

Roadside right-of-way areas: An underutilized native groundcover production site for large scale re-vegetation projects in Hawaii



Orville C. Baldos*, Joseph DeFrank, Scott Lukas. Department of Tropical Plant and Soil Sciences, University of Hawaii at Manoa, Honolulu, Hawaii
 Glenn Sakamoto. USDA-NRCS Plant Materials Center, Ho'olehua, Hawaii
 Christopher Dacus. Hawaii Department of Transportation, Kapolei, Hawaii

INTRODUCTION

Large scale roadside re-vegetation with native plants is a relatively new initiative in State of Hawaii.

Efforts to utilize native Hawaiian plants in roadside right of way re-vegetation were initiated by the Hawaii Department of Transportation (HDOT) as early as the mid 1990s. However, plantings were done on a small scale and with a limited number of species (i.e. mostly shrubs). Planting materials, including native groundcovers, were mainly nursery propagated and planted by hand. This proved to be too costly and laborious if done on a large scale.

To reduce labor cost and increase efficiency of large scale roadside re-vegetation, the HDOT worked with the University of Hawaii to conduct research on hydroseeding of native Hawaiian groundcovers. In 2009, large scale planting protocols and selective weed control tools for selected groundcover species were developed and incorporated in the HDOT construction specifications SB 619 and 641.

Despite the development of large scale planting and establishment protocols for the 3 native groundcovers, finding a sustainable source of planting materials to supply roadside re-vegetation projects remains a challenge.

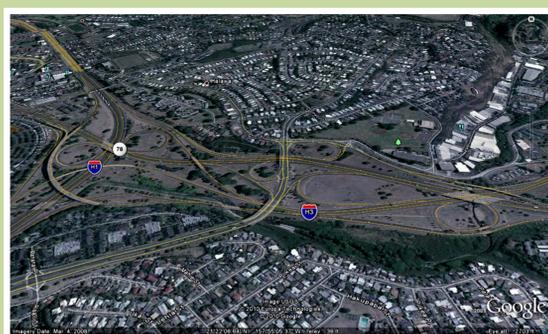


Figure 1. The Halawa Interchange in Aiea, Hawaii. HDOT is developing this site for native plant production as well as for native hydroseed research



Figure 2. Other highway interchanges in the city and county of Honolulu with potential for native plant production. Mililani Cemetery-H2 Exit: A1) satellite photo and A2) site photo. Fort Weaver Road-Farrington Highway Exit: B1) satellite photo and B2) site photo.

To date, seeds and cuttings of commonly used native Hawaiian groundcovers are not available commercially or in large quantities. Extensive field plantings that are specifically managed for supplying large volumes of seeds and cuttings are extremely rare in the state.

Herbicides are the most cost effective tools for weed control in native seed production blocks. However, restrictions hinder the use of these herbicides on private farms.

In order to make native Hawaiian groundcovers more available, we are proposing the use of roadside right of ways as native plant production areas.

WHY USE HIGHWAY RIGHT OF WAYS/ROADSIDES AS NATIVE PLANT PRODUCTION AREAS?

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

WHAT AREAS CAN BE UTILIZED FOR NATIVE PLANT PRODUCTION?

Flat or gently sloping roadsides that are greater than 1 acre (>0.4 ha), with irrigation lines and possesses non-rocky topsoil are suitable for native plant production. Highway interchanges are examples of favorable sites (Figures 1 and 2).

WHAT AREAS ARE NOT SUITABLE FOR NATIVE PLANT PRODUCTION?

Steep sites, sites with rocky or thin topsoil and sites that do not have access to irrigation are generally not suitable for native plant production.

SELECTIVE HERBICIDES: IMPORTANT TOOLS FOR LARGE SCALE NATIVE SEED PRODUCTION AND ROADSIDE ESTABLISHMENT

Pre and post emergence herbicides are cost effective tools not only for managing roadside right of way vegetation but also for controlling weeds in native groundcover production sites. However, the commercial use of herbicides in native plant production is limited due to crop and site restrictions on the label.

Selective herbicides for roadside right of way use may have potential utility in roadside native plant production sites. Since these herbicides have the ability to control only specific weed species, identifying which herbicides are safe to use in a specific native planting could ease weed control operations and reduce herbicide injuries. Also, since these herbicides are labeled for weed control on roadsides, they can be used on roadside plantings without label violations.

Herbicide tolerance studies that we have conducted over the past 3 years have identified selective herbicides for roadside establishment and production of 3 native groundcover species (Table 1).

Table 1. Pre and post emergence herbicides for selective weed control in plantings of pili grass, 'aki'aki grass and mau'u 'aki 'aki.

Groundcover	Pre emergence	Post emergence Grass	Post emergence Broadleaf
Pili grass <i>Heteropogon contortus</i>	Ronstar WP (oxadiazon) ^T Surflan (oryzalin) ^T	Plateau DG (imazapic) ^M	Plateau DG (imazapic) ^M Garlon 4 (triclopyr) ^M
'Aki'aki grass <i>Sporobolus virginicus</i>	Ronstar G (oxadiazon) ^{T,C} GoalTender(oxyfluorfen) ^T	Assure II (quazalofop p-ethyl) ^M	Milestone (aminopyralid) ^M Certainty (sulfosulfuron) ^M
Mau'u 'aki'aki <i>Fimbristylis cymosa</i>	Ronstar WP/G (oxadiazon) ^T Surflan (oryzalin) ^T	Fusilade DX (fluazifop-p-butyl) ^{T,S,M}	Milestone (aminopyralid) ^M

^T – transplants; ^S – seedlings; ^C – stem cuttings; ^M – established plants

NATIVE GROUNDCOVER AND SEED PRODUCTION DEMONSTRATION SITE AT THE H1-UNIVERSITY AVENUE INTERCHANGE



The H1-University Avenue Exit (H1) is an ideal research and demonstration site for native groundcovers since it is adjacent to the University of Hawaii's Manoa campus.

Besides the native seed production blocks, the H1 site also serves as a test site for native plant hydroseeding and weed control studies.



Preparation for native seed production plantings on the H1 site started in early 2007.

Successive irrigation and post emergence herbicide applications were conducted to exhaust the weed seedbank. It is recommended that this be done at least 3 times before planting.



After subsequent weed flushings and herbicide applications, the plugs of native groundcovers were planted in holes on weed cloth covered ground.

A seed production block for mau'u 'aki'aki was initially established at the H1 site to provide seeds for hydroseeding experiments.



Installing weed cloth facilitated weed control and seed harvesting operations in low growing groundcovers such as mau'u 'aki'aki.

For this groundcover, seed heads are harvested using an articulated hedge trimmer and a leaf vacuum.



In 2009, additional native seed production blocks were installed. These included pili grass (left photo) and emoloa (*Eragrostis variabilis*) (right photo).

Seed harvesting operations for these groundcovers are currently being developed.

FUTURE DIRECTIONS/RESEARCH

In the next 4 years, the development of roadside establishment and seed production protocols for an additional 3 species is planned. These include emoloa, kamanomano (*Cenchrus agrimonoides*) and konakona (*Panicum torridum*).

Another HDOT project is also planning to develop large scale establishment and plant material production protocols for various native Hawaiian shrubs and tree species.

FOR MORE INFORMATION, PLEASE VISIT:

Native Plants for Hawaii's Roadways Website: Contains streaming media and research publications on roadside establishment and weed control for native Hawaiian groundcovers.
http://www.ctahr.hawaii.edu/deFrankJ/NON_HOMEPAGE_PAGES/Native%20Plants%20for%20Hawaii's%20Roadways.htm

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