

# Annual Report of Hawaiian T&E Plants, at Palomar Community College



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# 2016

Volume 3

*This report indicates the current status of the seeds and any subsequent seedlings from the collections made of cultivated T&E seeds from the Honolulu Botanic Gardens, National Tropical Botanic Garden, and the Waimea Valley Arboretum in the spring of 2013.*

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## Introduction

In the summer of 2012, I contacted the Hawaii Department of Forestry and the US Fish and Wild Life Service to request approval to collect from botanical gardens in Hawaii and bring back to the mainland seeds of some threatened and Endangered plant species native to the Hawaiian islands.

Those collected were as follows:

- *Sesbania tomentosa*
- *Abutilon mensiesii*
- *Abutilon sandwicensis*
- *Hibiscadelphus distans*
- *Polycias racemosum*
- *Caesalpinia kaviaensis*

Due to pest problems in the greenhouse and concerns of committing all the available seeds to first trial failures, some of the seed was held for planting until a later date. In the fall of 2013 the new Teaching & Learning Center was completed at the San Marcos Campus and officially opened to students in January of 2014. The gardens that surround the center were designed to exhibit plants native to Hawaii and greater Polynesia.

By the spring of 2013, it was discovered that *Sesbania tomentosa* grew rapidly enough to plant out in the garden the following year. After several failures, we succeeded with growing the species in the ground in the hopes that they might act as ambassadors for conservation. If nothing else, just being in the garden they provide every visitor a chance to see how beautiful and diverse our world is and hopefully entice at least a few to take some active role in the efforts to protect it.

**The Following Botanical institutions provided seeds for nearly all of the Hawaiian Native plants in these gardens.**

[The National Tropical Botanical Garden](#)

[NTBG The Honolulu Botanical Gardens](#)

[The Waimea Valley Botanical Garden](#)

## Campus Nursery & Soil Type for Planting

Refer to Volumes 1 and 2 for more information on the campus nursery and soil types used for planting.

## Seed and Seedling Status, As Of Spring 2016

As with last year the chart below shows that only 3 species are still represented in the seed bank at the college. Again this year; there are more seed in the seed bank, as a few our *Sesbania tomentosa* continued to produce seed. Also; while doing the annual seed count I noticed that last year, I mistakenly reported the number of seeds in the seed bank for both *Caesalpinia kaviaensis* and *Hibiscadelphus distans*. With the corrections made we increased the total by 1 and 2 respectively. The three species held in the bank collectively yield a total of 1,605 seed, with the best represented species being *Sesbania tomentosa*.

Genus species	Remaining in Seed Bank	Plants Alive at Present
<i>Caesalpinia kaviaensis</i>	3	0
<i>Sesbania tomentosa</i> (original collection of 25)	18	0
<i>Sesbania tomentosa</i> Plant #1	494	0
<i>Sesbania tomentosa</i> Plant #2	84	0
<i>Sesbania tomentosa</i> Plant #2&3	64	0
<i>Sesbania tomentosa</i> Plant #3	60	0
<i>Sesbania tomentosa</i> Plant #4	877	0
<i>Hibiscadelphus distans</i>	4	1
<i>Polycias racemosum</i>	1	1

The total number of seedling T&E species from the original collection dropped from last year's total of 9 to 2.

*Caesalpinia kaviaensis* is still worth trying in Southern California Botanic Gardens and thankfully we do still have three seeds to experiment with.



***Polycias racemosum* in the nursery January 2016.**



***Hibiscadelphus distans* in the nursery January 2016.**

As discussed in the last two editions of this report, the greatest success was with the *Sesbania tomentosa* seeds. These plants have been very vigorous and one of the original seedlings survived nearly two winters outdoors in the ground. From our

trials with only 7 plants the species has been strong enough to survive and fruit annually if the roots are kept warm. A seed viability test from the strongest specimen will be done in the spring of 2016. If viability is good the resulting seedlings will be planted in the Polynesian garden.



Though our seed bank is small, many species of plants are preserved for later plantings or research use.

## Pest Problems

As is often the case, plant pests tend to be problematic in closed environments like greenhouses and hothouses.

The plant pests listed below have shown an affinity for the plant species currently being grown in the greenhouse.

- *Tetranychus* sp. -Red Spider Mite

- *Trialeurodes vaporariorum* -  
**Greenhouse White Fly**
- *Pseudococcus* sp. - **Mealy Bug**
- *Yellow/Brown Scale*

Historically Red spider mite has been voracious on the foliage of the *Sesbania tomentosa* in the greenhouse, but is not a problem in the landscape. The one specimen of *Sesbania tomentosa* in the ground in the Polynesian Garden during the late spring of 2015, began to show some signs of stress from California's record drought. At first we tried weekly additional watering with a five gallon bucket to see if this would help. The plant began to show signs of recovery, with more upright turgid leafs and quickly producing new growth. However; the bucket watering by the crew accidentally exposed a substantial root, resulting in an infestation of *Armadillidium* or one of the other California woodlice species. The damage was severe by the time it was noticed and the result was a major setback for the plant. We immediately covered the root with soil and then mulched the plant. We also provided it with a bubbler from a nearby dedicated bubbler line to alleviate the drought stress problem. The plant did get a mild infestation of Brown/Yellow Scale bug, and so was treated with a systemic insecticide as a precautionary measure. The end result was that by the fall the plant had recovered, resumed blooming and producing seed.

Red spider mite still occasionally affects the growth of the *Polycias racemosum* specimen we have and I am beginning to think that temperatures in the greenhouse are a bit too warm for this species. In the spring we will move the remaining specimen to our shade house and allow it to acclimate, where it should (based on other experiences with other species) do much better.

The *Hibiscadelphus distans* this year showed significant and rapid growth. During a growth cycle, the specimen was attacked by Brown/Yellow scale brought in by Argentine ants. However; after treatment with Systemic insecticide the pest and ants disappeared and the growth continued nicely.

## Response to Cold

*Sesbania tomentosa* is fast growing, tolerant of air temperatures to at least 29 degrees Fahrenheit. However; these plants are not tolerant of prolonged drought and seem slightly temperamental to prolonged root temperatures in the low 40's high 30'sF. We lost four large specimens in containers due to the cold this year. However; when planted in the ground and supplied with regular irrigation this species has been strong enough to survive and fruit annually.

The temperatures in late December of 2015 hovered around 33-30 degrees f at night and rarely exceeded 58 during the day for two weeks straight. I expect that soil temperatures in the nursery containers may have approached the 30's f. Frost did set and slightly damage the large Ice Cream Banana plants 4 feet to the west of the *Sesbania*, but no obvious damage was seen on the *Sesbania*, except for the typical winter leaf bronzing. However; in early February the plant began a rapid decline. By mid-February the crown of the plant was clearly dead. It was then decided to cut the top off the plant and leave the stump in the ground just in case new growth sprouts from the soil, though we do not have high expectations.

The two plants on the list below that are currently in the greenhouse, have fared well and showed no signs of cold damage to date.

- *Hibiscadelphus distans*
- *Polycias racemosum*



## Garden Areas As Of January 2016



**A view of the South Plaza of the Teaching & Learning Center January 2016**

The images above and below show some areas of the Polynesian and Hawaii Test gardens, as well as some of the specimens contained in the gardens as of January, 2016.



**Hawaiian Native Plant Test Garden**

There are so many species to see in the garden that to include them all would be impossible here. I have included a few images below of some of the more unique species for California that are currently growing in the garden.



***Acacia koa*; a native to the Hawaiian Islands. This seedling is already 5 years old. Growth in California seems to be much slower than *Acacia koaia* shown here last year.**

Frequent drought conditions are common place events in California. In San Marcos at the main campus it is rare to receive more than 18 inches of precipitation per year. As a result, water management strategies are a significant concern and played a major role in the garden design. Many of the plants have bubblers that irrigate only them on an as needed basis. This minimizes wasted water in the large expanses where lava rock was used as ground cover/mulch.

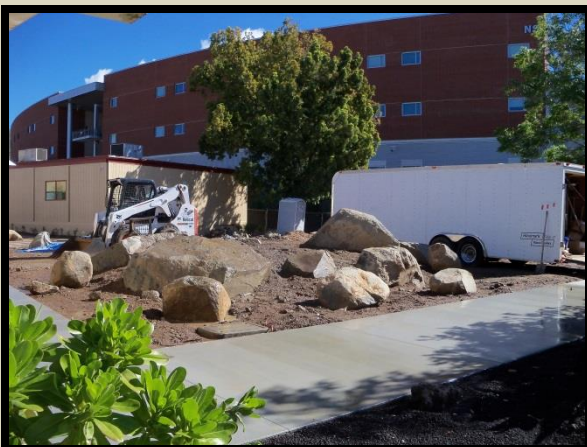




Foliage flowers and been pods of *Sesbania tomentosa* in the Polynesian Garden, November 2015.



*Sesbania tomentosa* in Polynesian Garden, early January 2016.



Site of Polynesian Expansion Garden, Spring 2015.

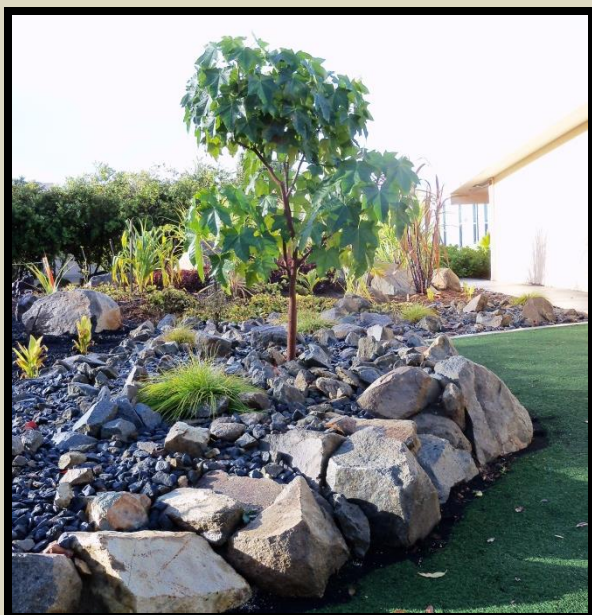
The Polynesian Expansion Garden has moved along nicely, though slowly.



The above is an uncommon variety of Sugar Cane (*Saccharum officinarum*) for California. The Hawaiians, who apparently had 60-90 different cane varieties, called this variety Hapai and it is believed to have been introduced from Papua New Guinea. (peers Com.)

The cane variety Hapai, along with a hand full of other cane varieties, were supplied by the Hawaii Agricultural Research Center this past year. The permitting for importing these was done through USDA, Hawaii Department of Agriculture and H.A.R.C. The expansion of the Polynesian garden this year has allowed us to “thoughtfully” continue introducing the public to many more spectacular plants that we have been growing in the nursery. We also hope to harvest rain water off the MC building (seen in the picture behind the Skid Steer) and store it in an in-ground cistern. The water will be used to at least fill a water feature, but hopefully to water some of the plant material as well. [3]





The tree above is the Kukui nut tree, *Aleurites moluccana*. A tree brought by the Polynesians from South East Asia due to the valuable oils in the seed.



A faux dried lava flow, with *Portulaca molokiniensis* growing on the flow. These plants were donated by the late Dick Henderson, the former curator of the Cactus Garden on campus. They are near threatened in Hawaii due to their only native habitats; west Maui and nearby Islands being at risk.

## Educational Outreach



An example of the garden plant labels

Each species when they are planted in the garden are given a plaque or label. These labels provide some basic information concerning the plant. The scientific name of the plant is given, as is the plants common name (often in Hawaiian or another Polynesian language), the place of origin, botanical family and the IUCN Red List status or USFWS listing status. By giving visitors insight as to what they are looking at, these labels help to educate the public and have the effect of engaging them in thought and further discussion.

Growing T&E plants is a great undertaking and it comes with a responsibility to share your knowledge and findings with others, as well as take advantage of educational opportunities when they arise. Ex-situ and In-situ conservation efforts are important, but so is educating the public why we botanical institutions do the work we do. The intent of growing these species on campus first and foremost was to create a unique garden that would showcase plants that are in peril from Hawaii and Greater Polynesia, which hopefully encourages people to become active in conservation efforts wherever they

may live. This year at least 3 formal tours with 20-30 attendees on each tour were shown the Polynesian garden, while countless other individuals were given personal tours of the garden. I personally saw students stopping to read the signs and then looking up plants on their cell phones.

At this point, collectively these approaches only scratch the surface at the possibilities, but they do meet our goal of conservation through education and cultivation. As time progresses we will certainly improve upon our educational program and hope that the end result will be that our visitors are one step closer to contributing to a society that is willing to sacrifice, even if just a little, to preserve our planets beautiful biodiversity.

## **Conclusion**

The opportunity to grow unique and rare plants such as the Hawaiian T&E species listed above has provided us new insight to their cultural requirements and tolerances. As we move forward in our efforts to grow many of these rare and unique species we will no doubt continue to learn more about their adaptability and survivability in new habitats. This information may help in conservation efforts, but will at least provide us with an opportunity to share our discoveries with others. And no doubt for some species who can adapt to California's climate, they will have the chance to serve as ambassadors for conservation to the students, staff, faculty and the community.

## **Bibliography**

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