



# Cal EPPC News

## *Protecting California's Natural Areas from Wildland Weeds*

Vol. 10, No. 4, Winter 2002

Quarterly newsletter of the California Exotic Pest Plant Council



**Here's to the volunteers!** In honor of all those who lend their hands to managing invasive plants in the field—like these girls removing Scarlet wisteria *Sesbania punicea* seed pods along the American River—this issue of *Cal-EPPC News* features photos from the Sacramento Weed Warriors, an environmental stewardship project of the California Native Plant Society's Sacramento Valley Chapter. Volunteers ranging in age from 7 to 84 logged more than 6,000 hours in the project's first year. They come from schools and colleges, AmeriCorps, youth groups, neighborhood organizations, churches, businesses, and government agencies. Says Frank Wallace, the Weed Warriors' coordinator, "Government land managers are beginning to see the enormous potential for volunteer workers. As a former educator, I also see the great potential for combining stewardship and environmental education for our younger generation. One misperception that continues to be a challenge is that our sponsors often seem to believe that a volunteer program should be free! I emphasize to our sponsors that volunteer programs need paid leadership who ensure that work is done according to professional standards and who provide sustainability of services. Once you have that in place, volunteer services can be very cost-effective, while providing all the intangibles that benefit our schools and our communities over the long term."

## **Inside:**

Testing natural-based herbicides for roadside vegetation control

Remote sensing of *Arundo*

*Hypericum canariense* update



## California Exotic Pest Plant Council

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A California 501(c)3 nonprofit organization

### Our Mission

CalEPPC works to protect  
California's natural areas  
from wildland weeds through  
research, restoration, and education.

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## CalEPPC News

Winter 2002 - Volume 10, Number 4

Editor: Doug Johnson, dwjohnson@caleppc.org

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## From the Director's Desk

Once again, the Symposium was a rousing success, a great exchange of information and inspiration! Thanks to everyone that made it happen, especially those who presented talks and posters and the sponsors who provided financial support.

Speaking of sponsors, the list of institutional supporters in the last issue of *Cal-EPPC News* accidentally left out **Mike Krebsbach of Monsanto**. He has been one of our most consistent supporters, and we want to be sure to give him credit here. His contributions not only helped keep conference costs low, but also helped print the *2003 Wildland Weeds of California* calendar.

**Herbicides**—now there's a topic for you. Most restorationists conclude that we cannot come close to stemming the tide of invasive plants without using herbicides in certain situations, and that the research and experience with particular products has shown them to be ecologically safe. Environmental purists, on the other hand, argue that we cannot know everything about the environmental fate of herbicides, and that it's unwise to use materials with any potential for detrimental effects. It is a topic worthy of constructive dialogue.

This issue of *Cal-EPPC News* features an update on Steve Young's research on natural-based herbicides as alternatives for **Caltrans roadside management**. His work shows several things: first, formulations of common materials such as clove oil can provide weed control; and second, such alternatives cost a lot more than synthetic herbicides, especially since they typically require multiple applications.

We also present some interesting early results from a remote sensing project that is enabling inventory of *Arundo* over large areas from aerial imagery. And speaking of *Arundo*, we hear from the questionable ideas department that the SamoaPacific mill on Humboldt Bay is proposing to **grow *Arundo* agriculturally** as a source of pulp for paper. It might slow down the logging on our forests, but the potential to spread rhizomes is frightening. Perhaps they could use the mill to process eucalyptus pulp instead! We'll keep you posted.



**Bringing people together under a big tent** Lunch outside at the 2002 Symposium in Sacramento, October 11-13.

# Wildland Weed NewsNewsNewsNewsNews

Sciencedaily.com (8/13/02) reports that researchers using systematics and phylogeography are tracing the Eurasian source of **invasive saltcedar** (*Tamarix* spp.) in the U.S. DNA sequencing helps identify species and document hybridization, which may help researchers find host-specific insect biocontrol agents.

A study in *Science* (8/9/02) reports that habitat destruction costs the world \$250 billion each year. A network of global nature reserves would ensure the delivery of **environmental goods and services** (including climate regulation, water filtration, soil formation, and sustainably

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*"If you are thinking of planting pyracantha or cotoneaster—both invasive and cliches besides—be a sport and plant toyon instead."*

*Ron Sullivan, San Francisco Chronicle, 10/5/02, Home & Garden section*

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harvested plants and animals) worth at least \$400 trillion more each year than the goods and services from their converted counterparts. Author interview at <http://ens-news.com/ens/aug2002/2002-08-09-07.asp>

SB 1573, introduced by California State Senator Betty Karnette (D-San Pedro) creates an **Interagency Aquatic Invasive Species Council** that will develop a comprehensive plan to address the increasing impacts of aquatic invasive species in California. SB 1573 was signed by Gov. Davis on September 15, 2002.

The **National Aquatic Invasive Species Act (NAISA) of 2002** has been introduced in Congress by Sen. Levin (D-MI), Rep. Gilchrest (R-MD), and Rep. Ehlers (R-MI). The act reauthorizes and strengthens the National Invasive Species Act of 1996, which regulated ballast discharge from commercial vessels and importations of live organisms. The current bill creates a national monitoring network, and sets aside funding for rapid response and state and regional grants.

New research has found that **wildlife corridors** enhance crucial plant-animal interactions in fragmented habitats. By influencing bird and insect behavior, such corridors increase pollen flow and seed dispersal, crucial means of genetic exchange between habitat fragments. [Procedures for the National Academy of Science, 9/16/02]

In an attempt to reduce the introduction of invasive plants, staff at the **Santa Rosa Plateau Ecological Reserve** located at the

southern end of the Santa Ana Mountains have put brushes at each trailhead along with signs that explain to hikers why they should clean their boots prior to hiking. [*Bakersfield Californian*, 9/26/02, p. B-1]

On October 2, Rep. Bob Goodlatte (R-VA), Chairman of the Agriculture Subcommittee on Departmental Operations, Oversight, Nutrition, & Forestry held a hearing to **review federal agency performance** in monitoring and preventing the introduction of invasive species, and to look for ways to better coordinate the organizations involved in the National Invasive Species Council, co-chaired by the Departments of Agriculture, Interior and Commerce.

## Symposium DPR Credits

If you signed the sheet at the Symposium and submitted a scantron form you will receive 2 hours of "laws and regulations" credit and 7 hours of "other" credit. Use DPR code numbers **A-1437-02** and **A-1438-02**.

If you also attended the field trip, signed the sheet and submitted a scantron form, you will receive an additional 5 hours of "other" credit. Use DPR code number **A-1439-02**.



**Friendly weed folk** From left, Jake Sigg, Exotics Chair for the California Native Plant Society; Carla Koop, Watershed Coordinator for Alhambra Creek; Lia Hull, Executive Coordinator of the Golden Gate Biosphere Reserve Association; Alison Stanton, consultant with BMP Ecosciences and CalEPPC boardmember; and Katy Zaremba of the Coastal Conservancy's Invasive Spartina Project. [photos by Sara Marcellino]

## Current Cartography

# New remote sensing tool under evaluation

Marc R. Horney

Many of us would dearly like to have a mapping tool capable of searching an aerial photo or a satellite image and accurately pinpointing the location of every invasive weed in the scene. Used every few years it could provide information on the extent of infestation and the rate and direction of spread (or retreat) and help inform our strategies for implementing control. Unfortunately, that day is not quite here yet—but it may be getting closer.

In the last few years, researchers have successfully demonstrated techniques for detecting several invasive weed species by using computers to “classify” plants based on the characteristics of solar energy reflected by their leaves or flowers. A common limitation of these techniques is that unique relationships between solar reflectances and plant species must be established for each individual image. That isn't a great obstacle for researchers, but it can be a practical problem for project managers mapping weed infestations on a landscape- or watershed-scale where tens to hundreds of images may need to be processed. One way around that difficulty is simply to manually map weed infestations from high-resolution aerial photos. A great deal of vegetation mapping has been done that way over the years, but it can take a considerable amount of time, it requires very good imagery, and it is subject to the skill of the photo interpreter and the physical distinctiveness of the target weed species.

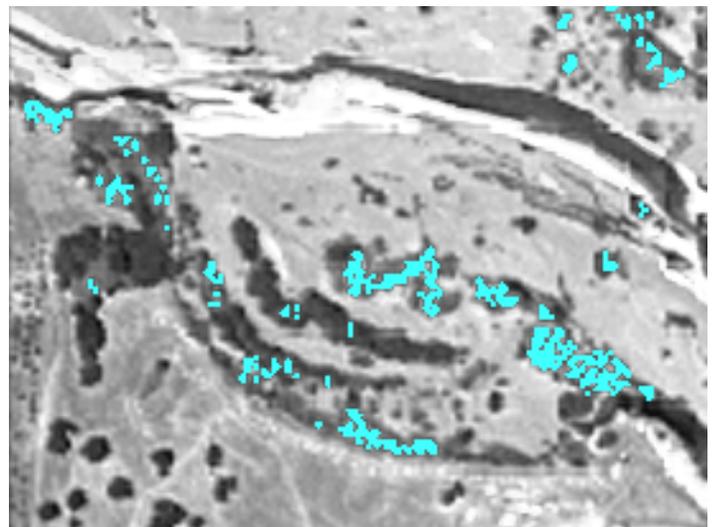
One possible alternative to these practices may be a new spectral analysis procedure being developed by ERSAR, INC. of Lincoln, NE. Instead of classifying plant canopies in terms of their solar reflectance characteristics, the ERSAR analysis processes the reflectance data to produce quantitative estimates of specific pigment concentrations, canopy cover and leaf architecture. The developer describes the analysis as being robust to background, solar and view angle effects, allowing classifications based on plant biophysical properties to be uniformly applied to ERSAR output from different images.

Several tests of the ERSAR procedure have been conducted in Colusa and Glenn Counties in 2000 and 2001. In 2000 the ERSAR analysis was used to classify *Arundo donax* and Yellow starthistle from IKONOS 4-meter 4-band satellite imagery. In 2001 the same procedure was used to detect perennial pepperweed using 1-meter 6-band digital aerial imagery, and to reclassify the *Arundo* from 2-meter 6-band digital aerial imagery. Results so far indicate that while the Yellow starthistle classification system did not capture low-to-moderate density infesta-

tions well using IKONOS data, the higher resolution perennial pepperweed and arundo classifications both performed satisfactorily. While the coarser resolution IKONOS imagery was adequate for detecting large arundo colonies, it generally failed to allow detection of arundo plants presenting less than 8m of pure canopy in sensor view. On the perennial pepperweed project, an attribute set defined for pepperweed in an image from a wetland site at the Colusa Wildlife Refuge was successfully used to detect pepperweed in another image acquired over an agricultural area (fallow fields, orchards and field crops) 5km away.

Future plans include stepping ERSAR trials up to a watershed scale to determine how effective and usable the procedure is for processing larger image sets. Funding for this research was provided by a grant from the UC Center for Pest Management Research and Extension. Reports on the ERSAR evaluation trials will be available by the end of 2002.

*Dr. Horney is Natural Resources Management & Range Livestock Production Advisor for the University of California Cooperative Extension in Colusa, Glenn and Tehama Counties. Contact him at (530) 865-1154 or <mrborney@ucdavis.edu>.*



**From the air** The remote sensing techniques was used at a site along the Sacramento River (lower photo). *Arundo* was detected from a characteristic “signature” in aerial photos using 6 frequency bands. The blue areas in the upper photo mark patches of *Arundo* as determined by the classification software.

## Feature

# Exploring alternative methods for vegetation control and maintenance along roadsides

By Steve L. Young

UC Hopland Research & Extension Center

The California Department of Transportation (Caltrans) manages approximately 15,000 miles of highway and more than 230,000 acres of right-of-way throughout the state. A major portion of the management and maintenance effort is associated with vegetation control. This need is driven by safety concerns, such as ensuring visibility of traffic and highway structures and minimizing fire potential by reducing vegetative biomass. Additionally, vegetation control provides benefits by reducing the presence of noxious weeds and other pests, and it is a major component of erosion control.

### Reducing herbicide use on roadsides

The use of herbicides on Caltrans-managed acreage has raised concerns of environmental quality, public health, and worker safety, especially in the North Coast area of California. An Environmental Impact Report (EIR) was completed in late 1992 which assessed the risks of the agency's use of chemical vegetation control programs (Jones & Stokes 1992). Following the issuance of this document, Caltrans adopted an integrated vegetation management program and set goals for reduction of chemical use: a 50% reduction by 2000, and an 80% reduction by 2012 (Jones & Stokes 1997). Currently, Caltrans District 1 has severely limited its use of herbicides within two counties (Mendocino and Humboldt) within its district borders. Alternative methods of vegetation control need to be developed and proven effective in a variety of types of plant communities and climates in order for Caltrans to be able to continue its mandate in these counties and elsewhere.

Caltrans approached UC Hopland Research & Extension Center to conduct

research on alternatives to conventional herbicides. The primary aspect of this research has focused on the many natural-based (non-synthetic) products that can be used for vegetation control. These products are typically either compounds derived from plants or combinations of ingredients that are naturally found in the environment (i.e. acetic acid, pine oil and pelargonic acid). They have several features that make them desirable for herbicidal-type applications. Most of the natural-based products are organic or non-synthetic, have a low toxicity rating, and are fast-acting with a short residual life on plant or soil material. Many carry a food grade rating and are exempt from regulation by the EPA.

### Researching natural-based products

These natural-based products also have disadvantages that have made their use to date relatively uncommon. Unlike commercial herbicides that translocate within a plant's tissue, most natural-based products are contact inhibitors that do not translocate within the plant. The treated plant, unless it's a young seedling, is not killed unless a major portion of the tissue is contacted. Any uncontacted tissue containing actively growing plant cells will continue to grow, depending on the severity of injury and size of plant. Thus, for control of vegetation, a high volume of these substances is required, along with repeat applications to kill new shoots or recovering plant tissue. To date these drawbacks have been assumed to restrict the practical utility of these products along roadsides. Therefore, we initiated scientific testing of these natural-based products to determine their efficacy and economic feasibility in roadside and rangeland settings. Specifically, the objectives of these studies were to

determine: (1) the rate and timing of application that provides control of the target vegetation and (2) the costs associated with the use of natural-based products for vegetation control.

The final report on this research, to be completed in December 2002, will provide a documented assessment of the effectiveness of vegetation control treatments that may serve as alternatives to currently registered herbicides for use along Caltrans roadsides. The selected research reported here represents the main greenhouse and field studies on natural-based products that were conducted for the multi-year project (see tables next page). Results from the remaining field studies will be included in the final report.

### Corn gluten meal as a pre-emergence treatment

Corn gluten meal (CGM), the protein fraction of corn and a byproduct of corn wet-milling, is a natural-based granular applied material. Research at Iowa State University has shown CGM, which is 10% nitrogen by weight, to be an effective preemergence weed control treatment in turf grass settings (Christians 1993; Bingamen and Christians 1995; McDad and Christians 2000).

We conducted trials at two types of sites: one dominated by annual grasses, the other dominated by French broom (*Genista monspessulana*) and Jubata grass (*Cortaderia jubata*). Each site was mowed to a height of less than 4 in. prior to treatment application. Treatments consisted of CGM alone (at several different levels), CGM with compost, compost alone, standard synthetic herbicide Gallery® (isoxaben) with Surflan® (oryzalin), as well as untreated

*continued next page...*

## roadside alternatives...

...continued from previous page

control plots. In order to completely analyze the effectiveness of corn gluten and compost on vegetation control, we used both quantitative (point frame) and qualitative (visual control and vigor) methods, converting data for statistical analyses.

Initial indications after one year's worth of data suggest that the highest rate of CGM alone (1000 lbs/1000 ft<sup>2</sup>) was the most effective treatment for controlling vegetation at both types of sites. Lower rates (250 and 500 lbs/1000 ft<sup>2</sup> with and without compost) did not consistently control vegetation for all locations. The addition of compost as mulch to all treatments played a role in lowering weed pressure, especially at the annual grass sites. Following the first year of this two-year experiment, the cost of a roadside application of 1000 lbs/1000 ft<sup>2</sup> of CGM came to \$22,000/acre. The cost of a standard synthetic treatment of isoxaben at \$88/lb (at a rate of 1.25 lb/acre) and oryzalin at \$37/gal (at 1 gal/acre) would equal approximately \$147/acre. Even if CGM were used at low rates and just in urban interchanges, the price differential is sizable.

### Post-emergence treatments for annuals

The use of the natural-based products acetic acid, pine oil, ammoniated soap or fatty acids and citrus distillate were compared to glyphosate (RoundUp<sup>®</sup>) for control of annual vegetation in roadsides or rangelands. Plots were established along a roadside right-of-way in formerly grazed rangeland dominated by a variety of exotic annual grasses including foxtail fescue (*Vulpia myuros*), hare barley (*Hordeum leporinum*), medusahead (*Taeniatherum caput-medusae*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*) and slender oat (*Avena barbata*). There was a limited amount of broadleaf filaree (*Erodium botrys*). The treatments were broadcast-applied twice, except for glyphosate and fatty acids, starting April 11, 2001. Prior to re-applications on May 17, weed

control was evaluated visually. Due to weather-related early senescence of all other species prior to the second application, only control of slender oat, medusahead and hare barley was evaluated.

The natural-based products showed phytotoxicity on all vegetation. Control with all of the natural-based products was less than 73% after the second application and significantly less than the standard (control) treatment of glyphosate. ("Percent control" is the percent reduction in plant growth compared to an untreated control plot.) The cost, including applicator fees, for acetic acid was \$2,050/acre for two applications compared to glyphosate at \$199/acre for a single application.

### Post-emergence treatments on perennials

Experiments were conducted at Jug Handle State Reserve in Mendocino. Total vegetation control was evaluated with pine oil, plant essential oils, acetic acid, and citrus distillate, as well as glyphosate and glufosinate. Gorse (*Ulex europaeus*), a woody perennial that was mowed prior to site establishment, was the dominant vegetation at both sites with both Himalaya blackberry (*Rubus procerus*) and California blackberry (*Rubus ursinus*), two other woody perennials, velvet grass (*Holcus lanatus*) and sweet vernalgrass (*Anthoxanthum odoratum*) growing in the open spaces. The most

abundant forb was common catsear (*Hypochaeris radicata*). The synthetic herbicides, glyphosate (RoundUp<sup>®</sup>) and glufosinate (Finale<sup>®</sup>) were applied once, and the natural-based products were applied two or three times starting May 4, 2001. Visual evaluations for weed control were made prior to re-treatments and a final evaluation for vegetation control was made for both sites September 4. The results showed:

- Plant essential oils provided 80% or greater control of all vegetation (September 4).
- Plant essential oils were the most effective natural based treatment for controlling velvet grass, sweet vernalgrass and common catsear (>86%).
- Pine oil was 88% to 90% effective for control of common catsear.
- Acetic acid and citrus distillate were ineffective at controlling vegetation.

By comparison, glyphosate controlled blackberry, the two grasses and common catsear 94%, 100% and 100%, respectively (September 4). Glufosinate provided 84% or greater control of all species (June 1). Including applicator fees, it was more costly to use plant essential oils at \$2,463/acre for three applications versus one application of glyphosate for \$185/acre.

### Alternative materials for controlling roadside vegetation

<u>Material</u>	<u>Trade Name</u>	<u>Supplier</u>	<u>Tested</u>
Acetic/ethanoic acid	BurnOut	St. Gabriel Laboratories	Yes
Citrus distillate		Sunkist Growers, Inc.	Yes
Clove oil	Hexaherb <sup>™</sup>	EcoIPM, Inc.	Yes
Clove oil/acetic acid	Matran <sup>™</sup>	EcoIPM, Inc.	Yes
Corn gluten meal	BIO-WEED	BIOSCAPE, Inc.	Yes
DRA-033	(experimental)	EcoIPM, Inc.	Yes
Fatty acid	Scythe <sup>®</sup>	Biocontrol Network	Yes
Fatty acid	Greenscape	Yates NZ Limited	Yes
Fatty acid	BIO-Safe <sup>®</sup>	AGPRO NZ Limited	Yes
Herbicidal soap	Weed-Aside <sup>™</sup>	Gardens Alive!, Inc.	Yes
Pine oil	Organic Interceptor <sup>™</sup>	Certified Organics Limited	Yes
Sulfuric acid		Cheltec, Inc.	Yes
Sulfuric acid	CT-311	Cheltec, Inc.	Yes
Herbicidal soap	Superfast	Biocontrol Network	No
Mint oil		Idaho Mint Comm.	No
Vinegar 20%		Maestro-Gro	No

## Efficacy and cost-effectiveness

As of July 1, 2002, some preliminary conclusions can be made regarding the efficacy and cost-effectiveness of these alternative materials as compared to standard herbicides. In terms of efficacy, all of the alternative materials or natural-based products tested were phytotoxic to the types of vegetation present at our study sites. After the 2001 growing season, plant essential oils (Bioganic<sup>®</sup>) was the most effective treatment on both annual and perennial vegetation at our coastal test sites in Mendocino. Citrus distillate, pine oil (Organic Interceptor<sup>™</sup>) and acetic acid (BurnOut) in a single application provided less than 60% control as evaluated 14 days following treatment. Subsequent regrowth resulted in even less efficacy (except for the pine oil), as evaluated 49 and 123 days following the initial treatment, leading us to conclude these materials provided inadequate control. At our Hopland test sites, control of three dominant annual grasses after two applications of citrus distillate, acetic acid and pine oil was less than 70% as evaluated 35 days after the initial treatment. At both locations, it was inconclusive as to whether timing of applications and rates played a significant role in efficacy. (Studies conducted this past spring are giving similar results as spring 2001.) In contrast, the standard treatment of glyphosate (Roundup<sup>®</sup>) provided greater than 90% control with one application at all sites, except on gorse (76%) at Mendocino, throughout the entire season.

Though the cost to purchase natural-

based products for postemergence treatment was less than that for standard herbicides on dollars-per-volume or per-weight of formulated product, the overall costs for treatment were much greater. This resulted because greater treatment amounts were required, as were multiple applications, which increases both the amount of material needed but also the amount of labor needed. A detailed cost analysis of these natural-based products compared to standard herbicides will be included in the final report.

## Other areas of research and future investigations

Along with the trials whose preliminary results are described here, we are currently also conducting additional trials to evaluate the performance of other alternative methods and materials:

- We are comparing the performance of natural-based products to glyphosate as a cut stump treatment on French broom and Jubata grass.
- We are testing the application of high-intensity heat ("flaming")
- We are studying the optimal timing for mowing Yellow starthistle (Benefield *et al.* 1999; Thomsen *et al.* 1997).
- We are evaluating four newly found natural-based products—two fatty-acid products marketed in New Zealand, and sulfuric acid and plant essential oils products currently under development in the U.S.

The results of these experiments will be presented in the project's final report.

There are several specific questions that remain unanswered following the first full year of field studies: (1) Is it possible to obtain a complete kill after one application of natural-based products? (2) What is the effect of repeated applications, after several years of use, of natural-based products on long-lived perennial species and the soil? (3) What are the maximum and minimum application rates required to provide adequate control of target weeds, and how does this vary with timing of application? (4) How effective would it be to combine these alternatives with current roadside management practices? (5) What would be the response of Caltrans maintenance personnel to the use of alternatives and would there be less concern for safety because of the low toxicity rating for most natural-based products?

This initial project forms a foundation for further work to answer such questions, and to develop our knowledge of alternatives for vegetation control along roadsides.

Contact Steve at <[slyoung@ucdavis.edu](mailto:slyoung@ucdavis.edu)>

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## Sources for alternative materials

<u>Supplier</u>	<u>Location</u>	<u>Web site or address</u>
AGPRO NZ Limited	Auckland, NZ	<a href="http://www.agpro.co.nz">www.agpro.co.nz</a>
Biocontrol Network	Brentwood, TN	<a href="http://www.biconet.com/lawn/superfast.html">www.biconet.com/lawn/superfast.html</a>
BIOSCAPE, Inc.	Petaluma, CA	<a href="http://www.bioscape.com">www.bioscape.com</a>
Certified Organics Limited	Auckland, NZ	<a href="http://www.certified-organics.com/interceptor.htm">www.certified-organics.com/interceptor.htm</a>
Cheltec, Inc.	Sarasota, FL	<a href="http://www.cheltec.com">www.cheltec.com</a>
EcoIPM, Inc.	Franklin, TN	<a href="http://www.bioganic.com">www.bioganic.com</a> and <a href="http://www.ecoipm.com">www.ecoipm.com</a>
Gardens Alive!, Inc.	Lawrenceburg, IN	<a href="http://www.gardensalive.com">www.gardensalive.com</a>
Idaho Mint Comm.	Meridian, ID	1741 Gibson Way, Meridian, ID 83642
Maestro-Gro	Hamilton, TX	<a href="http://www.maestro-gro.com">www.maestro-gro.com</a>
St. Gabriel Laboratories	Gainesville, VA	<a href="http://www.milkyspore.com/burnout.htm">www.milkyspore.com/burnout.htm</a>
Sunkist Growers, Inc.	Ontario, CA	P.O. Box 3720, Ontario, CA 91761-0993
Yates NZ Limited	Auckland, NZ	<a href="http://yates.co.nz">yates.co.nz</a>

# Readings & Resources

## MAPPING BASICS

### California Weed Mapping Handbook

92-page draft document. Free online at [cain.nbio.gov/weedhandbook/](http://cain.nbio.gov/weedhandbook/)

This newly drafted handbook is a training resource for local groups (such as Weed Management Areas) involved in wildland weed mapping. It provides two types of information: (1) shared data standards, so that different data sets will be compatible, and (2) "how to" instructional information on mapping techniques. The aim of this guidebook is to help those working on weed issues to develop mapping systems that will support project goals on both a local and state level.

## HOW WE CHANGE

### Changing Behavior: Insights and Applications

King County Hazardous Waste Management Program

21-page report. Free online at [www.ciwmb.ca.gov/UsedOil/Grants/Resources/Planning/Behavior.doc](http://www.ciwmb.ca.gov/UsedOil/Grants/Resources/Planning/Behavior.doc)

A practical report that includes action steps and a detailed list of principles, with examples of projects that have used these principles. These insights and principles are directly applicable to the Going Native garden tour we're planning in the San Jose area, and worth thinking about for any other projects. A 1-page Executive Summary is available at [ww.metrokc.gov/hazwaste/lhwmp/behavior.html](http://ww.metrokc.gov/hazwaste/lhwmp/behavior.html).

Tanya Kucak

## Q & A FOR KIDS

### Teaching Points about Invasive Plants

Univ. of Florida, Center for Aquatic and Invasive Plants [plants.ifas.ufl.edu](http://plants.ifas.ufl.edu)

4-page pamphlet. Free.

Written to help teachers and trainers address students' questions about native and non-native plants. The points were proposed by K-12 teachers. Can be used as-is or as basis for developing your own materials.

## DIFFERENT APPROACHES

### Halting the Invasion: State Tools for Invasive Species Management

Environmental Law Institute

112-page report with CD ROM. \$20.00.

800/433-5120 or [www.eli.org](http://www.eli.org)

This report identifies 17 tools for states to effectively prevent, regulate, and manage

invasive species as well as enforce and implement existing laws. It offers three examples of model state programs and provides specific recommendations on improvements states could make to their existing invasive species tools. Finally, the report compiles detailed information on each states' laws and regulations related to invasive species.

## GREATEST HITS

### Invasive and Exotic Species

Natural Areas Association

CD ROM. \$30.00.

A compendium of 93 articles from the *Natural Areas Journal* on invasive and exotic species. Arranged by subject, with complete bibliography. Order online at [www.natareas.org](http://www.natareas.org)

## ROOM FOR IMPROVEMENT

### INVASIVE SPECIES: Clearer Focus and Greater Commitment Needed to Effectively Manage the Problem

United States General Accounting Office Report to Executive Agency Officials, October 2002

109-page report. Free online at [www.gao.gov/new.items/d031.pdf](http://www.gao.gov/new.items/d031.pdf)

This GAO review finds that the federal government has made little progress in implementing the actions called for by the National Invasive Species Management Plan. In addition to a call for incorporating economic data into invasive species management budget objectives, THE GAO recommended that the next management plan, due in January 2003, include performance goals that facilitate evaluation of progress.

## CHEAT SHEET

### Weed Treatment Calendar

Solano County Weed Management Area Card. Free from [mpdoran@ucdavis.edu](mailto:mpdoran@ucdavis.edu)

Compiling information from published articles, UC-WRIC, CalEPPC newsletters, local experience, reviews by UCCE weed specialists, etc., this well-formatted card tells you the best times for mechanical and chemical treatments of 11 weeds.

## SIMPLY THE BEST REFERENCE

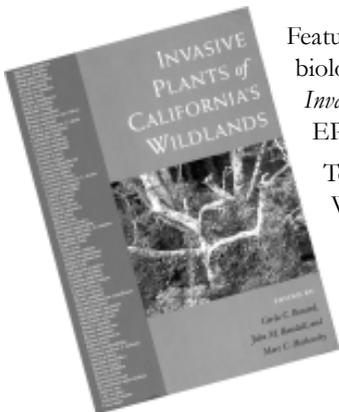
### Invasive Plants of California's Wildlands

Carla C. Bossard, John M. Randall, Marc C. Hoshovsky, Editors

360 pages, 133 color photos, 76 line illustrations, 79 maps

University of California Press, 2000. Paperback.

List price: \$29.95. Cal- EPPC price: \$24.95 plus tax



Featuring species accounts with detailed info on plant biology and control techniques for 78 species listed as *Invasive Plants of Greatest Ecological Concern* by Cal-EPPC.

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# Sacramento Weed Warriors!



## New and Contributing Members

We apologize if we forgot you or got your information wrong! Please let us know by emailing [dwjohanson@caleppc.org](mailto:dwjohanson@caleppc.org)

### New Sustaining Member:

· Victoria Jadali (Thousand Oaks)

### New Contributing Members:

· Katie Barrows (La Quinta)  
· Melissa Ervin (The Nature Conservancy, Irvine)  
· Mike Forbert (West Coast Wildlands, Pacifica)  
· Robert Gilbert (Soquel)  
· Ellen L. Simms (UC Botanical Garden, Berkeley)  
· Bern Smith (Landsmiths, El Granada)

### New Institutional Members:

· Redwood State and National Park (Orick)  
· Mike Bisciegli (DeAngelo Brothers, Inc., Chino)

### And Welcome to New Members:

Marty Acree (National Park Service, El Portal) · Earl Andress (USDA APHIS, Brawley) · Carol Arnold (Contra Costa County RCD, Concord) · Debra Ayres (UC Davis, Davis) · Sally Barrett (Cache Creek Conservancy, Woodland) · Debra Boelk (UC Davis, Davis) · Joshua Boldt (EIP Associates, Sacramento) · Herb Bolton (USDA CSREES, Washington, DC) · Shannon Brawley (Cache Creek Conservancy, Woodland) · Ron Brown (BLM, Hollister) · Peter Buck (Sacramento Area Flood Control Agency, Sacramento) · Daniel Burmester (Cal Dept. of Fish & Game, Rancho Cordova) · Regina Butala (SRS Technologies, Lompoc) · Roger Buttermore (US Fish & Wildlife Service, Stockton) · Noreen Cabanting (Bonterra Consulting, Costa Mesa) · Tom Cardenas (California Surveying & Drafting Supply, Sacramento) · Cameron Chabre (Elkhorn Slough, Watsonville) · Bernardo Chavez (BLM, Santa Fe, NM) · Buford Crites (City of Palm Desert, Palm Desert) · Kathy Crump (Friends of Five Mile Creek, Stockton) · Ann Dennis (CalFlora Database, Albany) · Cov DeRamus (GGNRA, Sausalito) · Kerry Eastman (San Joaquin River Parkway & Cons. Trust, Fresno) · Lee Echols (GGNPA/Site Stewardship, San Francisco) · Rob Evans (Circuit Rider Productions, Windsor) · Robin Fallscheer (Cal Dept. of Fish & Game, Stockton) · Dennis Fox (Bakersfield) · Greg Gallagher (University of Wisconsin, Madison, Redding) · Kevin Ghalambor (Watershed Institute/CSUMB, Seaside) · Anthony Guerriero (Watershed Institute/CSUMB, Seaside) · Claudia Gumbaro (Caltrans, Stockton) ·

### New members, cont'd:

Kate Handrich (BLM, Hollister) · Mark Hessing (National Training Center & Fort Irwin, Barstow) · Brian Hildebidle (Golden Gate National Parks Association, San Francisco) · Xiaohong Huang (Cal. Dept. of Water Resources, Bakersfield) · Lia Hull (Golden Gate Biosphere Reserve Association, Stanford) · Geri Hulse-Stephens (CNPS Sanhedrin Chapter, Willits) · Marie Jasieniuk (UC Davis, Davis) · Ryan Jones (GGNPA/Site Stewardship, San Francisco) · JoEllen Kassebaum (Natural Resources Division, Miramar Marine Base, San Diego) · Susan Kelly (Center for Invasive Plant Management, Bozeman, MT) · Larry Klaasen (Sierra Club, San Diego) · Janet Klein (Marin Municipal Water District, Corte Madera) · John Knapp (Santa Catalina Island Conservancy, Avalon) · Denise Knapp (Santa Catalina Island Conservancy, Avalon) · Sara Koenig (Lassen Volcanic National Park, Mineral) · Eddy Konno (Cal Dept. of Fish & Game, La Quinta) · Carla Koop (Alhambra Watershed Action Group, El Cerrito) · Lisa Lacabanne (Aquatic Outreach Institute, Richmond) · John Lambrinos (UC Davis, Woodland) · Jaymee Marty (The Nature Conservancy, Galt) · Jodi McGraw (UC Berkeley, Integrative Biology, Berkeley) · Miguel Mejia (BLM, Barstow) · Michael Mooney (San Francisco) · Pam Neilson (NRCS Tulare County, Visalia) · Tony Nelson (Marin County Land Trust, Point Reyes) · Ron Nelson (Ecovisions, Arcata) · Aaron Norwood (GGNPA/Site Stewardship, San Francisco) · Danny Pando (BLM, Barstow) · Arnie Peterson (Lassen Volcanic National Park, Mineral) · Carolyn Pizzo (USDA APHIS PPQ, Sacramento) · Liz Ponzini (GGNRA, Sausalito) · Sarah Ross (Sacramento Area Flood Control Agency, Sacramento) · Maria Ryan (Univ. of Nevada, Reno, Las Vegas, NV) · Weena Sangkatavat (Bonterra Consulting, Costa Mesa) · Stephanie Sapper (Caltrans, Fullerton) · Aleutia Scott (National Park Service, San Francisco) · Anil Shrestha (UC Statewide IPM Program, Parlier) · Jodie Snowbarger (Contra Costa Co. Ag. Dept., Concord) · Scott Stewart (Conservaseed, Walnut Grove) · George Strnad (Oakland) · Jeffrey Summers (Watershed Institute, Seaside) · Sara Sweet (UC Davis, Davis) · Apple Szostak (Aquatic Outreach Institute, Richmond) · Carol Thornber (UC Davis, Davis) · Luz Torres (Caltrans, Los Angeles) · Samuel Valdez (Official Trip Reports, San Francisco) · John Wade (Pescadero Conservation Alliance, Pescadero) · Jessie Walker (AMEC Earth & Environmental, San Diego) · Frank Wallace (CNPS, Sacramento) · David Washburn (Washburn Grove Management, Hemet) · John Watson (Cache Creek Conservancy, Woodland) · Molly Webster (GGNRA, Sausalito) · Shawn Witaschek (San Mateo County Parks, Redwood City) · Isa Wou (USGS, Vallejo) · Paul Yamazaki (CalTrans, Los Angeles) · Dana York (NPS, Death Valley) · Katy Zarembo (Invasive Spartina Project, Oakland) · David Zweifel (Big Sur Land Trust, Carmel)

## Species Focus

# Hypericum canariense

Info from Mandy Tu of the Wildland Invasive Species Team, online at [www.tncweeds.ucdavis.edu](http://www.tncweeds.ucdavis.edu)

*Hypericum canariense* (St. Johnswort family) is native to the Canary Islands where it is often located in xerophytic scrub or forested zones, from 150 to 800m elevation. It can be very common



locally (Bramwell & Bramwell 1974). In North America, *H. canariense* occurs as an invader in Hawaii and in California (USDA-NRCS 2001). Previous reports from California list this species as present only in San Diego and Santa Barbara counties (CalFlora 2001). In San Diego, *H. canariense* has escaped cultivation as an ornamental near the Point Loma military cemetery (M. Kelly, pers. comm.). In San Mateo County, *H. canariense* currently covers approximately 62-99 acres near Gazos Creek. There are several populations of *H. canariense* along the county's coast, all rapidly expanding in range (J. Wade, pers. comm.).

*H. canariense* is a shrub that can grow up to 5m tall and has simple, opposite leaves that are oblong-lanceolate, with tapered bases. Although the plant has features desirable to horticulturists and is thought to have escaped from cultivation (CDFA 2001), it is currently not widely grown as a garden or landscape plant. It is kept at the Los Angeles Arboretum and seeds are offered for sale on the internet (Platt 2001), but on the whole the plant

does not seem to be widely offered at wholesale or specialty nurseries in North America.

*H. canariense* appears to outcompete and exclude nearly all other vegetation once it has invaded. In coastal California areas that have become infested, *H. canariense* can comprise up to 90 to 100% of the vegetation cover, and it outcompetes and excludes native scrub vegetation (J. Wade, pers. comm.). In favorable conditions, infestations of *H. canariense* can spread at a rate of up to 45-90 meters per year.

*H. canariense* produces large amounts of viable seed. Many seedlings have been found just downslope of mature shrubs in San Diego County (M. Kelly, pers. comm.). Little information is available on successful control methods for *H. canariense*. Mike Kelly has been successful using the cut-stump method with full-strength glyphosate.

### References:

- Bramwell, D. and Z. Bramwell. 1974. Wildflowers of the Canary Islands. Stanley Thornes, Ltd., London.
- CDFA. 2001. California Department of Food and Agriculture-Weed Management (<http://pi.cdffa.ca.gov/weedinform/HYPERICU2.html>)
- Kelly, M. 2001. California Exotic Pest Plant Council. Personal communication.
- Platt, K. 2001. The Seed Search ([www.seedsearch.demon.co.uk/](http://www.seedsearch.demon.co.uk/)), site accessed November 2001.

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Wade, J. 2001. Pescadero Conservation Alliance. Personal communication.

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*Update from John Wade, Pescadero Conservation Alliance*

**Treatment:** Ken Moore's State Parks crew sprayed last year with limited success. I did some test cuttings and it resprouted. Weed wrenching is difficult due to a complex and deep root network, but it might work better when the ground is softer. TNC had success using Garlon.

**Survey:** I did another aerial flight this year. Yes, it is continuing to spread.

**Research:** Katrina Dlugosh is researching the plant for her doctoral thesis at UCSC.

**Planning:** We have a global email list of people concerned with the problem in Hawaii, Australia and elsewhere and are comparing eradication technique notes. It needs a real campaign with funding.

**Local Projects:** I've talked with the manager at the mushroom farm in Pescadero that has one of the biggest infestations, and they would be cooperative with removal if someone else did it.

Contact John at <[JWSavsLand@aol.com](mailto:JWSavsLand@aol.com)>



*H. canariense* infestation on the San Mateo County coast along Highway 1.

# The WILDLAND WEED CALENDAR...

## **California Association of Resource Conservation Districts: 2002 Annual Meeting & Conference**

November 14-17, 2002  
Redding, CA

<[www.carcd.org/con2002/conf2002.htm](http://www.carcd.org/con2002/conf2002.htm)>

## **Using Native Grasses and Graminoids in Restoration and Revegetation**

November 20-21, 2002  
San Luis Obispo, CA

Workshop sponsored by the California Native Grass Association. Contact Jan Bridge at <[admin@cnga.org](mailto:admin@cnga.org)>

## **Invasive Plants and Restoration in the West: A Partnership Workshop**

December 8-11  
Salt Lake City, UT

Sponsored by the Center for Invasive Plant Management and the National Invasive Species Council. <[www.weedcenter.org/help/helphome.html](http://www.weedcenter.org/help/helphome.html)>

## **Invasive Species: A Comparison of Hawaii and California**

January 6-8, 2003  
Kailua-Kona, HI

Presented by the California-Pacific Section of the Society for Range Manage-

ment. Field trips visiting Hawaiian rangelands with a hands-on approach. For more information contact Bill Frost (530/621-5509, [wefrost@ucdavis.edu](mailto:wefrost@ucdavis.edu))

## **Second Biennial CALFED Science Conference: Advances in Science and Restoration in the Bay, Delta and Watershed**

January 14-16, 2003  
Sacramento Convention Center, CA

<[www.iep.ca.gov/calfed/sciconf/2003/](http://www.iep.ca.gov/calfed/sciconf/2003/)>



150 years... of *Carpobrotus*

## **California Weed Science Society Annual Meeting**

January 19-22, 2003  
Santa Barbara, CA

[www.cwss.org/conf.htm](http://www.cwss.org/conf.htm)

## **Two-Day Weed School**

January 29-30  
Konocti Harbor Resort, Lake County, CA

Sponsored by the Lake County WMA with the assistance of a grant from the Center for Invasive Plant Management. Speakers include Dr. Nelroy Jackson and Dr. Joe DiTomaso. CEU's offered. For more information contact Tony Gallegos (707/263-2341 or [tonyg@co.lake.ca.us](mailto:tonyg@co.lake.ca.us))

## **National Invasive Weed Awareness Week**

February 24-28  
Washington, DC

4th annual gathering of weed managers to participate in visible public activities and to lobby their representatives. <[www.nawma.org](http://www.nawma.org)>

## **IPINAMS 2003 - Invasive Plants in Natural and Managed Systems: Linking Science and Management**

November 3-7, 2003  
Fort Lauderdale, FL

<[www.esa.org/ipinams-emapi7](http://www.esa.org/ipinams-emapi7)>

## Quotable:

“*Arundo donax* reproduces ONLY by rhizomes—roots from one plant that ‘grow’ another plant. It cannot produce by seed or any other method. Hence, grown under the controlled conditions of a professional agricultural operation, outside of flood plain areas, and with the advice and oversight of agricultural officials, it is 100% safe.”

From “The True Facts About *Arundo Donax*” in an open letter to public officials from Francis J. Fitzpatrick, President of Samoa Cane Enterprises. The firm purchased Louisiana-Pacific’s pulp mill on Humboldt Bay, and hopes to use the facility to make paper from agriculturally grown *Arundo*.

“New York has giant blind albino alligators in the sewers (and if you don’t believe me, go ask snopes.com). Hah. Bunch of wimps. California has something much worse: gorse. Gorse and pampas grass, poison hemlock and yellow starthistle, Scotch broom and German ivy, red-apple aptenia and blue-gum eucalyptus. Any of these is a bigger threat than a bite on the butt from a servergator, and not only because (unlike sewerators) they’re all demonstrably real and threatening. There are dozens more, and, fellow gardeners, they’re partly our fault.”

Ron Sullivan, San Francisco Chronicle, 8/24/02, Home & Garden section

# CalEPPC Membership Form

***We're working to protect California's wildlands from invasive plants—join us!***

CalEPPC's effectiveness comes from a strong membership, including scientists, land managers, policy makers, and concerned citizens. Please photocopy the form below, complete, and mail with your payment. Additional donations are always welcome to support our projects; we are a 501(c)(3) nonprofit organization, and donations beyond basic membership rates are tax deductible.

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