



Weed Control In Gardens, Landscapes And Turf.

Dr Joe DeFrank
Dept. of Tropical Plant and Soil Science
CTAHR - UH, Manoa



Tropical Plant & Soil Sciences Department
University of Hawaii at Manoa

Topics Covered-Weed Control in Landscapes

- 1. Web based resources for weed ID**
- 2. Web based resources for pest control recommendations**
- 3. Common broadleaf weeds**
- 4. Sedge weeds**
- 5. Topical apps. for Y & P nutsedge**
- 6. Non-chemical options for turf renovation**



For more information on topics covered

<http://www.ctahr.hawaii.edu/deFrankJ/index.htm>

WEED CONTROL IN HAWAII WITH DR. JOE DEFRANK

Professor of Weed Science - University of Hawaii Department of Tropical Plant and Soil Science



[Weed Science 481-Fall 2011- Lecture notes and handouts](#)

[Weed ID Gallery - Economically Important weeds in vegetables, turf and potted ornamentals in Hawaii.](#)

[Streaming Media Content](#) ←

[Plants for People: Beverage Crops, Fall 2011 with Dr. Skip Bittenbender](#)

[ASHS 2011 WORKSHOP: Propagation Techniques of Select Tropical Ornamentals, Specialty Crops, and Native Plants in Hawaii](#)

[TPSS 491/711 Digital Tools for Scientific Content Fall 2012](#)



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[Web based resources for weed I.D. and control, problems weeds in warm season turf & Purple nutsedge control for gardens and ornamental nursery beds. \(posted 10/16/2012\)](#)

[Weed control recommendations-home turf, landscapes and gardens \(posted 06/01/2012\)](#)

[Weed control in Aiea ball field, Waipio Soccer Field issues and new rules for Aquatic weed control - CPS 12th Annual Seminar and Tradeshow \(posted 05/22/2012\)](#)

[Weed control update for warm season turf in Hawaii - Pacifica Ag. Tradeshow \(posted: 01/19/2012\)](#)

[Weed control Considerations for Potted Tropical Ornamentals and Turf \(posted: 02/09/2011\)](#)

[Aiea Baseball field weed cleanup - 2010 \(posted: 01/31/2011\)](#)

[Pili Grass as a Living Mulch in Tropical Vegetable Crop Production in Hawaii 2009.](#)

[Weed Control in Native Hawaiian Plants](#)

[Native Plants on Hawaii's Roadways](#)

[Restoring Native Habitats in Hawaii](#)

[Student presentations for Weed Science Lab, TPSS/PEPS 481](#)

[Herbicide and Growth Regulator Studies in Potted Ornamentals 2005 to 2007](#)

[Non-Weed Control Presentations \(posted 06/21/2011\)](#)

[HOME](#)



For more information on topics covered

Viewing tips for live seminar presentations – Open 2 browser windows
1- for video and 1 – for high resolution slides as pdf

Web Based Resources For Weed I.D. And Control, Problems Weeds In Hawaiian Turf And Purple Nutsedge Control In Gardens And Ornamental Nursery Beds - 2012

On October 12, 2012, Dr. DeFrank made a presentation to participants of the "DOD Pesticide Applicator Recertification & PMPAR Training NAVFAC Pacific and HIJIRSG" at Ford Island on Oahu. The participants are part of federal employee's pesticide certification program required of all pesticide handlers. This presentation covers Dr. DeFrank's selected web based resources for Hawaii weed I.D. and control recommendations. Problem sedge and broadleaf weeds are described and control recommendations for warm season turf are discussed. The presentation concludes with an in-depth description of the biology of Purple Nutsedge and IPM practices used to control this important weed with cultivation, systemic herbicides and woven black plastic weed mat.

For more information on this presentation contact:
Dr. Joe DeFrank
email.defrenk@hawaii.edu
Phone: 808-956-5698.

Suggested method to view streaming media and slideshow:

1. Open two browser windows, one will be used to view the "talking head" and the other will be used to view the slide show images as an Adobe pdf.
2. Click on the link to "view lecture", let the program download and start then hit pause.
3. In the second window open the pdf version of the slide show and once the first slide appears return to lecture and resume play.
3. With two windows open, one for the video and one for the slide show you can follow the lecture for the queues to change the slide image.

Title of Presentation	Media format	Seminar Handout Links to referenced web recourses	Slide show images as pdf
Web based resources for weed ID and control, problems weeds of warm season turf and Purple nutsedge control. (posted 10/16/2012)	view lecture	pdf	Click to download slide show

Right click tab area to duplicate browser window

Ornamental Nursery Beds - 2012

On October 12, 2012, Dr. DeFrank made a presentation to participants of the "DOD Pesticide Applicator Recertification & PMPAR Training NAVFAC Pacific and HIJIRSG" at Ford Island on Oahu. The participants are part of federal employee's pesticide certification program required of all pesticide handlers. This presentation covers Dr. DeFrank's selected web based resources for Hawaii weed I.D. and control recommendations. Problem sedge and broadleaf weeds are described and control recommendations for warm season turf are discussed. The presentation concludes with an in-depth description of the biology of Purple Nutsedge and IPM practices used to control this important weed with cultivation, systemic herbicides and woven black plastic weed mat.

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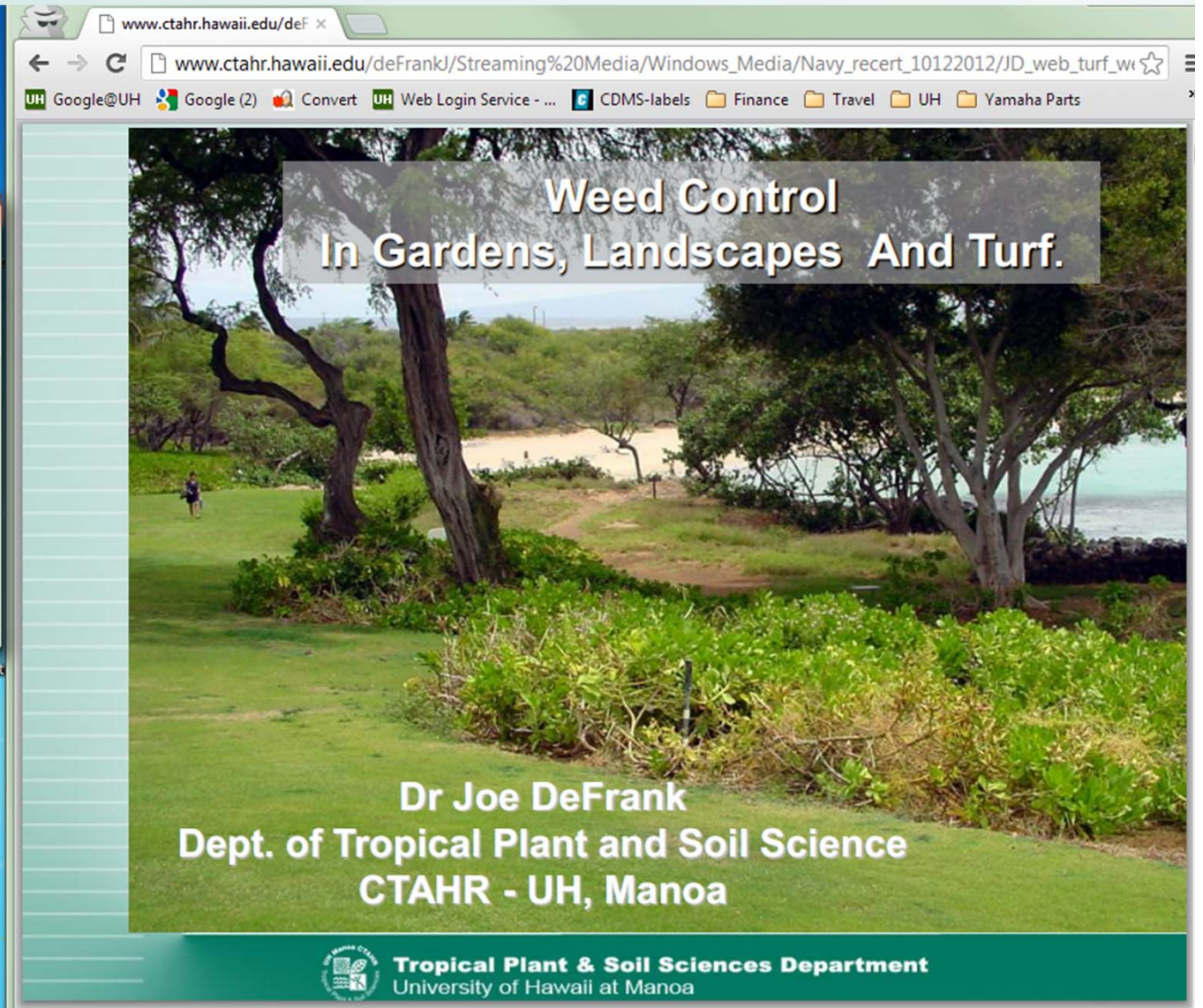
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Web resources for weed control. On-line Handbook of Hawaiian Weeds

<http://www.flickr.com/photos/uhmuseum/sets/72157616041949833/>

University of Hawaii Museum > Collections > Joseph F. Rock Herbarium · Exhibits



Weeds of Hawaii

[Thumbnails](#) [Detail](#) [Comments](#)

Slideshow

[More](#) ▾

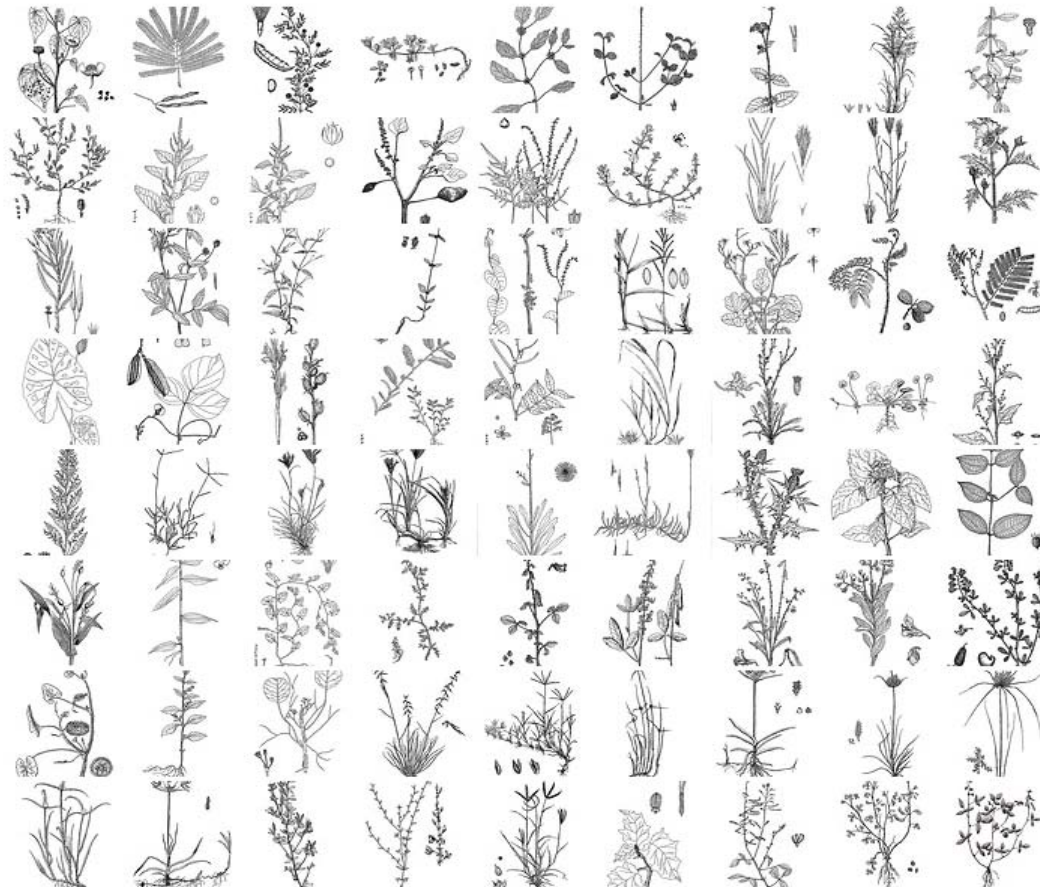


Handbook of Hawaiian Weeds. Edited by E. L. Haselwood and G. G. Motter (1966).

Published for Harold Lyon Arboretum by University of Hawaii Press, Honolulu.

227 photos | 1,585 views

Items are from between 06 Jul 2006 & 03 Aug 2006.



Tropical Plant & Soil Sciences Department
University of Hawaii at Manoa

Web resources for landscape weed control.

<http://www.flickr.com/photos/uhmuseum/sets/72157616041949833/>



Cuscuta sandwichiana

DODDER

Description:

A slender twining parasite. Stems threadlike, leafless, usually yellowish or orange but sometimes tinged with red. Leaves reduced to minute scales. Flowers white, yellow, or orange, tiny, occur in massed clusters; calyx 5-lobed, cupped; corolla 5-lobed, 1/8 inch across, cut halfway down; stamens 5; styles 2, extended. Fruit a capsule, nearly spherical, 1/8 inch in diameter, indehiscent, 2-celled. Seeds 4, each 1/12 inch in diameter, brownish in color (20).

Propagation:

By seed and creeping stems.

Habitat:

Found in arid and moist regions at lower to middle elevations.

History:

Endemic to Hawaii.

Notes:

Declared noxious in Regulation 2. It attaches itself to other plants by suckers.

Comments and faves

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Web resources for weed control.

Weeds of Hawaii Pastures

URL: <http://www.ctahr.hawaii.edu/invweed/weedsHi.html>



HOME | NREM | CTAHR | UH

Info for Homeowners

Info for Conservation

Info for Farmers

Info for Ranchers

Weeds of Hawaii

Videos

Links

Contact CTAHR Scientists

Dr. James Leary

Dr. Joe DeFrank

Dr. Ted Radovich

Weeds of Hawaii

Weeds of Hawaii's Pastures and Natural Areas; An Identification and Management Guide by P. Motooka, L. Castro, D. Nelson, G. Nagai, and L. Ching. ©2003, College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa.

Available for sale from CTAHR, this book includes a quick visual key to help quickly identify weedy trees, shrubs, vines, herbs and grasses found in Hawaii. Individual fact sheets from the publication are available below (.pdf).

- *Abrus precatorius*, Precatory bean, black-eyed susan, bead vine, rosary pea
- *Acacia confusa*, Formosa koa, small Philippine acacia, yanangi (Belau)
- *Acacia farnesiana*, Klu, huisache
- *Acacia mearnsii*, Black wattle
- *Ageratina adenophora*, Maui pamakani
- *Ageratum conyzoides*, Tropic ageratu
- *Amaranthus spinosus*, Spiny amaranth, pigweed
- *Andropogon virginicus*, Broomsedge
- *Ardisia elliptica*, Shoebuttton ardisia
- *Arthrostemum ciliatum*, Arthrostemum
- *Asclepias physocarpa*, Balloon plant
- *Asystasia gangetica*, Chinese violet, coromandel
- *Axonopus fissifolius*, Narrowleaved carpetgrass
- *Bambusa vulgaris*, Feathery bamboo, common bamboo
- *Batis maritima*, Pickle weed, akulikulikai
- *Bidens pilosa*, Hairy beggartick, Spanish needle
- *Blechnum occidentale*, Blechnum fern
- *Bocconia frutescens*, Bocconia, plume poppy, tree poppy
- *Boerhavia coccinea*, Red spiderling
- *Brachiaria mutica*, Paragrass, californiagrass, panicumgrass, buffalograss
- *Buddleia asiatica*, Dog tail, huelo ilio
- *Buddleia madagascariensis*, Smoke bush
- *Caesalpinia decapetala*, Catsclaw, popoki, wait-a-bit, Mysore thorn, puakelekino
- *Casuarina equisetifolia*, Ironwood, Australian pine, horsetail casuarina, coast she-oak, whistling pine, horsetail beefwood, Australian oak, swamp oak, toa (Samoa)
- *Cenchrus ciliaris*, Buffelgrass
- *Cenchrus echinatus*, Common sandbur

Buddleia asiatica

Dog tail, huelo 'ilio

Buddleia asiatica Lour.

Family: Buddleiaceae

Description: Shrub to 20 ft tall. Young stems hairy. Leaves opposite, alternate higher on the stem, 2–12 inches long by 3 inches wide, margins finely serrate. Flowers small, white or lavender, or greenish, in drooping tail-like inflorescence. Fruits are dry capsules, 0.2 inches long. Seeds tiny, winged on both ends. Genus named in honor of Rev. Adam Buddle, 17th–18th century English vicar and botanist⁽⁷⁰⁾; *asiatica*, of Asia⁽⁶⁹⁾.

Distribution: Native to south Asia, Taiwan, and Malaysia. Very common in mesic to wet pastures, forests, roadsides, and waste areas of O'ahu, Moloka'i, Maui, and Hawai'i up to 4000 ft elevation. Collected on O'ahu in 1908⁽⁷⁰⁾.

Environmental impact: Invades disturbed areas of forests.



Management: Sensitive to glyphosate and hormone-type herbicides. Very sensitive to triclopyr ester applied to basal bark (10% product in oil) and triclopyr amine in foliar application at 2% product in water.



Web resources for weed control.

Plants of Hawaii – by Forest & Kim Starr

URL: <http://www.hear.org/starr/images/?o=plants>


Plants of Hawaii

[Family Index](#) : [Species Index](#)

Images of plants found in Hawaii, by [Forest & Kim Starr](#) ([Image use policy](#)). Need a plant identified? Try [Hawaii Plant ID](#).

Scientific Name	Common Name	Family
Abelia x grandiflora	Glossy abelia	Caprifoliaceae
Abelmoschus esculentus	Okra, gumbo, lady's finger	Malvaceae
Abrus precatorius	Black-eyed Susan, rosary pea	Fabaceae
Abutilon eremitopetalum *	Hidden petal abutilon	Malvaceae
Abutilon grandifolium	Hairy abutilon	Malvaceae
Abutilon incanum	Hoary abutilon	Malvaceae
Abutilon menziesii *	Kooloaula	Malvaceae
Abutilon pictum	Lantern ilima, royal ilima	Malvaceae
Abutilon x hybridum	Hybrid abutilon	Malvaceae
Abutilon x milleri	Trailing abutilon	Malvaceae
Acacia aneura	Mulga acacia	Fabaceae
Acacia aulacocarpa	Hickory wattle, brown salv	
Acacia auriculiformis	Earpod wattle	
Acacia confusa	Formosa koa	
Acacia farnesiana	Klu	
Acacia koa *	Koa	
Acacia koaia *	Koaia, dwarf koa	
Acacia mangium	Mangium wattle	
Acacia mearnsii	Black wattle	
Acacia melanoxylon	Australian blackwood	
Acacia podalyriifolia	Queensland silver wattle	
Acacia retinodes	Water wattle	
Acacia sp.	Unknown acacia	
Acalypha hispida	Chenille plant, red hot catt	
Acalypha reptans	Cat tail	
Acalypha wilkesiana	Copper leaf, beefsteak	
Acanthospermum australe	Spiny-bur, Paraguay bur,	
Acca sellowiana	Pineapple guava	

Home > Malvaceae > [Abutilon incanum \(hoary abutilon\)](#)



Abutilon incanum
Hoary abutilon

Seed capsules
Lahaina Pali Trail, Maui
December 09, 2002

Image# 021209-0006

Plants of Hawaii

Home > Malvaceae > [Abutilon incanum \(hoary abutilon\)](#)

Native: Indigenous?

Abutilon incanum (Hoary abutilon)
Habitat with Kim and Forest
Puu Pehe, Lanai
April 06, 2006
060406-7299

Abutilon incanum (Hoary abutilon)
Camp
Honokanala, Kahoolawe
July 31, 2003
030731-0133

Abutilon incanum (Hoary abutilon)
Habitat and view Puu pehe
with Kim and Forest
Puu Pehe Cove, Lanai
April 05, 2007
070405-6861

Abutilon incanum (Hoary abutilon)
Habitat and view Puu pehe
Puu Pehe Cove, Lanai
April 05, 2007
070405-6859

Abutilon incanum (Hoary abutilon)
Flower
Kealahakiki, Kahoolawe
October 14, 2004
041014-0090

Abutilon incanum (Hoary abutilon)
Helicopter LZ
Honokanala, Kahoolawe
March 30, 2004
040330-0103

Abutilon incanum (Hoary abutilon)
Habit
Laa Kaaialalo, Kahoolawe
February 17, 2004
040217-0048

Abutilon incanum (Hoary abutilon)
Habitat too harsh
Moku Naio, Lanai
April 06, 2006
060406-7125

Abutilon incanum (Hoary abutilon)
Flower
Lahaina Pali Trail, Maui
December 09, 2002
021209-0045

Abutilon incanum (Hoary abutilon)
Habit and view
Honokanala, Kahoolawe
February 07, 2009
080707-2342

Abutilon incanum (Hoary abutilon)
Seed capsules
Lahaina Pali Trail, Maui
December 09, 2002
021209-0008

Abutilon incanum (Hoary abutilon)
Habit view nearby rocks
Puu Pehe, Lanai
April 06, 2006
060406-7316

Abutilon incanum (Hoary abutilon)
Flower
Lahaina Pali Trail, Maui
December 09, 2002
021209-0046

Abutilon incanum (Hoary abutilon)
Habit and view Puu pehe
Molokai, Maui
April 05, 2006
060405-6992

Abutilon incanum (Hoary abutilon)
Habitat
Honokanala, Kahoolawe
May 25, 2005
050525-1879

Abutilon incanum (Hoary abutilon)
Habit
Kii, Lanai
April 06, 2006
060406-9251

Abutilon incanum (Hoary abutilon)
Habit
Lahaina Pali Trail, Maui
December 09, 2002
021209-0009

Abutilon incanum (Hoary abutilon)
Seed capsules
Lahaina Pali Trail, Maui

Abutilon incanum (Hoary abutilon)
Voucher 060406 08
Kii, Lanai

Abutilon incanum (Hoary abutilon)

Abutilon incanum (Hoary abutilon)
Seed capsule and flower bud
Lahaina Pali Trail, Maui

Abutilon incanum (Hoary abutilon)

Abutilon incanum (Hoary abutilon)

Abutilon incanum (Hoary abutilon)
Habitat and view Puu pehe
Hulopoe, Lanai

Abutilon incanum (Hoary abutilon)
Habitat view helau and
Forest

Abutilon incanum (Hoary abutilon)
Habitat view Puu Pehe
South coast, Lanai

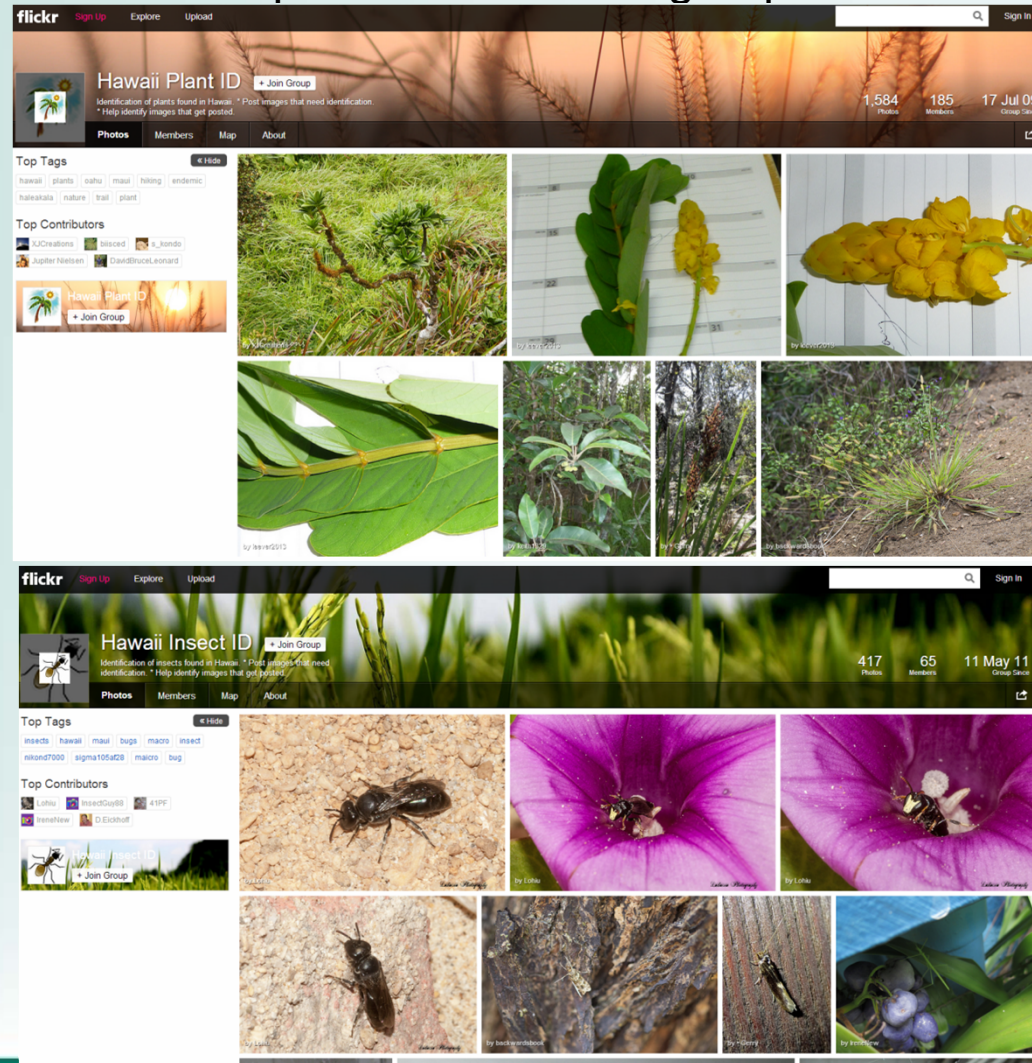


Web resources for weed control.

Hawaii Plant & Insect ID, join and submit photos, explore gallery

Plant ID = <http://www.flickr.com/groups/hawaiiplantid/>

Insect ID = <http://www.flickr.com/groups/hawaii-insect-id/>



Free to join
and submit
images for
ID



Tropical Plant & Soil Sciences Department
University of Hawaii at Manoa

Web resources for weed control.

Greenbook.com for herbicide labels and safety info (<http://www.greenbook.net/>)



HOME COMMODITY MARKETS PRODUCTS/SERVICES STORE MY PROFILE HELP ABOUT

Welcome, Joseph! Logout

Oct 11, 2012

[Click here to view the website tutorial video](#)

Greenbook offers use of our plant protection decision engine free of charge to the industry. We require registration in order to learn more about our users and the products and services that they employ. This data is used to develop new product offerings and deliver the most robust experience possible. Registration for Greenbook only takes a few moments to complete.

Recently Updated

Southern Agricultural

Start

EPA n/a Labels MSDS

Dot Sara Title III Worker Protection Storage & Temp Crops/Sites

Southern Agricultural

2

2,4-D Dimethylamine Salt EPA n/a Group O Herbicide Labels MSDS

Mode of Action Dot Sara Title III Worker Protection Storage & Temp Crops/Sites Pests

Plant Protection Product Search

Agriculture Turf & Ornamental IVM/Right of Way

State Company

Product Category Product

Active Ingredient Pest Category

Crop/Site Category Pests

Crops/Sites

All Any

Any

Rate Finder

State

Product

Crop

Pest

Applications

Quick Search

State

Category

Search Term:

Digital books now available



Web resources for landscape weed control.

Greenbook.com for herbicide labels and safety info (<http://www.greenbook.net/>)

Greenbook offers use of our plant protection decision engine free of charge to the industry. We require registration in order to learn more about our users and the products and services that they employ. This data is used to develop new product offerings and deliver the most robust experience possible. Registration for Greenbook only takes a few moments to complete.

Recently Updated

The screenshot displays the Greenbook Plant Protection Product Search interface. The interface is divided into four main sections:

- Syngenta/Abund Flowable:** Features the Syngenta logo and a list of links including EPA 100-1098, Labels, MSDS, Mode of Action, Dot, Sara Title III, Worker Protection, Storage & Temp, Crops/Sites, Pests, and States. Below this is the DuPont logo with the slogan "The miracles of science" and a "Classic" section listing Chlorimuron-ethyl, EPA 352-436, and Group B Herbicide.
- Plant Protection Product Search:** This section is highlighted with yellow circles. It includes a search filter for Agriculture, Turf & Ornamental, and IVM/Right of Way. The search criteria are: Location (Hawaii), Company (empty), Herbicide (selected), Product (empty), Active Ingredient (empty), Weeds (selected), Commercial Turf (selected), Crabgrass (Digitaria) (selected), Bermudagrass (Cynod) (selected), and Crabgrass (Digitaria s) (selected). At the bottom, there are buttons for "Add crop", "Remove crop", "Add pest", and "Remove pest", along with radio buttons for "All" and "Any".
- Rate Finder:** Includes dropdown menus for State, Product, Crop, Pest, and Applications, with "SEARCH" and "CLEAR" buttons.
- Quick Search:** Includes dropdown menus for State and Category, a "Search Term:" input field, and "SEARCH" and "CLEAR" buttons. Below this is an image of a tablet and smartphone displaying the Greenbook app.



Web resources for landscape weed control.

Greenbook.com for herbicide labels and safety info (<http://www.greenbook.net/>)

Search - Results

Your search for Databases: Turf & Ornamental, States: HI, Crops: Bermudagrass (Cynodon spp.), Pests: Crabgrass (Digitaria spp.), Category: Herbicide returned 52 products

Page 1 of 1

Choose up to three items to compare.

1. Prograss EC
2. Image 70 DG
3. Monument 75WG

Clear All

[Click here to view comparison chart](#)

Product Summary	Bayer Environmental Science	BASF Corporation T&O Products	syngenta
Prograss EC Ethofumesate Group N Herbicide	Image 70 DG Imazaquin Group B Herbicide	Monument 75WG Trifloxysulfuron-sodium Group B Herbicide	
Outdoor Ornamental:			
Residential Turf:			
Commercial Turf:			
Other Sites:			
Peas			
Weeds:			
Mo:			
Chemical Group:	Sulfonamide	Sulfonamide	Sulfonamide
Tank Mixes			
Tank Mixes:	atrazine		

BASF Corporation *Image 70 DG*
T&O Products

Imazaquin
Imazaquin Ammonium Salt
EPA# 241-319
Group B Herbicide

Label
MSDS

Mode of Action
DOT
Sara Title III
Worker Protection
Storage & Temp

Crops/Sites
Pests
States
Tank Mixes

Add E-Alert Compare product

syngenta *Monument 75WG*

Trifloxysulfuron-sodium
EPA# 100-1134
Group B Herbicide

Label
MSDS

Mode of Action
DOT
Sara Title III
Worker Protection
Storage & Temp

Crops/Sites
Pests
States
Tank Mixes

Add E-Alert Compare product

Bayer Environmental Science *Prograss EC*

Ethofumesate
EPA# 432-941
Group N Herbicide

Label
MSDS

Mode of Action
DOT
Sara Title III
Worker Protection
Storage & Temp

Crops/Sites
Pests
States
Tank Mixes

Add E-Alert Compare product



Web resources for landscape weed control.

Product Summary	 Bayer Environmental Science Prograss EC Ethofumesate EPA #432-941 Group N Herbicide	BASF Corporation T&O Products Image 70 DG Imazaquin Imazaquin Ammonium Salt EPA #241-319 Group B Herbicide	 Monument 75WG Trifloxysulfuron-sodium EPA #100-1134 Group B Herbicide
Pests			
Weeds:	Barnyardgrass/Watergrass; Bermudagrass; Bluegrass, Annual; Burclover; Canarygrass; Chickweed, Common; Clover, White; Crabgrass, Hairy/Large; Crabgrass, Smooth/Small; Foxtail, Green; Foxtail, Yellow; Foxtail, Yellow; Nutsedge, Purple; Nutsedge, Yellow; Pigweed, Redroot; Purslane, Common	Bahiagrass; Bittercress, Hairy; Bluegrass, Annual; Burweed, Lawn; Buttercup; Buttercup, Smallflower; Buttonweed, Virginia; Carpetweed; Chickweed, Common; Chickweed, Mouseear; Clover, White; Crabgrass; Cudweed, Purple; Dandelion; Deadnettle, Purple/Red; Dollarweed; Eclipta; Eveningprimrose, Cutleaf; Fescue, Tall/Alta; Flatsedge, Rice/Umbrellaplant, Annual; Garlic, Wild; Geranium, Carolina; Geranium, Dovefoot; Henbit; Knawel; Kyllinga, Green; Medic, Black; Nutsedge, Purple; Nutsedge, Yellow; Onion, Wild; Parsley-piert; Pennywort, Water; Pigweed; Ryegrass, Perennial; Sandbur, Field; Sedge, Annual; Sedge, Globe; Sorrel, Red/Sheep; Violet/Wild Violet	Bahiagrass; Bahiagrass; Barley, Little; Bluegrass, Annual; Bluegrass, Roughstalk; Burweed, Lawn; Buttercup, Hairy; Buttonweed, Virginia; Carpetweed; Catsear; Chickweed, Common; Chickweed, Mouseear; Clover; Clover, Hop; Clover, Rabbit's-foot; Crabgrass; Cudweed, Narrowleaf; Dallisgrass; Dandelion; Dichondra; Fescue, Tall/Alta; Garlic, Wild; Geranium, Carolina; Henbit; Indigo, Creeping; Ivy, Ground; Khakiweed; Kyllinga, Cock's-comb; Kyllinga, Green; Medic, Black; Nutsedge, Purple; Nutsedge, Yellow; Oxalis; Pansy, Field; Parsley-piert; Pennywort, Lawn; Rescuegrass /Rescue Brome; Ryegrass; Ryegrass, Perennial; Sedge, Annual; Sedge, Globe; Shepherd's-purse; Signalgrass, Broadleaf; Speedwell, Corn; Spurge, Spotted; Torpedograss



Web resources for landscape weed control.

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Page 1 of 1

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1. Progress EC
2. Image 70 DG
3. Monument 75WG

[Clear All](#)

[Click here to view comparison chart](#)

BASF Corporation *Image 70 DG*

T&O Products

Imazaquin
Imazaquin Ammonium Salt
EPA# 241-319
Group B Herbicide

[Label](#)
[MSDS](#)

Mode of Action
DOT
Sara Title III
Worker Protection
Storage & Temp

Crops/Sites
Pests
States
Tank Mixes

[Add E-Alert](#) [Compare product](#)

syngenta *Monument 75WG*

Trifloxysulfuron-sodium
EPA# 100-1134
Group B Herbicide

[Label](#)
[MSDS](#)

Mode of Action
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Worker Protection
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Crops/Sites
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States
Tank Mixes

[Add E-Alert](#) [Compare product](#)

Bayer Environmental Science *Progress EC*

Ethofumesate
EPA# 432-941
Group N Herbicide

[Label](#)
[MSDS](#)

Mode of Action
DOT
Sara Title III
Worker Protection
Storage & Temp

Crops/Sites
Pests
States
Tank Mixes

[Add E-Alert](#) [Compare product](#)

- DOT
- Documents
- SARA Title III
- MOA
- State Registration
- Storage
- Temperature
- Worker Protection
- Rates
- Crops Sites Pests
- Tank Mixes

Documents

[Label](#)

[MSDS](#)

SPECIMEN

IMAGE[®]

70 DG herbicide

Selective herbicide for use on established lawns of Bermudagrass, centipedegrass, St. Augustinegrass, zoysiagrass, and zoysiagrass
Including use on golf courses, and farms, commercial and residential turf, and for use around selected landscape ornamentals

Active Ingredients:
Imazaquin (2-(4-chlorophenyl)-6-(4-methylphenoxy)-6-oxo-1,2,3,4-tetrahydropyridin-3(1H)-one) 100%
Other Ingredients: 0%
Total: 100%

U.S. Patent No. 4,788,018
EPA Reg. No. 241-319

**KEEP OUT OF REACH OF CHILDREN
CAUTION/PRECAUCIÓN**

See label for complete First Aid, Precautionary Statements, Directions For Use, and Conditions of Sale and Warranty.

In case of an emergency contacting the or properly stocking this product, call 800 or 800-851-0800 (P 241319).

MSD Corporation
20 East Ohio
Research Triangle Park, NC 27709

BASF
The Chemical Company



Web resources for landscape weed control.

2013 North Carolina Ag. Chemical Manual <http://ipm.ncsu.edu/Agchem/agchem.html>

Table of Contents

ABBREVIATIONS

I. PESTICIDE USE AND SAFETY INFORMATION

Restricted Use Pesticides; Local Need -- 24(c) Registrations in N.C.; The Safe Use Of Pesticides

II. CHEMICAL APPLICATION EQUIPMENT

Types of Equipment; Cleaning Equipment; Calibrating Chemical Application Equipment; Useful

III. HOW SEND SPECIMENS FOR DISEASE, INSECT, AND WEED IDENTIFICATION

Plant Disease and Insect Clinic; What to Sample; Insect Identification; Plant and Weed Identifi

IV. FERTILIZER USE

Lime and Fertilizer Suggestions for Field Crops; Pasture and Hay; Fruit; Lawns; Ornamental Plan
Fertilizer Rules and Regulations; Nutrient Content of Fertilizer Materials; Mixing Herbicides Wi
Production Rates and Nutrient Content; and Use of Municipal and Industrial Sludges

V. INSECT CONTROL

Agricultural Uses (see also [pest information](#) from NCCES)
Pesticides and Honey Bees; Field Corn, Grain Sorghum, Small Grains, Cotton, Forage Crops, Pea
Stored Products: On Farm and Commercial Fumigants
Livestock and Poultry
Specialized Uses: Community Pest Control and Industrial and Household Pests
Ornamental Plants Grown in Greenhouses and Nurseries and Landscapes
Christmas Trees
Commercial Turf
Wood and Wood Products
Home Uses: Home Vegetable Garden; Household Pests; Home Lawns; and Pets

VI. INSECT AND DISEASE CONTROL OF FRUITS

Apple Spray Program; Blueberry Spray Program; Caneberry Spray Program; Winegrape Spray P

VII. CHEMICAL WEED CONTROL

Weed Control in Field Crops: Corn, Cotton, Kenaf, Peanuts, Sorghum, Soybeans, Sunflowers, T
Fruit Crops; Hay Crops and Pastures; Lawns and Turf; Ornamentals; Vegetable Crops; Forest Sta

VIII. PLANT GROWTH REGULATORS

Cotton; Harvest Aids and Preharvest Desiccants; Apples; Floriculture Crops in Greenhouses; Wc

IX. ANIMAL DAMAGE CONTROL

General Practices; Wildlife Killed for Depredations or Accidentally; Description of Potential An

X. DISEASE CONTROL

Field Crops: Wheat; Alfalfa; Corn; Cotton; Peanut; Soybean; and Tobacco
Floral, Nursery, Landscape and Turfgrass Diseases
Sanitizing Greenhouses and Plant Beds

2013 North Carolina Agricultural Chemicals Manual

College of Agriculture and Life Sciences
North Carolina State University

Web resources for landscape weed control.

2013

North Carolina Ag. Chemical Manual <http://ipm.ncsu.edu/Agchem/agchem.html>

TABLE 7-14. CHEMICAL WEED CONTROL IN LAWNS AND TURF

Herbicide and Formulation	Amount of Formulation Per 1,000 sq ft	Amount of Formulation per Acre	Pounds Active Ingredient per Acre	Precautions and Remarks
Postemergence Control or Suppression of Summer Weeds Such as CRABGRASS Species, GOOSEGRASS, DALLISGRASS, VIRGINIA BUTTONWEED, DOVEWEED, FLORIDA PUSLEY, NUTSEDGE and KYLLINGA Species; Winter Weeds Such as <i>poa annua</i>, <i>poa trivialis</i>, TALL FESCUE, HENBIT, CORN SPEEDWELL and Species of RYEGRASS, CHICKWEED AND CLOVER				
thiencarbazone + foramsulfuron + halosulfuron, MOA 14 + 2 + 2 (Tribute Total) 60.5 WG	0.0735 oz	3.2 oz	0.121	Apply to well-established residential and commercial bermudagrass lawns, golf courses (excluding greens), athletic fields, sod farms, roadsides, parks, cemeteries and recreational areas. Do not exceed 3.2 oz per acre per application or 6.4 oz per acre yearly. Use 0.25 to 0.5% by volume nonionic surfactant or 0.5 to 1% by volume methylated seed oil. After application, wait 12 weeks to overseed ryegrass or bermudagrass. Wait 1 month after bermudagrass seedling emergence and 2 weeks after sprigging or sodding bermudagrass before treating. Crabgrass and goosegrass are controlled up to 2 tiller stage.
Postemergence Control, GOOSEGRASS				
diclofop-methyl, MOA 1 (Illoxan) 3 EC	0.75 to 1 fl oz	32 to 43 fl oz	0.75 to 1	Apply in established bermudagrass. Rate depends on number of goosegrass leaves from one to four leaves. Check label for specific rates.
foramsulfuron, MOA 2 (Revolver) 0.19 SC	0.39 fl oz	17 fl oz	0.025	For use on bermudagrass and zoysiagrass grown on home lawns, golf courses and sod farms. See precautions listed under annual bluegrass section. For goosegrass control, apply 17 fl oz per acre on plants up to 2 tillers followed by 17 fl oz per acre 2 weeks later.
sulfentrazone, MOA 14 (Dismiss) 4 SC	0.275 fl oz	0.75 pt	0.375	May be applied to home lawns. For use on creeping bentgrass, tall and fine fescue, perennial ryegrass, Kentucky bluegrass, and all warm-season turf species except St. Augustinegrass. See precautions listed under purple and yellow nutsedge section. For goosegrass control, apply 0.75 pt per acre on plants up to 2 tillers.
Postemergence Control, BAHIAGRASS, CRABGRASS, DALLISGRASS, GOOSEGRASS, NUTSEDGE, ANNUAL SEDGES, SANDBUR				
MSMA, MOA 17 (various brands)		several concentrations	1.82 to 4.5	Bermudagrass, bluegrass and zoysiagrass are tolerant. Injury may result on bentgrass, fescue and St. Augustinegrass (commercial sod production only). Do not use on carpetgrass or centipedegrass. MSMA restrictions: For existing golf courses, spot treat (100 sq ft per spot) not to exceed 25% of total acreage. For new courses, make 1 broadcast application per year. For sod farms, make 1 to 2 broadcast applications per year and maintain 25 feet buffer around permanent water bodies. For highway rights of way, make 2 broadcast applications and maintain 100 feet buffer around permanent water bodies. All turf uses will be prohibited after Dec. 31, 2013.

Web resources for landscape weed control.

Bayer Advanced – products for homeowners (<http://www.bayeradvanced.com/lawn-care/products>)

The screenshot shows the Bayer Advanced website interface. At the top, the Bayer Advanced logo is on the left, followed by the tagline "Better Science. Better Results.®". On the right, there are links for "Contact Us", "Register", and "En Español", along with the Bayer logo. Below this is a navigation bar with "Home", "Find a Product", "Locate a Store", and "Learning Center", and a search bar. A secondary navigation bar shows categories: "Show:", "All", "Weeds", "Disease Control", "Insects & Pests", "Grubs", and "Crabgrass". The "Weeds" category is selected. The main content area displays a grid of 18 products. The first two products, "Season Long Weed Control For Lawns" and "Southern Season Long Weed Control for Lawns", are circled in yellow. Other products include "Fungus Control For Lawns", "NATRIA Disease Control", "NATRIA Grass & Weed Killer", "NATRIA Snail & Slug Killer Bait", "Season Long Grub Control Plus Turf Revitalizer", "Complete Brand Insect Killer For Soil & Turf", "24 Hour Grub Killer Plus", "All-In-One Lawn Weed & Crabgrass Killer", "Bermudagrass Control For Lawns", "Southern Weed Killer For Lawns", "2-In-1 Moss & Algae Killer", "Weed Killer For Lawns", "Powerforce® Multi-Insect Killer - Granules", "Powerforce® Multi-Insect Killer - Liquid", "Dual Action Snail & Slug Killer Bait", and "Brush Killer Plus". At the bottom of the grid, there are navigation arrows: "← Previous", "1", "2", "Next →", and "View More ▶".



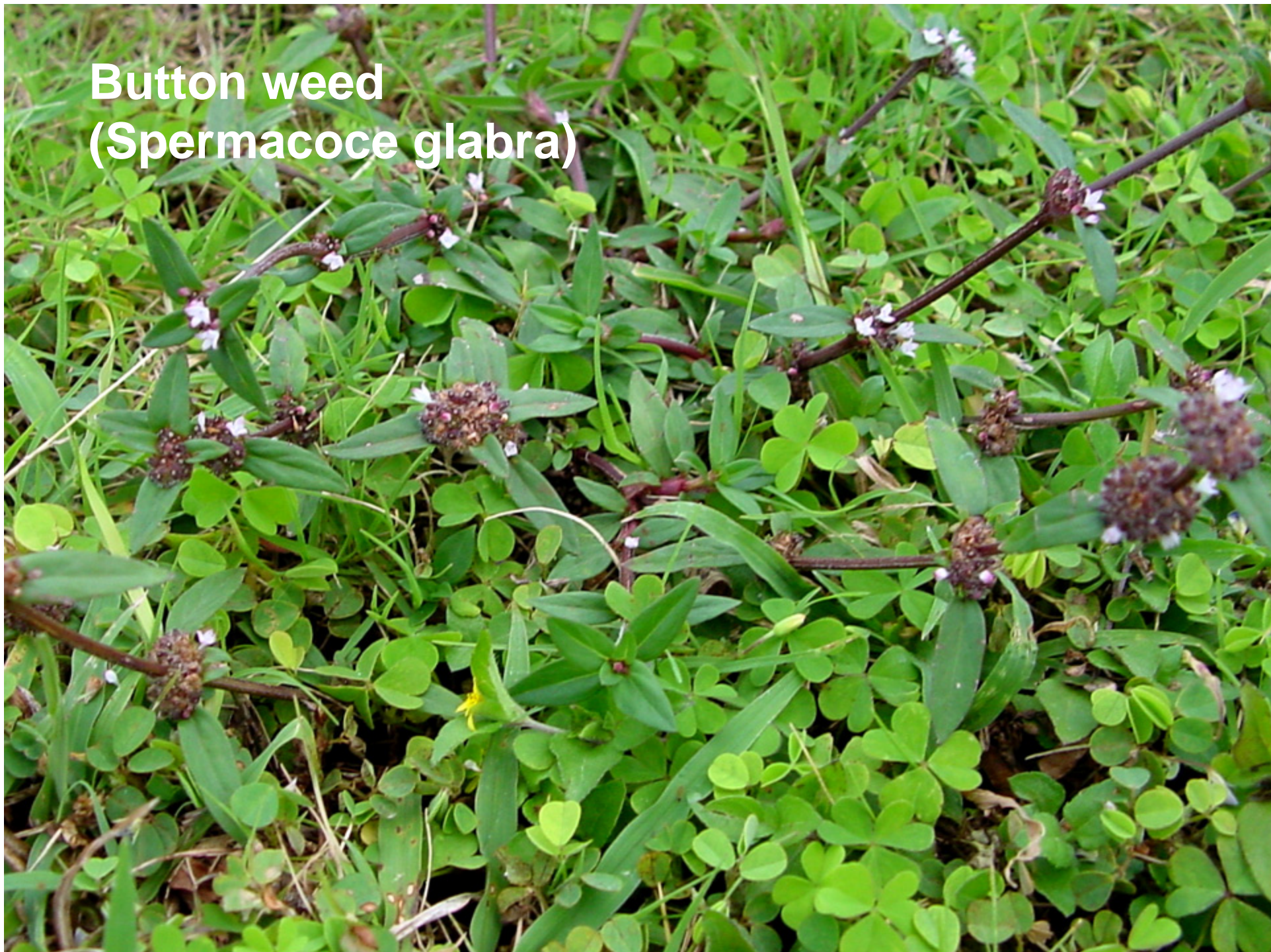


**Creeping indigo
(*Indigofera spicata*)**

Desmodium triflorum – beggar weed



Button weed
(*Spermacoce glabra*)





**Khaki weed
(*Alteranthera pungens*)**



**Ground ivy
(*Glechoma hederacea*)**



Graceful spurge-*Chamaesyce hypericifolia*

A photograph of a graceful spurge plant growing in a grassy field. The plant has several upright, thin stems with opposite, lanceolate leaves. Small, pale flowers are visible at the tips of the stems.



Garden spurge-*C. hirta*

A photograph of a garden spurge plant growing in a grassy field. The plant has a more bushy appearance with several upright stems and clusters of small, pale flowers.



Prostrate spurge-*C. prostrata*

A photograph of a prostrate spurge plant growing in a crack in the ground. The plant has a dense, low-growing habit with many small, round leaves and tiny flowers.



Sprawling Horse Weed
(*Calyptracarpus vialis*)



Commonly used Postemergence Broadleaf herbicides

Trimec Southern

- Mixture of 3 herbicides, no MSMA
- Use on Bermuda, zoysia grass, St. Aug. & Centipedegrass
- Seashore paspalum not on label



Commonly used Postemergence Broadleaf herbicides

SpeedZone

- Mixture of 4 herbicides, no MSMA
- Common and hybrid Bermuda and zoysia grass
- Seashore paspalum not on label
- Adds carfentrazone to Trimec for faster activity



Commonly used Postemergence Broadleaf herbicides

SpeedZone Southern

- Mixture of 4 herbicides, less 2,4-D for reduced injury to warm season turf
- Common and hybrid Bermuda, zoysia grass, Centipede, Kikuyugrass, Seashore paspalum and St. Aug. (see label for excluded cultivars)



Commonly used Postemergence Broadleaf herbicides

Confront

- Mixture of 2 herbicides, trade names of Lontrel and Turflon
- Use on Bermuda, zoysia grass and centipedegrass
- Seashore paspalum not on label
- User can determine suitability for species not on label
- Good activity on legume type weeds
- Dichondra, a leguminous plant, is tolerant



Commonly used Postemergence Broadleaf herbicides

Manor

- Single product
- Use on Bermuda, St. Aug., zoysia grass and centipedegrass
- Seashore paspalum not on label
- Very good activity on sparges
- Controls Bahiagrass, a paspalum species related to Seashore



Sedge Weeds in Hawaiian Landscapes

Purple nutsedge-Cyprus rotundus

Yellow nutsedge-C. esculentus

Green Kyllinga-Kyllinga brevifolia

White Kyllinga-K. nemoralis





Purple Nutsedge

- Brown narrow spikes in flower head
- Tubers in chains
- Seed not viable
- Spreads by vegetative parts = tubers



Purple nutsedge

Nutsedge persistence





PURPLE NUTSEGE

Yellow Nutsedge

- Yellowish-Brown or straw colored flower head
- Round tubers at the end of rhizomes, sweet
- Does not form chains, seed not viable
- Spreads by vegetative parts= tubers





Yellow Nutsedge





Website for cultivation and use of yellow nutsedge tubers as a refreshing beverage

<http://www.chufadevalencia.org/>

The screenshot shows the website's layout. At the top left is the logo for 'CHUFA DE VALENCIA' with the text 'CONSEJO REGULADOR DENOMINACION DE ORIGEN'. To the right is a navigation menu with categories like 'Who we are', 'History', 'PREMIS Fallas 2013', and 'Create Orxata Recipes'. Below the logo is a language selection bar and a 'NOTICIAS' section with two news items. The main content area features a large video player with a field of chufa and the text 'REFLEJO DE SU TIERRA,'. Below the video is a 'Suscríbete a nuestro Magazine' button and three featured articles: 'VI EDITION "Xufa PREMIS OF', 'Video reports on the Horchata and', and 'Properties of horchata'. At the bottom left, there is a 'zonal social media' section with links to Blog Nova Orxata and Facebook. The bottom right contains contact information for the Consejo Regulador D.O. Chufa de Valencia and logos for the Generalitat Valenciana and the Conselleria d'Agricultura, Pesca i Alimentació.



White Kyllinga

- **White single round flower heads**
- **No tubers**
- **spreads by seed and underground stems**





White kyllinga



Green Kyllinga

- **Green single round/oval flower heads**
- **No tubers**
- **Spreads by seed and underground stems**



Green kyllinga







Eleocharis spp.



Commonly used herbicides for selective sedge control in turf

**Manage/Sedgehammer/Sedge Pro
Certainty
Monument**



Commonly used Postemergence Sedge herbicides

Manage/SedgeHammer/SP

- Single product
- Use on Bermuda, St. Aug., zoysia grass, centipede grass, Seashore paspalum and Kikuyugrass
- Primarily used for purple nutsedge
- Less effective on Kyllingas
- Little to no injury on turf



Commonly used Postemergence Sedge herbicides

Certainty

- Single product, very low use rate .25 – 2.0 dry oz/a
- Use on Bermuda, St. Aug., zoysia grass, centipedegrass, Seashore paspalum and Kikuyugrass
- Used for purple nutsedge and Kyllingas
- Controls some selected /grass & broadleaf weeds (Wth. Clover, Crowfoot Grass, Ground Ivy, Dandelion)
- Little to no injury on turf
- Root absorbed, citrus very sensitive be aware of tree roots



Commonly used Postemergence Sedge herbicides

Monument

- Single product
- Use on Bermuda and zoysia grass
- Controls sedges and selected grass and broadleaf weeds
- Suppression of Crab, Dallis and Torpedograss
- Controls Creeping Indigo, Khakiweed and Black medic





Non-selective Wiper in non-crop areas





**Selectivity
based on height
Wiper for tall
weeds in turf**





Improved weed wick for stubborn grasses



Wiper in between row areas and for weeds above crops

Alley Cat Farm Equipment, URL: <http://weedwipe.corecommerce.com/>



Rotowiper, URL: <http://rotowiper.co.nz/site/index.php?p=1>



Factors for wiper applications

1. Pre application growth activation of weeds and turf.
2. Sufficient height difference between weeds & turf.
3. Glyphosate at 15-20% (20-25 oz/gal) for wiping weeds.
4. 2-3 day delay mowing and irrigation after app.





**Selectivity
based on height
Wiper for tall
weeds in turf**



“Lights Out” Method of weed and turf removal In support of sport turf restoration Without herbicides

Appropriate Sites

- 1. Public parks, school fields & private residences**
- 2. Eliminate herbicides for turf and weed removal during turf renovation**
- 3. Use woven plastic weed mat for plant kill**
- 4. Requires time, irrigation, fertilizer to accelerate renovation process**



Why use plastic mulch for plant kill





Tropical Plant & Soil Sciences Department
University of Hawaii at Manoa



Tropical Plant & Soil Sciences Department
University of Hawaii at Manoa



**Extending the wiggle wire
beyond the clip base results in
puncture holes**





**Mature weeds covered and killed
Plant tissue break down rapid**



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L.O. on Zenith zoysia weedy turf - 2011



7 – days of cover





28 – days of cover



28 – days of cover, Creeping Indigo severely damaged



Verticut to remove thatch, exposed soil surface in area covered with weed mat



**Tarp cover for 28 days best for complete mechanical
thatch removal including subsurface crowns
of perennial grass weeds**



Regrowth 28 days after thatch removal + compost



“Lights Out” for sport turf renovations



Weed mat held in place with water filled lay flat hose. Spring clips to keep water in hoses.



“Lights Out” for sport turf renovations



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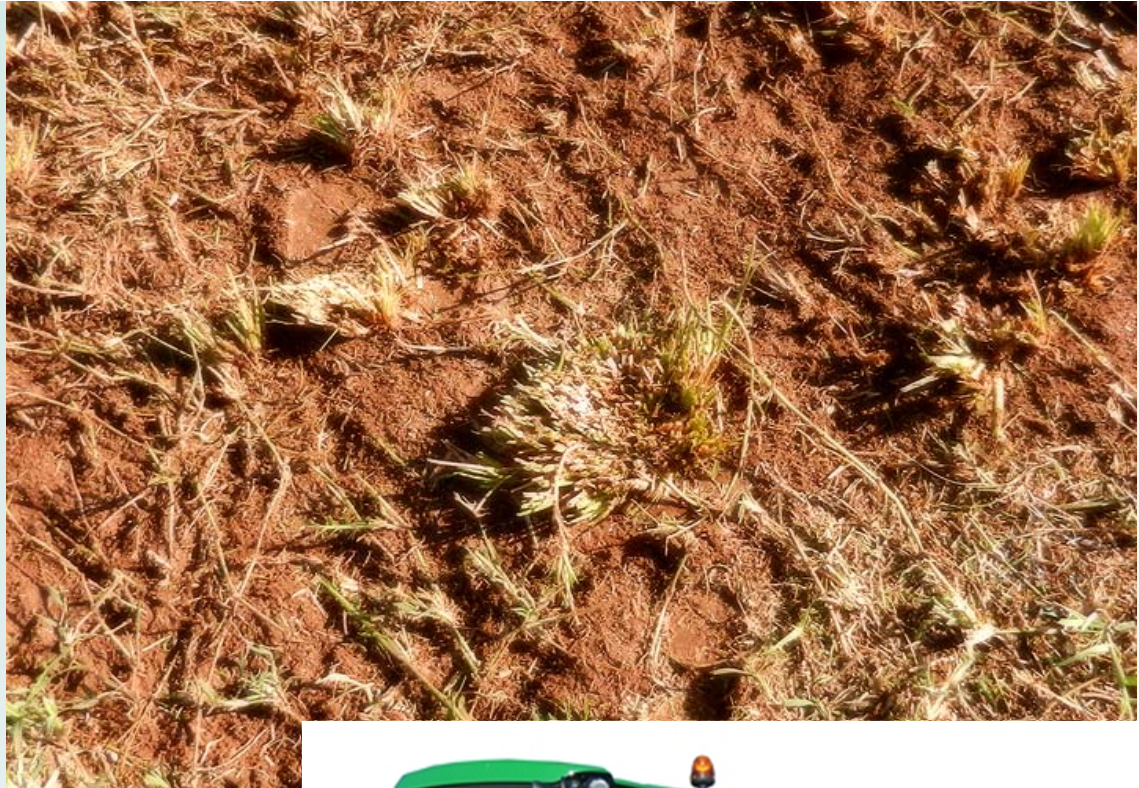
Chain drags to breakup thatch



Improve Soil Conditions



Tropical Plant & Soil Sciences Department
University of Hawaii at Manoa



Tropical Plant & Soil Sciences Department
University of Hawaii at Manoa



Following tarping and thatch removal

- 1. Fertilize to stimulate weed seed germination**
- 2. Weeds grow 2-3 weeks**
- 3. Reapply tarp for 7-10 days all annuals dead.**
4. Replant with sprigs or hydro seed.
5. Old Bermuda from below ground and new planting material to provide rapid fill in and stable playing surface.
6. Time table:
 - a) Kill weedy thatch 25-30 days
 - b) Remove thatch and fertilize 2-3 days
 - c) Weeds grow from seeds-3 weeks
 - d) Cover to kill weeds 7 days
 - e) Fill in post planting 2 months
 - f) Total 4-5 months: apply mat to fill in



Kill small annual weeds with 1-2 weeks of weed mat cover
Provides weed free site preparation
Hydro seeding accelerates fill in



Good weed kill w/ 1-week of cover



14 days of weed growth

14 days weed growth + 1-wk cover

21 days of weed growth



Following tarping and thatch removal

1. Fertilize to stimulate weed seed germination
2. Weeds grow 2-3 weeks
3. Reapply tarp for 7-10 days all annuals dead.
4. Replant with sprigs/hydro cap or hydro seed.
5. Old Bermuda fills from below ground and new planting material provides rapid fill in and stable playing surface.
6. Time table:
 - a) Kill weedy thatch-25 to 30 days
 - b) Remove thatch and fertilize 2-3 days
 - c) Weeds grow from seeds-3 weeks
 - d) Cover to kill seedling weeds-7 days
 - e) Fill in post planting-2 months
 - f) Total 4-5 months: apply mat to fill in





Hydro seeding has traditionally been used to seed road cuts or other hard to reach sites

Hydro seeding mix includes seeds, mulch (recycled paper + processed straw), tacifier, nutrients and growth stimulants.



Following tarping and thatch removal

1. Fertilize to stimulate weed seed germination
2. Weeds grow 2-3 weeks
3. Reapply tarp for 7-10 days all annuals dead.
4. Replant with sprigs/hydro cap or hydro seed.
5. **Old Bermuda fills from below ground and new planting material provides rapid fill in and stable playing surface.**
6. **Time table:**
 - a) **Kill weedy thatch-25 to 30 days**
 - b) **Remove thatch and fertilize 2-3 days**
 - c) **Weeds grow from seeds-3 weeks**
 - d) **Cover to kill seedling weeds-7 days**
 - e) **Fill in post planting-2 months**
 - f) **Total 4-5 months: apply mat to fill in**



Lights Out research topics

- 1. Weed mat cover duration to kill weeds & minimize impact or existing turf species**
- 2. Fertilizer types and rates to maximize weed seed germ.**
- 3. Duration for weed seed germination and growth prior to 2nd weed mat cover.**
- 4. W/hydro seeding: cultivars, seeding rates, growth additives.**
- 5. Time to initiate mowing after seeding.**



For more information

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HI Weed ID:

<http://www.ctahr.hawaii.edu/deFrankJ/index.htm>



