevent kalo, the Hawaiian ancestor from being tampered with in the name of unproven threats. Maui County is vehemently opposed to further GMO experimentation on our `aina. Vote YES! Mahalo.

Nadine Newlight

Pa`ia 96779  
808-



Testimony Presented Before the  
House Committee on Agriculture  
Wednesday, March 4, 2009  
by  
Wayne Nishijima

HB 1663 - RELATING TO AGRICULTURE

Chair Tsuji, Vice Chair Wooley, and Members of the Committee:

My name is Wayne Nishijima, and I serve as Associate Dean and Associate Director for Cooperative Extension of the University of Hawai'i at Mānoa College of Tropical Agriculture and Human Resources (CTAHR). I am pleased to provide personal testimony on HB 1663. This testimony does not represent the position of the University of Hawai'i or CTAHR.

The purpose of HB 1663 is to prohibit the development, testing, propagation, release, importation, planting, or growing of genetically modified taro in the State of Hawaii.

I am opposed to HB 1663 as written. The bill would be acceptable to me if the ban only applied to Hawaiian taro, but the bill proposes a broad-scale ban not only Hawaiian taro but bans on all transgenic taro research in the State.

Out of respect for the cultural significance of Hawaiian taro, CTAHR agreed not to conduct any transgenic research on Hawaiian taro. We have honored the terms of the May 24, 2005 agreement and will continue to do so.

There are other places in the Pacific Basin, however, that are concerned with the effects disease and other threats to non-Hawaiian taro. We would like to continue to provide aid to and research on these non-Hawaiian taro varieties. To be prevented from conducting any research on taro would be a great disservice to our clients and to our obligations as a land grant university, and may eventually affect the future availability of taro. Unfortunately, research is usually not considered important until a potentially devastating problem is experienced first hand.

I recommend that amendments proposed by the University in separate testimony be considered to improve this bill.

Thank you for the opportunity to testify on this bill.

## wooley1-Christopher

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**From:** Adrienn&Paul Olson [adrien\_honduras@yahoo.com]  
**Sent:** Tuesday, March 03, 2009 11:48 AM  
**To:** AGRtestimony  
**Subject:** Oppose HB1663; Support HB 1226 with amendments

To the committee on agriculture:

Attn: Reps. Clift Tsuji, Chair & Rep. Jessica Wooley, Vice Chair

My name is Paul Olson, and I am a resident of Kalaheo on the island of Kauai. I was born on the Big Island in Honoka'a more than forty years ago and grew up eating poi. My family on both sides were farmers, and my childhood idol was the agricultural innovator and humanitarian, George Washington Carver. After finishing my undergrad degree in Botany with an emphasis in Anthropology, I worked in the Philippines as a Peace Corps volunteer with the Department of Natural Resources. Later on I completed a Ph.D. in biology. Presently I am employed at Pioneer in Waimea, where I have the chance to serve humanity doing crop research.

From all these experiences I have learned that plant research, including biotech approaches, could help preserve taro. Insect and disease pressures change over time and it seems counter productive to exclude any approaches. At the same time I also believe the Hawaii community should have a leading voice in preserving taro - given taro's significant role in Hawaiian history. I am concerned that antiGMO activists are hitchhiking their anti-science agenda onto a culturally sensitive issue. I also believe the ali'i were exemplary innovators and would have had a balanced view on genetic modification - that it is just another tool in the plant breeders tool box.

I oppose the bill because it sets a bad precedent for our state. The bill sends an anti-science message that would likely scare other businesses from investing in Hawaii. And if Hawaii is perceived as anti-science, it will become more difficult for children of your constituency to find meaningful employment in the Islands.

On the other hand, HB 1226 with amendments reinforces the use of scientific evidence and prudent risk assessment to address legitimate public policy concerns and eliminates excessive regulations that hinder the growth and benefits of biotechnology. It is a reasonable compromise. Federal agencies with the appropriate expertise and resources - in collaboration and coordination with our state agencies - can oversee agricultural biotechnology in Hawaii more consistently than at the county level. County agencies lack the resources and expertise to appropriately regulate the science. Adding more to county administration will impede investment in agricultural biotechnology statewide.

Moreover, HB 1226 respects the rights of farmers to select organic, conventional or biotechnology growing practices, and ensures the academic freedom of researchers to solve some of our world's most pressing food security challenges. The amendment to the bill offers a compromise to ban research on kalo; research on non-Hawaiian varieties of taro must be allowed to continue to address real human needs.

In conclusion, I'm sure that we both prefer that Hawaii be known as a technology leader and center for creativity. Biotech has aided papaya, and has potential to help anthurium production and other small crops. I would be ashamed to see Hawaii place a moratorium on any crop. Hawaii is a state that can model healthy coexistence of a variety of agriculture. I would prefer to see the legislature focus their precious time on devising ways to preserve and protect taro, for taro farming education and training programs, to promote funding to evaluate ways to control major pests like apple snails, and a Senate bill for continued discussions between taro farmers, OHA, Hawaii Dept of Agriculture and University of Hawaii. Let's show aloha, not alienation, to science and humanity.

**Please oppose HB1663 and support HB 1226 with amendments.**

Mahalo for your attention.

Paul D. Olson

Kalaheo HI 96741

## wooley1-Christopher

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**From:** mailinglist@capitol.hawaii.gov  
**Sent:** Monday, March 02, 2009 10:11 AM  
**To:** AGRtestimony  
**Cc:** SOSFarminfo@yahoo.com  
**Subject:** Testimony for HB1663 on 3/4/2009 9:00:00 AM

Testimony for AGR 3/4/2009 9:00:00 AM HB1663

Conference room: 312  
Testifier position: support  
Testifier will be present: No  
Submitted by: Kelly Sato  
Organization: Individual  
Address: . Kilauea, HI  
Phone: 808- ;  
E-mail: [SOSFarminfo@yahoo.com](mailto:SOSFarminfo@yahoo.com)  
Submitted on: 3/2/2009

Comments:  
To our representatives,

As an organic farmer I am shocked that after ALL the evidence that is out there regarding the health issues that are contributed to GMO foods that anyone could still consider GMO's a viable option.

GMO Taro is being promised as the savior for all taro farmers as it is to eliminate blight. Farmers in India were also promised that it would end their troubles with drought. A Google search will educate you on what has happened to those farmers. But here is a quick summery: When the GMO crops that the farmers invested in started failing they were told that they now needed to invest more money into the new and improved seeds, fertilizers and pesticides as a package deal. However they could not afford to do so. They felt betrayed by their government as it did not protect them! Some farmers committed suicide, others sold kidneys.

Before they continue to make more and more GMO products that once out there can not be 100% recalled. Let's wait and see how responsible these biochemical companies will be with the pandora they, with our governments help, let out of the box.

I, as a farmer, understand the fears and frustration that the taro farmers are feeling but the answer is NOT with GMO creations. Conventional farming practices create the never ending need of more chemical amendmets. It has been proven that the more herbicides, pesticides and antibiotics we use the stronger the weeds, pests and viruses become. So more and stronger chemicals are dumped into our soils and bodies.

That is where the real problem lies, biochemical companies have created a dependency on their products and it has killed our soils. So the first thing we need to look at is NOT a new creation, that NOBODY knows what problems it will produce, but a look at growing soil that is full of life and nutrients.

Respectfully,  
Kelly Sato

Thomas T Shirai Jr  
P O Box 601  
Waialua, HI 96791  
Email: [Kawaihapai@hawaii.rr.com](mailto:Kawaihapai@hawaii.rr.com)

House Committee on Agriculture (AGR)  
Representative Clift Tsuji (Chair) / Representative Jessica Wooley (Vice Chair)  
Notice of Hearing  
Wednesday, March 4, 2009  
9:00AM / State Capitol Conference Room 312

March 4, 2009

RE: Testimony Supporting HB 1663 (Relating to Taro Security)

Aloha Chair Tsuji, Vice Chair Wooley & Committee Members,

I Support HB 1663. My Grandpa and his Kupuna were Taro (*Kalo*) mahiai (farmers). They were Cultural Informants for Bishop Museum who provided information about Waialua Moku:

*The Hawaiian Planter by E. S. Craighill Handy (1940) – Page 85*  
"Kaaimoku Kekulu (sic: Kaaemoku Kakulu), native of the district says that the name of spring and the terrace section noted above is Kaaiea."

*Kawaihapai. "There is a sizable area of terraces in the lowlands (now surrounded by sugar cane), watered by Kawaihapai Stream. These terraces have evidently been lying fallow for some time, though several were being plowed for rice or taro in the summer of 1935. At the foot of the cliffs, watered by a stream the name of which was not learned, are several small terraces in which taro is grown by David Keaau (sic: David Keao)."*

There is no need to improve taro (*kalo*) thru *Genetically Modified Organism (GMO)* because our ancestors had a more traditional, effective and respectful way regarding this matter for many generations. Growing *GMO Taro*, has a direct effect upon the entire *Ahupua'a System* when the water from the *lo'i* goes in the *kahawai (stream)*, *muliwai (head water)* and *kahakai (ocean)* affecting our seafood subsistence including all marine life. This has quietly and potentially affected *Mokule'ia*.

Verse 2 of the chant entitled *Kalena Kai* ([http://huapala.org/KAL/Kalena\\_Kai.html](http://huapala.org/KAL/Kalena_Kai.html)) composed by King *Liholiho* in 1820 which describes the agricultural productivity of *Mokule'ia* was not meant to be interpreted as *Genetically Modified Crops*:

*Kalena Kai by King Liholiho (1820) – Verse 2*  
*'O ka ehu' ehu o ke kai – The sea spray*  
*Ka moena pawehe o Mokule'ia – Geometric designs of the plains of Mokule'ia*

Thank you for the opportunity to provide testimony supporting HB 1663. *Malama Haloa.*

Thomas T Shirai Jr  
Mokule'ia, Waialua

2 March 2009

Representative Clift Tsuji  
Chair, House Agriculture Committee  
Hawaii State Capitol, Room 402  
415 South Beretania Street

Honorable Chair Tsuji:

I am opposed to HB 1663 that would prohibit the development, testing, propagation, release, importation, planting, and growing of genetically modified taro in the Hawaii. As an agricultural scientist, a consumer of food and one who believes in sustainability, this bill fails on all accounts.

- Limiting the cultivars of taro available to growers severely hampers a growers ability make timely and wise economic decisions on how to best produce their crop.
- Limiting the methods that researchers can employ to develop better taro or produce taro that is pest and disease resistant does not benefit the people of our state in the long run.
- Limiting the type of taro that we can import into the state, for consumption or planting, has the effect of making taro even more scarce.

There is no evidence documenting harmful effects from the development, testing, propagation, release, importation, planting, growing, or consumption of genetically modified taro. We have no need for unneeded laws in our state, therefore I am opposed to HB 1663.

Yours truly,

Brent Sipes, PhD

[sipes.brent@gmail.com](mailto:sipes.brent@gmail.com)

## wooley1-Christopher

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**From:** Leslie Yee Hoy [lesyeehoy@yahoo.com]  
**Sent:** Tuesday, March 03, 2009 1:23 PM  
**To:** AGRtestimony  
**Cc:** Rep. Lyla B. Berg; Rep. Isaac W. Choy; Rep. Cindy Evans; Rep. Joey Manahan; Rep. Angus McKelvey; Rep. K. Mark Takai; Rep. James Tokioka; Rep. Glenn Wakai; Rep. Barbara Marumoto; Rep. Jessica Wooley; Rep. Clifton K. Tsuji  
**Subject:** Testimony in support of HB1663 and opposition to HB1226

Aloha

My name is Leslie Yee Hoy and I farm taro in Halawa valley on the island of Molokai. I'm submitting testimony in strong support of HB1663 and in strong opposition of HB1226. I support HB1663, but wouldn't mind if it included all other crops and not just taro. I believe in technology: responsible (moral & legal) technology not irresponsible technology. It appears that these biotech companies operating in Hawaii are trying to silence our legislators and in the process all the people of Hawaii, not just taro farmers. In HB1226 there's mention of some unknown relevant federal agency to be in charge of requiring or not the issuance of permits to these bio tech companies. I would be very concerned about this relevant federal agency and their relationship to these biotech companies. It appears that the whole biotech industry looks at Hawaii as the perfect place to do business, because of the absence of rules or regulations. Public safety, should be the #1 concern. I care about the health and welfare of my children, grandchildren, great grandchildren and so on. Do you care about your families welfare? If you honestly believe that these biotech companies and their practices are safe for Hawaii and our families, I can accept that. But, if you have any doubts or concerns about these companies and for some reason or another vote in favor of them operating without any oversight, I find this to be unacceptable. I ask that committee on Agriculture support HB1663 and oppose HB1226.

A hui hou  
Leslie A. Yee Hoy

**wooley1-Christopher**

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**From:** mailinglist@capitol.hawaii.gov  
**Sent:** Tuesday, March 03, 2009 8:15 AM  
**To:** AGRtestimony  
**Cc:** youngakw@hotmail.com  
**Subject:** Testimony for HB1663 on 3/4/2009 9:00:00 AM

Testimony for AGR 3/4/2009 9:00:00 AM HB1663

Conference room: 312  
Testifier position: oppose  
Testifier will be present: No  
Submitted by: Alan Young  
Organization: Individual  
Address:  
Phone: 808  
E-mail: [youngakw@hotmail.com](mailto:youngakw@hotmail.com)  
Submitted on: 3/3/2009

Comments:

## **Arlina Agbayani**

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**From:** OFSTONE@aol.com  
**Sent:** Tuesday, March 03, 2009 2:09 PM  
**To:** AGRtestimony  
**Cc:** OFSTONE@aol.com  
**Subject:** In support of HB 1663

Jeri Di Pietro  
GMO Free Kaua`i  
PO Box 343  
Koloa, HI 96756  
808

In Strong support of HB 1663, relating to taro security

Agriculture Committee Hearing  
HB 1663 Taro Bill  
Hearing Wednesday March 4, 2009 at 9:00 a.m. in Room 312  
Chair: Cliff Tsuji

Dear Chair Cliff Tsuji and Agricultural Committee members,

Mahalo for scheduling a hearing on this very important Taro Security bill.

GMO Free Kaua`i is a citizen's group of over 3000 members who support precaution surrounding the manipulation of DNA in our food crops.

Taro is our most important food in Hawai`i and we feel the focus of research and crop improvement should center around what farmers, backyard growers and consumers want. The feeling is very clear, we do not want the genetic engineered taro to threaten our ability to grow traditional varieties. We want to preserve the rights of conventional and organic farmers and we want to protect the hypo allergenic qualities of taro as a safe food choice with those who have allergies.

Since growing of GMO varieties excludes the ability to grow non GMO or traditional and hybrid varieties, we urge you to prevent the release of GMO Taro into our environment.

As we have seen with GMO papaya, there is infringement upon the farmers who do not want the presence of genetically engineered DNA from entering their crop. The release of GMO Rainbow and SunUp Papaya has put undue burden on those wishing to avoid contamination. This is not right and farmers, growers and consumers have a right to plant non patented seed.

What would farmers due with their GMO huli, if they were contracted to re purchase huli every time they plant? The idea that a corporation would control the planting material of kalo is wrong for this state.

The 2050 Sustainability Plan is meant to guide us towards food and energy sovereignty. Let's not thwart our own future by giving control of our state plant to a patent holder.

Sincerely,  
Jeri Di Pietro

GMO Free Kaua'i  
PO Box 343  
Koloa, HI 96756

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## Arlina Agbayani

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**From:** mailinglist@capitol.hawaii.gov  
**Sent:** Tuesday, March 03, 2009 2:09 PM  
**To:** AGRtestimony  
**Cc:** bill.medeiros@mauicounty.us  
**Subject:** Testimony for HB1663 on 3/4/2009 9:00:00 AM

Testimony for AGR 3/4/2009 9:00:00 AM HB1663

Conference room: 312  
Testifier position: support  
Testifier will be present: No  
Submitted by: Council Member Bill Kauakea Medeiros  
Organization: Individual  
Address: Wailuku, Maui, HI 96793  
Phone: 808-2  
E-mail: [bill.medeiros@mauicounty.us](mailto:bill.medeiros@mauicounty.us)  
Submitted on: 3/3/2009

Comments:  
Honorable Clift Tsuji, Chair  
and Members of the Committee On Agriculture

Dear Chair & Members:

I support HB1663 Relating to Taro Security. During the last Legislative Session (2008), I sponsored a resolution from the County of Maui, County Council, that was submitted to the Legislature supporting similar legislation regarding a ban on GMO Taro. As the councilmember representing East Maui District specifically, but also all other areas and islands in Maui County, I voice my support on behalf of our taro farmers and residents of Maui County.  
Mahalo!

HB 1663, Taro Security  
Hse AGR, Weds, March 4, 2009  
9:00 am – Room 312  
Position: Oppose

Chair Tsuji and Members of the House Agriculture Committee:

My name is PePe Miranda. I am a native of the high land of the republic of Panama and have witness devastation on some pest and dices more specific in Coffee. also taro is a fundamental part of Our diet.

Today I oppose this bill because I believe that genetic engineering research and development, done responsibly and under federal regulations, is something that all farmers should have the option of using. Research is a long-term process and costs millions of dollars. When disease destroys a crop, it is too late to begin research to find a solution.

This bill calls for a ban of genetic engineering research and development on all taro. While I can appreciate the cultural significance of taro to the Hawaiian community, this bill does not address only Hawaiian taro.

I understand that not all taro are of the Hawaiian varieties, and there are many other varieties that could benefit from the option of using genetic engineering breeding technologies if needed.

Thank you for the opportunity to present testimony. I can be reached at (808) 443-7100

Thanks again

Jose PePe Miranda

## **Arlina Agbayani**

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**From:** Joan Conrow [joanconrow@hawaiiantel.net]  
**Sent:** Tuesday, March 03, 2009 1:47 PM  
**To:** AGRtestimony  
**Subject:** HB 1663 Hearing 9 a.m. 3-4-09

Dear Representatives:

I urge you to vote yes on House Bill 1663.

It is important to protect the genetic integrity of Hawaii's most cultural significant crop.

Taro is too valuable and specialized a crop to tamper with using technology that is still relatively new, and whose environmental and human health considerations are largely untested.

Please protect kalo.

Mahalo.

Joan Conrow  
Anahola, HI 96703

Representative Clift Tsuji, Chair  
Representative Jessica Wooley, Vice Chair  
House Committee on Agriculture

Opposition of HB 1663, relating to Genetically Modified Plant Organisms

**Room:** 312

**Hearing Date:** Wednesday, March 4<sup>th</sup>

**Time:** 9:00 AM

**Position:** **Oppose**

Dear Representative Tsuji,

My name is Doug Tiffany, I live in Kalaheo on the island of Kauai and I oppose the passage of HB 1663. This bill goes too far by banning research of all varieties of taro (Hawaiian and non-Hawaiian). It is possible that in the future Hawaii could face a disease or insect pest that would destroy the taro production we have left in the State. If we limit the tools we can use to fight future diseases and pests we will regret it later.

Thank you for this opportunity to testify.

G. Douglas Tiffany, PhD.

Kalaheo, HI 96741  
tiffanygd@yahoo.com

**wooley1-Christopher**

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**From:** mailinglist@capitol.hawaii.gov  
**Sent:** Tuesday, March 03, 2009 4:14 PM  
**To:** AGRtestimony  
**Cc:** pitzathawaii@gmail.com  
**Subject:** Testimony for HB1663 on 3/4/2009 9:00:00 AM  
**Attachments:** Oppose HB 1663.doc

Testimony for AGR 3/4/2009 9:00:00 AM HB1663

Conference room: 312  
Testifier position: oppose  
Testifier will be present: No  
Submitted by: Karen Pitz  
Organization: Individual  
Address: , Honolulu, Hawaii  
Phone: !  
E-mail: [pitzathawaii@gmail.com](mailto:pitzathawaii@gmail.com)  
Submitted on: 3/3/2009

Comments:

To: Chair Tsuji, Vice Chair Wooley, and Members of the Committee on Agriculture  
Re: HB 1663

My name is Karen Pitz and I'm submitting this testimony as a private citizen. I oppose HB 1663 which prohibits any kind of research and development of genetically modified taro.

First of all, genetically engineered plants have been commercially used for a long time and there are no scientifically based studies that have shown these crops have caused harm to human. We need to be able to protect our crops in every way we can. Taro has many diseases that can decrease production or even decimate it. Every kind of tool available should be studied and used to protect taro when needed.

Secondly, although we value and respect all cultures in Hawaii we should not let any one put forward their cultural beliefs and insert it into our laws. There should remain the separation of church and state.

**wooley1-Christopher**

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**From:** Hector Valenzuela [hectoruh@yahoo.com]  
**Sent:** Tuesday, March 03, 2009 3:42 PM  
**To:** AGRtestimony  
**Subject:** testimony HB1226 and HB1663

March 3, 2009

TO: House Agriculture Committee  
Clift Tsuji, Chair

FROM:  
Hector Valenzuela, Ph.D.  
Mililani, Hawaii

RE: TESTIMONY- IN OPPOSITION to Bill HB1226 – Please say NO to GMO preemption bills in Hawaii  
and

&

RE: SUPPORT for HB 1663, to ban the growing of ALL taro varieties in the state.

Dear members of the House Agriculture Committee:

I write this testimony in OPPOSITION to bill HB1226 (on preemption) and in strong support of HB1663, which would ban the research and field planting of genetically modified (GM) taro in Hawaii

I have worked as a UH-Manoa Professor and Crop Production Specialist for 18 years, but write this on a personal capacity. My research is in the area of sustainable and ecological agriculture. As someone who supports sustainable agriculture, I have become increasingly concerned about the unregulated open-field plantings of GM crops in Hawaii. In general I have concerns about the health and environmental risks, and about the long-term cultural and socioeconomic impacts on our communities.

**I am opposed to bill Bill HB1226 for the following reason:**

I see this bill as highly undemocratic, and feel that it steps over the basic principle of “home-rule.” In this day and age when the federal government has been unable to properly oversee the safety of our food, and the health and safety of our financial systems, it is inappropriate to once again let lobbyists, large transnational corporations, and corrupt federal politicians, to dictate the future of agriculture in the state. Our citizens in Hawaii have the right to become educated and to participate in the democratic process- to determine the future of their communities. Our citizens have the right to analyze each GM crop on a case by case basis, and if needed, to enact legislation for any particular GM crop, if they feel that it risks the health of their families or community. Please say NO to bill HB1226.

**Below I summarize key positions concerning my support for HB 1663 which would protect ALL taro varieties from genetic modification, and contamination:**

1. **Lack of data showing the safety of GM crops.**

Statements made by GM proponents are not backed by scientific, peer-reviewed data. No studies have been conducted in Hawaii or elsewhere to evaluate the short- or long-term effects on humans from having consumed GM crops over the past 12 years.

## **2. Lack of oversight/regulations.**

GM crops are poorly regulated or in most cases DEREGULATED. Our federal courts and internal USDA and FDA reports have found that our regulatory agencies are often incapable of detecting potential side-effects from the consumption or planting of GM crops.

## **3. Unintended Consequences (see references below).**

Recent findings in the scientific literature have shown that GM crops do indeed pose potential health and environmental risks, and that the benefits to farmers have not always been matched with the promises made by GM proponents.

a. A comprehensive literature review published this month in a scientific journal documents a wide range of potential health side effects from the few animal feeding studies that have been conducted to date (Dona and Arvanitoyannis, 2009).

b. A recent refereed publication showed that the commercial planting of GM cotton was NOT more profitable than that of conventional varieties (Post et al. 2008). Similarly, several publications have shown that the yields of GM crops are similar or lower to than that of conventional varieties.

c. A recent publication from Spain showed that contamination was inevitable and that the principle of co-existence was not working in that country (Binimelis, 2008). Contamination has occurred in all regions where GM crops have been planted. GM corn contamination has been documented in several states of Mexico, even though there is a ban on GM plantings in that country.

d. There are still many unknowns about potential environmental risks. For instance the toxic Bt from GM crops was found to affect non-target organisms in nearby aquatic habitats (Harwood et al. 2005; Rosi-Marshall, 2008). Also, antibiotic genes from Bt crops were found to transfer to microbes in nearby aquatic habitats and aquifers (Koike et al 2007). As another example the Bt toxin from GM corn was found to affect the growth of earthworms in the soil (Zwalhen, 2003).

## **4. GM taro is not the answer for Hawaii.**

My overall assessment as a Crop Specialist is that GM taro is not the answer for farmers in Hawaii, and that GM taro would not contribute toward our self-sufficiency and sustainability. The only plant disease epidemiologist at UH-Manoa concurs, having stated that we already have all of the tools at our disposal to manage the major pests and diseases in taro- by following traditional pest control strategies.

Mahalo for your consideration in opposing HB1226 and in support of HB1663 (all varieties).

Sincerely,

Hector Valenzuela  
94-1070 Anania Cr. No. 107  
Mililani, HI 96789  
<http://www2.hawaii.edu/~hector/>  
tel. 808-625-1277

## References

- Binimelis, R. 2008. Coexistence of plants and coexistence of farmers: Is an individual choice possible? *J. Agric. Environ. Ethics.* 21(5):1187-7863.
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Uptake of Bt endotoxins by nontarget herbivores and higher order arthropod predators: molecular evidence from a transgenic corn agroecosystem. *Molecular Ecology* (2005) 14, 2815–2823
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### **Professional Bio:**

Dr. Hector Valenzuela a full Professor and Vegetable Crops Specialist at the University of Hawaii-Manoa received his Ph.D. from the University of Florida. Dr. Valenzuela has conducted applied agroecology research for 23 years in support of commercial farmers, organic farming, and sustainable agriculture. He has authored over 380 technical and educational publications, has conducted over 200 field research trials with over 60 different vegetable and cover crop species, has organized over 60 field days and workshops for farmers in Hawaii and the Pacific Region, given over 200 presentations, and has participated in 13 international assignments. A staunch supporter of organic and sustainable farming in Hawaii, Dr. Valenzuela established the first long-term organic research plots in Hawaii in 1993, the longest-running organic research project in the Pacific Region, and established the first Web sites to assist vegetable farmers (1998) and organic farmers (2005) in the Pacific Region.

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## wooley1-Christopher

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**From:** bryna@kahea.org on behalf of Kahu Haloa [nakahuohaloa@gmail.com]  
**Sent:** Tuesday, March 03, 2009 5:05 PM  
**To:** AGRtestimony  
**Subject:** FARMER TESTIMONY HB1663 SUPPORT / HB1226 OPPOSE

can you print this to be in packets, he will likely be able to testify in person.

mahalo!

---

IN SUPPORT of HB1663  
IN OPPOSITION TO HB1226

Kaipō'i Kelling  
Mahi'ai (Taro Farmer, Kane'ohe)

Aloha mai kakou,

This is a letter in support of H.B. 1663 and S.B.709-SD1 to protect all taro from genetic modification. And in opposition to H.B.1226 a preemption on GMOs.

I am a mahi'ai and a ku'i 'ai practioner who believes in keeping Haloa pure for the safety and the purity of our lives and our 'aina. I am a farmer who is concerned about Kalo and the native varieties that remain in our care today. Our Kupuna created the greatest bio diversity of taro in the world and they knew the value of propagation in order to obtain food security.

I may not produce as much kalo as the island of Kaua'i but I also have the right to choose to plant and harvest kalo in the ways that our kupuna have shared with me. Their ways included green manure, fallowing, diversity and adaptation and crop rotation. These ancient practices are a proven method to keep Haloa strong. They stayed away from chemicals, non-fallowing and monocropping which are the standard practices of commerical taro farmers in the state of Hawaii today. These reasons mentioned are a large cause of the problems that taro farmers are facing and they often ask the scientists for their mana'o to kokua.

I am also a practioner in the tradition of ku'i 'ai where I engage in using the board and stone to produce kalo for my 'ohana. The kupuna varieties are known and tested for many generations and are famous for their solidity or kalo pa'a. Pololu, Piko kea, Moi, Ha'akea, ohe, api'i and many others can be produced with the pohaku ku'i 'ai. The varieties that are produced commerically such as Maui Lehua, various new hybrids such as pa lehua and hġ6 are kalo that are soft and are great for milling poi but they can not stand the mana of the pohaku. I have tried various times to make good quality 'ai or food and I have failed many times because the consistency of the kalo pa'a or hard taro is not found in these commerical varieties.

I am also opposed to the dilemma that the bio-tech industry is currently placing in front of the mahi'ai and taro growers in the state of Hawaii. They are offering a moratorium on all kalo in exchange for the banning of the public's input into other genetic modification of all other plants and animals in my homeland. This is an absurd and unreasonable request because as a tax payer and a concerned citizen of Hawaii I have the right to know what type of experiments are being conducted and tested in my backyard and if I feel that such an experiment is not safe or benefical for our environment or ourselves than I also have the right to testify against it.

Mahalo nui for listening to my leo,

Kaipo'i Kelling

Mahi'ai

All of the following individuals submitted exactly the same written testimony in support of HB 1663 and in opposition of HB 1226. See attached sample of written testimony.

1. Johnathan Cender
2. Jodi Drisko
3. Tom Gillen
4. Vickie Innis
5. Lehua Kimberly
6. Angela Kirschbaum
7. Spring Manju
8. John Miller
9. Frank Pulaski, III
10. Tracey Schavone
11. Ann Strong
12. Susan Windle
13. Diane Fujimura
14. Debbie Piepgrass
15. Donald Cooke
16. Yoni Silberman
17. Ernest Messersmith
18. Shaunagh Robbins
19. Francesca Bishop
20. Jessy Sconfienza
21. Mililani Trask
22. Carol Beardmore
23. Pamela Dyson
24. Dennys Eymard
25. Erica Rainhart
26. Erica Hahn
27. B.A. McClintock
28. Terese Vaiceliunas
29. Tristen Wanke
30. S. Jenkins
31. Eloise Engman

## wooley1-Christopher

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**From:** jkecender@yahoo.com  
**Sent:** Tuesday, March 03, 2009 11:25 AM  
**To:** AGRtestimony  
**Subject:** Protect Hawaii! Oppose HB1226, Support HB1663

Representative Clift Tsuji  
Hawaii State Capitol, Room 403  
415 South Beretania Street  
Honolulu, HI 96813-2425

Dear Representative Tsuji,

As a consumer and supporter of healthy food and agricultural practices in Hawaii, I strongly urge you to oppose H.B. 1226 and any law prohibiting the state or county from regulating GMOs in Hawaii. The federal government has proven itself incapable of adequately regulating GM crops, as evidenced by scores of contamination episodes. Thus, state and county officials must retain their authority to set stricter standards than lax and unreliable federal regulators. This applies particularly to GM plants engineered to produce potentially hazardous, experimental pharmaceuticals, many of which have been grown in Hawaii. In 2006, a federal district court ruled that the USDA had failed to conduct a meaningful environmental assessment before granting permits to grow such hazardous "pharma crops." The state legislature must not rob state and county officials of the ability to protect Hawaiian citizens and Hawaii's fragile environment from such reckless activities. Community and consumer safety is endangered when local governments are prohibited from taking every step to ensure public safety.

Recent food safety disasters (i.e., peanut butter and spinach recalls) affirm the need to establish the broadest safety net possible. Consumers deserve and demand a comprehensive web of food safety standards, which must include state and county governments.

In addition, I urge you to support HB1663, the prohibition on the development, testing, propagation, release, importation, planting, or growing of genetically modified taro in the State of Hawaii.

Hawaii needs local community oversight of GMO crops, such as the ban on GMO taro, to protect our health; our unique environment; our local farmers, laborers and economy; and consumer and community rights.

The people of Hawaii want, need and deserve more safe, healthy food--and should expect that their State and local government will be at work to protect them. I urge you to oppose attempts to weaken or limit State or County authority to regulate genetically modified crops and food in Hawaii.

Please oppose the preemption bill, HB 1226, and support the ban on GMO taro in the state, HB 1663.

Sincerely,  
Jonathan Cender  
PO Box 982

**KAHEA List of Testifiers:** The following individuals submitted written testimony in support of HB 1663 through KAHEA: The Hawaiian-Environmental Alliance.

1. John Keikiala Aana
2. Chris Kobayashi
3. Ke Kula 'o Samuel M. Kamakau, LPCS
4. Demetri Rivera
5. Vince Kana'i Dodge
6. Hector Valenzuela, Ph.D.
7. Mark Alapaki Luke
8. Walter Andrade
9. Ed Wendt
10. Leslie Yee Choy
11. George Keoki Ruisuki Fukumitsu
12. Kipahulu Ohana
13. Joan Lander
14. Daniel Bishop
15. Walter Andrade
16. Robert Domingo
17. Ed Wendt
18. Keoki Kahumoku
19. Jason Ito
20. David Webb
21. Nalei Kahakalau
22. Jim Albertini
23. Kane Turalde
24. Steven Hookano
25. Alison Yahna
26. Donald Cooke
27. Kyle Nakanelua
28. Mele Coelho
29. Steve Morgan
30. Seth Raabe
31. Thomas Young
32. Pauahi Hookano
33. Eva Kapelaonaalii Collins
34. Claire Cummings
35. Hanalei Fergstrom
36. Association of Hawaiian Civic Clubs
37. Tara White
38. Caitlin Ross Odom
39. Lorrin Pang
40. Nancy Kobayashi
41. Donna Weilenman
42. Margery Freeman
43. Ina Roessler
44. Joan Lander
45. Jeri Di Pietro
46. Laulani Teale
47. Vicki McCarthy
48. B.A. McClintock
49. Vicki Vierra
50. Shannon Renee Rudolph
51. Miranda Lewitsky
52. Rachel Winkler
53. Cory Harden
54. Beryl Blainch
55. Jeff Haun
56. Spencer Leineweber
57. Sylvia Partridge
58. Skye Loe
59. Mary Baker
60. David Webb
61. Alexis Horio
62. Evelyn Souza
63. Laura and Andrew Binstock
64. Gwen Ilaban
65. Marjorie Erway
66. Eliza Goodhue
67. Mayumi Marks
68. Linda Lee Evans
69. Katy Fogg
70. Lori Fernandez
71. Catherine Aki
72. Andrea Baer
73. Lee Altenberg
74. Walter Ritte
75. Jeri Di Pietro
76. Friends of GMO Free Kauai
77. Steve Morgan
78. Richard Welker
79. Pam Haight
80. Lei Kihoi
81. Dawn Boucher
82. Jason Winnett
83. Robin Stetson
84. Puanani Rogers
85. Kamaka Jingao
86. Lynlie Waiamau
87. Andrew Binstock
88. Bettina Jones
89. Rino Geremen
90. Stephen Dinion
91. Neil Frazer, PhD

**KAHEA List of Testifiers:** The following individuals submitted written testimony in support of HB 1663 through KAHEA: The Hawaiian-Environmental Alliance.

92. David Adam Edelstein

93. Mary Lacques

To: State Senate  
State House of Representatives  
Re: Testimony in SUPPORT of ban on GMO Kalo (HB1663 & SB709-SD1)  
From: West Kauai Taro Farmer's Co-op  
President- John Keikiala Aana  
Taro Farmer- 30yrs; Former owner- Makaweli Poi Mill, Inc; Former Vice President- Kauai Taro  
Grower's Assoc.; Member- State Task Force on Taro Security and Purity; Kanaka Maoli

Aloha,

The West Kauai Taro Farmer's Co-op represents taro farmers from the west side of Kauai, mostly from Waimea and Makaweli Valleys. Our taro production is included in the 70-80% of the state's taro supply that Kauai produces. We also are the farmer's that have lasted through the generations and generations, and continue to produce taro against great odds, because we are the living Hawaiian culture. We continue to plant taro because it is who we are, and it is a legacy that has been passed on to us by our kupuna.

Our members are mostly small commercial taro farmers. Our taro production mostly goes to supply the poi market on Kauai. While we are considered commercial farmers, one thing that we have in common is that we don't farm taro for just the money. My uncle and mentor, Bernie Char, used to say, "You cannot grow taro for just the money. It has to come from in you. You have to love to do it."

While we might represent a smaller proportion of the Kauai's taro production than the larger commercial farmers, we are no less important. There are many other small taro farmers throughout the state, who oppose any kind of GMO research, on any kind of taro. The West Kauai Taro Farmer's Co-op. supports the ban on GMO Kalo.

Please Kokua,

John Keikiala Aana

To: State Senate  
State House of Representatives  
Re: Testimony in support of ban on GMO Kalo

From: John Keikiala Aana  
Taro Farmer- 30 yrs.  
Former owner- Makaweli Poi Mill, Inc.  
Former Vice President- Kauai Taro Growers Assoc.  
President- West Kauai Taro Farmers Co-op.  
Member- State Task Force on Taro Security and Purity  
Kanaka Maoli

Aloha,

I am a descendant of the Makuaole family, from Makaweli Valley, formerly known as Olokele Valley. Our family has a history of growing kalo in this area that can be traced back to pre-western contact. Unlike many Kanaka Maoli families, who were dispossessed from their kuleana lands, we have managed to hold on to our land, and continue to this day, to plant kalo, and to care for the very same aina that our ancestors cared for. We, as Kanaka Maoli, are direct descendants of Haloa, and Kalo.

We, as the indigenous people of this land, have had our lands stolen illegally, have been made to be second class citizens in our own land, and now are being attacked at the very essence of our spirit. Would we think of going to Japan or China, or any other country, and tell those people that we want to Genetically Modify their ancestors? Would the people of those countries allow that? I don't think so. But that is exactly what they are trying to do to us. This is no longer just a taro farmer issue. This is a Kanaka Maoli issue.

The Kanaka Maoli were conservationists. They practiced sustainability. They understood that what we do today will directly affect the generations to come. That is why they practiced kapu system, to guarantee the sustainability of their resources: They took only what they needed to sustain themselves, and left the rest to restore and replenish that resource. By doing that, they guaranteed their own survival and existence into the future.

As a commercial taro farmer for the past 30+ years, and as a poi miller for 15 yrs., I understand the economics of taro and poi production. I have seen the results of leaf blight and pocket rot, and the devastation caused by apple snails. I have seen poor quality soil and taro, resulting in decreasing yields of both taro and poi. But at the same time, I have also seen beautiful, solid taro, with no pocket rot. I have seen promising results with some hybrid taro, with old Hawaiian varieties, and with wild varieties taken from the mountains of Kauai. I know from my own experience that we can grow strong, healthy taro without genetically modifying it. GMO taro is not the answer to our problems. There are other scientific methods to develop disease resistant varieties. We as farmers, need to rotate and fallow our patches, and take the time to replenish the soil organically. If the soil is healthy, the taro will grow healthy and high yields.

But this is the problem. Large commercial farmers only grow one variety of taro and do not fallow their patches. They do not take the time to rest and replenish the land. They have kept on planting large areas just to force profits, but now they are getting more disease, snails and lower yields. There are those that think that a GMO taro is the answer to their problems, so that they can continue high intensive, mono-cropping practices, which are unsustainable into the future. Allowing GMO taro to be produced would be the beginning of the end of the taro industry. Plus, the apple snail can still eat 50% of a GMO taro. Get rid of the apple snail and production will increase by 50%. Think about it.

No one knows what the future will bring, but I hope that we can learn from the practices of our ancestors. We Hawaiians, farmers and non-farmers, know what is pono in our hearts. It is not a future based on GMOs. It is a future based on sustainability and conservation. We need to put a kapu on GMOs. We humbly ask you to support the ban on GMO research on kalo.

Mahalo for your Kokua,

*John Keikiala Aana*

Testimony in Support of HB1663

Chris Kobayashi  
Fulltime Organic Taro Farmer  
Hanalei, Kauai

Aloha Representatives,

I am in strong support of HB1663, Ban on GMO taro in Hawaii.

My parents and grandparents farmed taro since the early 1940's. I grew up surrounded by taro fields. I attended the University of Hawaii and got a B.S. in Agriculture. I didn't know at the time that I would be the one to take over the farm after my dad retired.

If my dad was here today, he would say that we need to protect and take care of the taro. He was the one who taught me how to select for the best *huli* (vegetative propagative piece) for the next planting. Sometime in the '60s and '70s, there was this "disease" called Guava Seed. Not even the CTAHR researchers knew the cause of it. There seemed to be no cure. My dad, in his wisdom, felt strongly that selection of *huli* played a huge part in eliminating that "disease". Today, it is rare to see Guava Seed in our plantings. Selection of *huli* means being observant of the plants and of their many good and desirable qualities in the field as they respond to the seasons and other environmental factors. This is what all the Kanaka Maoli Kahu o Haloa who came before all of us did. It is through their astute observations and abilities to select and breed that we have the different Hawaiian varieties today.

Through observation, it seems that the production and quality of taro started to decline rapidly in the late 1980's and early 1990's. To me, it was similar to the stock market crash. I think. But in our case, it was the Soil Fertility Crash. I spoke to an agronomist at UH but he didn't seem to agree with me. I believe we had different perspectives of what a healthy soil is.

If one looks at how commercial taro is being farmed today, one will see that the field barely has time to rest and fallow or grow a rotational crop in between, before taro is once again planted in the same field. If there is disease present, continuous planting will just increase the disease presence. We must break the disease cycle. Change the environment so that the beneficial microorganisms can multiply.

There are many many applications that we can try in growing taro. Most are not new. They are simply being rediscovered. Our ancient elders and kupuna knew of them. Farmers who are in touch with the natural cycle of the earth know of these secrets to growing healthy and nutrient dense food.

GMO taro will not save taro or our commercial farmers. Making the taro resistant to one disease may make it vulnerable to another. Farmers who say that they will not plant or eat the GMO taro but want the research to continue just in case, will end up planting it because if they continue to farm with out regard for true soil fertility, their crops will not be healthy and prone to disease and they will think that they have arrived at that "just in case" time.

My point is that, we need to provide a healthy environment for the taro. Just like us human beings. When the flu is going around, not everyone gets it. Why? Because of what we feed ourselves that help to boost our immune systems. Likewise, the ones who get sick probably have some kind of stress on their bodies. So simple. Let's not unleash a GE live organism that we could never recall if it is later determined that they cause harm.

Also, I don't believe that there are enough regulations to keep this kind of experiment in the lab or greenhouse. Who will be liable? Dr. Susan Miyasaka? UH? HARC? The lab assistants? DOA? USDA? The farmer who plants it? With the demand for organic food growing, will consumers want to buy and eat GMO taro or poi? Would you feed it to your baby? Or your elderly parent?

As a farmer, I know that taro varieties can and will get easily mixed up besides getting crosspollinated naturally or purposely. And gmo taro? That's on a microscopic level and we'd definitely not be able to see the difference.

What about the farmer who chooses to grow non gmo taro?

What about the consumer who hopes that the organic or non gmo taro really is non gmo taro?

Please help to support keeping taro pure; keeping its nutritional and medicinal qualities intact; it's genetic integrity pure.

Mahalo nui,  
Chris Kobayashi, Kalo farmer  
Wai`oli, Hanalei, Kaua`i

Testimony of Chris Kobayashi- Organic Taro Farmer  
In Support of Ban on GMO-Taro

Aloha mai kakou,

We want a ban on GMO-taro for all varieties of taro in Hawaii.  
Contamination is forever. Coexistence is impossible.

There are those who say they simply want the research to continue just in case. And they also claim they would never plant it. Do you really believe that? Do you think that this research and technology would stay "safely" in the lab? For the safety of all of us who kanu taro, who cherish it as a family member because it provides and feeds us, for our aina - the land and water- which supports the growing of our food. It is time to stop and think what we are doing to all that is real and all that matters to us as human beings on this planet. Money and the drive to own and control does not make for anything healthy.

Malama Haloa. Malama kalo. Malama `aina.  
One earth, one land, one air, one people.  
Mahalo ke akua.

chris kobayashi  
p.o.box 135  
hanalei, HI 96714

# Ke Kula 'o Samuel M. Kamakau, LPCS

45-037 Kāne'ōhe Bay Drive, Kāne'ōhe, HI, 96744  
Tel: 808.235.9175 • Fax: 808.235.9173 • www.kamakau.com

*E mālama 'ia ana ka mauili ola o kākou mai kēlā hanauna a i kēia hanauna.  
Our spirit of being is nurtured from generation to generation.*

Testimony in SUPPORT of HB1663, and in OPPOSITION TO HB1226

March 4, 2009

Aloha kakou elected lawmakers,

Ke Kula O Samuel Manaiakalani Kamakau is a Hawaiian immersion charter school located in Kane'ōhe Hawai'i. Our school focuses on educating our future leaders and community members with an emphasis on some key principles and Hawaiian values including: Malama 'Aina, Stewardship of the Land, Malama Kino, Health and Wellness. 'Ai Pono, Healthy Diet.

We the 'Uo Mamo, or Board of Directors comprised of representatives consisting of school faculty including school director, teachers, support staff, parents, students and community members of Ke Kula O S.M. Kamakau firmly request that you, the lawmakers elected to represent us, **support legislation imposing a ban on Genetically Modified and Genetically Engineered taro of ALL varieties of taro (colocasia esculenta) in Hawaii, and oppose any legislation preempting genetic modification at any level in Hawai'i.**

Our request is validated on several levels.

1. Genetically engineered taro has not been proven safe for our environment and cross contamination will pose unnecessary risks to our 'aina as well as to our native varieties of taro.
2. Genetically modified and engineered products have not been proven safe for human consumption and also poses a threat to the well known hypoallergenic properties of taro (see reference attached).
3. Genetic engineering of kalo or taro is disrespectful to Hawaiian values and beliefs.

As an educational organization that utilizes taro farming, preparation and consumption as key components of our curriculum, our concerns are great regarding this issue. As an educational program that has hopes to restore one of the largest know lo'i or wetland taro patches in the area of Ha'iku, our recognition as taro farmers and exponential amounts of future taro farmers are undeniable. The purity and integrity of taro is extremely valuable if not vital to the future of many of our lessons to be taught.

We SUPPORT legislation as indicated in HB1663 banning genetic modification of ALL taro varieties in Hawai'i, and OPPOSE legislation as indicated in HB1226 gmo preemption bill, for the same reasons listed above.

Mahalo Piha,  
Ke Kula O Samuel Manaiakalani Kamakau  
'Uo Mamo

*SEE ATTACHED REFERENCE*

Dona, A. and I.S. Arvanitoyannis. 2009. Health Risks of Genetically Modified Foods. Critical Reviews in Food Science and Nutrition. 49:2,164-175

**Health Risks of Genetically Modified Foods**  
**Dona, A. and I.S. Arvanitoyannis. 2009.**  
***Critical Reviews in Food Science and Nutrition.***  
**49:2,164-175**

Overview  
Need for testing  
Effects on animal growth  
Effect on gastrointestinal tract  
Effects on the liver  
Effect on pancreas  
Effect on the blood  
Effects on the immune system  
Effect on biochemical parameters  
Mortality  
Developmental effect on fetus, babies  
Pleiotropic and insertional effects (when genes influences multiple traits, thus one mutation such as from gmos can affect all traits)  
Gmo growth hormone in milk, effect on host animal  
Gmo growth hormone in milk, IGF effect on human health  
Pigs expressing human growth hormone  
GM pigs  
On antinutrients  
On potential transfer to the gut  
Allergic responses  
Bt expressed in many crops, farm workers exposed to

## **OVERVIEW**

First, the authors challenge the concept of "substantial equivalence," which was used as a justification by the FDA to deregulate several key GM crops: "Substantial equivalence" may provide some theoretical points background in predicting toxicity, but in practice the only reliable way to evaluate the toxicity of a GM food is through toxicity tests on animals.

Furthermore, it has been argued that GM foods should be subjected to the same testing and approval procedures as medicines (i.e., clinical trials) since they must be adequate to ensure that any possibility of an adverse effect on human health from a GM food can be detected. "On the premise that GM crops are safe because no evidence exists to the contrary this article indicates that: "In the absence of adequate safety studies, the lack of evidence that GM food is unsafe cannot be interpreted as proof that it is safe."

Also: "The results of most of the rather few studies conducted with GM foods indicate that they may cause hepatic, pancreatic, renal, and reproductive effects and may alter hematological, biochemical, and immunologic parameters the significance of which remains unknown. The above results indicate that many GM food have some common toxic effects. Therefore, further studies should be conducted in order to elucidate the mechanism dominating this action."

Also: "Small amounts of ingested DNA may not be broken down under digestive processes and there is a possibility that this DNA may either enter the bloodstream or be excreted, especially in individuals with abnormal digestion as a result of chronic gastrointestinal disease or with immunodeficiency"

### **Need for testing**

“The toxicity tests should comply with the guidelines for toxicity testing of drugs. It should be emphasized that since these GM foods are going to be consumed by every human being they should be tested even more thoroughly than drugs and more experiments are required in order to study the possible toxicity and make any conclusions.”

Also: “postmarketing surveillance should be part of the overall safety strategy for allergies, especially of high-risk groups such as infants and individuals in “atopic” families”

### **Effects on animal growth**

Body weight might be significantly altered as it has been shown with the consumption of Mon863 corn (Seralini et al., 2007) and GM rice on rats (Li et al., 2004).

### **Effect on gastrointestinal tract**

Stomach erosion and necrosis were reported in rats fed with flavr-savr GM tomatoes, while GM potatoes expressing *Galanthus nivalis* (GNA) lectin induced proliferative growth in their stomach which is of particular importance if one takes into consideration that glomerular stomach erosions can lead to life-threatening hemorrhage, especially in the elderly and patients on nonsteroidal anti-inflammatory agents (Pusztai et al., 2003).

Intestines may also be affected by GM food consumption as it has already been shown with GM potatoes expressing Bt toxin which caused the disruption, multinucleation, swelling, and increased degradation of ileal surface cells in rats (Fares and El-Sayed, 1998), GM potatoes expressing gna which induced proliferative growth in the small-large intestines (Ewen and Pusztai, 1999a) and GM soybean type Roundup Ready R which caused moderate inflammation in the distal intestine of salmon (Bakke-McKellep et al. 2007). “Also: “Binding to surface carbohydrates of the mouse jejunum was also revealed with CryIAC protoxin of the Cry genes, the most common terminators applied in currently approved crops (Vazquez-Padron et al., 2000).

According to Pusztai et al. (2003) since it is the genetic manipulation process itself which led to toxicity, similar hazards might be seen in animals or humans fed genetically-manipulated soya, canola, and corn over a long period of time (i.e., years or decades). The chronic inflammation and proliferative effect that may be caused by some GM plants on the gastrointestinal tract may lead after years to cancer.

### **Effects on the liver**

As for the effects of GM food on liver there are only a few long-term studies. It has been found that GM soya can alter the cell structure and functioning of the liver in mice reversibly (Malatesta et al., 2002; 2003; 2005) and can cause changes in histomorphology (Ostaszewska et al., 2005) and the protein profile of the liver in rainbow trout (Martin et al., 2003).

Alterations have also been observed in hepatic enzymes after consumption of raw rice expressing GNA lectin (Poulsen et al., 2007), GM Bt with vegetative insecticidal protein gene (Peng et al., 2007) and in DuPont’s subchronic feeding study in rats fed diets containing GM corn 1507 (MacKenzie et al., 2007). These alterations in hepatocyte cells and enzymes may be indicative of hepatocellular damage. Consumption of Mon863 corn in rats led to increase in triglycerides in females (Seralini et al., 2007).

### **Effect on pancreas**

GM soybean has also an impact on pancreas, since changes occurred in pancreatic acinar cells

of mice and a high synthetic rate of zymogen granules containing low amounts of  $\alpha$ -amylase (Malatesta et al., 2003). "Effect on kidneys" Another target organ of some GM crops is the kidney. Smaller kidneys were developed in DuPont's study in rats fed diets containing GM corn 1507 (MacKenzie et al., 2007), whereas consumption of Mon863 corn in rats led to lower urine phosphorus and sodium excretion in male rats. There were also small increases in focal inflammation and tubular degenerative changes characteristic of a classic chronic progressive nephropathy (Seralini et al., 2007). Rats fed GNA rice had elevated creatinine plasma concentration either due to some kind of renal effect or the increased water consumption in order to excrete the excess iron in the GNA rice diet (Poulsen et al., 2007).

Salmons fed GM soybean had higher head kidney lysozyme and higher acid phosphatase activities (Bakke-McKellep et al., 2007).

### **Effect on the blood**

Response variables were observed in animals fed with GM crops. DuPont's study in rats fed diets containing GM corn 1507 showed a decrease in red blood cell count and hematocrit of females (MacKenzie et al., 2007) while GM corn Mon863 affected the development of blood with fewer immature red blood cells (reticulocytes) and changes in blood chemistry in rats (Seralini et al., 2007). Bt with VIP insecticidal protein gene caused a decrease in platelets, monocytes ratio in female rats, and an increase in the granulocytes ratio in male rats (Peng et al., 2007).

### **Effects on the immune system**

As for the effects of GM crops on the immune system an increase in the production of Cry9C-specific IgG and IgG1 in rats and mice fed with GM heat-treated corn CBH351 was observed (Teshima et al., 2002) because the Cry gene possesses immunogenic properties as it was shown by Vazquez-Padron et al. (1999). Serum IgG mediates the inhibition of serum-facilitated allergen presentation. The presence of enhanced IgG Abs activates the IgG response (van Neerven et al., 1999) thereby indicating the occurrence of an allergic reaction having occurred, although Germolec et al. (2003) suggest that antigen specific IgG does not correlate to clinical allergy. Moreover, GM corn Mon863 caused higher white blood cell levels in male rats (Seralini et al., 2007). DuPont's sub chronic feeding study in rats fed diets containing GM corn 1507 showed that eosinophils concentration in females was decreased (MacKenzie et al., 2007).

Rats given a diet based on GNA rice showed enlargement of the lymph nodes, and decreased weight of the mesenteric and of the female adrenal lymph nodes which may be indicative of an immune toxic response (Poulsen et al., 2007).

### **Effect on biochemical parameters**

Subchronic feeding of GNA rice in rats resulted in decrease in glucose, while cholesterol, triglyceride, and HDLD concentration were higher (Poulsen et al., 2007).

### **Mortality**

An increased mortality was observed in rats fed with GM tomatoes since seven out of forty rats died within two weeks without any explanation (Pusztai et al., 2003).

### **Developmental effect on fetus, babies**

Food-ingested M13 DNA fed to pregnant mice, was detected in various organs of fetuses and newborn animals, suggesting a possible transfer through the transplacental route (Doerfler and Schubert, 1998). Maternally ingested foreign DNA could be a potential mutagen for the developing fetus. Birthrates of piglets fed GM corn in Iowa country displayed an 80% fall due to high levels of Fusarium mold (Strieber, 2002), although it has been claimed that Bt corn expressing Cry proteins is

less contaminated with mycotoxins (Weil, 2005). A Russian rat study reported very high death rates in the young of rats fed GM soya (56% died) in stunted growth in the surviving progeny (Ermakova, 2005). A study of GM rice expressing Xa21 on the development of rat embryos showed that there was an increase in the body weight gain of pregnant rats, the body weight, body length, and tail length of fetal rats (Li et al., 2004) whereas GM rice expressing cowpea trypsin inhibitor caused an increase in the male rats' body length and in the female rats' red blood cell number, hemoglobin, and monocyte number (Zhuo et al., 2004)."

**Pleiotropic and insertional effects (when genes influences multiple traits, thus one mutation such as from gmos can affect all traits):**

"Concern has been expressed about the above potential effects which might cause the silencing of genes, changes in their level of expression or, potentially, the turning on of existing genes that were not previously being expressed (Conner and Jacobs, 1999). This interaction with the activity of the existing genes and biochemical pathways of plants, may lead to disruption of metabolism in unpredictable ways and to the development of new toxic compounds or an increase of the already existing ones as it happened with two genetically produced foods, tryptophan and g-linolenic acid (Hill et al., 1993; Sayanova et al., 1997).

Moreover, research into epigenetics has also revealed that genes account for only a part of the control of the biochemistry of organisms, and organisms have a level of control above genes that interact with genes explaining why genetic engineering is so unpredictable, with different results produced by each attempt and why the products are often unstable. The possibility that an unidentified compound may be present in the GM food makes crucial that each transgenic food as whole food and not as a single protein should be tested directly for toxicity in animals, although as Kuiper et al. (2004) state there are limitations in establishing dose-response relationships."

**Gmo growth hormone in milk, effect on host animal**

The use of rbGH in dairy cattle in order to increase milk yield has caused large controversy. Problems occurring such as an increase in mastitis may pose a risk to human health since the increased antibiotic use leads to antibiotic residues in milk (Epstein, 1996). Adverse effects in cows have been observed including lameness, mastitis, subclinical ketosis, an increase in embryonic loss and abortion, a decrease in final pregnancy rates, as well as a decrease in birth rate (Dohoo et al., 2003). It should be noted that lameness has also been reported in studies with transgenic pigs genetically engineered to carry human and bovine growth hormone genes (Pursel et al., 1989).

**Gmo growth hormone in milk, IGF effect on human health**

The consumption of milk from cows injected rbGH leads to an increase in IGF-I in humans, since IGF-1 survives digestion (Xian et al., 1995). The oral free IGF-1 feeding studies in rats sponsored by Monsanto and Elanco looked at by the Joint Expert Committee on Food Additives (JECFA) in 1992 had ambiguous results since neither used IGF-1 associated with its binding proteins, which are resistant to acidic conditions and may enable IGF-1 to survive digestion in the stomach. Moreover, IGF-1 is protected from digestion by the major milk protein casein (Hansen et al., 1997) and the milks buffering effect (Xian et al. 1995). Moreover, Monsanto's 90-day rat study which had previously shown that rbGH "is not orally active in rats" was re-examined and it was found that rbGH elicited a primary antigenic response meaning that rbGH was absorbed intact from the gut (Eppard et al., 1997). The full significance of human exposure to rbGH and IGF-1 is unknown, particularly in the neonate, the subpopulation at greatest risk (Morris, 1999). According to Chan (1998), at least some of the absorbed IGF-I can effectively stimulate the proliferation of cancer cells. The increased levels of IGF-I in humans predict increased rates in colon, breast, and prostate cancer, since they stimulate the indolent

slowly growing tumor cells that appear in an aging individual resulting in clinical cancer necessarily old. On the other hand, FDA states that this potential does not exist since any increase of IGF-I in milk is much lower than the physiological amount produced in the organism. These concerns about the consumption of milk from cows injected rbGH may be carried also to other animals such as pigs expressing human GH, pigs injected recombinant porcine somatotropin (rpST), and GH transgenic salmon.

### **Pigs expressing human growth hormone**

Transgenic pigs expressing human GH showed dramatic effects in growth rates, feed conversion, and body composition, but exhibited serious side effects that were attributable to the high level of GH expression (Pursel et al., 1989). Repeated injections of rpST can also produce altered lipid composition similar to that of the GH transgenic pigs (Solomon et al., 1997). Growth hormone on fish However, when the fish growth hormone (GM) gene is introduced in salmon may GH circulation may elevate by 40-fold, leading to enlarged skulls and impair feeding and respiration (Dunham and Devlin, 1999). Experiments should be conducted in animals being fed GH transgenic salmon and other fish in order to examine whether the consumption of GH transgenic fish expressing high levels of GH will increase the levels of IGFI and lead to the same health risks as rbGH milk. It should be emphasized that as in milk there is a possibility that the presence of other proteins in the fish tissue may protect IGF- 1 from digestion, which remains to be demonstrated in animal studies.

### **GM pigs**

The experiment of Saeki et al. (2004) with pigs containing spinach desaturase gene which converts saturated fat into the unsaturated fat linoleic acid resulted in a high degree of mortality in founders and the F1 generation. Increased mortality might have been due to a random integration process where the transgene can insert in and damage any active gene locus (insertional mutagenesis) or to the significant alteration in the embryonic lipid profile caused by the transgene. The porcine embryo is unique in its high intracellular lipid content, which is associated with its sensitivity against freezing or in vitro production (Niemann and Rath, 2001). We strongly believe that the same toxicity could occur if the pregnant pigs were fed only the new source of linolenic acid obtained from transgenic canola or of any future modified crop, since it alters the percentage of 18:2n-6 in liver (Palombo et al., 2000). We should be aware that any change in the lipid profile of liver can also result in changes in metabolism with unexpected consequences.

### **On antinutrients**

“The insertion of a new gene can sometimes lead to increase in existing levels of anti-nutrients, some of which cannot be reduced with heat treatment (Bakke-McKellep et al., 2007). One of the most widely available commercial GM products nowadays glyphosate-resistant Roundup Ready\_R soybean may display an increase in anti-nutrients (Padgett et al., 1996). Heat-stable anti-nutrients such as phytoestrogens, glucinins, and phytic acid were also found to cause infertility problems in sheep and cattle (Liener, 1994), allergenic reactions and binding to phosphorus and zinc thereby making them unavailable to the animal respectively (Adams, 1995). An increase in the anti-nutrient level should not be accepted since a GM food may be consumed as raw material.”

### **On potential transfer to the gut**

“short DNA fragments of GM plants have been detected in white blood cells and in milk of cows and in chicken and mice tissues that had been fed GM corn and soybean, respectively (Beever and Kemp, 2000; Einspainer et al., 2001; Hohlweg and Doerfler, 2001; Phipps and Beever, 2001). Furthermore, fragments of recombinant cry1Ab gene were detected in the gastrointestinal tract of

*Bacillus thuringiensis* (Bt)11 corn-fed pigs but not in the blood (Chowdhury et al., 2003). Therefore, it seems plausible that small amounts of ingested DNA are not broken down under physiological digestive processes. The fact that fragments of transgenic genes may not be detected in blood but can be detected in tissues of animals by PCR, underlies that they are in quite low levels in circulation and more sensitive methods of detection are needed (Puztai 2001).

Moreover, Murray and his coworkers (2007) showed that not all PCR assays can detect DNA in extractions of shortly cooked corn, making the interpretation of the results from PCR even more difficult. These limitations in the detection of GM DNA should make us reconsider the view that gene transfer cannot occur, which falls in agreement with the findings of Netherwood et al. (2004) that transgene from GM soya survived passage through the small bowel in human ileostomists. According to Flachowsky (2005) the uptake of GM DNA into cells of the gastrointestinal tract will normally have no biological consequences because the DNA will be degraded in the cell. The question is whether it can be degraded in patients with severe gastrointestinal diseases. In the unlikely event that the DNA is recombined into a host chromosome, the probability that it will exert any biological effect on that cell remains unknown.”

### **Allergic responses**

“The introduction of novel proteins into foods such as a GM soybean variety expressing methionine from Brazil nut (Nordlee et al., 1996) and GE corn variety modified to produce a Bt endotoxin, Cry9C (Bernstein et al., 2003) may elicit potentially harmful immunological responses, including allergic hypersensitivity (Conner et al., 2003; Taylor and Hefle, 2002).

Moreover, according to Prescott et al. (2005) the introduction of a gene expressing nonallergenic protein such as GM field pea, expressing alpha-amylase inhibitor-1, may not always result in a product without allergenicity. This study underlines the need to evaluate new GM crops on a case-to-case basis and to improve the screening requirements for GM plants. Brassica juncea, another GM plant, expressing choline oxidase gene caused low IgE response in mice and a cross-reactive epitope search showed a stretch similar to Hev b 6 having some antigenic properties although according to Singh et al. (2006) it had no allergenicity. These findings should be more carefully interpreted and repeated in other animal series in order to elucidate whether IgE response may play a role in toxicity.

### **As for Bt expressed in many crops, farm workers exposed to**

Bt pesticide may develop skin sensitization and IgG antibodies to the Bt spore extraction (Bernstein et al., 2003).”Effects on animal growthBody weight might be significantly altered as it has been shown with the consumption of Mon863 corn (Seralini et al., 2007) and GM rice on rats (Li et al., 2004).

Dona, A. and I.S. Arvanitoyannis. 2009. Health Risks of Genetically Modified Foods. *Critical Reviews in Food Science and Nutrition*. 49:2,164-175

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Aloha Senators and Representatives

-Kalo is a hypoallergenic food.  
If you mess around with that, it ain't going to be hypoallergenic anymore.

-GMO kalo will contaminate our organic taro.  
Take away our livelihood.  
We cannot coexist.

-GMO proponents are only thinking about chemicals and their pockets.

-It's not going to be a pure taro anymore.  
Pure taro is going to be like an artifact.  
You will only find it in the museum.

Please support a BAN on GMO KALO in Hawaii.

Mahalo,

Demetri Rivera  
Kalo farmer  
Wai`oli, Hanalei, Kaua`i

Member of Onipa`a na Hui Kalo, an inclusive statewide organization.  
Presently member of Kauai Taro Growers Association (KTGA),  
which does NOT represent my views on kalo.

demetri rivera  
p.o.box 114  
kilauea, HI 96754

Testimony of Demetri Rivera- Organic Taro Farmer  
In Support of Ban on GMO-Taro

Aloha mai kakou,

Ban GMO taro research and growing in Hawaii.  
Contamination is real.  
Contaminate one, you contaminate all.  
Just look at the papaya industry.

I am an organic kalo farmer and this is my livelihood.  
We cannot coexist with GMOs.

Malama Haloa  
Malama `aina  
Mahalo

Demetri Rivera  
P.O.Box 114  
Kilauea, HI 96754

In SUPPORT of HB1663 and SB709-SD1

Vince Kana`i Dodge  
Coordinator, `Ai Pohaku Workshop/Ma`o Farms/WCRC

Aloha kakou.

O wau o Kana`i Dodge. Noho wau ma Wai`anae O`ahu. O Fred and Aiko Dodge ko`u ma makua. He makua wau me elua keiki nui a me ekolu mo`opuna. I`m Vince Dodge and I live in Wai`anae, O`ahu. My parents are Fred and Aiko Dodge. I have two grown children and three granddaughters. I am a part-time kalo farmer. I am a poi maker, cultural practioner and educator.

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I understand that as decision makers you will be lobbied by the very powerful biotech industry and I remind you that you have been elected to represent us- the people, who are busy with all the responsibilities and necessities of daily living. We are not paid to lobby. We have entrusted you, our elected officials to make wise and practical decisions on our behalf and to protect us. We need protection from GMO foods.

GMO technology is unnatural. It involves the forcing together of genes from plants, animals, viruses, pesticides, etc. to create an organism that is unnatural. Then this unnatural genetically modified organism (GMO), which is alive, is set lose in the natural world. It has not been thoroughly tested for its safety (unlike GMO medicines). This is not safe science. This is not operating on the "precautionary principle", which is the foundation of safe science, and this is why we need protection from GMOs. We are at risk here because these unnatural, scientifically unsafe GMOs are fed to us. They are fed to us as feed for the animals we eat or directly to us in the food we buy in the stores. **It is fed to us unlabeled.** If GMO foods are safe as the industry tells they are it makes sense that they would totally support the labeling of their products. The opposite is true. The GMO industry has spent millions of dollars fighting every attempt to have their products labeled. They don't want GMO foods labeled. *They don't want any responsibility for the effects their unnatural, poorly tested scientifically unsafe GMO foods will have on us.* **That is why we need protection from the GMO food industry. That is why at this time we need a ban on GMO taro.**

Mahalo nui loa to all you legislators who are making wise and practical decisions on our behalf and protecting us. We really appreciate and honor your service. This is a kakou thing- we are striving together to keep our home, our food safe and well. Please educate yourselves about the GMO issues. Please watch the DVDs "The Future of Food" and "Islands at Risk". I will be happy to get you copies. My contact information is below.

There are many other important reasons to reject the genetic modification of taro and support the ban on GMO taro. They include:

- The cultural significance of kalo/taro
- Real and imagined threats to taro growing and the industry
- Patenting and ownership of GMO crops
- Lawsuits against farmers whose crops are contaminated by GMO
- Public education about GMO
- The real beneficiaries of GMO

I am happy to get you information on any of the above issues or come and discuss them with you and/or your staff.

Ho`opiha kau `eke poi i ka manawa apau,  
*May your poi bowl be always full,*

Vince Kana`i Dodge  
Coordinator, `Ai Pohaku Workshop/Ma`o Farms/WCRC  
Cell:  
Home:  
[vince@maoorganicfarms.org](mailto:vince@maoorganicfarms.org)

IN SUPPORT OF HB1663 and SB709-SD1

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RE: TESTIMONY- IN SUPPORT for Ban on GMO-taro  
Ban research and planting of GM taro in Hawaii

Dear Members of the State Legislature:

I write this testimony in strong support of bills HB1663 and SB709-SD1, which would ban the research and field planting of genetically modified (GM) taro in Hawaii

I have worked as a UH-Manoa Professor and Crop Production Specialist for 18 years, but write this on a personal capacity. My research is in the area of sustainable and ecological agriculture. As someone who supports sustainable agriculture, I have become increasingly concerned about the unregulated open-field plantings of GM crops in Hawaii. In general I have concerns about the health risks, about environmental risks, and also about the long-term cultural and socioeconomic impacts on our communities.

Below I summarize my key positions:

1. Lack of data showing the safety of GM crops.

Statements made by GM proponents are not backed by scientific, peer-reviewed data. No studies have been conducted in Hawaii or elsewhere to evaluate the short- or long-term effects on humans from having consumed GM crops over the past 12 years.

2. Lack of oversight/regulations.

GM crops are poorly regulated or even deregulated. Our federal courts and internal USDA and FDA reports have found that our regulatory agencies are often incapable of detecting potential side-effects from the consumption or planting of GM crops.

3. Unintended Consequences (see references below).

Recent findings in the scientific literature have shown that GM crops do indeed pose potential health risks, environmental risks, and that the benefits to farmers have not always been matched with the promises made by GM proponents.

a. A comprehensive literature review published this month in a scientific journal documents a large number of potential health side effects from the few animal feeding studies that have been conducted to date (Dona and Arvanitoyannis, 2009).

b. A recent refereed publication showed that the commercial planting of GM cotton was NOT more profitable than that of conventional varieties (Post et al. 2008). Similarly, several publications have shown that the yields of GM crops are similar or lower than that of conventional crops.

c. A recent publication from Spain showed that contamination was inevitable and that the principle of co-existence was not working in that country (Binimelis, 2008). Contamination has occurred in all regions where GM crops have been planted. GM corn contamination has been documented in several states of Mexico, even though there is a ban on GM plantings in that country.

d. There are still many unknowns about potential environmental risks. For instance the toxic Bt from GM crops was found to affect non-target organisms in nearby aquatic habitats (Harwood et al. 2005; Rosi-Marshall, 2008). Also, antibiotic genes from Bt crops were found to transfer to microbes in nearby aquatic habitats and aquifers (Koike et al 2007). As another example the Bt toxin from GM corn was found to affect the growth of earthworms in the soil (Zwalhen, 2003).

4. GM taro is not the answer for Hawaii.

My overall assessment is that GM taro is not the answer for farmers in Hawaii, and that GM taro would not contribute toward our self-sufficiency and sustainability. The only plant disease epidemiologist at UH-Manoa concurs, having stated that we already have all of the tools at our disposal to manage the major pests and diseases in taro- by following traditional pest control strategies.

Mahalo for your consideration in support of HB1663.

Sincerely,

Hector Valenzuela  
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Mililani, HI 96789  
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#### Professional Bio:

Dr. Hector Valenzuela a full Professor and Vegetable Crops Specialist at the University of Hawaii-Manoa received his Ph.D. from the University of Florida. Dr. Valenzuela has conducted applied agroecology research for 23 years in support of commercial farmers, organic farming, and sustainable agriculture. He has authored over 380 technical and educational publications, has conducted over 200 field research trials with over 60 different vegetable and cover crop species, has organized over 60 field days and workshops for farmers in Hawaii and the Pacific Region, given over 200 presentations, and has participated in 13 international assignments. A staunch supporter of organic and sustainable farming in Hawaii, Dr. Valenzuela established the first long-term organic research plots in Hawaii in 1993, the longest-running organic research project in the Pacific Region, and established the first Web sites to assist vegetable farmers (1998) and organic farmers (2005) in the Pacific Region.

#### Professional contact Information

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**Mark Alapaki Luke**

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**Taro Farmer- Wailua 'Auwai lo'i in Kahana Valley, Kamakakūokalani Center for Hawaiian Studies, Ka Papa Lo'i o Kānewai, 'Onipa'a Nā Hui Kalo, Geography Dept at Honolulu Community College, and the East-West Center International Board**

**TESTIMONY- IN SUPPORT  
Ban of Genetically Modified Taro (HB1663 & SB709-SD1)**

Aloha Honorable Legislators,

For over 1200 years farmers in Hawai'i have cared for and have protected the most extensive collection of varieties of taro on the planet. In Hawai'i, taro is the plant of the people- it is our living culture and ancient history, native nutrition and ecological tradition. Taro provides a beloved and unique hypoallergenic food, medicine, sustainable agriculture, and industry for Hawai'i. Genetically modifying any variety of *kalo* (taro) is culturally disrespectful and also poses irreversible and irresponsible dangers to our food, health, environment and economy.

Native planters of the *wā kahiko* (old days) were proficient in managing over 300 varieties of *kalo* tailored for different uses, these varieties were acquired through natural propagation and farming. From these *kūpuna* (ancestors and elders) we have been fortunate to receive their *'ike* (knowledge) and live a lifestyle that is perpetuated with planting *kalo*, researchers and corporations are willing to disrespect this tradition that has been working of many generations. Each variety has qualities suited for different environments and uses, therefore satisfying sustainability and longevity. Other work around the world with genetically engineered crops have unfolded inevitable risks, such as elimination of diverse crops, and risk of famine due to catastrophic loss of crops that are the sole surviving species. These unknown risks are alarming, and at the same time ownership of the only surviving variety of *kalo* will result in a monopolized control of our most valuable source of the Hawaiian culture.

I support sustainable farming & precautionary scientific research that does not expose the taro species to the disrespect and risks of genetic engineering. I ask that the lawmakers actively support farmers/scientists in publicly accepted and safely advanced methods of protecting *kalo* by addressing land & water issues and controlling invasive pests & diseases. I also ask that the legislators pursue other avenues such as more public lands to grow *kalo* and more access to the water for growing *kalo*. I also ask the legislators to really find the truth behind the research in genetically modified organisms (GMO) of *kalo*, do they really want to help the farmers, or are there other reasons, what's at stake for these entities, do they enjoy eating poi? Do they have fame and money as their number one priority? Certain entities that are focused on pursuing genetic modification of *kalo* have given reasons that resemble scare tactics, they seem to know what the *kalo* planter needs, even though they aren't the taro farmers in the fields who really understand the real situation. They claim that they can combat the apple snail, the number one reason for crop yield declines, are their GMO varieties made of plastic or are they going to be toxic? I don't see how they can create a variety that will combat this invasive pest that was introduced by people who had a "bright idea" to help Hawai'i, how many times has this happened

and been catastrophic? Are they willing to give up their royalties and patents of ownership of our living ancestor, because they “really” want to help the *kalo* industry and the people who enjoy the poi? Because of the resistance encountered from many people and organizations in recent years, GMO proponents are no longer wishing to genetically modify Hawaiian varieties, now they pursue other non-Hawaiian varieties. As scholars, I would think they know the origin for all taro, which came with the voyagers from the same place, what makes the Hawaiian varieties different from the others? More importantly, if allowed to genetically modify the non-Hawaiian varieties here in Hawai‘i, where are they going to plant these synthetic varieties, here in this *‘āina* (land & environment), of Hawai‘i? This wouldn’t be *pono* (proper) and would be very disrespectful to contaminate this *‘āina*, and to also be deceptive about their intentions while carrying this out!

*Kalo* is an incomparably sacred and valuable part of our island community. We join *mahi'ai* (farmers) of Hawai‘i in calling on you and your fellow legislators to protect all of us and Hawai‘i’s unique culture and resources by passing a law to provide a ban on the genetic modification and patenting of taro. As faculty and staff who teach the Hawaiian culture and the importance of the *‘āina* which is the source of the culture, how should I explain to my students that the Hawaiian culture is not respected by Hawai‘i’s government? How do I tell them that the very foundation of Hawai‘i’s heritage is being altered by greedy and irresponsible scientific research?

In conclusion, please consider my plea for Hawai‘i to preserve our heritage and the integrity of the *kalo* plant. I am in favor of banning research and growing of GMO taro.

Mālama Pono,

Me ka ha‘aha‘a (with humility),

---

***Mark Alapaki Luke***

University of Hawai‘i at Mānoa

Kamakakūokalani Center for Hawaiian Studies, Honolulu Community College

& Ka Papa Lo‘i o Kānewai

2645 Dole Street

Honolulu, Hawai‘i 96822

Testimony of Mark S. Alapaki Luke (kalo planter in Kahana Valley)  
In Support of Ban on GMO-Taro

Aloha mai kakou,

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

**-Taro Deserves the Best Available Science-**

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

**-Health and Environmental Safety Concerns about GMO-Taro-**

Taro is a nutritious food crop, especially cherished as a baby food and staple dish in Hawaii for centuries; and around the world as an important medicinal food for diabetes, cancer, autism and serious food allergies. Taro is the world's only hypo-allergenic, or allergy-free, carbohydrate. GMO-taro, on the other hand, is not the same as natural taro. GMO-taro has never been in the human food supply before, and has NOT been scientifically tested on humans to prove that it is safe to eat. Moreover, the unnatural genetic mutations of GMO-taro can never be guaranteed to be hypo-allergenic, thus threatening consumers of this uniquely important medicinal food source. In fact, numerous scientific studies on laboratory animals show that GMOs can cause toxic, allergic, and even deadly reactions. Unnatural gene mutations introduced through GMO-taro may harm insects, birds, fish, and soil health. Risks and damages to Hawaii's people and lands could be irreversible.

**-Community and Ethical Concerns about GMO-Taro-**

Cultivated throughout centuries to be abundantly grown on Hawaii's diverse agricultural lands, taro is the sacred foundation of our unique local agriculture, society, traditions and family structure. Genetic modification of taro is an affront to the sacred Hawaiian tradition that respects the taro plant as a family member, an older brother to humanity. This family tradition is rooted in honoring the relationship of mankind with the very plants we depend on for healthy nourishment, and establishes an unique genealogical connection between taro and the Hawaiian people. The wisdom of such healthy community values must be encouraged, not disrespected or desecrated. Despite the unique and utmost importance of this plant to our community, GMO-taro has been developed without any informed community consent, raising serious ethical science concerns. Businesses and researchers in Hawaii should encourage informed community consent and review, not avoid oversight and involvement from the very communities most effected by their activities.

**-Economic and Bioprospecting Concerns about GMO-Taro-**

The right to grow taro naturally and traditionally belongs to the public, and should never be owned by a corporation or university. Private patents and control of our public food resources would cripple our food security, taro economy and violate our inherent public rights. GMO-taro experiments and patents cannot help taro farmers with the real problems that they face and will only endanger the valuable traditional biodiversity of taro in Hawaii.

**-Legal and Governance Concerns about Preemption Legislation-**

In "exchange" for a ban on GMO-taro, the biotech/GMO industry may attempt to turn our community's intentions to protect taro into unfair "preemption" legislation which would prohibit state or county oversight, and public notice of all other GMOs and biotech activities in Hawaii. We do not support any such attempts to preempt legitimate local government regulations to protect public health. Preempting local efforts to protect public health raises serious legal, ethical, and scientific concerns-- our public and environmental safety, as well as our local-governance authority, must be prioritized over private investment concerns and high-risk experiments.

**-Help Taro, Don't Hurt Taro!-**

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no actual need to permanently change the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama 'Aina,

Mark S. Alapaki Luke (kalo planter in Kahana Valley)

Kumu (Teacher)

University of Hawaii at Manoa (Hawaiian Studies) & Honolulu Community College (Hawaiian Studies & Geography)

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103A  
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In SUPPORT OF HB1663 & SB709-SD1

Walter Andrade

Kona and Kalopa Farmer

To the Hawaii Legislators:

RE: GMO Legislation in State of Hawaii.

For once can we just use common sense in making long terms decisions that affect the health and welfare of our people...

As publicly elected officials you have a responsibility to protect the people of Hawaii. Caution is strongly advised on allowing GMO to taint our food supply.

Unfortunately, pollinating GMO strains become invasive when released into the environment. By their virulent nature GMO strains infect and dominate the gene pool forever. You CAN NOT recall a GMO strain once introduced. Case in point is the accidental release of GMO rice after Hurricane Katrina destroyed the GMO testing facility, cross pollination of soybean in Canada, accidental mishandling and release of GMO corn seed to Central American countries and the list goes on. The fact remains that you CAN NOT recall a GMO strain once introduced.

It is all too common that a well meaning scientific community together with profit oriented corporations makes hasty decisions with disastrous consequences. Case in point, DDT, Pesticides, CFC's, Cigarettes and Hydrogenated Oils, all market driven profit centers for large corporations and allowed without through study or applying the Precautionary Principle. Twenty years from now if we find that trans-genetic organisms in the food supply cause cancer, birth defects, immune deficiencies or worse, we would struggle to mitigate the consequences because we CAN NOT recall those GMO strains from the gene pool.

Please apply the Precautionary Principle... it is there for a reason... it's just common sense.

[http://en.wikipedia.org/wiki/Precautionary\\_principle](http://en.wikipedia.org/wiki/Precautionary_principle)

I understand the pressures you have in making this decision as evidenced by the number of Bills being generated to address the GMO issue... You are not the first to be faced with applying the Precautionary Principle to this GMO dilemma. <http://www.i-sis.org.uk/prec.php> and you are not alone on this issue, 68 nations, 828 scientists from 38 countries support rethinking of GMO testing and propose a 5 year moratorium on GMO testing until further study can be done. <http://www.i-sis.org.uk/list.php#list>. Please review the white paper from The Bio Safety Protocol and the UN Convention on Biological Diversity <http://philosophy.wisc.edu/streiffer/CourseFolders/HOM565S01Folder/Biosafety%20Position%20Paper.pdf>

Just because multinational corporations have top down political clout and influence through established financing mechanisms at the university and land grant colleges with the support of federal and international regulatory agencies, doesn't make GMO a wise course to follow... Sometimes being cautious and saying no to money interests is the right answer.

My opinion, as a coffee and vegetables farmer, is the GMO approach to solving our agricultural challenges is extremely risky, not well thought out, is seriously under studied, and controversial for many valid reasons...

My position, as a coffee and vegetables farmer is simple. GMO strains released accidentally or intentionally take away my freedom of choice to consume, grow, market and sell non GMO food products. Any GMO introduction will destroy my market for specialty Kona Coffee. My coffee sold at commodity grade prices \$3.00 lb will force me into bankruptcy as well as other growers involved in meeting the expanding markets for non GMO or Organic Foods. There is no current way to contain pollen drift and consequently no way for Non GMO and Organic farming to coexist GMO farming.

Agriculture is really pretty simple as understood and practiced for thousands of years by large sophisticated cultures. It starts with the soil... A healthy, fertile soil is a dynamic organism, full of microbial and fungal life that transforms organic matter into humus. Humus is a stable byproduct that provides all the nutrients, trace minerals and gases necessary for sustained vegetative outputs. If you acknowledge that fact and support soil fertility in your agricultural practices, food production becomes sustainable and profitable. Healthy soils produce healthy plants, which when consumed produce healthy people and animals. On the other hand, a sick unbalanced soil produces dis-ease, first in the soil, then in the plants and then in the animals and people who consume them.

Until we get back to applying this knowledge in agriculture we will be chasing the problems, we created, with back end solutions like GMO and oil based chemical fertilizers, pesticides and herbicides. Sick plants from sick soils are stressed and attract pests, who by the way are only doing their job of eliminating weakness in the natural ecosystem.

- o Amory Lovins, CEO of Rocky Mountain Institute, "If we don't understand how things are connected, often solutions become the problem".

While the Biotech Industry has made significant contributions in medical research, and I am not saying there isn't a place for them or the "tools" they develop in Agriculture, I just don't believe that GMO in our food supply is a good idea, especially when the testing has not been done and the consumer is not given the choice. The potential risks far outweigh the potential benefits. Caution is strongly recommended. The UH can and will find other agricultural problems to study and make meaningful, less risky contributions to our ag economy until the GMO issue can be worked out.

Even though I do not support GMO in agriculture... If you folks enact laws that allow Hawaii to continue with GMO research, testing and field trials, we must demand, through legislation, that GMO research, testing and field trials follow the established Control Group Protocol used in all valid experiential testing. [http://en.wikipedia.org/wiki/Control\\_group](http://en.wikipedia.org/wiki/Control_group)

Due to the invasive nature and permanence of GMO strains in the food chain it would be prudent to establish the entire Big Island as the Control Group for any ongoing GMO research, testing, and field trials. Being upwind of the other Hawaiian Islands may give us some measure of protection against pollen drift cross contamination and physical isolation from experiments gone wrong. This way the Big Island can make a significant contribution to Hawaii's food security and agricultural research at the same time.

- o We must establish the Big Island as a GMO Free Zone for all research, testing and field trials related to human and animal food and or seed production.
- o Exemption to the law would be allowed for non-food related agricultural industries like

orchids and other cut flowers as well as for the Papaya industry, because GMO strains have already been released and are found widely in the wild plant population.

If you folks don't demonstrate respect for GMO risks to public health and safety, the cultural aspects of taro and the economic aspects of non GMO related farming, you may be committing political suicide. Basically you can piss off a few multi national companies and UH researchers or you can piss off a whole lot of voters...

Just follow the Precautionary Principle and you can put the responsibility back on the GMO companies where it belongs and protect yourselves, your kids, your grand kids and neighbors from eating questionable foods.

Aloha nui,

Walter Andrade

Kona and Kalopa Farmer

P.O. Box 586

Holualoa, HI 96725

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(808) fax

[walman1@hawaii.rr.com](mailto:walman1@hawaii.rr.com)

Testimony of Ed Wendt  
Taro Farmer, Wailuanui East Maui

In Support of Senate Bill 709-SD1 and HB1663

Dear Committee Members:

Please support Senate Bill 709-SD1 and House Bill 1663, that would impose a moratorium on all testing, propagating, cultivating, growing and raising genetically engineered taro in Hawai`i, and apply to genetically-modified plants brought in from outside Hawai`i as well. Passage of this bill will ensure the safety and perpetuation of our native kalo, and I urge your support.

Our `ohana have been full-time kalo farmers in Wailuanui, East Maui for many generations. My sons and grandchildren work lo`i kalo alongside me and my brother. The species of kalo that we farm have been cultivated in our village families for many generations. The kalo is strong, nutritious and although our `ohana has encountered many challenges (various diseases, foreign snail infestations, lack of water), we have preserved and continue to grow kalo for our families. Allowing GMO kalo would put our lo`i kalo at great risk and adulterate Hawaiian kalo species that our families have been cultivating for many generations. There is data which suggests there is no way to secure existing species from contamination once GMO experimentation is permitted.

We urge your support of S.B. 709-SD1 and H.B.1663 in order that we can continue to perpetuate, practice and honor our Hawaiian traditions and culture.

Mahalo for this opportunity to testify.

Ed Wendt  
P.O. Box 961  
Haiku, Hawai`i 96708

Testimony of Leslie Yee Hoy, Taro Farmer, Halawa Valley- Molokai

In Support of Ban on GMO-Taro

Aloha mai kakou,

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

-Taro Deserves the Best Available Science-

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

-Health and Environmental Safety Concerns about GMO-Taro-

Taro is a nutritious food crop, especially cherished as a baby food and staple dish in Hawaii for centuries; and around the world as an important medicinal food for diabetes, cancer, autism and serious food allergies. Taro is the worlds only hypo-allergenic, or allergy-free, carbohydrate. GMO-taro, on the other hand, is not the same as natural taro. GMO-taro has never been in the human food supply before, and has NOT been scientifically tested on humans to prove that it is safe to eat. Moreover, the unnatural genetic mutations of GMO-taro can never be guaranteed to be hypo-allergenic, thus threatening consumers of this uniquely important medicinal food source. In fact, numerous scientific studies on laboratory animals show that GMOs can cause toxic, allergic, and even deadly reactions. Unnatural gene mutations introduced through GMO-taro may harm insects, birds, fish, and soil health. Risks and damages to Hawaii's people and lands could be irreversible.

-Community and Ethical Concerns about GMO-Taro-

Cultivated throughout centuries to be abundantly grown on Hawaii's diverse agricultural lands, taro is the sacred foundation of our unique local agriculture, society, traditions and family structure. Genetic modification of taro is an affront to the sacred Hawaiian tradition that respects the taro plant as a family member, an older brother to humanity. This family tradition is rooted in honoring the relationship of mankind with the very plants we depend on for healthy nourishment, and establishes an unique genealogical connection between taro and the Hawaiian people. The wisdom of such healthy community values must be encouraged, not disrespected or desecrated. Despite the unique and utmost importance of this plant to our community, GMO-taro has been developed without any informed community consent, raising serious ethical science concerns. Businesses and researchers in Hawaii should encourage informed community consent and review, not avoid oversight and involvement from the very communities most effected by their activities.

**-Economic and Bioprospecting Concerns about GMO-Taro-**

The right to grow taro naturally and traditionally belongs to the public, and should never be owned by a corporation or university. Private patents and control of our public food resources would cripple our food security, taro economy and violate our inherent public rights. GMO-taro experiments and patents cannot help taro farmers with the real problems that they face and will only endanger the valuable traditional biodiversity of taro in Hawaii.

**-Legal and Governance Concerns about Preemption Legislation-**

In "exchange" for a ban on GMO-taro, the biotech/GMO industry may attempt to turn our community's intentions to protect taro into unfair "preemption" legislation which would prohibit state or county oversight, and public notice of all other GMOs and biotech activities in Hawaii. We do not support any such attempts to preempt legitimate local government regulations to protect public health. Preempting local efforts to protect public health raises serious legal, ethical, and scientific concerns-- our public and environmental safety, as well as our local-governance authority, must be prioritized over private investment concerns and high-risk experiments.

**-Help Taro, Don't Hurt Taro!-**

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no actual need to permanently change the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama 'Aina,

Leslie YEE hoy  
Halawa Valley  
Molokai, HI 96734

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Malama 'Aina,

Leslie Yee Hoy

Kailua, HI 96734

# Kaloman

February 17, 2009

Governor Linda Lingle  
Lt. Governor Duke Aiona  
House of Representatives  
Senate Representatives

Re: Legislative Bills on Taro and Water

Aloha,

As one of the few Hawaiian Taro farmers, 7<sup>th</sup> generation mahi`ai and lawai`a, I appeal to you to support our cause to maintain the purity of the Hawaiian taro, increase water access, provide more land and provide financial assistance and disaster insurance.

What we need is to become more sustainable, as were our kupuna of days of old. What we need today is for leaders such as yourselves to be bold, to stand up for what you know is pono and not yield to compromise that will undermine the life of our lands. For Ke Akua says, do not commit blasphemy against the land, for this will be an abomination.

Support our cause to maintain the purity of the Hawaiian taro and kalo lifestyle.  
Support the increase of water access in favor of the mahi`ai.  
Support the provision of more lands for farming.  
Support financial assistance and disaster insurance in favor of the mahi`ai.

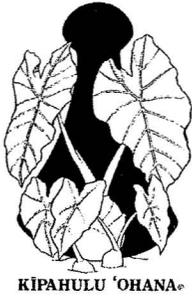
Our Ali`i knew that their success was dependant on the foundation of its people, for indeed the *"life of the land is perpetuated in righteousness"*. Thus the Hawaii State Constitution placed the kuleana of the lands above all things. Doing pono and making pono for all things upon the land increased the prosperity of its people. As Kumu John Kaimikaua stated so well, "when the land flourishes, so does it's people".

On May 1, 1959 our state motto was adopted by Joint Resolution No.4 of the 30<sup>th</sup> Territorial Legislature.

Today in this 2009 Legislature you are the centennials that stand watch upon the land and its people. Do not let us be ambushed. Stand firm upon the aina, with and for its people.

Ua mau ke ea o ka aina I ka pono ...The life of the land is perpetuated in righteousness.

George Keoki Ruisuki Fukumitsu  
Mahi`ai a me Lawai`a  
Hakipu`u Ahupua`a  
Ko`olaupoko ~ Oahu Island



## Kipahulu 'Ohana

PO Box 454, Hana, HI 96713  
www.kipahulu.org

Hawaii State Legislature

February 18, 2009

Aloha,

I am writing on behalf of the Kipahulu Ohana to urge your support of a ban on the genetic modification of kalo in Hawai'i.

Kipahulu Ohana is a nonprofit organization founded in 1995 by descendents of the Kipahulu moku in East Maui in order to promote the practice of traditional ahupua'a management, restoration and education. Since 1995, through a Cooperative Agreement with the National Park Service, we have operated Kapahu Living Farm within the Kipahulu section of Haleakala National Park where we farm over three acres of ancient kalo lo'i that has been restored to active production.

Kapahu Living Farm is managed by our Project Director and traditional konohiki John Lind. Through the knowledge passed down to him and his personal experience, Lind has identified several varieties of Hawaiian kalo that he chooses to cultivate, because they are hearty and make high quality poi.

Our production is completely organic—we use no chemical fertilizers or pesticides. While we do have minor challenges with some diseases, Lind has found that these challenges can be adequately addressed by ensuring a plentiful flow of cold water around and through the lo'i, using green manure (weeds) buried in the lo'i to feed the kalo plants along with other natural fertilizers, and other traditional techniques.

From a practical standpoint, we have no interest or need for genetically modified varieties of kalo. From a cultural and spiritual standpoint, we want to emphasize the deep connection Hawaiians have with Haloa, and strongly oppose the genetic modification of this plant that is the single most important plant in the Hawaiian culture, considered as the elder brother of the Hawaiian people.

We ask that you support measures to prohibit the development, testing, propagation, release, importation, planting, or growing of genetically modified taro in the State of Hawaii.

Mahalo,

Scott Crawford  
Executive Director

Support for Ban on GMO-Taro  
From Joan lander (Taro Grower)

Aloha mai,

We live in Ka'u on Hawai'i island and plant taro in our yard.

We are very happy that our county council listened to the voices of taro growers and consumers and passed a ban on GMO taro on our island.

Now this ban needs to be extended to all islands.

This food plant is too important to our health to be interfered with.

We all need to consume taro in its pure form.

If you allow people to tinker with taro's genetics, we can never again be sure that the taro we eat is safe.

Growers will not exchange huli anymore for fear of planting taro that is unsafe, thus breaking down a centuries-old tradition of sharing huli.

Why would you want to destroy the solidarity of our taro-growing communities and introduce fear and anxiety into the most important agricultural activity in Hawai'i?

You as lawmakers must act on behalf of the people, not the few determined to manipulate the basic foods we eat, no matter the cost.

Do the right thing and protect, at the very least, this plant that is the heart and soul of Hawai'i.

Joan Lander  
PO Box 29  
Na'alehu, Hawai'i 96772-0029

In Support of Ban on GMO-Taro

Daniel Bishop & 'Ohana- Taro Farmers

My name is Daniel Bishop and, together with my wife, four sons, and their families, are Kalo farmers in Waiahole valley. We have also been members of Onipaa Na Hui Kalo since it's beginning. I am writing this letter to voice our support for a ban on any type of research which has to do with genetically modifying any Kalo .

Respectfully submitted;

Daniel Bishop

February 9, 2009

To: Hawaii Legislators

From: Walter Andrade, Farmer

RE: SUPPORT GMO Legislation in State of Hawaii.

For once can we just use common sense in making long terms decisions that affect the health and welfare of our people. As publicly elected officials you have a responsibility to protect the people of Hawaii. Caution is strongly advised on allowing GMO to taint our food supply.

Unfortunately, pollinating GMO strains become invasive when released into the environment. By their virulent nature GMO strains infect and dominate the gene pool forever. You CAN NOT recall a GMO strain once introduced. Case in point is the accidental release of GMO rice after Hurricane Katrina destroyed the GMO testing facility, cross pollination of soybean in Canada, accidental mishandling and release of GMO corn seed to Central American countries and the list goes on. The fact remains that you CAN NOT recall a GMO strain once introduced.

It is all too common that a well meaning scientific community together with profit oriented corporations makes hasty decisions with disastrous consequences. Case in point, DDT, Pesticides, CFC's, Cigarettes and Hydrogenated Oils, all market driven profit centers for large corporations and allowed without through study or applying the Precautionary Principle. Twenty years from now if we find that trans-genetic organisms in the food supply cause cancer, birth defects, immune deficiencies or worse, we would struggle to mitigate the consequences because we CAN NOT recall those GMO strains from the gene pool.

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I understand the pressures you have in making this decision as evidenced by the number of Bills being generated to address the GMO issue... You are not the first to be faced with applying the Precautionary Principle to this GMO dilemma. <http://www.i-sis.org.uk/prec.php> and you are not alone on this issue, 68 nations, 828 scientists from 38 countries support rethinking of GMO testing and propose a 5 year moratorium on GMO testing until further study can be done. <http://www.i-sis.org.uk/list.php#list>. Please review the white paper from The Bio Safety Protocol and the UN Convention on Biological Diversity <http://philosophy.wisc.edu/streiffer/CourseFolders/HOM565S01Folder/Biosafety%20Position%20Paper.pdf>

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Aloha nui,  
Walter Andrade  
Kona and Kalopa Farmer  
P.O. Box 586  
Holualoa, HI 96725

Attention: State of Hawai'i Legislators  
STRONG SUPPORT FOR BAN ON GMO-TARO

From: Robert Kealohapumehana Domingo (Kalo Planter)  
O O'ahu Kakuhihewa ka mokupuni  
O Ko'olauloa ka moku  
O Ka'a'awa ke 'ahupua'a

Aloha mai kakou,

O wau o Robert Kealohapumehana Domingo and I am writing to strongly encourage all legislators and lawmakers to support and pass SB709 moratorium on developing, testing, propagating, cultivating, growing and raising genetically engineered taro in the state of Hawai'i.

It is well known and documented within the Hawaiian genealogy chant or Kumulipo, that taro, kalo, or colocasia esculenta, honored Kupuna Haloa Nakalaukapalili is said to be the elder brother of Kanaka or mankind. As a Kanaka Maoli or native Hawaiian, Hawaiian cultural practitioner, head of household, husband, father of three children, haumana mahi'ai kalo, traditional style poi maker or ku'i 'ai practitioner, kalo grower and consumer, supporter and parent of the Hawaiian language immersion schools, taxpayer and voter, I must make my voice and mana'o or opinion heard loud and clear: *Genetic modification of kalo is DISRESPECTFUL !! GMO taro is NOT PONO! It is not necessary and not wanted. Genetic engineering of Hawaiian kalo should not be allowed within these islands or anywhere else for that matter.*

Kalo, not only a spiritual center or piko of Hawaiian culture, a traditional symbol of the 'ohana structure, has been the staple food of Hawaiians since the beginning of time, and for many other cultures in more recent years. We the Kanaka Maoli for well over a thousand years have been growing and have been sustained and nourished by kalo planted in the traditional methods. Especially in the form of poi, kalo was eaten by all branches of the 'ohana from the oldest kupuna perhaps in their deathbed to the newest of infants still upon their mother's breast. Poi was widely known by the po'e kahiko or people of the past, to have many benefits: tremendous nutritional value, ease of digestion (complex carbohydrate), it is also hypoallergenic thus eliminating the concern for allergic reaction. It would be disastrous to allow such an extremely valuable and irreplaceable resource to become contaminated, mutated and exposed to the risk altering its proven "super-food" qualities. Genetic modification is commonly known to inherently introduce undesirable properties including possible allergens and antibiotic resistant genes. Keep kalo pure! Altering taro is unsafe and is BAD SCIENCE!

The po'e kahiko were extremely knowledgeable of the 'aina and of our fragile yet bountiful environment. They knew how to properly utilize the resources and viewed the land as a sacred. "Ua mau ke 'ea o ka 'aina i ka pono: the life of the land is perpetuated in righteousness" If we disturb the pono or balance of the 'aina, we are destined to suffer the consequences. It has been documented that the kanaka maoli once had upwards of 300 varieties of kalo developed naturally through generations of a natural conventional hybrid process. Today there is said to be only approximately 80 varieties remaining. The modern colonized ideals of profit, ownership, convenience, overdevelopment, misuse of land, water and other natural resources, overall short sightedness and a lack of due care has begun to outweigh our traditional values and has taken a toll on our 'aina and ultimately our beloved Kalo. Lo'i kalo or traditional wetland taro patches, once had thriving veins of cold water fed by a clean and well maintained kahawai or stream. Today, our streams are reduced, many to a trickle, some have gone dry. Mahi'ai kalo once had enough acreage to allow them to let their patches lay fallow after harvest in order to replenish natural nutrients, rather than immediately replanting time and time again in depleted soil compensated with large amounts

of fertilizers and chemicals, a common practice today due to limited access to lands suitable for taro farming.

Another particularly interesting part of traditional methods of planting has actually been under review again in recent times, diversification. Planting many taro varieties with different characteristics that may adapt to various conditions such as higher salinity in lower elevations closer to the ocean, heat and drought resistant varieties, varieties that could be left without being harvested for extended periods of time. Another poor practice common in taro farming today is known as mono-cropping, of course the exact opposite of the traditional theories of diversification, single or limited varieties planted to fit commercial guidelines are forcing farmers to plant crops not ideal for their individual farm environments and conditions thus limiting proper growth and reducing crop volume and quality. These factors contribute to many of the struggles faced by taro farmers today. The poor practices of misuse and neglecting the 'aina need to be modified, not our kalo! GMO kalo is UNECESSARY!!

Our kupuna were truly the greatest scientists. They had hundreds of names for different winds, they studied thousands of different native plants and had thousands of different uses, they navigated the Pacific using the winds, stars and currents, in hand crafted vessels with hand made tools, they could build homes, fishponds, great altars and dry stacked stone walls that stood firm for centuries, they knew that in order to survive, they had to use what the 'aina had to offer, and that they did. It's time that we look to the past to learn for the future.

In closing, I have discussed only a few of the many reasons to protect our beloved elder brother Haloa Nakalaukapalili, the taro. I strongly feel that a BAN on GMO taro as described in SB709 is imperative.

Let us remember that the 'aina is a limited resource and our decisions today will have great impacts for the generations of tomorrow. Keep our kalo pure and preserve it for generations to come. I sincerely hope that you, the elected lawmakers of this state, will heed my recommendation. It is time that we the people of Hawai'i heed the advice of our Kupuna. "He ali'i ka 'aina, he kauwa ke kanaka; The land is the chief and we the kanaka are the servants"

Malama 'aina, Malama Haloa Nakalaukapalili!  
Robert Kealohapumehana Domingo

Testimony of Ed Wendt, East Maui Taro Farmer

In Support of House Bill 1663

Dear Committee Members:

Please support House Bill 1663, that would impose a moratorium on all testing, propagating, cultivating, growing and raising genetically engineered taro in Hawai`i, and apply to genetically-modified plants brought in from outside Hawai`i as well. Passage of this bill will ensure the safety and perpetuation of our native kalo, and I urge your support.

Our `ohana have been full-time kalo farmers in Wailuanui, East Maui for many generations. My sons and grandchildren work lo`i kalo alongside me and my brother. The species of kalo that we farm have been cultivated in our village families for many generations. The kalo is strong, nutritious and although our `ohana has encountered many challenges (various diseases, foreign snail infestations, lack of water), we have preserved and continue to grow kalo for our families. Allowing GMO kalo would put our lo`i kalo at great risk and adulterate Hawaiian kalo species that our families have been cultivating for many generations. There is data which suggests there is no way to secure existing species from contamination once GMO experimentation is permitted.

We urge your support of H.B. 1663 in order that we can continue to perpetuate, practice and honor our Hawaiian traditions and culture.

Mahalo for this opportunity to testify.

Ed Wendt  
P.O. Box 961  
Haiku, Hawai`i 96708

## Testimony

### In Support of Ban on GMO-Taro

Aloha mai kakou

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

#### -Taro Deserves the Best Available Science-

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term

scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

#### -Health and Environmental Safety Concerns about GMO-Taro-

Taro is a nutritious food crop, especially cherished as a baby food and staple dish in Hawaii for centuries; and around the world as an important medicinal food for diabetes, cancer, autism and serious food allergies. Taro is the worlds only hypo-allergenic, or allergy-free, carbohydrate. GMO-taro, on the other hand, is not the same as natural taro. GMO-taro has never been in the human food supply before, and has NOT been scientifically tested on humans to prove that it is safe to eat. Moreover, the unnatural genetic mutations of GMO-taro can never be guaranteed to be hypo-allergenic, thus threatening consumers of this uniquely important medicinal food source. In fact, numerous scientific studies on laboratory animals show that GMOs can cause toxic, allergic, and even deadly reactions. Unnatural gene mutations introduced through GMO-taro may harm insects, birds, fish, and soil health. Risks and damages to Hawaii's people and lands could be irreversible.

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informed community consent, raising serious ethical science concerns. Businesses and researchers in Hawaii should encourage informed community consent and review, not avoid oversight and involvement from the very communities most effected by their activities.

**-Economic and Bioprospecting Concerns about GMO-Taro-**

The right to grow taro naturally and traditionally belongs to the public, and should never be owned by a corporation or university. Private patents and control of our public food resources would cripple our food security, taro economy and violate our inherent public rights. GMO-taro experiments and patents cannot help taro farmers with the real problems that they face and will only endanger the valuable traditional biodiversity of taro in Hawaii.

**-Legal and Governance Concerns about Preemption Legislation-**

In "exchange" for a ban on GMO-taro, the biotech/GMO industry may attempt to turn our community's intentions to protect taro into unfair "preemption" legislation which would prohibit state or county oversight, and public notice of all other GMOs and biotech activities in Hawaii. We do not support any such attempts to preempt legitimate local government regulations to protect public health. Preempting local efforts to protect public health raises serious legal, ethical, and scientific concerns-- our public and environmental safety, as well as our local-governance authority, must be prioritized over private investment concerns and high-risk experiments.

**-Help Taro, Don't Hurt Taro!-**

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no actual need to tamper with the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama 'Aina,

Keoki Kahumoku

Hilo, HI 96720

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

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**-Help Taro, Don't Hurt Taro!-**

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As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama 'Aina,

Jason Ito

Hanalei, HI 96714

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

We are an organic farm called Sunny Kapoho Citrus in the Kapoho area of Puna on the Big Island. We produce oranges and banana but not papaya because the environment here is polluted with GMO papaya.

We began growing taro when Hawaii County Council bill# 361 was passed to prevent the environment from being polluted with GMO taro. We are so glad for this because taro is growing better than other vegetables here.

Here in paradise where nature provides so abundantly we can choose exclusively from Naturally Evolved Organisms (NEO). Those who would choose GMO instead would pollute the environment at our expense, externalizing their costs for monetary gain, and that would be irresponsible behavior.

Malama Aina,

David Webb  
PO Box 2167  
Pahoa, HI 96778

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

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Malama Aina,

Nalei Kahakalau  
P.O. Box 1764  
Honokaa, HI 96727

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I have been growing taro in Kurtistown for nearly 30 years, and before that I grew taro on Oahu. On Our Malu-Aina farm we have more than 30 varieties of taro. Today we marketted organic taro leaves and root to Island Naturals Hilo store. Last Wed. we donated 50 pounds of taro leaf for the new Hawaiian pastor's luau at Ola'a Hawaiian Congregational Church in Kurtistown.

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

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As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Jim Albertini  
P.O. Box AB  
Kurtistown, HI 96760

## Testimony

### In Support of Ban on GMO-Taro

Aloha mai kakou

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

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As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Kane Turalde  
PO Box 1022  
PO Box 1022  
Waimea, HI 96796

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

**-Taro Deserves the Best Available Science-**

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

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**-Community and Ethical Concerns about GMO-Taro-**

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informed community consent, raising serious ethical science concerns. Businesses and researchers in Hawaii should encourage informed community consent and review, not avoid oversight and involvement from the very communities most effected by their activities.

**-Economic and Bioprospecting Concerns about GMO-Taro-**

The right to grow taro naturally and traditionally belongs to the public, and should never be owned by a corporation or university. Private patents and control of our public food resources would cripple our food security, taro economy and violate our inherent public rights. GMO-taro experiments and patents cannot help taro farmers with the real problems that they face and will only endanger the valuable traditional biodiversity of taro in Hawaii.

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**-Help Taro, Don't Hurt Taro!-**

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no actual need to permanently change the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

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Malama Aina,

Steven Hookano  
245 wailua road  
haiku, HI 96708

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

As a beekeeper, I understand all too well the dangers of genetically engineered organisms contaminating the pollen collected by honeybees, and through them spreading into non-gmo crops. Pollen are microscopic particles and very difficult to contain. There is no need for genetic modification on such a healthy, and culturally sacred plant. There is no room in this already devastated ecology for mistakes! And mistakes always happen... killer bees, varroa mites, coqui... and these are all large organisms!

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Malama Aina,

alison yahna  
po box 679  
ka'alualu rd  
na'alehu, HI 96772

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Malama Aina,

Donald Cooke

Kaneohe, HI 96744

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Kyle Nakanelua

Haiku, HI 96708

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Malama Aina,

Mele Coelho

Kailua, HI 96734

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Representing the collective voice of many residents from the island of Molokai, I am asking our Hawaii State Legislature to protect our island as well as the State of Hawaii from the potentially damaging effects occurred by the introduction, propagation and experimentation of genetic modification of all taro varieties grown within the State of Hawaii.

The introduction of genetically engineered taro has the potential of creating irreversible damage to our native ecosystems, demonstrates a complete disregard for Native Hawaiian Culture and allows for privatized patenting of Hawaii's natural resources.

The genetic modification of crops in general is an infant science whose complete effects are yet to be known. Many documented cases of the harmful health effects on humans of GMO crops exist including- allergenic problems, respiratory problems, intestinal reactions and skin problems. Further conclusion through reasonable scientific deduction suggests increases in miscarriages, birth defects and cancer. Regardless of these evidences, adequate studies in regard to the effects of GMO crops on humans have not been conducted.

In laboratory tests on mice and rats scientific laboratory tests unequivocally reveal that genetically modified crops have caused damage to kidneys, stomach lesions, sterility, excessive cell growth to the small intestine and even death. Field studies on cows, goats, sheep and pigs have revealed similar devastating results.

Taro remains the world's only allergy-free carbohydrate and contributes significantly to the welfare and health of human life. On the other hand the unnatural genetic mutations of GMO-taro can never be guaranteed to be hypo-allergenic, thus, any transgenic contamination to indigenous varieties of taro as well as to other natural growing varieties of taro, has the potential of robbing Native Hawaiians and consumers alike of this uniquely important medicinal food source.

At this time we understand there to be no proven benefits of GMO Taro to taro farmers or consumers and all proposed benefits remain to be purely speculative. The Taro Security and Purity Task Force, established under Act 211, has acknowledged that GMO Taro is not the best available science needed to safely perpetuate taro farming or the most suitable option in protecting consumers in Hawaii. Options for the control of taro disease include cold water induction, reduction of over planting and recent developments which include the introduction of non contaminating fish toxins to successfully control such diseases.

In representing the community of Molokai, we will not tolerate such disrespect of our culture, blindly except the potential damaging consequences to our 'aina or except the health risks placed upon our people .

Mahalo,

Steve Morgan/ Hui Ho'opakele 'Aina

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Steve Morgan  
P.O. Box 72  
Maunaloa, HI 96770

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

My name is Seth Raabe. I am a farmer at Kikoo in Kipahulu on the Island of Maui. I plant kalo along with many other things in a natural way. There is always abundance so we are supported economically as well as physically nourished.

I firmly believe that a viable future for these Islands can only be achieved by returning to balance with our environment.

This is why I am calling out to all of you to support the bill banning genetic modification of our life staple. To not protect our main food source in a natural state would be sheer stupidity. Look around the world. Look at Mexico... contaminated beyond repair. Hawaii nei is the heartland of the kalo plant; by far the greatest diversity of varieties in one place on Earth. I hope this is common knowledge for all of you making this decision.

So I respectfully ask each and every one of you voting on these bills to look into your heart and ask what is more important for our future: continuing the natural legacy of the kalo plant, or giving it up for an elite sector to gain patent rights and power to alter our life staple. Think of the consequences of both paths.

From Kipahulu,

Seth Raabe  
HCR1 Box 170  
Hana, HI 96713

Testimony  
In Support of Ban on GMO-Taro

Thomas Young

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Taro is a nutritious food crop, especially cherished as a baby food and staple dish in Hawaii for centuries; and around the world as an important medicinal food for diabetes, cancer, autism and serious food allergies. Taro is the world's only hypo-allergenic, or allergy-free, carbohydrate. GMO-taro, on the other hand, is not the same as natural taro. GMO-taro has never been in the human food supply before, and has NOT been scientifically tested on humans to prove that it is safe to eat. Moreover, the unnatural genetic mutations of GMO-taro can never be guaranteed to be hypo-allergenic, thus threatening consumers of this uniquely important medicinal food source. In fact, numerous scientific studies on laboratory animals show that GMOs can cause toxic, allergic, and even deadly reactions. Unnatural gene mutations introduced through GMO-taro may harm insects, birds, fish, and soil health. Risks and damages to Hawaii's people and lands could be irreversible.

-Community and Ethical Concerns about GMO-Taro-

Cultivated throughout centuries to be abundantly grown on Hawaii's diverse agricultural lands, taro is the sacred foundation of our unique local agriculture, society, traditions and family structure. Genetic modification of taro is an affront to the sacred Hawaiian tradition that respects the taro plant as a family member, an older brother to humanity. This family tradition is rooted in honoring the relationship of mankind with the very plants we depend on for healthy nourishment, and establishes a unique genealogical connection between taro and the Hawaiian people. The wisdom of such healthy community values must be encouraged, not disrespected or desecrated. Despite the unique and utmost importance of this plant to our community, GMO-taro has been developed without any

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

My husband and I farm taro on the East side of Maui in Wailuanui. We strongly urge you to support and pass the ban on genetically modified taro. Not only is this culturally appropriate, it is a matter of protecting the one type of hypoallergenic starch IN THE WORLD. It is for this reason alone that the taro ban should be in effect for ALL TYPES OF TARO, not just the hawaiian varieties.

Taro, Haloa, is something that is close to the heart of every hawaiian, and this battle even inspired me to go back to school and complete my master's degree, and I have begun a phd program at the university, the passion that has been stirred up within me as a result of this fight for our food for our people is something that I know and understand within my na'au that will never be extinguished.

In the words of my kupuna, James Kauli'a, "forever protest until the last aloha 'aina," although this was spoken in regards to annexation (which is another pressing issue today) I see the genetic modification of our food as yet another form of annexation and usurpation. I will continue to resist, to fight for our identity as a people, which in this culture as with all, is expressed in the food that we eat.

na'u no me ke aloha 'aina mau a mau,  
na Pauahi Ho'okano

pauahi hookano

ewa beach, HI 96706

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

**-Taro Deserves the Best Available Science-**

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

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informed community consent, raising serious ethical science concerns. Businesses and researchers in Hawaii should encourage informed community consent and review, not avoid oversight and involvement from the very communities most effected by their activities.

**-Economic and Bioprospecting Concerns about GMO-Taro-**

The right to grow taro naturally and traditionally belongs to the public, and should never be owned by a corporation or university. Private patents and control of our public food resources would cripple our food security, taro economy and violate our inherent public rights. GMO-taro experiments and patents cannot help taro farmers with the real problems that they face and will only endanger the valuable traditional biodiversity of taro in Hawaii.

**-Legal and Governance Concerns about Preemption Legislation-**

In "exchange" for a ban on GMO-taro, the biotech/GMO industry may attempt to turn our community's intentions to protect taro into unfair "preemption" legislation which would prohibit state or county oversight, and public notice of all other GMOs and biotech activities in Hawaii. We do not support any such attempts to preempt legitimate local government regulations to protect public health. Preempting local efforts to protect public health raises serious legal, ethical, and scientific concerns-- our public and environmental safety, as well as our local-governance authority, must be prioritized over private investment concerns and high-risk experiments.

**-Help Taro, Don't Hurt Taro!-**

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no actual need to permanently change the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Eva Kapelaonaalii Collins

Wai?anae, HI 96792

## Testimony

### In Support of Ban on GMO-Taro

Aloha mai kakou

I am the author of the book *Uncertain Peril, Genetic Engineering and the future of seeds* and I have studied this topic for 15 years. The public policy, the science, the environmental and the ethical/cultural issues demand that legislative action be taken to protect taro for both being genetically engineered and patented.

I submit my book, particularly pages 188-190 which deal with taro in Hawaii as part of my testimony here, I will send it in separately. But I urge the legislature to join all the other countries in the world that are banning, studying, labeling, and regulating gmo plants and have the courage to stand up for the traditional farmers in Hawaii and against the predatory practices of agrochemical corporations who do not have the state's best interests in mind.

It is the duty of government to protect the health, safety and food security of its people. I have read the following message and I adopt it as part of my own.

Claire Hope Cummings

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

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As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Claire Cummings

Angwin, CA 94508

Support for Ban on GMO-Taro

Hanalei Fergerstrom  
Moku o Keawe

Re: Haloa

Aloha,  
In the foundation of the Gods, Lono is the third to appear.  
He Lono  
He Lono  
He Ulu ta mea ai O te po'e honua

You, Lono are responsible for the staff of life for all the people of the earth.

That is the relation of Lono and Haloa.

It is therefore a matter of religious covenant between the Hawaiian People and their Gods.

TESTIMONY IN SUPPORT OF TARO FARMERS REGARDING

HB 1663 RELATING TO TARO SECURITY

Hearing date, time and place:

Wednesday, February 18, 2009 9:10 a.m. Conf. Rm. 329

Aloha Chairperson Carroll, Vice-Chair Shimabukuro and Members of the House Committee on Hawaiian Affairs, as well as Chairperson Tsuji, Vice-Chair Wooley and House Committee on Agriculture. Thank you for this opportunity to testify on House Bill 1663, which prohibits the development, testing, propagation, release, importation, planting, or growing of genetically modified taro in the State of Hawai`i.

`Imi Hale – Native Hawaiian Cancer Network, is one of 25 Community Network Programs funded by the National Cancer Institute's Center to Reduce Cancer Health Disparities to address the cancer health disparities among Native Hawaiians. `Imi Hale is a program of Papa Ola Lōkahi, a federally recognized community-based organization focused on improving the health and well-being of Native Hawaiians. Operating on the principles of community-based participatory research, `Imi Hale emphasizes community involvement, capacity building, and respect for cultural values with tangible benefits to the community.

`Imi Hale and Papa Ola Lōkahi support taro farmers in their efforts to protect and preserve Native Hawaiian traditional cultural practices as it relates to taro. This position is supported by cultural protocol, scientific evidence and ethical reasoning, and calls for sanctions against bioprospecting, misappropriation of natural resources, and the development or patenting of Native Hawaiian genetic material, including taro.

The Paoakalani Declaration, written by kanaka maoli, the indigenous people of the Hawaiian archipelago, as an expression of their collective right to self-determination in the perpetuation of their culture, under threat of theft and commercialization of traditional knowledge states:

*“In Hawai`i, bioprospecting and biotechnology institutions and industries are imposing western intellectual property rights over traditional, cultural land-based resources. This converts our (kanaka maoli) collective cultural property into individual property for purchase, sale and development. The biogenetic materials of our peoples, taken for medical research for breast cancer and other diseases attributable to western impact have been obtained through misrepresentation, and without the free, prior, or informed consent of our people. We view these activities as biopiracy and condemn these acts as biocolonialism.”*

Moreover, the Association of Hawaiian Civic Clubs, a confederation of fifty-two (52) Hawaiian Civic Clubs throughout the States of Hawai`i, Alaska, California, Colorado, Illinois, Nevada, Utah, Virginia and Washington State passed Resolution 2005-23 on October 5, 2005, which resolved that the legislature of the State of Hawai`i and the University of Hawai`i impose

policies to safeguard and protect Hawai`i's public trust resources from genetically engineered and bioprospecting threats, in consultation with Native Hawaiian organizations.

We ask that you support taro farmers in their efforts to protect and preserve Native Hawaiian traditional cultural practices as it relates to taro by passing HB 1663 out of committee.

Aloha Environmental Management Committee,

Please support all bills to ban the genetic modification of (GMO) taro in Hawai'i. As someone who eats organically grown food, the importance of these bills is loud and clear. Protect crops like kalo before they are altered.

Once someone like UH maps the genome and is successful at doing a genetic cross, another company will come along and purchase their work and make it round up ready and patent it. Let's call these GM companies what they are "the world's largest producer of herbicides and pesticides." They already control 1/3 of the global commercial seed market. Do you know that the United States has not banned a chemical in 17 years?

Protecting Kalo from falling into the category of a controlled use plant is the right thing to do. Right now there is nothing to protect them from being patented. If they were allowed to experiment on our islands, the federally granted permits from APHIS would not give you a county or state right to the disclosure of where, what or when these test were happening.

The 2050 sustainability plan stresses the critical nature of preserving Hawaiian culture and resources. Protecting kalo, protecting Haloa is our kuleana. As we embrace the importance of food security, let's protect the interest of the Hawaiian people.

The precautionary principle says that when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established. We enact the essence of precaution when (#1) we have reasonable suspicion of harm and (#2) scientific uncertainty about cause and effect, then (#3) we have a duty to take action to prevent harm.

We do not have to prove harm, we are obligated to act when safety is unknown.

This is especially important here on Kaua'i, as we have so many acres in taro. We look to Hawai'i to lead the way in passing this legislation, so Kalo will be protected on all of the Hawaiian Islands.

Sincerely,  
Tara White  
P.O. Box 1696  
Hanalei, HI 96714

Caitlin Ross Odom  
Kaua'i resident artist  
Kilauea, HI 96754  
[caitlinrossodom@mac.com](mailto:caitlinrossodom@mac.com)

Aloha Legislators,

I am in support the 10 year moratorium on the genetic modification of taro and wish this sacred food never to be gmoed in our environment. We have already been threatened for years with the unknown effects of gmo testing in Hawai'i and the use dangerous chemicals that goes along with these big agribusiness practices. I say enough is enough! When are the legislators of Hawai'i going to do what is best for the health and culture of Hawai'i and not big business? Recognize this is a sacred plant and show respect for the people of this land. Support sustainable farming practices in Hawai'i and stop using the land for freaky experiments which the damaging effects are still not known.

I join the mahi'ai of Hawai'i in calling on you and your fellow legislators to protect all of us and Hawaii's unique culture and resources by voting 'ae! for the 10 year moratorium on the genetic modification and patenting of all varieties of the taro plant species.

malama haloa! malama pono,

Caitlin Ross Odom

In Support of Ban on GMO-Taro

Dr. Lorrin Pang

State Legislators,

Thank you for the chance to be heard.

Some in support of Industry's position on genetic engineering (GE or GMO's) have claimed that they do not believe in the Precautionary Principle. For the rest of us who practice it and realize that there is no viable alternative to this principle, I would like to argue for a halt to the genetic engineering of Kalo. The Precautionary Principle says that we do not expose the public to products until we know and agree upon the hazards and the benefits. This is especially true if the product, like genetically engineered crops cannot be easily "recalled" or contained. There was recent widespread, costly contamination in the US with GE long grain rice. After lengthy investigation we still do not know how contamination occurred in this 1.2 billion dollar mistake.

It is curious that those who oppose a Kalo ban now propose an alternative "study group". This is an admission that hazards/benefits have not yet been determined. This is a general concern of GE crops cited during a recent international meeting reported in 29 Sept 2008 of Newsweek " (Biotech companies withdrew from the project in protest.) The problem? Yields for GM varieties...are unpredictable and often lower...patent protected, cost more...". If data is inadequate enough to warrant a study group then, according to the Precautionary Principle, a ban should be put in place until the group's work is completed and reviewed.

While it is true that I have worked on and endorse GE pharmaceuticals it must be pointed out that the GE bacterial/yeast involved are contained in laboratories. It is the products of the bacteria, not the life forms themselves which leave the laboratory. In general these products are: not alive, tested in human studies prior to marketing, labeled, targeted to only those with medical indications, tracked after marketing often with additional warnings notices, and sometimes recalled. Contrast this to what has happened in Hawaii with GE crops.

Proponents of GE crops feel that enough is "known" to allow at least laboratory research with the concession that more might be needed prior to field studies and marketing. What is the basis for this position? Regarding health issues they cite the position of the FDA, the federal agency with ultimate responsibility and liability. Yet in November of 2007 a scientific review of the FDA by its own scientists (on the internet, FDA: Science and Mission at Risk, Nov 2007) showed long standing problems with the FDA's science and lack of a scientific approach. Specifically there needs to be more emphasis on the "...." science of safety...although there are many needs... in all Centers and programs, ...none is as time sensitive and critical as surveillance and risk management". It would be one thing if the FDA had required data which could be re-examined but FDA's position regarding GMO's has been based on their misguided opinions.

Ethical review committees which have exempted or approved of GE products need to reconsider their positions (and liability) in light of the FDA report. This is typical of pharmaceuticals. If new hazards are found or one finds that there is no grounds for previous assurances of safety – all exposed must be notified. Was bad science done out of ignorance or was there an underlying agenda? Since 2005 before a US Senate investigation committee testimony by FDA insiders point out the widespread problem of conflict of interest (summary article in Reader's Digest April 2008).

There needs to be a halt on GE products (including Kalo ) until definitive studies are complete. But who will determine the adequacy of the studies? In light of previous reports of poor science and conflict of interest in our lead regulatory agency for health, the public can only ask for transparency and rigorously policing for conflict of interest. In a normal regulatory processes financial “stakeholder” status is synonymous with conflict of interest. Those in this position must be removed from major decisions or influence peddling. I have heard that there will be an effort at the State level to again preempt County/home rule input on GMO's in Hawaii. This misguided effort simply recreates all the pitfalls playing out in our federal regulatory agencies, including our FDA – lack of transparency, bad science and conflict of interest. Unfortunately it is now the local regulators at the state level and most recently the Big Island county council which have to enforce precautionary policing. Grassroots, environmental activism/science are an emerging American phenomenon as communities are force to “look out for themselves” – Discover, August 2008 pages 68-71.

You have my scientific and health credentials. I have no conflict of interest. Those who continue to support my presence at these meetings and who continue to question my absence at special “study groups” will continue to express our concerns in public, transparent venues....legislative and court hearings. But why do conflicted testifiers get to speak? The New England Journal of Medicine has shown that in spite of denial, those with conflict of interest cannot put theirs aside.

Again, thanks for bringing this important issue to the table.

As private Citizen  
Lorrin Pang, MD, MPH  
America's Best Doctors List 2007-9  
Retired Army Medical Corp  
Consultant to the World Health Organization

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Aloha Senators,

Please change the language of SB 709, a moratorium on the genetic modification of Hawaiian varieties of taro, to that of HB 1663 which calls for a ban on gmos on ALL varieties of taro.

A ban on Hawaiian varieties of taro is not enough.  
We want a ban on all varieties of taro in Hawaii.  
Contamination is forever. Coexistence is impossible.

There are those who say they simply want the research to continue just in case. And they also claim they would never plant it. Do you really believe that? Do you think that this research and technology would stay "safely" in the lab? For the safety of all of us who kanu taro, who cherish it as a family member because it provides and feeds us, for our aina - the land and water- which supports the growing of our food. It is time to stop and think what we are doing to all that is real and all that matters to us as human beings on this planet. Money and the drive to own and control does not make for anything healthy.

Malama Haloa. Malama kalo. Malama `aina.  
One earth, one land, one air, one people.  
Mahalo ke akua.

nancy kobayashi  
p.o.box 44  
hanalei, HI 96714

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I was born in Honolulu and started my life precariously, thriving under the care of the doctors and nurses at Kapi`olani, and with the help of Hawaiian friends and neighbors. I learned the value of poi and its incredible nutrition.

Although I live far away, I still buy Hawaiian poi when it's available. It is an incredible food that can be given infants to help them thrive. It should not be tampered with!

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro.

Too often we change things, not realizing the harm we're doing. For example, cars became preferred over horses, even though at the time they were not as fast, simply because they did not soil the streets with manure. Instead, we have learned they poison our air with fumes. We do not always know how changes will impact us in the future.

I stand with those who ask me to say, and I repeat their words, because they are speaking eloquently:

I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

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#### -Help Taro, Don't Hurt Taro!-

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no inherent need to alter the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama 'Aina,  
Donna Beth Weilenman

Donna Weilenman  
1  
Martinez, CA 94553

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I am concerned about possible GMO experimentation on all crops and especially taro. Taro is a crop that is an important part of Hawaiian culture. Since they are against experimenting on their national crop, it should NOT be done.

Therefore please vote for SB709 and HB1663 to protect the Hawaiian people's most important crop.

Margery Freeman

Kapaia, HI 96746

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

My husband Norbert Roessler and I Ina Roessler are fulltime residents of Kauai. We support the ban on GMO Taro and specifically ALL varieties of Taro not just Hawaiian varieties.

Malama 'Aina,  
The Roesslers

Ina Roessler

princeville, HI 96722

## Testimony

### In Support of Ban on GMO-Taro

Aloha mai kakou

Although the wording of my message (below) is taken directly from the generic message eloquently composed by Na Kahu o Haloa, I totally agree with every point and could not have phrased it any better.

Please listen to the people of Hawai'i!

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

#### -Taro Deserves the Best Available Science-

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

#### -Health and Environmental Safety Concerns about GMO-Taro-

Taro is a nutritious food crop, especially cherished as a baby food and staple dish in Hawaii for centuries; and around the world as an important medicinal food for diabetes, cancer, autism and serious food allergies. Taro is the world's only hypo-allergenic, or allergy-free, carbohydrate. GMO-taro, on the other hand, is not the same as natural taro. GMO-taro has never been in the human food supply before, and has NOT been scientifically tested on humans to prove that it is safe to eat. Moreover, the unnatural genetic mutations of GMO-taro can never be guaranteed to be hypo-allergenic, thus threatening consumers of this uniquely important medicinal food source. In fact, numerous scientific studies on laboratory animals show that GMOs can cause toxic, allergic, and even deadly reactions. Unnatural gene mutations introduced through GMO-taro may harm insects, birds, fish, and soil health. Risks and damages to Hawaii's people and lands could be irreversible.

#### -Community and Ethical Concerns about GMO-Taro-

Cultivated throughout centuries to be abundantly grown on Hawaii's diverse agricultural lands, taro is the sacred foundation of our unique local agriculture, society, traditions and family structure. Genetic

modification of taro is an affront to the sacred Hawaiian tradition that respects the taro plant as a family member, an older brother to humanity. This family tradition is rooted in honoring the relationship of mankind with the very plants we depend on for healthy nourishment, and establishes a unique genealogical connection between taro and the Hawaiian people. The wisdom of such healthy community values must be encouraged, not disrespected or desecrated. Despite the unique and utmost importance of this plant to our community, GMO-taro has been developed without any informed community consent, raising serious ethical science concerns. Businesses and researchers in Hawaii should encourage informed community consent and review, not avoid oversight and involvement from the very communities most effected by their activities.

**-Economic and Bioprospecting Concerns about GMO-Taro-**

The right to grow taro naturally and traditionally belongs to the public, and should never be owned by a corporation or university. Private patents and control of our public food resources would cripple our food security, taro economy and violate our inherent public rights. GMO-taro experiments and patents cannot help taro farmers with the real problems that they face and will only endanger the valuable traditional biodiversity of taro in Hawaii.

**-Legal and Governance Concerns about Preemption Legislation-**

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**-Help Taro, Don't Hurt Taro!-**

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no inherent need to alter the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama 'Aina,

Joan Lander  
PO Box 29  
Naalehu, HI 96772-0029

## Testimony

### In Support of Ban on GMO-Taro

Aloha mai kakou

GMO Free Kaua'i represents over 3000 concerned citizens on Kaua'i. Kaua'i produces the most taro in the state. Most people here grow taro in their yards for their family and friends.

We join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. We are deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

#### -Taro Deserves the Best Available Science-

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

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#### -Community and Ethical Concerns about GMO-Taro-

Cultivated throughout centuries to be abundantly grown on Hawaii's diverse agricultural lands, taro is the sacred foundation of our unique local agriculture, society, traditions and family structure. Genetic modification of taro is an affront to the sacred Hawaiian tradition that respects the taro plant as a family member, an older brother to humanity. This family tradition is rooted in honoring the

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**-Economic and Bioprospecting Concerns about GMO-Taro-**

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**-Help Taro, Don't Hurt Taro!-**

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As a strong supporter of taro farming on Kaua'i and in Hawaii, we ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama 'Aina,

Jeri Di Pietro  
PO Box 338  
Koloa, HI 96756

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Aloha Kakou --

As an advanced student of la'au lapa'au, a professional with a background in Public Health, a descendant of maka'ainana who grew kalo for generations, a peacemaker and a mother, I ask that you support the protection of kalo through the passage of SB709 with amendments that include all varieties of kalo, to reflect the protections articulated in HB1663. No GMO's, please!

Mahalo nui to all who have worked on this effort.

Me ke aloha,

Laulani Teale, MPH

Laulani Teale

Kane'ohe, HI 96744

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I am against the genetic modification of all taro varieties. I was deeply disturbed last year when some members of the legislature changed the bill that was submitted to them. It showed, at best, a lack of understanding of the issue of genetically modified Taro and, at worst, it showed that some members were willing to give in to greed by changing the bill to reflect the methods and ideas of others.

Please support this bill without adding improper changes to it such as the ones made last session.

Yours truly,  
Vicki McCarty  
Honokohau Valley, Maui, HI

Vicki McCarty

;

Lahaina, HI 96761

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I have severe food allergy and have researched GMO foods because of this. ALL literature and research on the subject done by independent scientists points to the very real existence of allergic responses. Not only that but GMOs are being released into the wild and contaminating other plants.

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

**-Taro Deserves the Best Available Science-**

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

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**-Help Taro, Don't Hurt Taro!-**

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no actual need to tamper with the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama 'Aina,

B.A. McClintock  
Disabled-email only  
Honolulu, HI 96825

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I urge you to add the amendments suggested by the taro farmers. There is no crop, including taro, that requires any genetic modification. We have seen all too many times how the most well intentioned efforts of scientists have nonetheless caused inestimable damage to our planet.

I reject all GMO and urge you to do likewise.

Thank you for your time, and attention to my concerns.

Aloha,

Vicki Vierra  
HC 1 Box 5077  
Keaau, HI 96749

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Aloha,

We want "REAL" food! I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

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**-Economic and Bioprospecting Concerns about GMO-Taro-**

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**-Help Taro, Don't Hurt Taro!-**

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no actual need to permanently change the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama 'Aina,

Shannon renee Rudolph  
P.O. Box 243  
P.O. 243  
Holualoa, HI 96725

808-

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

On the first day of the school year, we each planted a kalo plant to watch grow as we grow through the year. I feel very strongly connected to kalo and it's health parallels mine. Taro is a food of life! Please protect it.

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

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As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama 'Aina,

Miranda Lewitsky

4

Honokaa, HI 96727

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I strongly support the ban on GMO taro. Taro is a natural food and common sense tells us that man meddles with its genetic makeup at the peril of our health — and future economic well being as well, because once those companies or organizations have the patent and our natural taro has been compromised through contamination from their patent-held GMO taro, we can look forward to them charging what the traffic will bear for that taro.

Those who stand to make a profit on GMO taro assure us that they are the scientific experts, know better than us and that there is no threat to our health. "Trust us" is the theme. How many times have we heard similar refrains and been the loser for it?

The high risks to our health, escalation in taro prices because of the profits going to those that hold the GMO patents, and the lock they will have on our taro through enforceable patents, is a big step in the direction of a lower quality of life for we the people. Companies or people controlling our food through patents? How is this an improvement over what in the past nature has freely given us?

We have already seen what Monsanto has done to farmers whose crops have been accidentally or deliberately contaminated by their patented GMO crops, such as corn. What more do we need to dissuade us from GMO taro?

Taro is the unique and basic staple of true Hawaiians. We will be the lesser if it changes into a form of Frankenfood through genetic modification. Let's keep it as the highly nourishing, healthy, delicious and natural food that it has been to those in Hawaii for over a thousand years, a food we can enjoy without reservations about its healthy effect on our bodies. I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro.

Malama 'Aina,

Rachel Winkler

Honolulu, HI, HI 96814

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Research sustainable traditional farming, not genetic mutilation!

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

-Taro Deserves the Best Available Science-

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

-Health and Environmental Safety Concerns about GMO-Taro-

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-Community and Ethical Concerns about GMO-Taro-

Cultivated throughout centuries to be abundantly grown on Hawaii's diverse agricultural lands, taro is the sacred foundation of our unique local agriculture, society, traditions and family structure. Genetic modification of taro is an affront to the sacred Hawaiian tradition that respects the taro plant as a family member, an older brother to humanity. This family tradition is rooted in honoring the relationship of mankind with the very plants we depend on for healthy nourishment, and establishes an unique genealogical connection between taro and the Hawaiian people. The wisdom of such

healthy community values must be encouraged, not disrespected or desecrated. Despite the unique and utmost importance of this plant to our community, GMO-taro has been developed without any informed community consent, raising serious ethical science concerns. Businesses and researchers in Hawaii should encourage informed community consent and review, not avoid oversight and involvement from the very communities most effected by their activities.

**-Economic and Bioprospecting Concerns about GMO-Taro-**

The right to grow taro naturally and traditionally belongs to the public, and should never be owned by a corporation or university. Private patents and control of our public food resources would cripple our food security, taro economy and violate our inherent public rights. GMO-taro experiments and patents cannot help taro farmers with the real problems that they face and will only endanger the valuable traditional biodiversity of taro in Hawaii.

**-Legal and Governance Concerns about Preemption Legislation-**

In "exchange" for a ban on GMO-taro, the biotech/GMO industry may attempt to turn our community's intentions to protect taro into unfair "preemption" legislation which would prohibit state or county oversight, and public notice of all other GMOs and biotech activities in Hawaii. We do not support any such attempts to preempt legitimate local government regulations to protect public health. Preempting local efforts to protect public health raises serious legal, ethical, and scientific concerns-- our public and environmental safety, as well as our local-governance authority, must be prioritized over private investment concerns and high-risk experiments.

**-Help Taro, Don't Hurt Taro!-**

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no actual need to permanently change the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama 'Aina,

Cory (Martha) Harden  
P.O. Box 10265  
P.O. Box 10265  
Hilo, HI 96721

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

For the third year in a row I implore you to ban genetic modification of our state plant, kalo. Thank you,  
Beryl Blaich

Beryl Blaich  
PO Box 1434  
Kilauea, HI 96754

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Please reject the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Mahalo,

Jeff Haun

Jeff Haun  
PO Box 248  
Hakalau, HI 96710

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about cultural disrespect, patenting and bio-prospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

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Malama Aina,

Spencer Leineweber

Architecture  
Honolulu, HI 96822

808-

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I support a ban on GMO-taro. It is completely unacceptable to introduce GMO-taro onto even 1 inch of hawaiian soil.

Malama Aina,

Sylvia Partridge  
P. O. Box 1255  
Hanalei, HI 96714

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Gee. . . why don't we take YOU and tweek you genetically 'cause you're not quite good enough the way Creator made you. Then we can clone you and make a billion of you and make lots of money because there will be a patent and we can play God because no one else will be able to recreate you. Sacredness can NOT be manufactured, so 'enuf already!

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

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**-Help Taro, Don't Hurt Taro!-**

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As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Skye Loe

xxx

Kihe'i, HI 96753

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

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Malama Aina,

Mary Baker  
P.O. Box 644  
Waimanalo, HI 96795

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

We are an organic farm called Sunny Kapoho Citrus in the Kapoho area of Puna on the Big Island. We produce oranges and banana but not papaya because the environment here is polluted with GMO papaya.

We began growing taro when Hawaii County Council bill# 361 was passed to prevent the environment from being polluted with GMO taro. We are so glad for this because taro is growing better than other vegetables here.

Here in paradise where nature provides so abundantly we can choose exclusively from Naturally Evolved Organisms (NEO). Those who would choose GMO instead would pollute the environment at our expense, externalizing their costs for monetary gain, and that would be irresponsible behavior.

Malama Aina,

David Webb  
PO Box 2167  
Pahoa, HI 96778

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Personal Note:

I'm currently studying Environmental Safety and you can't imagine all the things we are paying for from the past. I hope my voice is heard.

Mahalo  
Alexis Horio

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

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#### -Help Taro, Don't Hurt Taro!-

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As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Alexis Horio

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Without reservation I join the communities across our State in rejecting the genetic modification of all taro varieties. The banning of GMO-taro is pono! I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

Our God given, Naturally grown taro deserves the best available science- To alter the natural being of our Hawaiian staple, taro is not a road we'd loke to travel. We shouldn't tamper with Mother Nature's perfect package and we must remain steadfast in the ways we've fed generations past and those to come. We see the effects of growth hormones and the "progress of science" in our children and grandchildren today. The onset of puberty starts years before it should in may of our keiki. To say that we must prevent diease in taro is not reason enough to cause the irreversible, unnatural genetic mutations in our naturally-grown staple is unacceptable and a potential danger to all. It is essential to protect our unique Hawaiian taro varieties, farms and water sources-- without GMOs. .

Malama Aina,

EVELYN SOUZA

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I am deeply concerned for the current and future generations regarding the genetic modification of foods.

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

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As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

laura and andrew BINSTOCK  
po box 1268  
haiku, HI 96708

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Gwen Ilaban

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I urge you to reject all genetic modification of taro varieties, by supporting a ban on GMO-taro. There are unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

I am not going to give you more detailed reasons of why there should be a ban on GMO-taro, as I know you have received such information already. Please thoroughly read that info and take it seriously, as you think about your vote on GMO-taro.

Look forward to hearing from you.  
Malama Aina,

Marjorie Erway  
PO Box 2807  
Kailua-Kona, HI 96745

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Taro is, without doubt, the Staff of Life in the Hawaiian Islands. This applies to all of us who reside here. As such, it is of utmost importance that the genome of taro remain whole and unbroken from genetic modification. Changing the life pattern and blueprint of taro is a violation against humanity.

I voice my concern to any who would consider the taro plant our property and not our partner in the cycle of life. Without our major food crops, we will not live, and changing their inherent nature is a setup for failure, starvation, and manipulation of the balance of power through controlling food sources.

Stop genetic modification in the Hawaiian Islands now.

Peace,

Eliza W. Goodhue

Eliza Goodhue  
P O Box 791469  
Paia, HI 96779

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

-Protect Taro, Don't Hurt Taro!-

I don't buy any GMO product. If there is GMO taro, I don't buy it. Most of people who I know are not consuming any GMO food or product, so they won't buy GMO taro, too.

Many of akamai people know what is pono, and what is not pono. Making GEO taro is not pono.

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no actual need to permanently change the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina, Malama pono,

Mayumi Marks

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Do not allow such unnatural practices to pollute Hawaiian taro or our sacred land. These false ways of farming are not wanted or needed.

For love of Mother Nature & good crops the way nature intended, Linda Lee Evans

Linda Lee Evans

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

From across the Pacific, I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro. The unique, fragile ecosystem of Hawai'i is NOT the place to experiment with genetically-modified crops; rather, the historic and present importance of taro should be protected for current and future generations.

-Taro Deserves the Best Available Science-

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

-Health and Environmental Safety Concerns about GMO-Taro-

Taro is a nutritious food crop, especially cherished as a baby food and staple dish in Hawaii for centuries; and around the world as an important medicinal food for diabetes, cancer, autism and serious food allergies. Taro is the world's only hypo-allergenic, or allergy-free, carbohydrate. GMO-taro, on the other hand, is not the same as natural taro. GMO-taro has never been in the human food supply before, and has NOT been scientifically tested on humans to prove that it is safe to eat. Moreover, the unnatural genetic mutations of GMO-taro can never be guaranteed to be hypo-allergenic, thus threatening consumers of this uniquely important medicinal food source. In fact, numerous scientific studies on laboratory animals show that GMOs can cause toxic, allergic, and even deadly reactions. Unnatural gene mutations introduced through GMO-taro may harm insects, birds, fish, and soil health. Risks and damages to Hawaii's people and lands could be irreversible.

-Community and Ethical Concerns about GMO-Taro-

Cultivated throughout centuries to be abundantly grown on Hawaii's diverse agricultural lands, taro is the sacred foundation of our unique local agriculture, society, traditions and family structure. Genetic modification of taro is an affront to the sacred Hawaiian tradition that respects the taro plant as a family member, an older brother to humanity. This family tradition is rooted in honoring the relationship of mankind with the very plants we depend on for healthy nourishment, and establishes

an unique genealogical connection between taro and the Hawaiian people. The wisdom of such healthy community values must be encouraged, not disrespected or desecrated. Despite the unique and utmost importance of this plant to our community, GMO-taro has been developed without any informed community consent, raising serious ethical science concerns. Businesses and researchers in Hawaii should encourage informed community consent and review, not avoid oversight and involvement from the very communities most effected by their activities.

**-Economic and Bioprospecting Concerns about GMO-Taro-**

The right to grow taro naturally and traditionally belongs to the public, and should never be owned by a corporation or university. Private patents and control of our public food resources would cripple our food security, taro economy and violate our inherent public rights. GMO-taro experiments and patents cannot help taro farmers with the real problems that they face and will only endanger the valuable traditional biodiversity of taro in Hawaii.

**-Legal and Governance Concerns about Preemption Legislation-**

In "exchange" for a ban on GMO-taro, the biotech/GMO industry may attempt to turn our community's intentions to protect taro into unfair "preemption" legislation which would prohibit state or county oversight, and public notice of all other GMOs and biotech activities in Hawaii. We do not support any such attempts to preempt legitimate local government regulations to protect public health. Preempting local efforts to protect public health raises serious legal, ethical, and scientific concerns-- our public and environmental safety, as well as our local-governance authority, must be prioritized over private investment concerns and high-risk experiments.

**-Help Taro, Don't Hurt Taro!-**

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no actual need to permanently change the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

I am fortunate to have visited the islands a few times in my life, and with each visit, I gained a deeper and richer appreciation of the culture, people, history, language, flora and fauna, land and water. I also firmly support measures to protect and sustain Hawai'i's unique ecosystem. As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Katy Fogg

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

In my family we eat poi every week.

Please do not genetically alter this staple of our diet and our culture. I support taking care of the land from which the taro grows. Please help to assure steady, clean water sources for nourishing haloa. Please do change the plant's genetic structure.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Lori Fernandez  
P.O. Box 11197  
Lahaina, HI 96761

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I object to any genetically modification of taro. If this was a grass roots effort on the part of Hawaiians requesting research to be done, then it would be a different story. But this is science being crammed down the throat of Hawaiians. This science ignores the cultural significance of the taro as a food staple. The science ignores the relationship of taro to the Hawaiians as the "older brother", as a family member. Instead it is as if an surgical experiment is being preformed on a live conscious human being with the same amount of horror being expressed by the Hawaiian people.

Taro breeding programs are the best route to go, but genetically modification is unacceptable.

Catherine Aki  
P.O. Box 788  
Kauanakakai, HI 96748

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Please do not support genetic testing on Taro in Hawaii. We already have contamination of organic crops by these biogenetic species in this state, and many studies show the harmful effects of genetic testing.

Sincerely,  
Andrea Baer  
Maui

Andrea Baer

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

It is unacceptable that the State puts in meager resources into biosecurity --- protecting Hawaii from alien plants, animals, and pathogens --- and as a consequence has new plant diseases that attack endemic, Polynesian, and agricultural plants and animals. The response should not be genetic engineering of the plants, which is a radical alteration of the genomes and population genetics of the species, with unknown consequences.

Growing studies show that GMO genes are impossible to contain, and spread out of control into populations where consent for the presence has not been given.

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

-Taro Deserves the Best Available Science-

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

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**-Community and Ethical Concerns about GMO-Taro-**

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**-Economic and Bioprospecting Concerns about GMO-Taro-**

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**-Help Taro, Don't Hurt Taro!-**

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no actual need to permanently change the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Lee Altenberg

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Aloha, my name is Walter Ritte and I am in strong support of protecting Kalo (Haloa) from GMO. I am speaking as a Hawaiian who grows and eats Kalo, and a Hawaiian who has a serious kuleana to protect my eldest brother Haloa, the first born of our people.

Our culture, geneology and traditions have been ignored by the University of Hawaii and the Biotec Industry. Our first born has been genetically modified and patented by the University of Hawaii without the consent of the Hawaiian people.

We demand protection, Hawaiians and taro farmers want legislative protection for Haloa, we have petitions with over 6,000 signatures.

This issue has become an embaressment to this state as the health, safety and culture of the people is being jeapordized to protect the Biotec Industry.

To not place rules, protections and guidelines for a new industry breeds mistrust.

Hawaiians like my self will not go away, we have been here for thousands of years. We will not accept industries that threaten our lands, our families our existence.

We demand and we will not stop demanding until Haloa is protected by law. Walter Ritte

walter ritte  
po box 486  
kaunakakai, HI 96748

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Mahalo for the opportunity to declare my support for a ban of any genetic modification of taro in the state of Hawai'i. The mere rumor of genetically modified taro on Kaua'i has tainted the perception of all taro on our island. Farmers, growers and consumers, have begun questioning where huli is coming from. Since you cannot tell by looking and DNA testing is not an option without knowing which genetic construct has been forcefully inserted, people are beginning to steer away from sharing planting material. As we grow into sustainable food security, we do not want to create future roadblocks for farmers and growers by having to contend with a living pollution such as GE plants.

This technology has placed a burden onto growers to protect their crops from contamination, instead of the purveyors of this plant modified with unrelated species to be contained by the patent holder. We have seen with GMO papaya that markets are lost, seed banks are contaminated and pollen travels to organic farms.

Never before in the history of mankind have we crossed plants with unrelated plant DNA, or plants with animal DNA, and even plants with human DNA. This science is in question in many countries around the globe. To allow GM food into our food supply and onto store shelves without labeling, goes against consumers trust.

We are what we eat, and eating healthy is our first line of health insurance. For mothers with children who have food allergies, taro is a safe and nutritious food that they can depend on.

It is more important for us to fallow and feed the soil with green manures, and keep taro healthy and productive in our state. Alternatives to chemical farming do exist and are healthier for the land and the people

Farmers don't want genetically engineered huli, Hawaiians do not want their ancestor's DNA altered by forceful gene manipulation, and consumers don't want to eat it. Changing the genetics of a hypo allergenic food is a very bad choice. I cannot name another food that is hypo allergenic, can you?

We are seeing an increase in food allergies related to the crops that have been genetically manipulated in the lab, like corn, soy, canola and wheat. There is something inherently dangerous about inserting gene randomly with attached viral promoters that turn on all coded traits, some traits are certainly better left off in the case of dormant disease genes.

Please protect all varieties of taro in our state of Hawai'i for future generations. This crop has a large market, and genetic engineering would only hurt us economically, as well as culturally and environmentally.

Please malama Haloa, so that Haloa can malama us.

Malama Aina,

Jeri Di Pietro  
PO Box 338  
Koloa, HI 96756

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

GMO Free Kaua'i is a group of over 3000 people concerned about the lack of science and regulation regarding genetically engineered food crops and the patenting of seed.

As we work towards meaningful ways to achieve food sovereignty, genetically engineered test fields are limiting our choices and steering jobs away from our island.

We support a ban of any genetic modification of taro in the state of Hawai'i.

Since you cannot tell a genetically engineered plant by looking, and DNA testing is not an option without knowing which genetic construct has been forcefully inserted, people are beginning to steer away from sharing planting material.

As we grow into sustainable food security, we do not want to create future roadblocks for farmers and growers by having to contend with a living pollution such a GE plants.

This technology has placed a burden onto growers to protect their crops from contamination, instead of the purveyors of this plant modified with unrelated species to be contained by the patent holder.

We have seen with GMO papaya that markets are lost, seed banks are contaminated and pollen travels to organic farms.

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It is more important for us to fallow and feed the soil with green manures, and keep taro healthy and productive in our state. Alternatives to chemical farming do exist and are healthier for the land and the people and wildlife.

Farmers don't want genetically engineered huli, Hawaiians do not want their ancestor's DNA altered be forceful gene manipulation, and consumers don't want to eat it. Changing the genetics of a hypo allergenic food is a very bad choice.

We are seeing an increase in food allergies related to the crops that have been genetically manipulated in the lab, like corn, soy, canola and wheat. There is something inherently dangerous about inserting gene randomly with attached viral promoters that turn on all coded traits, some traits are certainly better left off in the case of dormant disease genes.

Please protect all varieties of taro in our state of Hawai'i for future generations. This crop has a large

market, and genetic engineering would only hurt us economically, as well as culturally and environmentally.

Please malama Haloa the taro.

Friends of GMO Free Kaua'i  
PO Box 343  
Koloa, HI 96756

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

You must realize, that there is no way, as Hawaiians, that we will allow you to touch, change, or shake up the gene of the Taro!

Cultivated throughout centuries to be abundantly grown, taro is the sacred foundation of our agriculture, society, traditions and family structure. Genetic modification of taro is an affront to the sacred Hawaiian tradition that respects the taro plant as a family member, an older brother to humanity. This family tradition is rooted in honoring the relationship of mankind with the very plants we depend on for healthy nourishment, and establishes a unique genealogical connection between taro and the Hawaiian people.

If you so boldly disrespect or desecrate Taro, you will have to face the out come.

Donna Morgan

Steve Morgan  
P.O. Box 72  
Maunaloa, HI 96770

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

As a frequent visitor to Hawaii, I would like to point out that I NEVER buy anything I know to be genetically modified.

At some point soon, people the world over are going to notice that nature must be honored if we are to survive. Genetic Modification is not only a profanity, it serves no one but corporations like Monsanto.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Richard Welker

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I enjoy fresh taro and a variety of products currently using taro grown in Hawai'i. I join farmers and consumers in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. Like many citizens, I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harm to our local farming economy that are associated with GMO-taro.

Other countries have outlawed GMO for all farm products until those risks are established. As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by passing SB 709 and HB 1663 which ban GMO-taro.

Sincerely,

Pam Haight

Olympia, WA 98501

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I am against GMO taro, and extremely upset about the health consequences as a result. There should be no tampering of a natural plant, and especially because in our Hawaiian culture, the kalo is representative of our ancestry.

-Taro Deserves the Best Available Science-

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

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**-Help Taro, Don't Hurt Taro!-**

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As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Lei Kihoi

P.O. Box 1746

P.O. Box 1746

Kailua-Kona, HI 96745

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I would like to add my voice to the chorus supporting a ban on the genetic modification of all taro varieties in Hawaii. I feel it is arrogant to allow this level of cultural disrespect. Taro is not just a plant to the native Hawaiian's; it is a fundamental part of their culture. Furthermore, genetic modification of food plants exposes us to unknown health risks and potential harm to our local farming economy.

Abundantly grown on Hawaii's diverse agricultural lands, taro is the sacred foundation of Hawaii's traditional culture. Genetic modification of taro is an affront to the sacred Hawaiian tradition that respects the taro plant as a family member, an older brother to humanity. This family tradition is rooted in honoring the relationship of mankind with the plants we depend on for nourishment, and establishes an unique genealogical connection between taro and the Hawaiian people. The wisdom of such healthy community values must be encouraged, not disrespected or desecrated. Despite the unique and utmost importance of this plant to our community, GMO-taro has been developed without any informed community consent, raising serious ethical science concerns. Businesses and researchers in Hawaii should encourage informed community consent and review, not avoid oversight and involvement from the very communities most effected by their activities.

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As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Mahalo nui loa,

Dawn Boucher

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Kalo is our elder. How could anyone genetically modify an elder? Might as well try to genetically modify your grandmother.

Leave the taro the way the kapuna left it.

Say no to GMO.

Thanks,

Jason Winnett

Kalapana

Jason Winnett  
Chain of Craters Rd  
Kalapana, HI 96778

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro..

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Robin Stetson  
RR4, Box 2333  
Pahoa, HI 96778

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

My name is PuaNani Rogers, and I live on Kauai where most of our kalo from poi is grown. Poi is a most important food for me, my family and especially our na keiki. Please do not allow scientist to genetically modify any taro varieties. It would make us hesitate about feeding it to our na keiki, our na mo`opuna.

I support any science that will protect our kalo from disease, apple snails, water studies to replenish and purify our streams and rivers that feed our lo`i.

Therefore, I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

Please listen to the people of our community, I am a kupuna and am speaking for my generation as well as for the next, and the next, and the next generations yet to be born.

Mahalo for voting NO to GMO-kalo!

Puanani Rogers

Kapaa, HI 96746

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Malama Aina,

Kamaka Jingao

Kamaka Jingao

Honolulu, HI 96817

## Testimony

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Aloha mai kakou

I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

#### -Taro Deserves the Best Available Science-

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

#### -Health and Environmental Safety Concerns about GMO-Taro-

Taro is a nutritious food crop, especially cherished as a baby food and staple dish in Hawaii for centuries; and around the world as an important medicinal food for diabetes, cancer, autism and serious food allergies. Taro is the world's only hypo-allergenic, or allergy-free, carbohydrate. GMO-taro, on the other hand, is not the same as natural taro. GMO-taro has never been in the human food supply before, and has NOT been scientifically tested on humans to prove that it is safe to eat. Moreover, the unnatural genetic mutations of GMO-taro can never be guaranteed to be hypo-allergenic, thus threatening consumers of this uniquely important medicinal food source. In fact, numerous scientific studies on laboratory animals show that GMOs can cause toxic, allergic, and even deadly reactions. Unnatural gene mutations introduced through GMO-taro may harm insects, birds, fish, and soil health. Risks and damages to Hawaii's people and lands could be irreversible.

#### -Community and Ethical Concerns about GMO-Taro-

Cultivated throughout centuries to be abundantly grown on Hawaii's diverse agricultural lands, taro is the sacred foundation of our unique local agriculture, society, traditions and family structure. Genetic modification of taro is an affront to the sacred Hawaiian tradition that respects the taro plant as a family member, an older brother to humanity. This family tradition is rooted in honoring the relationship of mankind with the very plants we depend on for healthy nourishment, and establishes a unique genealogical connection between taro and the Hawaiian people. The wisdom of such healthy community values must be encouraged, not disrespected or desecrated. Despite the unique and utmost importance of this plant to our community, GMO-taro has been developed without any

informed community consent, raising serious ethical science concerns. Businesses and researchers in Hawaii should encourage informed community consent and review, not avoid oversight and involvement from the very communities most effected by their activities.

**-Economic and Bioprospecting Concerns about GMO-Taro-**

The right to grow taro naturally and traditionally belongs to the public, and should never be owned by a corporation or university. Private patents and control of our public food resources would cripple our food security, taro economy and violate our inherent public rights. GMO-taro experiments and patents cannot help taro farmers with the real problems that they face and will only endanger the valuable traditional biodiversity of taro in Hawaii.

**-Legal and Governance Concerns about Preemption Legislation-**

In "exchange" for a ban on GMO-taro, the biotech/GMO industry may attempt to turn our community's intentions to protect taro into unfair "preemption" legislation which would prohibit state or county oversight, and public notice of all other GMOs and biotech activities in Hawaii. We do not support any such attempts to preempt legitimate local government regulations to protect public health. Preempting local efforts to protect public health raises serious legal, ethical, and scientific concerns-- our public and environmental safety, as well as our local-governance authority, must be prioritized over private investment concerns and high-risk experiments.

**-Help Taro, Don't Hurt Taro!-**

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no actual need to permanently change the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

As a strong supporter of taro farming in Hawaii, I ask you to protect the security of the health of natural taro and the local taro industry by establishing a ban on GMO-taro.

Lawmakers need to read two informative books on the subject of GMO's written by Jerry Smith "Seeds of Deception" and "Genetic Roulette". As a parent and grandparent, I am very concerned about the effects of GMO's on our food supply, and I want the choice of being able to eat NON-GMO as well as feed my keiki and moopuna NON-GMO. The eating of poi is a daily thing in our ohana and I want the reassurance of knowing that I am feeding my family pure kalo, the way my ancestors have been eating it for hundreds of years. The scientific community cannot guarantee that the Hawaiian varieties of Kalo will not become contaminated by any GMO varieties released into the environment in the future. I support fully a complete ban on any research, testing or cultivation of GMO Kalo.

Malama Aina,  
Lynlie Waiamau  
PO Box 3723  
Lihue, HI 96766

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I have been researching genetic modification and am thoroughly convinced that it is a TERRIBLE idea. I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

-Taro Deserves the Best Available Science-

GMO-taro is claimed to potentially reduce one type of taro disease in one variety of taro by creating irreversible, unnatural genetic mutations whose safety to consumers and the environment is not scientifically proven. GMO-taro has no proven benefits to taro farmers or consumers and is not the best available science needed to safely perpetuate taro farming and protect consumers in Hawaii. Better and safer options exist. Long-term scientific studies and farming practices throughout the Pacific have resulted in proven scientific techniques to expand the local taro industry, protect unique Hawaiian taro varieties, farmlands and watersheds-- without GMOs. These community-accepted practices include: organically improving soil health, establishing appropriate water-flow standards to prevent disease and pests, stopping imports of diseased taro and pests into Hawaii, and growing many traditional varieties of natural taro with different natural disease resistance. Being that safer science exists, there is no need or demand for experimental GMO-taro from local taro farmers or consumers.

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and utmost importance of this plant to our community, GMO-taro has been developed without any informed community consent, raising serious ethical science concerns. Businesses and researchers in Hawaii should encourage informed community consent and review, not avoid oversight and involvement from the very communities most effected by their activities.

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In "exchange" for a ban on GMO-taro, the biotech/GMO industry may attempt to turn our community's intentions to protect taro into unfair "preemption" legislation which would prohibit state or county oversight, and public notice of all other GMOs and biotech activities in Hawaii. We do not support any such attempts to preempt legitimate local government regulations to protect public health. Preempting local efforts to protect public health raises serious legal, ethical, and scientific concerns-- our public and environmental safety, as well as our local-governance authority, must be prioritized over private investment concerns and high-risk experiments.

**-Help Taro, Don't Hurt Taro!-**

Agricultural science has proven that the taro will be as healthy as the land in which it is grown and the care with which it is shown. There is no actual need to permanently change the taro plant's natural genetic structure nor patent the plant for private profit in order to protect the local taro industry. Rather, farmers, scientists and decision makers must work to solve the broad resource management problems that face taro farming. Lack of meaningful support to address the drastically increasing challenges from invasive diseases, pests, excessive and illegal diversions of water, and operating costs, has led to a decrease in taro farming and a taro shortage in Hawaii. With appropriate political, scientific and community support, taro will once again be a primary resource for Hawaii's food security, contributing significantly to a healthy local diet and economy. GMO-taro and patents, however, could destroy the safety and sanctity of natural taro as an important allergy-free food, cultural resource and local agricultural industry in Hawaii.

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Malama Aina,

andrew binstock  
po box 1268  
haiku, HI 96708

Testimony  
In Support of Ban on GMO-Taro

Malama Aina,

Bettina Jones  
PO BOX 803  
Kihei, HI 96753

Aloha mai kakou

While I am a transplant to this wonderful state, I believe in respecting the host culture and its wisdom and contribution to the land and the community. I moved here thirty one years ago and first tasted taro then. I love it and it is perfect the way it was created by nature and tended by the local people who grow it. Don't mess with something that has no business being touched. After viewing the film King Corn and seeing that one cannot even eat GMO corn ( used for corn syrup) and it is replacing the majority of natural strains of corn on the mainland - sickens me no end. Scientists in Norway are storing seeds of native food plants for the purpose of replanting in case of the devastation to food crops that have no alternative. GMO's are becoming the main strain and that is not necessarily a good thing. Nor do I like the tactics that Monsanto has done in the communities where it operates. It has become a huge corporate giant and manages to get what it wants no matter what. Do not allow these people to alter Taro. This is not right culturally or scientifically. I join communities across Hawaii in rejecting the genetic modification of all taro varieties, by supporting a ban on GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

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Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

i am Rino Kalamalino'lino'onalani Geremen, better known as Lino. I am the hawaiian studies makua at kuhio elem. i strongly support this bill for no gmo in kalo.

please put a stop to this and make it pono. leave our kalo alone don't try to mess it up. kalo is our ohana.

how would yall feel if we did something stupid to something yall own? would that be okay with you? i don't think so. once again leave our kalo alone.... no gmo...

hewa....

Rino Geremen

honolulu, HI 96816

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I join communities across Hawaii in rejecting the genetic modification of -ALL- taro varieties, by supporting a ban on all GMO-taro. I am deeply concerned about the unknown health risks, irreversible threats to native ecosystems, cultural disrespect, patenting and bioprospecting of Hawaii's natural resources and potential harms to our local farming economy that are associated with GMO-taro.

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Malama Aina,

Stephen Dinion

Honolulu, HI 96822

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Aloha Legislator,

I write to you as a scientist with several peer-review research papers in the field of ecology, and many more published research papers in other areas of science. I'm usually supportive of new technology, but in this case I'm not.

GMO taro is a bad idea. Our nation's experience with corn has amply demonstrated that genetic modification reduces genetic diversity, robustness to unknown diseases and nutritional value. To genetically modify taro for any use outside the laboratory would only make Hawaii's food supply more dependent on large mainland corporations.

Mahalo for your service to our state, and may you decide wisely for the Hawaii our keiki will inherit.

Neil Frazer, PhD

Kailua, HI 96734

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

I would like to add my voices to the many calling for the banning of all GMO taro and other GMO experimentation in Hawai'i.

We can't afford to fall victim to false assurances about the safety of these experiments; we literally have no where to go.

David Adam Edelstein

Seattle, WA 98125

Testimony  
In Support of Ban on GMO-Taro

Aloha mai kakou

Dear Senators,

I support SB709, with amendments, to protect all natural taro, and to ban genetically altered taro. I support the amendments that the taro farmers themselves are proposing, by changing the bill language to reflect that of HB1663. The amendments protect all varieties of taro and the economic viability of the local taro industry. The health of our communities and our visitor industry will also be protected from the unknown risks of this untested technology. We cannot assume that genetically engineered taro is safe until proven so.

We cannot risk the loss of any more biodiversity throughout our island ecosystem.

We must respect the cultural beliefs of native Hawaiians, and leave these sacred ancestral roots intact. Hawaiian farmers have maintained the largest number of taro varieties for over 1200 years. Please, support this living legacy.

Sincerely,

Mary Lacques

Sincerely,  
Mary Lacques

Teacher Mary Lacques  
Teacher  
P.O. Box 14  
P.O. Box 14 Hale'iwa HI 96712  
Haleiwa, HI 96712