

INTRODUCED PLANT CONTROL ON PRIVATE LANDS IN HAWAI'I

Carl "Soot" Bredhoff

ABSTRACT

Introduced plant control as practiced by ranchers in Hawai'i is briefly discussed. Mechanical control is usually used to open new areas or maintain pastures heavily overgrown with brush. Herbicides have been applied in many different ways by ranchers, and more knowledge is needed. The use of foraging animals to control introduced weeds, especially woody plants, has been used for years in Hawai'i, but fire has been less successful because of long-term regime effects on rangelands. More biological research is needed to address rangeland weeds.

INTRODUCTION

When I was in school, my soils professor used to remind us not to refer to soil as dirt. "Dirt," he said, "is matter out of place." Similarly, when alien or introduced plants get out of place, they become pests that must be eliminated or controlled. Lantana (*Lantana camara*), for instance, is a desirable ornamental at the Keāhole Airport on Hawai'i Island or in your local shopping center, but in the pasture it is an undesirable pest. The same is true of Christmas berry (*Schinus terebinthifolius*), common guava (*Psidium guajava*), kāhili ginger (*Hedychium gardnerianum*), and many other plants.

Ranchers in Hawai'i, along with other private landowners, have tried over the years, with varying degrees of success, to control introduced plants. This paper is written from the perspective of a cattle rancher controlling alien plants on private lands. Some of the methods used by ranchers are outlined in this paper.

MANUAL CONTROL

It all started with the axe, pick, saw, mules, and horses. These were used until better methods came along and labor costs went up.

MECHANICAL CONTROL

Mechanical controls usually are a primary step in taming pasturelands that have become overgrown and heavily infested with alien plants, or in opening up new areas for establishing pastures. After the primary step, eventually other methods are used to control alien plants.

Bulldozing, or grubbing, is usually used where large alien plants such as Christmas berry have invaded. Chain dragging can be used on woody plants such as koa haole (*Leucaena leucocephala*), the native 'a'ali'i (*Dodonaea viscosa*), and lantana. The chain either breaks off the plants or pulls them up by the roots. Usually, an anchor chain is pulled by a bulldozer. The loop of the chain is held open by a heavy bar, or the chain can be pulled by two bulldozers.

Rolling, or the use of a roller-chopper pulled by a bulldozer, is also effective on woody plants and shrubs. In addition, a smooth roller can prepare the ground, especially rocky ground, for mowing later. The two most common types of rollers used here in Hawai'i are the smooth Krajewski roller and the roller-chopper. The Krajewski weighs about 15 tons and is fabricated from used sugar mill rollers. Many ranchers on the island of Hawai'i use this type. The roller-chopper has blades on it and can be filled with water to make it heavier. It does a good job of chopping woody brush. At Kaupō Ranch on Maui, we had good results controlling lantana and koa haole with a roller-chopper.

Mowing can be used to control introduced plants if the terrain permits. The widths of mowers vary, but mowers usually create a five- to seven-foot swath. Mowers are pulled either by crawler or rubber tire tractors. At Kahuku Ranch in Ka'ū on Hawai'i Island, the lower pastures in the Kama'oa area were first rolled with a Krajewski roller to smooth out the terrain. Lantana was then controlled by mowing.

BIOLOGICAL CONTROL

Biological control was successful with cactus (*Opuntia* spp.) several years ago and more recently with Hāmākua pāmakani (*Ageratina riparia*) on the island of Hawai'i (Davis *et al.*, this volume). On the other hand, several insects have been introduced to control lantana (Davis *et al.*, this volume), but it continues to thrive on our rangelands. I hope that more work will be done on biological control of alien plants. It is certainly an economical method of control, once developed.

It was through the efforts of local cattlemen, working with the University of Hawaii, that the biological control of Hāmākua pāmakani was made possible just a few years ago. The present efforts of Maui cattlemen towards biological control of the grass webworm (*Herpetogramma licarsisalis*) is another example. Ranchers have a role in getting biological control research started, through lobbying legislators and so forth.

HERBICIDES

Over the years, herbicides have often produced very good results for ranchers. However, herbicides must be used with caution and with the safety of the environment and the user in mind. There is a need for continuing research into what chemicals, or combinations of chemicals, to use and the best ways to apply them. Some methods of application that have been used over the years are paint brush, pellets, knapsack sprayer, spray rig with nozzles or hose attachments, aerial spraying from fixed-wing plane or helicopter, and the rope-wick applicator which is brushed over the leaves of the plant. Some herbicides are sold over the counter in stores, while others are restricted in use and require a license for purchase. Information on herbicides can be obtained from the Cooperative Extension Agents in the localities where use is planned.

ANIMALS

By carefully grazing pastures with cattle, sheep, or goats (*Bos taurus*, *Ovis aries*, *Capra hircus*), we can control the introduced plants that are palatable to the grazing animals. Insufficient grazing causes grasses to become rank, stemmy, and unpalatable, and to lose much of their nutritional value. At the same time, we must try not to overgraze the desired species, or soon grass cover will decrease, and the pastures will become infested with weeds.

In addition to controlling introduced plants through general grazing, animals have been used for years in Hawai'i to open up brush land in order to develop grassland. At Kapāpala Ranch on the island of Hawai'i, a herd of goats is being used to control common guava and Christmas berry. Cattle can be used to control certain species of introduced plants by using high-density stocking rates for a short period of time. Intensive grazing may control certain problem weeds and in fact has been compared for effectiveness with herbicidal control (Anonymous 1987). The Voison or short-duration grazing system is useful in brush control, and very briefly it works as follows: grazing, hoof action, and movement of the cattle serve to break and trample the vegetation, allowing sunlight and moisture to reach desirable grasses and legumes; the hoof action breaks up any soil capping and makes places to trap rain; and the cattle deposit dung and urine. All of this has a beneficial effect on the pasture and assists in brush control. Increasingly, ranchers are putting part or all of their pasture lands into intensive grazing units for better pasture utilization and greater production. A book entitled *Intensive grazing management: forage, animals, men, profits* addresses situations in Hawai'i and is available locally (Smith *et al.* 1986).

FIRE

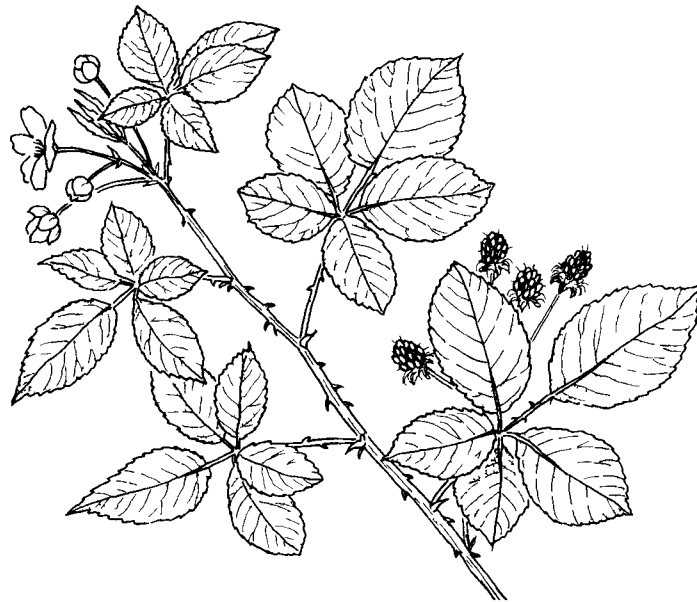
Fire has been used, with varying degrees of success, to control introduced plants on pasture land and to clear off old, rank grasses prior to broadcasting seed. When fire is used, timing is very important. Rain

is essential shortly after a fire so that the desirable grasses can make a quick recovery, getting a jump on the species being controlled and covering the ground exposed by the fire. But fire has a number of negative effects. For instance, it disturbs the microenvironment of the topsoil and decreases the aeration. It can also be a hazard. Many a pasture fire has burned out of control. Overall, the long-term detrimental effects of burning overshadow the short-term benefits, so this method is probably the least used for control of introduced plants on private lands in Hawai'i.

CONCLUSION

State and Federal agencies help private landowners by disseminating information, setting up trials and experiments, conducting research, and giving direct assistance such as controlling fountain grass (*Pennisetum setaceum*) along the highway in Ka'u on the Hawai'i Island. These agencies include the University of Hawaii Extension Service, the U.S. Department of Agriculture Soil Conservation Service, the Hawaii Department of Agriculture Plant Pest Control Branch, and local cattlemen's associations.

This has been a very brief and general summary of how introduced plants are controlled on private ranchlands in Hawai'i. Each ranch has unique weed problems, and the type of control used depends on location, economics, and the landowner's situation.



Literature Cited

Anonymous. 1987. Intensive grazing may control problem weed. *Hay & Forage Grower*, January, p. 19.

Davis, C.J., E. Yoshioka, and D. Kageler. [this volume] Biological control of lantana, prickly pear, and Hāmākua pāmakani in Hawai'i: a review and update.

Smith, B., P. Leung, and G. Love. 1986. *Intensive grazing management: forage, animals, men, profits*. Kamuela, Hawai'i: Grazers Hui.