



# UNIVERSITY OF HAWAII SYSTEM

## Legislative Testimony

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Testimony Presented Before the  
House Committee on Agriculture  
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By

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and

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### HB97 – RELATING TO THE PROTECTION OF AGRICULTURAL PRODUCTS AGAINST INVASIVE SPECIES.

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

We are, respectively Nellie Sugii, (Jr. Researcher at the Lyon Arboretum's Micropropagation Laboratory) and Christopher Dunn, Director of the Lyon Arboretum at the University of Hawai'i at Mānoa. We thank you for the opportunity to testify on House Bill 97 on behalf of the University of Hawai'i. The University of Hawai'i opposes HB97 with the newly amended SECTION 1. Chapter 1SOA, Hawai'i Revised Statutes, part II for the following reasons. There appear to be gross generalizations and loose interpretation of some processes and techniques listed as "gene altering" and "genetic engineering" of organisms.

I, Nellie Sugii, am a life-long Hawai'i resident, professional tissue culturist, and plant conservationist at the Lyon Arboretum who has been doing plant tissue culture for more than 32 years. I began working with orchids, studying and working as a research graduate assistant under Dr. Haruyuki Kamemoto at the University of Hawai'i, who is well known in the Dendrobium orchid flower industry for his pioneering work in amphidiplody. By using polyploid parents (in this case, having double the number of chromosomes of a normal plant), he was able to breed seedlings that were consistently uniform in plant and flower form and habit. This was extremely revolutionary and eventually defined the orchid cut and potted plant industry in Hawai'i, where many of today's Dendrobium potted plants and cut flower varieties derive from his research. What is significant is that the farmers are able to obtain their large numbers of uniform plants (uniformity is very important so that the performance of the plant is known) as inexpensive seedlings rather than as expensive cloned plants. Many of his polyploid breeding stock was derived through chromosome doubling (gene doubling) through the use of a chemical compound called colchicine. Almost all orchid seeds germinated in cultivation, no matter where in the world, are germinated in tissue culture. The orchid seeds are so small, that germination in any other way would result in a much lower percentage of seedling formation or none at all. Without techniques and processes such as tissue culture and gene doubling, the orchid industry would not have these

resources available to them to progress economically as far as it has. These kinds of research/work should not be considered as invasive or genetic engineering of foreign genes. Under the proposed amendment, they could be interpreted as such.

For the past 15 years, I have been working at the Lyon Arboretum to conserve native Hawaiian plants (the majority of which are the most endangered plant species in the world) and with culturally significant Hawaiian agronomic crops such as kalo (taro), mai'a (banana), and 'uala (sweet potato). Tissue culture is used to rescue, recover, propagate and store these plants in a "safe haven," where they are grown under sterile conditions and controlled light and temperature regimes. Without tissue culture, many more of our native plants would now be extinct. Tissue culture techniques such as embryo rescue, ovule culture, and cloning have rescued and recovered dozens of Hawaiian species from the brink of extinction, and have helped revitalize, multiply and safely store key Hawaiian crop plants such as kalo and maia.

Micro- and macro encapsulation are being investigated as a viable way to encapsulate plant embryos, tiny tissue cultured plants, and gametophytes (ferns) as a way to easily disseminate them back into their natural habitats and environments. In this case, it is not genetic engineering; rather, it is a technique or methodology to create a vessel to hold the plant tissue for safe and easy dissemination. Under this Bill, there would be no way to distinguish such uses owing to the general manner in which techniques and processes, such as micro- and macro encapsulation, are listed and described therein. Tissue culture is also the process that enables other life saving techniques to occur. In plant tissue culture, the possibility of ridding the Hawaiian taro and banana varieties of the contagious, destructive and eventually lethal viral diseases through viricide treatments are made possible. Again, this is not genetic engineering, not gene altering, not invasive, but instead a valuable tool that can be used productively to save species and rare plants.

Furthermore, it is important to make a clear distinction between plants and animals with respect to issues, techniques, and processes because they can be used for very different reasons in plants versus animals. As an example, in vitro fertilization is necessary when working with ferns, including rare native species. This is the method by which sporophytes are obtained in vitro, using the natural 2 stage life cycle of the ferns. One interpretation of this proposed bill, is that a permit would be required to work with rare ferns (and, potentially, other plants). We are not impregnating any animal. It is the same word, but vastly different usage.

The University of Hawai'i urge the Committee on Agriculture to re-assess HB97, and its newly proposed amended section. We understand the need to protect our agricultural products from invasive species, as it is stated succinctly in the O'ahu Invasive Species Committee statement of need: "Hawai'i is in the midst of an invasive species crisis affecting the islands' endangered plants and animals, overall environmental and human health, and the viability of its tourism and agriculture based economy," but it should not be at the expense of deterring responsible and sound research projects that possess the potential to have profound progressive effects on the natural environment, survival of native Hawaiian plants, agriculture, economy and the quality of life of all inhabitants on this planet, due to a generalization of terminology and a lack of clear definitions.