

## Ho'olehua Plant Materials Center

Progress Report of Activities  
2010

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### Who We Are

The Ho'olehua Plant Materials Center is located on the island of Molokai and situated on the fertile agricultural plains of Ho'olehua. It is one of 27 Centers located throughout the United States. The island of Molokai is 27 miles long and 11 miles wide (261 square miles) and the fifth largest island in the Hawaiian chain. The Center is responsible for servicing the plant conservation resource needs of the Pacific Island Area, which includes the State of Hawaii, Guam, Northern Mariana Islands, The Federated States of Micronesia, The Republic of Palau, The Republic of the Marshall Islands and American Samoa.

### The Hawaii Plant Materials Program

Controlling erosion, enhancing and protecting our natural resource base through the use of plant materials, is our main mission. To do this and be consistent with the USDA objectives and NRCS Strategic Plans, the Plant Materials Program develops, tests and transfers effective state of the art plant science technology, so as to meet stakeholders and conservation resource needs.



*Achyranthes splendens*

## 2008 Farm Bill and Pollinator Conservation

Plant pollinators (both native and non-native) are a vital part of our environment and are especially important to the global crop production. It is extremely important that we protect, enhance and encourage this valuable resource.

The new language in the 2008 Farm Bill makes pollinators and their habitat a priority for every USDA land manager and conservationist. The Farm Bill authorizes special consideration in determining payments for practices that promote pollinator habitat. Most importantly, the new Farm Bill authorizes the Secretary of Agriculture to encourage “the development of habitat for native and managed pollinators, as well as the use of conservation practices promoting native and managed pollinators”, during administration of any conservation program.

The Hoolehwa Plant Materials Center, with the State Resource Technology Team and partners, will be developing a pollinator plant list, which will support the NRCS field office conservation planners. This collaboration will aid in carrying out the 2008 Farm Bill and promoting pollinator plants.

### Pollinator Plants



*Achyranthes splendens*



*Vitex rotundifolia*, Pohinahina



*Argemone glauca*, Pua kala



*Waltheria indica*, Uhaloa

## **Native Plant Establishment with Zeba (A Super Absorbent Cornstarch Based Polymer)**

A study was initiated at the Hoolehua Plant Materials Center to test the effectiveness of a product known as Zeba. Developed by Absorbent Technologies, Inc. (ATI), Zeba is a patented soil amendment that absorbs water and nutrients, then repeatedly releases them as needed by the plant. Developed from a biodegradable cornstarch, Zeba is said to hold 400 times its weight in water. Zeba when applied to the soil surface prevents crusting and improves seedling vigor. It may also be incorporated into the soil at planting or be used as a seed coating to enhance germination.

The key attribute of this product is its ability to re-hydrate itself numerous times throughout the growing season, until Zeba eventually loses its effectiveness. This attribute is very important in low rainfall regimes, as moisture availability is the key element to plant survival. The product claims faster germination, quicker emergence, better plant establishment, and better yields while using less water. It is used readily in the turf industry and to some extent other agriculture endeavors, but very little in native plant re-vegetation projects.

The use of this product will be tested as a seed coat on two native plants, *Dodonaea viscosa*, aalii and *Eragrostis variabilis*, kawelu. These native dry land shrubs and grasses are commonly found in Hawaii, but at times are difficult to establish, unless adequate moisture is available. The use of this product can be quite beneficial for native plant establishment in the dry, heavily eroded leeward sites of the Hawaiian Islands.



*Zeba study February 2010*



*Zeba study November 2010*

***Trade names are used solely to provide information. Mention of a trade name does not constitute a guarantee of the product by the USDA-NRCS, nor does it imply endorsement over comparable products which are not mentioned.***

## **Energy Conservation National Sunn Hemp Study – Second Phase**

The second phase of the National Plant Materials Sunn Hemp study was installed at the Hoolehua Plant Materials Center (PMC). The study is part of a national inter-center PMC study, to investigate the adaptable growth range of our 1982 plant release *Crotalaria juncea*, 'Tropic Sun' sunn hemp for green manure and cover crop use.

'Tropic Sun' sunn hemp is a fast growing, nitrogen fixing, nematode suppressant legume, which was released by the Hoolehua Plant Materials Center. 'Tropic Sun' can provide up to 150 pounds of nitrogen per acre and add up to 2 tons of organic matter per acre, within 60 days after planting. It is also resistant to the root-knot nematode.

The rising cost of petroleum base fertilizers and fuel has spurred the interest at increasing the use of green manure crops for sustainable agricultural productions, as well as the increased efforts toward the production of 'Tropic Sun' sunn hemp seed.



Natural Resource Specialist, David Duvauchelle walks through a 45 day old stand of 'Tropic Sun' sunn hemp



'Tropic Sun' sunn hemp flower

## Kahoolawe Island Re-Vegetation Project

The island of Kaho’olawe is the smallest island in the Hawaiian archipelago. It is located approximately seven miles off the southwest coast of Maui and roughly covers 45 squares miles. The island rises to an elevation of 1,477 feet above sea level and has an annual precipitation of 27 inches near the summit. From the early 1800’s through 1992, overgrazing by feral goats and livestock, virtually left the upper one third of the island barren of vegetation and severely eroded. To compound the environmental problems of the island, the U.S. military used the island as a training area and target, at the onset of WWII .

In 1993 the island of Kaho’olawe was returned to the State of Hawaii, with the responsibility of the implementation of an environmental restoration plan by the Department of Navy, so as to control the soil erosion problems of the island. In the same year, the State of Hawaii created the Kaho’olawe Reserve and the Kaho’olawe Island Reserve Commission (KIRC), enabling the State to receive federal funds for their re-vegetation efforts. In 1997, the KIRC requested the assistance of the Hoolehua Plant Materials Center, primarily as a reliable large scale producer of native plant seeds, as well as technical support in their re-vegetation efforts. Since 1999, the Hawaii NRCS has received congressional earmarks, directing efforts towards the re-vegetation of the island.

Currently, the Hoolehua PMC dedicates twenty acres of land to the large scale production of native seeds. The following table summarizes the yearly amounts of seeds provided to KIRC.

Plant Materials Center Production for  
Kahoolawe Island Reserve Commission

Oct-Sep Fiscal Year Production	<i>Chenopodium oahuense</i> aweoweo lbs. of bulk seed	<i>Dodonea viscosa</i> aaalii - lbs. of bulk seed	<i>Erogronitis variabilis</i> kawelu lbs. of bulk seed	<i>Erogronitis variabilis</i> kawelu bales	<i>Heteropogon contortus</i> piligrass -lbs. of bulk seed	<i>Heteropogon contortus</i> piligrass bales	<i>Waltheria indica</i> uhaloa lbs. of bulk seed	<i>Achyranthes splendens</i> lbs. of bulk seed
1999	0.0	0.0	0.0	x	103.5	x	x	x
2000	51.0	7.0	11.0	x	105.0	x	x	x
2001	15.0	6.0	11.3	x	104.5	495	x	x
2002	0.0	14.0	160.0	x	10.5	954	x	x
2003	413.0	3.3	208.0	272	0.0	2050	x	x
2004	447.0	6.5	275.5	236	12.0	1940	x	x
2005	205.0	7.4	670.0	668	x	2381	x	x
2006	237.0	22.4	585.5	x	x	2125	x	x
2007	x	25.0	319.0	x	x	480	x	x
2008	x	10.0	x	x	x	1008	x	x
2009	14.0	10.0	x	x	450.0	1557	12	x
2010		10.0	100.0	x	92.0	749	8	70
2011								
<b>Total Production</b>	<b>1382.0</b>	<b>121.6</b>	<b>2340.3</b>	<b>1176</b>	<b>877.5</b>	<b>13739</b>	<b>20.0</b>	<b>70.0</b>

Due to the magnitude of the erosion and the isolation of the island, as well as having to co-exist with unexploded ordinances, the re-vegetation project of Kaho'olawe will be long term. The intent of our partnership with KIRC is to continue providing technical support, as well as to seek and develop alternative resources for reliable seed source.

BEFORE



Luamakika Crater in 2002 with Piligrass wattles

AFTER



Luamakika Crater 2010



Luamakika Crater 2002 with Piligrass wattles



Luamakika Crater 2010 with Piligrass cover



Luamakika Crater 2003 at rain koa shrine 2003 (note pilgrass bales in foreground)



Luamakika Crater 2010 at same rain koa shrine (note aalii shrubs in foreground)

## Evaluating Hydro-planting Techniques With Native Hawaiian Plants For Possible Roadside Application

The Hoolehua Plant Materials Center (PMC) in partnership with the University Hawaii at Manoa, Department of Tropical Plants and Soil Science and the State of Hawaii Department of Transportation is investigating the use of hydro-planting techniques for possible roadside application. Developing hydro-planting techniques for native species offers an opportunity to utilize native species for large-scale re-vegetation/erosion control and restoration projects.

Why use highway rights-of- ways/roadside as a native plant production area?

- Highway / roadside rights-of-ways are easily accessible
- Certain areas are large enough for seed production(>4 acres)
- Most sites are secure and may have utilities (i.e. irrigation)
- Pre and post emergence herbicides labeled for roadsides can be utilized without label violation

Hydro-planting involves the use of water, seeds or vegetative plant parts, and a mixture of one or more of the following: wood fiber, straw, paper, fertilizers and/or bio-stimulants. The mixture is agitated in a large tank and pumped out via a hose and nozzle attachment. A hydro-planting trial was conducted at the Plant Materials Center and involved a “hydro-mulching cap” over a native grass selection (hydro-mulch applied over vegetative grass sprigs).

*Sporobolus virginicus* or more commonly, aki`aki grass was used in the study to determine whether a hydro-mulching cap over aki`aki grass sprigs, would establish a suitable and successful ground cover. The study involved various mixtures of mulch ingredients, fertilizer, hormones and pre-emergence herbicides.

Aki`aki grass is a low growing, drought tolerant and extremely salt tolerant indigenous native grass. It is found throughout the tropics and sub-tropics, and most commonly seen growing along and near coastal and shoreline areas.



Application of hydromulch-cap over aki`aki sprigs,  
Summer 2009 PMC



Native planting along Oahu freeway Right-of- Ways

# People's Garden

## Hoolehua Plant Materials Center

In September of 2010 the Hoolehua Plant Materials Center accepted the challenge from USDA Agriculture Secretary, Tom Vilsack, for all the USDA facilities to develop a 'People's Garden'. The intent of the 'People's Garden' is to create an awareness of the importance of agriculture and to incorporate a sustainable practice that will nurture the environment. The garden will be a collaborative partnership between volunteers and community organizations.

A 1,600 sq. ft. 'People's Garden' is currently being nurtured and managed by NRCS Earth Team volunteer, Chelsea Sakamoto. Chelsea is a student of Molokai High School and is undertaking this challenge as part of her senior project. She, along with Molokai High School students from the Molokai Environmental Preservation Organization (MEPO), visits the garden regularly to help with planting, weeding and tending to the garden. The garden is currently growing taro, sweet potato, corn and eggplant.

The garden has an enormous impact on Molokai's small rural community, whose recipients are those who may be less fortunate.



People's Garden before crop planting



Mowing of 'Tropic Sun' sunn hemp, a green manure crop



Molokai Environmental Preservation Organization (MEPO), assists with the 'People's Garden'



Molokai High School students help weed People's Garden



State Office personnel help plant taro

## Throughout the Year

### Repair and Facility Maintenance



Old rusted and leaky roof of PMC seed storage building



Replacing the old roof



Brand new roof December 2009

### Training



Hawaii Soil and Water Conservation District and NRCS State Office personnel visit PMC for one day orientation



State Office Staff receive training on vetiver propagation



David Duvauchelle instructs summer hire on mechanical transplanter

### Visitors/Volunteers



Kilohana elementary School visit PMC



Plant Materials State Conservationist Advisory Committee Meeting



Summer hires Dana-Lynn, Alaysha, Tevin and John



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