

## Restoration event at Auwahi of 13<sup>th</sup> June 2009

It was a nice Saturday morning when we arrived at 7:45 o'clock at the parking lot next to the Ulupalakua Ranch Store flush against Kula Highway. Meanwhile 20 volunteers or so and the leaders had reached the meeting point and we were waiting eagerly to get into the off-road vehicles which should pick us up for the daylong trip to Auwahi, a remnant native tropical dry forest on the south slope of East Maui. One of the pick-up trucks was fully laden with the young plants (liners) which should be bedded at Auwahi. Before getting into the vehicles we had to examine and to brush off the treaded soles of our boots in order to prevent carrying seeds into the restoration area which is now particularly sensitive to introduction of alien plants. Finally we left and the first part of the trip went along the Kula- and Piilani Highway past mighty lava flows of the last eruption of Haleakalā which had been emplaced (it is not exactly known) sometime between 1450 and 1650. After about 6 miles we left the highway and turned to the left into a dirt road, rough terrain, private property of Ulupalakua Ranch. As the road was barred by a gate we had to open it up and then the convoy of 4-wheel driven trucks had to creep very slowly and cautiously along the trail over rough and smooth past now and then some black cows. We got sight of a scenery covered by the so-called Kikuyu grass (*Pennisetum clandestinum*), bizarre tree skeletons, small shrubs, and some introduced noxious weeds like the Apple of Sodom (*Solanum linnaeum*, *Solanaceae*, pōpolo kīkānia) with spiny leaves and yellow fruits and the alien ornamental plant Lantana (*Lantana camara*, *Verbenaceae*, lākana) which cattle are usually rejecting to eat. But I also discovered some specimens of the prickly poppy (*Argemone glauca*, *Papaveraceae*, pua kala) with spiny leaves and capsules and with white petals, which is endemic to Hawaii. After about another 45 minutes and after surmounting an elevation of 650 m we had arrived at the Auwahi restoration area at an elevation of 1150 m. The recultivation area was surrounded by a fence to protect it against greedy cows. The grass which covered once the terrain had been exterminated some time before by treatment with Roundup<sup>®</sup>, a systemic broad-spectrum herbicide which contains Glyphosate, the only agent which could (still) really harm the Kikuyu grass. Therefore the terrain has a different colour when seen from a space distance and it is well distinguishable from the non treated environment. It has the shape of a rectangle and can therefore be easily localized on Google Earth using the following coordinates:

20° 38' 37.98" N and 156° 20' 31.26" W

After getting out of the trucks we took the liners, our work gloves, the hand trowels and the so-called 'ō.'ō and entered the fenced terrain through a gate. The 'ō.'ō is a digging stick, a digging implement, or a spade. Its name is derived from a reduplication of the hawaiian 'ō which means any piercing instrument like fork, pin, skewer, harpoon, sharp-pointed stick, pitchfork, fishing spear and so on. Moving on the terrain turned out to be somewhat difficult – stumbling was bound to occur - because thick layers of dead grass were covering the ground hiding the sharp and pointed lava boulders.

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## **The problem**

The effects of grazing and introduced grasses are particularly damaging to dry forests in Hawaii, where the native flora evolved in the absence of mammalian grazers. Therefore most native woody plants lack defenses against grazing, and hence tolerate it poorly in comparison to continental species. In addition, fires apparently were infrequent until the arrival of humans less than 2000 years ago, and many dry forest trees and shrubs are eliminated by fire. Several African pasture grasses have been introduced to Hawaii, where they have spread into open-canopied forests and grazed lands.

### The Kikuyu grass (*Pennisetum clandestinum*, Poaceae):

Kikuyu grass was first collected on Hawaii in 1938. It was introduced as a pasture grass into the former Auwahi forest in the late 1940s. Because of its rapid growth and aggressive nature it is one of the most noxious weeds in Hawaii. The perennial sod-forming grass is native to the region of East Africa (Kenya, Democratic Republic of Congo) that is home to the Kĩkũyũ tribe. However, it is also a popular garden lawn species because it is cheap and drought-tolerant. It is spreading vegetatively by rhizomes and numerous long stolons, it can climb over other plant life, shading it out and producing herbicidal toxins that kill competing plants. It prevents new sprouts of other species from growing, may kill small trees and can choke ponds and waterways. It is resistant to mowing and grazing due to its strong network of roots, which easily send up new shoots. It springs up in turfs and lawns, and can damage buildings by growing in the gaps between stones and tiles. The plant is easily introduced to new areas on plowing and digging machinery, which may transfer bits of the rhizome in soil clumps. While the grass spreads well via vegetative reproduction from pieces of rhizome, it is also dispersed via seed. Because of its aggressive character the Kikuyu grass as well as the cattle contributed to elimination of many endemic plant species from Auwahi dry forest. Hence many dead trees can be seen at Auwahi but no sprouts attesting that root competition and grazing killed the next plant generations completely off.

### The project:

Since the late 1960s, Auwahi has been the focus of protection and restoration efforts. The backbone of the restoration of the Auwahi dryland forest are the volunteers who help to protect and restore patches of native dryland trees at Auwahi. This dedicated group of people comes from all over Maui, the other Hawaiian islands, and occasionally from the mainland and ... – from Germany ;-) - ... to unite under a common cause.

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After having carried all material together at the working place within the fenced area the instructors showed us how to get the liners into the soil. Some of the group were digging the holes using the 'ō.'ō, others again like myself were bedding the young plants. Not only is it important to get the liners out of the plastic shells very cautiously by knocking several times with the trowel at the sides of the shell so as to detach the young plant's roots very easily from the plastics but also the planting hole has to have

the optimal depth for the plants taking roots. Taking into account that the liners will not be watered after bedding one has to protect the soil around the planting hole from evaporation and desiccation and has to cover the soil surface around the plant with several layers of dead grass. Following these conditions the survival rate will be about 95%.

Lunch break was an ideal opportunity for us as to come in contact with all the other volunteers especially as it is not often that tourists from Europe are joining the group.

About 4:00 p.m. we had bedded all plants – more than 1100 plants of the following species:

Species	Family	Hawaiian name	English name
<i>Dodonaea viscosa</i>	<i>Sapindaceae</i>	'a'ali'i	Island yellowwood
<i>Ochrosia haleakalae</i>	<i>Apocynaceae</i>	hōlei	—
<i>Bidens micrantha</i> ssp. <i>kaleahala</i>	<i>Asteraceae</i>	ko'oko'olau	Grassland beggarticks
<i>Alphitonia ponderosa</i>	<i>Rhamnaceae</i>	kauila	Hawai'i kauilatree
<i>Pleomele auwahiensis</i>	<i>Agavaceae</i>	hala pepe	Halapepe tree
<i>Nothocestrum latifolium</i>	<i>Solanaceae</i>	'aiea	Broadleaf Aiea
<i>Osteomeles anthyllidifolia</i>	<i>Rosaceae</i>	u'u'ulei	Hawaiian Hawthorne
<i>Pouteria sandwicensis</i>	<i>Sapotaceae</i>	'āla'a	—
<i>Artemisia australis</i>	<i>Asteraceae</i>	'ahinahina	Oahu wormwood

It was a really great feeling after having been finished to look at and to sum up our day work but being conscious that it is only a drop in the ocean. However it might help to provide an understanding of the problems which have arisen by the inconsiderate action of man. Also knowing that this protected area is housing a single, medium-sized tree, *Melicope knudsenii* (*Rutaceae*, Alani), the last specimen of this species in the wild, made me feel that it was a privilege for me having been able to get to know and to get to see it. Actually I heard only by chance of this event in September 2007 during my first visit to Maui. Now it was the second time for me as a volunteer at Auwahi and it won't certainly be the last.

Steffen ROTH

**My godson Dario wrote an additional comment:**

"What I liked about the planting operation was that one gets to know a different side of Maui. And I think it's a great change versus the normal tourist-life which for a lot only takes place at the beaches. After the work you feel great because you helped nature. Additionally I want to say thank you for the kindness of all participants and of course the instructors, which provided a lovely atmosphere. So to everyone who reads this: Do not hesitate, its definitely worth it!"

Dario GALLAS