Exotic Pest Plants in the Press

Plant Invaders: the Threat to Natural Ecosystems

This book is the second in a new series of manuals in plant conservation which contribute to the People and Plants Initiative set up by the World Wide Fund for Nature (WWF), UNESCO and the Royal Botanic Gardens, Kew, England. The main aim of the initiative is to build up the capacity for work with local communities on botanical aspects of conservation of biodiversity.

The aim of this manual is to draw attention to the growing problem of invasive plant species, which are already a serious threat to the biodiversity of many parts of the world. Little is known of the factors that lead to biological invasions, making it difficult to predict which species will become invasive. There is, therefore, a need to increase public awareness of the threat to natural and semi-natural ecosystems and numerous instances of invasion are given to indicate the nature of the problem. There is also the need to alert research and governmental organizations in order to focus and strengthen research and management strategies, and to give practical information and advice on how to deal with invasive plants. The use of case studies of important species is designed to illustrate the wide variety of invasions and control methods.

The subject is approached in the context of conservation and concentrates on plant invasion as a threat to wild biodiversity, rather than agricultural weeds. The intention is to change current thinking on invasive plants, from an obscure problem to a major hazard to biodiversity.


California Exotic Pest Plant Council
CalEPPC NEWS
P.O. Box 1045
Cambria, CA 93428-1045

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TIME-DATED MATERIAL

PRINTED ON RECYCLED PAPER
Who We Are

CalEPPC NEWS is published quarterly by the California Exotic Pest Plant Council, a non-profit organization. The objects of the organization are to:

- provide a focus for issues and concerns regarding exotic pest plants in California;
- facilitate communication and the exchange of information among all sectors of exotic pest plant control and management;
- provide a forum where all interest groups may participate in meetings and share the benefits from the information generated by this council;
- promote public understanding regarding exotic pest plants and their control;
- serve as an advisory council regarding funding, research, management and control of exotic pest plants;
- facilitate action campaigns to monitor and control exotic pest plants in California; and
- review incipient and potential pest plant management problems and activities and provide relevant information to interested parties.

Newsletter Submissions

Letters to the Editor, notices, articles of all types, volunteer workshop schedules, photographs, and line drawings are welcome and may be submitted directly to the editor at the address to the right. We invite you to utilize CalEPPC NEWS as a forum for describing your project, asking for help, or bringing new issues or developments to the forefront. Electronic submission is gratefully accepted in PC-formatted 3.5" or 5.25" disks utilizing WordPerfect or Microsoft Word. Please enclose a quality hard copy with your disk. Copy for the Spring 1996 edition is due by the editor by March 15, 1996.

NOTE: THE EDITOR HAS MOVED!

Please contact the editor at:
1 Rio Camino Court, Sacramento, CA 95834 916.921.5911 FAX 916.921.5911 (call first) e-mail: sallydavis@aad.com

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Upcoming Meetings of Interest

February 14-16, 1998 "Controlling Arundo donax in the Riparian Ecosystem: A Workshop and Discussion Forum" sponsored by the Sonoma Ecology Center’s Creek Restoration Program. 9:00-4:30 at the Westerbeke Ranch, 2300 Grove Street, Sonoma, CA. Guest speakers include Paul Frander, co-founder of Team Arundo, Nelsy Jackson, Ph.D., of Monsanto Company, and Gary Bell, Ph.D., of The Nature Conservancy, who will lead in presentations and discussions of the biology of the plant and the process of organizing a comprehensive Arundo control program on a watershed scale. For information contact Richard Dale at 707.996.3744.


March 12-15, 1999 The Western Weed Coordination Committee (WWCC) and the Western Society of Weed Science (WSWS) combined annual meetings will be held in Albuquerque, New Mexico. Registration fee is $90, with one-day fees available. For more information, contact Barbara Mullin (WWCC) at 405.444.5400 or Gus Foster (WSWS) at 707.484.8925. To register for either or both meetings, contact Wanda Graves at 510.790.1252.

March 27-29, 1999 The Western Aquatic Plant Management Society, the western chapter of the North American Lake Management Society, and Portland State University will sponsor a "Symposium on Non-Native Organisms in Western Aquatic Ecosystems." The symposium will feature invited speakers who will discuss the biology, impact, and management of non-native organisms in aquatic ecosystems of the west. For more information, contact Mark Syrana, Program Chair, Biology Department, Portland State University, P.O. Box 751, Portland, OR 97207. Phone: 503.725.3853; FAX: 503.725.3854; E-mail: hzm@podin.cc.pdx.edu

April 16-18, 1999 "The Broom Symposium," jointly sponsored by the California Exotic Pest Plant Council (CalEPPC), the Pacific Northwest Exotic Pest Plant Council (PNW EPPC), the Oregon Department of Agriculture, and the Washington State Noxious Weed Control Board will be held at Portland State University, Portland, Oregon. The Broom Symposium will gather together a broad range of persons with interest in broom control and management and present information on control techniques, and the biology and ecology of broom. Attendees are encouraged to bring a poster or display that addresses the biology and/or management of Scotch, French, Spanish, or Portuguese brooms. Speakers and participants will be from Oregon, Washington, California, British Columbia, New Zealand and Australia. For more information, or to volunteer contact Dennis Isaacson at 503.986.4621 or Laurie Penders at 206.872.2972.


June 19-21, 1998 "Vernal Pool Conference," jointly sponsored by CNPS, SERCAL, and the western section of The Wildlife Society, will be held in Sacramento. For information, call Mark Skiller, 916.324.3816, George Clark at 916.355.4362, or Allen Barnes at 916.447.2077.

October 4-6, 1998 San Diego will be the site of CalEPPC Symposium ’98. Mark your calendar and save this weekend for another exciting and fun event!

October 30 - November 3, 1998 "SERCAL’s Fifth Annual Meeting will be held in Yosemite National Park."
Western Expert Educational Diagnostic System
Robert H. Callihan, Extension Weed Specialist
Robert T. Dobbins, Programmer/Analyst; and Sherri L. Carson, Laboratory Aide

WEEDS 2.1©: User-friendly computer software for identification of over 1000 weeds of the western U.S. and Canada. IBM Windows & laptop compatible, requires DOS 3.2 or higher, 400X RAM and 2 MB hard disk space.

NAWEEDS©: User-friendly computer software for identification of over 1300 weeds of the western U.S. and Canada. IBM Windows & laptop compatible, requires DOS 3.2 or higher, 400X RAM and 2.5 MB hard disk space.

This random-access software package will allow you to quickly identify weed species. By selecting a few plant characteristics of your choice, you can identify any species in the database. The large number of menu choices and selection functions will fit a variety of skill levels and plant conditions.

Exotic plant species have been introduced from one part of the globe to another throughout human history, many times with beneficial economic results, sometimes with disastrous ecological consequences. Perhaps the worst of these may be the loss of native biodiversity. The invasion of approximately 35 million acres of Australian farmland by prickly pear (Opuntia sp.) in the 1920s or the current spread of salt cedar (Tamarix sp.) in the riparian areas of the American Southwest (Loehman, 1993) are but two examples of the impacts exotic plants can have on native plant communities when they become weedy in their new environment.

Agroforestry, which has been adopted in many developing countries as one of the most promising land use systems in the fight against poverty and environmental degradation, has often focused on identifying species of trees that can produce fuelwood, fodder, and timber for people and fodder for livestock, among other things. Some of these trees, exotic species introduced because of their multipurpose value, have acquired the name of “miracle trees.” Yet little is known about the impacts such trees may have on local native flora and fauna.

Some tree species associated with agroforestry, while providing beneficial uses in fields and gardens, have behaved as weeds in the surrounding countryside. Fournelikas (1992) describes that Eucommia ulmoides and Lannea coromandelica, 2 exotic species introduced in the past for fuelwood tree plantations, are, respectively, “in the process of invading at the sides of roads, fields and the edges of the natural vegetation” and spreading “in some places” in the region, invading more humid parts of southern Mexico.

Biocentrism is more than the sum of the species present in a community (Gentry, 1994; Gentry and Hines, 1994) and the construction of exotic species into native communities, far from adding biological diversity, can in fact result in a loss of such diversity. For instance, what were previously different species assemblages within a common landscape may, after the introduction of exotic species in that landscape, share one or more of these exotic species and thus be more similar to each other than before. He argues that “native diversity is inherently more valuable over the long term than artificial diversity and should be the primary focus of conservation efforts.”

Yet the food and fuelwood crisis that is worsening in many developing countries is all too real. Gentry (1992) recognizes that closing the gaps of exotic species diversity is not possible in the face of the sustained utilization of native resources may be the only alternative to maintain social and economic harmonization in many developing countries. In solving these social and economic problems, managed agroforestry systems, although less diverse than most “natural forests,” have significant advantages over other land use forms such as selective logging or forest invention (Paduch and Peters, 1993).

For some agroforesters, Gentry’s (1992) challenge is tackled by the system of multipurpose trees. For Owino (1992), the tree is treated as an engineered community more than as a biological organism. He emphasizes that agroforestry is above all a strategy to “produce the maximum amount of tree product and/or services in the shortest possible time thus enabling maximum economic benefit.” Shiva et al. (1991) argue that while production is a required objective of agroforestry, “the deliberate substitution of diversity by uniformity - of crops, trees, and livestock...has worsened the biodiversity crisis.” They assert that biodiversity cannot be preserved if production systems are not themselves based on a policy of biodiversity conservation.

Agroforesters have included native species in their search for multipurpose trees, often with the help of indigenous people. Rochelaux et al. (1988) report on how local farmers in Kenya, although initiating focusing primarily on exotic tree species, often came back to agroforestry staff with lists of local tree species and with suggestions on how to incorporate them in an agroforestry scheme. Alsher and Motycka (1993) describe how naturally rich and diverse native agroforestries are in Latin America, including traditional agroforestry systems such as those managed by some Amazonian ethnic groups, which often contain well over 100 plant species per field.

There is no question that the dilemma noted by Gentry (1992) calls for innovative agroforestry schemes to be designed and implemented so as to raise production levels. Given the needlessness of some of the exotic trees that are so often introduced today by some agroforestry projects, it is urgent that such schemes be revised to consider the ecological/benefit ratio of such introductions and to provide for more emphasis on using native tree species. The conservation of native species diversity of many developing countries may be at stake.

Refereces
The Use of Fire for Yellow Starthistle (Centaurea solstitialis)
Management and the Restoration of Native Grasslands at Sugarloaf Ridge State Park

Project Summary as presented to the California Weed Conference, January 1996
Marla Hastings and Joseph DiTomaso

Abstract
Three consecutive prescribed summer burns conducted within Sugarloaf Ridge State Park have demonstrated a marked reduction in the density of this noxious annual while nearly doubling the cover of other forbs and native species. Essential elements to assure project effectiveness are identified, which include the critical timing for conducting the burns and the requirement to burn annually over a three year period.

Introduction
Sugarloaf Ridge State Park, Sonoma County, is located in the northern Coast Range near Santa Rosa, California. It contains a complex mosaic of vegetation types which include chaparral, mixed evergreen forest, woodland-savanna, grassland, and coniferous forest. Open grasslands occupy approximately 350 acres of the park’s 2700 acres. Livestock grazing and related agricultural practices since before 1900 heavily impacted the grassland areas.

The current grassland complex of the park includes both a native perennial component dominated by purple needlegrass (Nasella pulchra), blue wildrye (Elymus glaucus), and Lepus artemisiae, and an exotic annual European grassland component dominated by ripgut brome (Bromus diandrus), soft brome or blandro brome (Bromus hordeaceus), silver European hairgrass (Alopecurus myosuroides), wild oats (Avena fatua), and little quaking grass (Briza minor). Significant populations of yellow starthistle (Centaurea solstitialis) are found throughout the grassland areas. Mixed evergreen forest, composed of Douglas fir (Pseudotsuga menziesii), canyon oak (Quercus chrysolepis), tanoak (Liebovicius densiflorus), and madrone (Arbutus menziesii), is the major vegetation type throughout the park.

Yellow starthistle first invaded open grassland sites within the San Francisco Bay Area before 1869 (Maddox, D.M., and A. Mayfield. 1985) Today, yellow starthistle is the most widely distributed weed in California, occupying over 10 million acres. This represents approximately 10 percent of the total surface area within the state. Yellow starthistle is a root, rhizome, and aboveground leafy perennial, that spreads to form dense mats. It flowers July to September and produces numerous seeds that germinate from May to September. The flower is 0.25 to 0.50 inches in diameter. Seeds are dispersed by wind. Yellow starthistle germinates in the fall, but little is known about the dormancy and germination of its seeds. A single plant can produce over 100,000 viable seeds. The seeds require minimal pre-soaking before the seeds will germinate. Seeds may remain viable in the soil for over 20 years.

Methods
In 1984, yellow starthistle was identified as a seriously invasive component of the vegetation at Sugarloaf Ridge. Yellow starthistle had become dominant within the 10-acre meadow portion of the developed campground. It then rapidly spread within the park’s 350 acres of grassland.

In 1993, park resource managers initiated an active yellow starthistle management program. A 30-acre (Pony Gate) Compartment prescribed burn was conducted within this area. The burn was located adjacent to the park’s entrance.

If you examine an aerial photo of the California coastal area from a boat that was taken around the month of September, you can trace roads winding into the hills by the line of white plumes of Andean jaramoga (Carrionius jara) lining the road wherever a dozer has cut into a bank. Raw cuts are home to the jaramoga. I find myself admiring the beauty of the collection of the colorful dancing, indescribable areas of raw rock. I do not like that it replaces pleasant native species that accomplish the same end. Our road cuts provide a home and traffic distributes seeds along the roads.

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was insufficient grass fuel to carry a surface fire during either the 1993 or 1994 burn. As a result, yellow standhorne mortality was limited. During December 1994, annual grasses banded on a transect that was sown to produce fuel for the 1995 burn. Even with this added fuel, yellow standhorne remained dominant in this location.

At Sugarloaf Ridge, full burn was not inappropriate for yellow standhorne. Burning must occur after the annual and perennial grasses have cured and set their seeds, but prior to yellow standhorne seed development. Early or mid-summer burns also provide two to three extra months of fire protection due to the blackened area against the homes in urban interface locations.

Results
The 1993 burn was too cool to fully consume all of the yellow standhorne plants, yet nearly 100 percent of the yellow standhorne plants not consumed by the fire demonstrated complete foliar scorch two days following the burn. Yellow standhorne flowers and immature seed heads remained on the plants. The seeds of these plants did not mature during that growing season. The objective of eliminating yellow standhorne production was fully achieved.

In May 1995, results following the second annual consecutive burn showed a 90 percent reduction in relative yellow standhorne cover (coset stage). Even at maturity in July, two consecutive annual burns reduced yellow standhorne cover by 64 percent, with nearly doubling the reducing cover of other species, particularly native species. Perennial grass cover was reduced by 40 percent in the burned areas in May, but subsequently increased by nearly 300 percent in July. This illustrates the effectiveness of yellow standhorne control was also reflected in significant seed bank reduction. After a single burn, the soil seed bank was reduced by 74 percent, and after three years of burning, the reduction was 99 percent, (see Table below).

Discussion
The resource management strategy for the park is to continue with annual sequential prescribed burns within the 90-acre area, along with other additional burning compartments. The Pony Gate compartment will not be burned during the next three years so that yellow standhorne recolonization can be monitored. This will allow park resource managers to develop the fire regime required to maintain sustainable control of yellow standhorne.

It is extremely difficult to have complete success with burning alone in reducing yellow standhorne in most park locations, yet problems are presented with burning in near-proximity to facilities and in roadside locations. Non-flammable, 'Beby' yellow standhorne does not carry the same appropriate phenological stage without sufficient grass fuel to carry the fire. A flame thrower will be used to produce a scorch zone on roadside plants that do not burn during future broadcast burns. Fuel can be provided for large areas dominated by yellow standhorne without a grass complex with the application of the prescribed burn. The preferable treatment would be to sow locally collected native seed. Unfortunately, financial limitations may make this option infeasible.

Herbicide treatments have also been integrated into the park’s management strategy. Within the 10-acre developed campground area at Sugarloaf Ridge, a private contractor applied three separate herbicide treatments during Winter and Spring of 1994. Early Winter treatment of Galvanon 2 (Trichlorfon) along with Teler (Chlorosulfuron) was used during the Winter applications. Galvanon 2 was applied solely during a Spring 1994 treatment. Summer burning occurred in 1994 and 1995
EMPLOYMENT OPPORTUNITY

Vegetation Management Specialist

Jones & Stokes Associates, a leading environmental consulting firm, is seeking a Vegetation Management Specialist for its Sacramento office.

The selected candidate will conduct site work to quantify vegetation management requirements in developed and undeveloped settings, identify noxious weeds and other weedy vegetation, and prescribe vegetation management approaches consistent with IVM (e.g., chemical, mechanical, biological, manual, and cultural approaches). Other duties will be to develop and prepare vegetation management plans for developed and undeveloped settings and develop and monitor experimental plots to determine efficacy of vegetation management treatments. This position also will provide support to the management staff by performing other various technical and administrative duties.

Minimum requirements include a B.S in weed science, range management, agronomy, ecology, or related field and a valid Pest Control Advisory license from the California Department of Food and Agriculture within six months of hire. Two years experience in developing and preparing vegetation management plans, and working knowledge of applicable laws and regulations regarding vegetation management also are required. The ideal candidate must have excellent written and verbal communication skills, strong organizational and analytical skills, and be able to work as a member of a multi-disciplinary project team.

Preferred qualifications include knowledge and experience with computer spreadsheet and word processing programs, and participation/membership in professional organizations focused on vegetation management (e.g., CalEPPC).

We offer a competitive benefits package. Please send a cover letter, resume, and three references, ASAP to:

Human Resources/93-041
Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818-1914
FAX 916.737.3048

Notes from Symposium ‘95 Working Group Meetings
Saturday, October 7, 1995, Atolmar, CA

Lepidoptery Working Group Meeting

The Lepidoptery working group meeting was chaired by Joel Trumbo, Pesticide Use Coordinator for the California Department of Fish and Game. Since this was the group’s first meeting, most of the time was spent discussing areas in California where Lepidoptery has recently become invasive. Other topics that were touched upon include methods of control, toxicity, distribution mechanisms, seed longevity, and sources of information.

Paula Hubbard, Dale Schmidt, and Sally Manning said that Lepidoptery seems to be spreading in the Owens Valley (Inyo County) where it invades communities found in alkaline soils, such as alkali meadows. Several rare plants are found in communities where Lepidoptery is making inroads. The Los Angeles Department of Water and Power had used flooding as a control method in the Owens Valley without success.

Joel Trumbo and Ann Howald described substantial recent increase in distribution of Lepidoptery at several Department of Fish and Game Wildlife Areas, including Grizzly Island (Solano County) and Los Banos (Merced County). At Grizzly Island, past habitat management practices included annual plowing, resulting in rapid spread of Lepidoptery over hundreds of acres. Small-scale tests with Roundup, Garlon, and Trelon indicated that Roundup and Garlon were less effective than Trelon in controlling Lepidoptery after one application. Trelon doesn’t harm desirable grass species, but it cannot be used in water environments. DFG is conducting a large-scale test with Trelon to determine control effectiveness. At Grizzly Island, Lepidoptery seed seems to be dispersed by air and water. Seed dispersal can be curtailed by clipping the heads before the seed is mature. Jo Kintz noted that Lepidoptery has become widespread in the brackish lagoon area of the Malibu Creek watershed (Los Angeles County).

In 1995, Lepidoptery was seen at about 4,000 feet in the Sierra Nevada, growing in a wet ditch along Highway 50. It may reach this area as seed in hay bales used for erosion control.

Seed longevity for Lepidoptery is 10-15 years. The seed germinates under a variety of conditions. Open sites in alkaline wetlands can be rapidly colonized by Lepidoptery seedlings.

Lepidoptery is toxic to livestock! It is indigestible, and has a high silica content.

Working group members agreed that more information on Lepidoptery control is needed. Research priorities include a study of the ecosystem impacts of Lepidoptery invasions, including the effects of large-scale Lepidoptery infestations on wildlife populations and rate plant populations.

Working group participants included: Ann Howald, Paula Hubbard, Stephen Jones, Jo Kintz, Sally Manning, Dale Schmidt, and Joel Trumbo.

Lepidoptery Information sources:


Tamaskar Working Group Meeting

The Tamaskar working group meeting was chaired by Bill Neil. Bill Winzenborn, of the Bureau of Reclamation, reported on the USDA tamaskar/stxard bioterror control project. Jack DeLoach, of the Agricultural Research Service in Texas, has 2-3 insect species from Asia that are approved by APHIS and ready for trial release. One proposed release site is the TNO/BLM Dos Palmas Reserve in Coachella Valley. The trial release has been stalled by recent complaint from the Southern Western Flycatcher by the Fish & Wildlife Service. The listing decision reportedly acknowledges habitat degradation by tamaskar, but indicates nesting use by the flycatcher, so a consultation is required. The group’s conclusion was that biocontrol of tamaskar should not harm the flycatcher because introduced insect agents can only reduce population densities, not extirpate exotic tree species.

After attending CalEPPC Symposium ’94 in Sacramento, Carl Bell of U.C. Cooperative Extension, restated and confirmed the efficacy of Asparagus herbicde on tamaskar, in dilute foliar applications, with and without the addition of glyphosate (Roundup). Asparagus, marketed by American Cyanamid, is available in other states but is not registered for California due to minor deficiencies in the manufacturer’s test procedures.

Having validated studies in New Mexico which show that Asparagus kills tamaskar, Carl’s next step will be to request state approval for special local needs registration in California’s desert areas. Carl Bell has also received USDA grant funds to publish an information brochure on tamaskar, and sponsor a conference in Coachella Valley, tentatively scheduled for next spring.

Eileen Mackey, with the Metropolitan Water District, reported that MWD intends to remove tamaskar around Lake Mathews, a large reservoir south of Riverside, by cut-stump treatments using Rodeo, followed by inundation of the reservoir.

Bill Anderson, of the Revegetation and Wildlife Management Center, and the group discussed habitat quality.
after the relic perennials gave set seed. Isolated yellow starthistle plants were hand-poured during the summer of 1994 and 1995.

Although the results are very favorable to date, burning is clearly the preferred management technique for the reduction of yellow starthistle at Sugarloaf Ridge. Since the seed bank analysis documents such a remarkable reduction in yellow starthistle seeds following burning, the same ground mats will be burned in late June or early July 1996, during the other prescribed burning operations in the herbicide. Herbicides will continue to be applied as spot treatments, and along some roadways to plants escaping the burning.

Research continues to be conducted within the park. Full project documentation is forthcoming in an upcoming edition of California Agriculture.

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Marcia S. Hastings, California State Parks, Siskiyou District, 20 E. Spavin Street, Siskiyou, CA 95576. 707.298.1519; FAX 707.938.1405

Joseph M. DiTomaso, Coop Ext. Non-Crop Weed Ecololgy, Vegetables Crop/Weed Disease Program, Rockyhill Hall, University of California, Davis, CA 95616. 916.754.8715; FAX 916.756.6004

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Joel Triboulo said that Lepidoptera has become widespread in the brackish lagoon area of the Malibu Creek watershed (Los Angeles County). High water years have encouraged its spread.

Stephen Jones reported an infestation of Lepidoptera has recently been found along Alameda Creek (Alameda County). In 1995, Lepidoptera was seen at about 4,000 feet in the Sierra Nevada, growing in a wet ditch along Highway 50. It may have reached this area as seed in hay bales used for erosion control.

Seed longevity for Lepidoptera is 10-15 years. The seed germinates under a variety of conditions. Open sites in alkaline wetlands can be rapidly colonized by Lepidoptera seedlings.

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Working group members agreed that more information on Lepidoptera control is needed. Research priorities include a study of the ecosystem impacts of Lepidoptera invasions, including the effects of large-scale Lepidoptera infestations on wildlife populations and rate plant populations.

Working group participants included: Ann Howland, Paula Hubbard, Stephen Jones, Jo Kitz, Sally Manning, Dale Schmidt, and Joel Triboulo.

Lepidoptera Information sources:


Tamarisk Working Group Meeting

The Tamarisk working group meeting was chaired by Bill Neil. Bill Winsenborn, of the Bureau of Reclamation, reported on the USDA tamarisk/alder biocontrol project. Jack DeLoach, of the Agricultural Research Service in Texas, has 2-3 insect species from Asia that are approved by APHIS and ready for trial release. One proposed release site is the TNO/BLM Dos Palmas Reserve in Coachella Valley. The trial release has been stalled by recent action of the Southwestern Willow Flycatcher by the Fish & Wildlife Service. The listing decision reportedly acknowledges habitat degradation by tamarisk, but indicates nesting use by the flycatcher, so a consultation is required. The group’s conclusion was that biocontrol of tamarisk should not harm the flycatcher because introduced insect agents can only reduce population densities, not extirpate exotic tree species.

After attending CalEPPC Symposium ‘94 in Sacramento, Carl Bell of UC Cooperative Extension, tested and confirmed the efficacy of Arsenic herbicide on tamarisk, in dilute foliar applications, and with and without the addition of glyphosate (Roundup). Arsenic, marketed by American Cyanamid, is available in other states but is not registered for California due to minor deficiencies in the manufacturer’s test procedures. Having validated studies in New Mexico which show that Arsenic kills tamarisk, Carl’s next step will be to request state approval for special local needs registration in California’s desert areas. Carl Bell has also received USDA grant funds to publish an information brochure on tamarisk, and sponsor a conference in Coachella Valley, tentatively scheduled for next spring.

Eileen Mackey, with the Metropolitan Water District, reported that MWD intends to remove tamarisk around Lake Mathews, a large reservoir south of Riverside, by cut-stump treatments using Rodeo, followed by inundation of the stump.

Pam Anderson, of the Revegetation and Wildlife Management Center, and the group discussed habitat quality.
and groundwater transpiration rates of tamarisk/saltcedar relative to arrowweed and native riparian trees. Bill Neil concludes that tamarisk can be considered desirable habitat in exceptionally dry or saline areas where nothing else grows, but such conditions do not apply to most infested areas in California.

Other participants in the tamarisk working group discussion were Brian Canohe, Graziella Hinshaw, Julie Osborn, Steve Silver, David Thompson, and Betty Warne.

German Ivy Working Group

The German ivy group was chaired by David Chippering. The group discussed Geissodorum brevicalcarion, the ivy at the symposium. Vince Cicero, of San Luis Obispo, applied the study mix of 25% tricyclopyr (a 73 extinct in water) and 0.25% glyphosate and got good kill with survival of poison oak and mustard and did in the spray area. In experiments in San Francisco, Scoparius failed but came back, poppy and phacelia were killed. Vines in trees were killed by bud application. Tricyclopyr might volatilize to temperatures greater than 90°F and kill non-target plants in the canopy, so don't spray on hot days. The best time to spray is after the plant has flowered and when the energy is going back to the roots.

Solarization does not appear to work. It took four years to kill bagged plants in a bag house on Audubon Ranch. It took 1.5 weeks in an agricultural dryer to deactivate the plant.

80°F. The conditions under which bagged plants will die is unknown.

Eva Grookop's genetic study is still at the early stage with no data yet. BUT there seems to be different resistances to heat as much as plants collected from Redwood National Park fared worse in Davis than plants collected in San Diego and San Francisco.

More chemical good news. A fatty acid, SCTYPE, crops open cell walls to allow better herbicide penetration. It was suggested to use with glyphosate, or to spray prior to bagging to aid in dehydration. Garlon may not be used near water. DowElanco is helpful with information on application concentrations.

Manual removal works if you persist, with many return trips (monthly at GGNRA). After bagging the ivy, bury it deeply in the city dump. At Camp Alice Eastwood, similar results with a six-month return cycle.

German ivy working group participants included:

Greg Archbold, Jack Beigle, Len Blumrin, Carla Bossard, Dave Chippering, Woody Elliot, Kim Hayes, Sue Hubbard, Dave Kaplow, Judith Lowry, Dave Nelson, Ray and Judy Peterson, Dave Schmidt, Adrian Strogonoff, Pum Van der Linden, Peter Waldberger, and Sue Weis.

Broom Working Group

Broom Working Group discussed French, Spanish and Scotch broom. The group was chaired by Ray Swartley, of Corrandlas in Big Sur. One of the first topics of discussion was insufficient grass fuel to carry a surface fire during either the 1993 or 1994 burn. As a result, yellow starthistle mortality was limited. During December 1994, annual grasses banded at the fire perimeter were sown to produce fuel for the 1995 burn. Even with this added fuel, yellow starthistle remained dominant in this location.

At Sugarloaf Ridge, full burning is not appropriate for yellow starthistle mortality must occur after the annual and perennial grasses have cured and set their seeds, but prior to yellow starthistle seed development. Early or mid-summer burns also provide two to three extra months of fire protection due to the blackened area against the homes in urban interface locations.

Results

The 1993 burn was too cool to fully consume all of the yellow starthistle plants, yet nearly 100 percent of the yellow starthistle plants not consumed by the fire demonstrated complete foliar scorch two days following the burn. Yellow starthistle flowers and immature seed heads remained on the plants. The seeds of these plants did not mature during that growing season. The objective of eliminating yellow starthistle production was fully achieved.

In May 1995, results following the second annual consecutive burn showed a 90 percent reduction in relative yellow starthistle cover (cossette stage). Even at maturity in July, two consecutive annual burns reduced yellow starthistle cover by 50 percent, with nearly doubling the relative cover of other serpulc, particularly native species. Perennial grass cover was reduced by 40 percent in the burned areas in May, but subsequently increased by nearly 300 percent in July. This suggests the effectiveness of burning the yellow starthistle control was also reflected in significant seed bank reduction. After a single burn, the soil seed bank was reduced by 74 percent, and after three years of burning, the reduction was over 99 percent, (see Table below).

<table>
<thead>
<tr>
<th>SEED BANK ANALYSIS</th>
<th>SUGARLOAF RIDGE STATE PARK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Burn Sequence</strong></td>
<td><strong>Yellow starthistle seeds in the soil per square meter (5 cm deep)</strong></td>
</tr>
<tr>
<td>Unburned</td>
<td>10,000</td>
</tr>
<tr>
<td>After 1 burn</td>
<td>2,600</td>
</tr>
<tr>
<td>After 3 burns</td>
<td>52</td>
</tr>
</tbody>
</table>

As is generally the case in grassland burning, each of the annual prescribed fires burned in a mosaic of less and more severe fire intensity. Variability in volumes and flameablility of surface fuels produces a full range of fire intensity. Although the fire burned more of the vegetation, the dramatic reduction in yellow starthistle cover and seed bank documents that fire intensity is not crucial to the reduction of yellow starthistle. Burning during the appropriate phenological stage is critical for the elimination of seed production. Full consumption of yellow starthistle plants by fire is not crucial. Only if the fire consumed the seeds and germinate the plants is necessary, thereby arresting their development to maturity. Heat is critical for seed bank depletion.

Biodiversity was also measured in the unburned and burned compartments at Sugarloaf Ridge. Significant increases in forb or non-grass species within the burn compartments dramatically contrasted with unburned locations. In addition, the vegetation cover of native species increased two-fold. Six species, all non-California natives, increased in both frequency and vegetative cover in the unburned sites. By contrast, 15 species were more prevalent in the burned sites. Of these, eight were California broadleaf natives.

Light interception and soil temperature were also measured at and near the soil surface. Unburned plots contained noticeably more thatch, with a corresponding reduction in light penetration to the soil surface. Increased soil temperatures were measured at burning removed the thatch layer. Although other factors may also be involved, it is possible that reduced yellow starthistle competition, increased light and higher soil temperatures in the spring could influence the establishment and success of native plant species following burning.

Discussion

The resource management strategy for the park is to combine with annual or biannual prescribed burns within the fire protection area, along with other additional burning compartments. The Povy Gate compartment will not be burned during the next three years so that yellow starthistle recolonization can be monitored. This will allow park resource managers to develop the fire regime required to maintain sustainable control of yellow starthistle.

It is extremely difficult to have complete success with burning alone in reducing yellow starthistle in most park locations, yet problems are presented with burning in near-proximity to facilities and in road corridor locations. Non-flammable, Bayside yellow starthistle does germinate and label vocals for the fire and cannot reduce yellow starthistle in most park locations, yet problems are presented with burning in near-proximity to facilities and in road corridor locations. Non-flammable, Bayside yellow starthistle does germinate and label vocals for the fire and cannot reduce yellow starthistle in most park locations, yet problems are presented with burning in near-proximity to facilities and in road corridor locations. Non-flammable, Bayside yellow starthistle does germinate and label vocals for the fire and cannot reduce yellow starthistle in most park locations, yet problems are presented with burning in near-proximity to facilities and in road corridor locations. Non-flammable, Bayside yellow starthistle does germinate and label vocals for the fire and cannot reduce yellow starthistle in most park locations, yet problems are presented with burning in near-proximity to facilities and in road corridor locations. Non-flammable, Bayside yellow starthistle does germinate and label vocals for the fire and cannot reduce yellow starthistle in most park locations, yet problems are presented with burning in near-proximity to facilities and in road corridor locations. Non-flammable, Bayside yellow starthistle does germinate and label vocals for the fire and cannot reduce yellow starthistle in most park locations, yet problems are presented with burning in near-proximity to facilities and in road corridor locations. Non-flammable, Bayside yellow starthistle does germinate and label vocals for the fire and cannot reduce yellow starthistle in most park locations, yet problems are presented with burning in near-proximity to facilities and in road corridor locations. Non-flammable, Bayside yellow starthistle does germinate and label vocals for the fire and cannot reduce yellow starthistle in most park locations, yet problems are presented with burning in near-proximity to facilities and in road corridor locations. Non-flammable, Bayside yellow starthistle does germinate and label vocals for the fire and cannot reduce yellow starthistle in most park locations.
The Use of Fire for Yellow Starthistle (Centaurea solstitialis) Management and the Restoration of Native Grasslands at Sugarloaf Ridge State Park

Project Summary as presented to the California Weed Conference, January 1996
Maria Hastings and Joseph DiTomaso

Abstract
Three consecutive prescribed summer burns conducted within Sugarloaf Ridge State Park have demonstrated a marked reduction in the cover of yellow starthistle while nearly doubling the cover of other forbs and native species. Essential elements to assure project effectiveness are identified, which include the critical timing for conducting the burns and the requirement to burn annually over a three-year period.

Introduction
Sugarloaf Ridge State Park, Sonoma County, is located in the northern Coast Range near Santa Rosa, California. It contains a complex mosaic of vegetation types which include chaparral, mixed evergreen forest, woodland-savanna, grassland, and coniferous forest. Open grasslands occupy approximately 350 acres of the park’s 2700 acres. Livestock grazing and related agricultural practices since before 1900 heavily impacted the grassland areas.

The current grassland complexes of the park include both a native perennial component dominated by purple needlegrass (Nasella pulchra), blue wildrye (Elymus glaucus), and Leymus triticoides), and an exotic annual European grassland component dominated by riggipr brome (Bromus inermis), soft brome or Idaho brome (Bromus iliciformis), silver European hairgrass (Avena fatua), and wild oats (Avena fatua), and little quakinggrass (Briza minor). Significant populations of yellow starthistle (Centaurea solstitialis) are found throughout the grassland areas. Mixed evergreen forest, composed of Douglas fir (Pseudotsuga menziesii), canyon oak (Quercus chrysolepis), tanoak (Lithocarpus densiflorus), and madrone (Arbutus menziesii), is the major vegetation type throughout the park.

Yellow starthistle first invaded open grassland sites within the San Francisco Bay Area before 1859 (Maddox, D.M., and A. Mayfield. 1985). Today, yellow starthistle is the most widely distributed weed in California, occupying over 10 million acres. This represents approximately 10 percent of the total surface area. The plant is adapted to thrive in a wide range of soil and climate conditions, and is well suited to the habitat and lifestyle of the area.

As cars, and especially trucks, speed up and down our highways, they create turbulence. Vortexes of wind follow after the vehicles and carry dust, debris, and plant seeds along the shoulder, and, if present, the divider strips. In addition, the highway short rain drainage to the shoulders. Seeds, plus extra water, encourages growth of adapted seeds, especially in low rainfall areas where water may be limiting.

I first became enamored of this wildfire and road a decade ago when traveling east from San Diego on I-15. There, the ornamental African fountain grass (Pennisetum virgatum) appeared as a prominent feature of the desert landscape, forming a thriving ribbon of grass bordering the highway. As I highways short rain drainage to the shoulders. This can cause a lot of disorder and less, and the height of the grass decreased and the seeds became thinner and thicker. After an hour of driving, the grass was no longer found. Travel corridors have long been recognized as paths along which weeds have been dispersed. When homes were present, the seed carried along to fuel them usually contained weed seeds in the hay or grain. Fresh harvested grain, not yet cleaned, was shipped to market on the railroad. Seeds of contaminating weeds stirred through crudes and many weeds thrived along the railroad roadbeds. Since summer grass fires were regularly started by coals from steam engines firing the weed growth along the tracks, an early effort at eradicating control of the University of California was directed to20ifying railroad roadbeds with arsenates and borates to destroy all vegetation.

In the late 1940s, when Connell was promoting birdfood truff (Lentinus cruciatus) as a forage, country roadways were rapidly decorated with yellow flowers on the edges of farm fields. Farmers bringing hay in from the field spread the truff, for its hay quality was the only stages of development, no matter how the hay was harvested.

If you examine an aerial photo of the California coastal area from a photo that was taken around the month of September, you can trace roads winding into the hills by the line of white plumes of Andean jaguar (Ctenosaura jujuyana) laying the road wherever a dozer has cut into a bank. Raw cuts are home to the jaguar. I find myself admiring the ability of these creatures to find the jaguar, and one of my favorite areas of rock. I do not like that it replaces pleasant native species that accommodate the same end. Our road cuts provide a home and traffic distributes seeds along the roads.

Occasionally, roach catch basins will accumulate water in low areas. Our rare Coast Lilly (Lilium maritinum) survives and spreads to an extent in the seasonally wet highway catch basins. In Humboldt County, Lilium columbianum increases in gutters, where a narrow Highway 101 provides no place for cars to stop, and the banks are too steep for deer to browse. Common European mint and pennyroyal (Mentha arvensis and M. pulegium) will decorate moist verges in late summer with ribbons of blue. Other low, wet basins will abound with poison hemlock (Conium maculatum) or water parsley (Cerastie americana). Other umbellifers also include the wild carrot (Daucus carota), and in coastal areas you find more and more roadides bordered by European fennel (Foeniculum vulgare). Fennel and carrot spread in the fields, but along highways they occur in continuous stands.

Other plants noted as colonizing road shoulders include Gerse (Uleue orpes), Scotch broom (Cytisus scoparius), French broom (Genista monspessulana) and perennial sweet pea (Lathyrus latifolius). Colonies of these legumes extend into Oregon, the best none for forests large stands. In grass is about the size of a grain of millet.

A unique infrastructure occurs along Highway One at Little River, in Mendocino County. Here, the Southern California Waterline builds itself, forming a dense stand. The flower calyx forms several hundred bulbls in the fists of the flower bracts. About 1/4-1/5 inch in diameter, the bulbils are heavier than the seeds of plants mentioned. They are not so readily moved, and must fall to the ground to grow among the rest of the plant. Bulbs form a solid mat. I estimate the main colony to cover about three acres, with smaller colonies scattered along Highway One. The plants produce spikes of snowy orange flowers in May. There is enough evidence to believe that these are no longer found. I am not sure what they call them, for the common name is not generally known.

I am sure many of you have noticed this thing. According to my knowledge, we have not shared the observation as an element of common concern in our evaluation of exotic pests. Having looked at it, we may record and further observations to help our understanding. The spreading of weed seeds by auto turbulence will provide Caltrans with a further argument for spraying roadsides. In my opinion, controlling spraying of shoulder greatly simplifies management as compared to mowing, which requires signing of the road, and often a flagman in addition to the operator. In my opinion, it is easier to follow up after roadside spraying. I have found the result to be a great reduction in diversity of roadside plants, rather than elimination, although some species may be eliminated. I will withhold comments on other objections to spraying.

John Madison, formerly of Gaylord, CA currently resides in the Great Smoky Mountains.
French Broom Seedbank Depletion: A Micro-experiment on Summer Die-off
Greg Archibald

If you are involved in the battle to control French broom, you have probably had moments like this. After clearing or burning an infested area you watch in horror the following winter as new growth shoots up out of the seedbank like alfalfa sprouts at a health food store. The urge to dig, burn, chop or spray is almost irresistible.

On April 5, 1995, ranges of the Marin County Open Space District burned brome piles on the preserve near my home in Mill Valley, California. These were big piles, over 3 by 5 meters square at the base and over 1 meter high. Pulled brome was piled there after cutting or pulling from a long-established infestation nearby. Very few plants piled had seeds on them. After the burn, there was a tremendous flush of brome seedlings where the piles had been. It was one of those moments. But I kept my impulses in check and decided to do a little experiment instead. On June 3, when the flush of seedlings was well established, I carefully measured and dug out one square foot of a typical seedling flush from the burn site. I then counted all brome sprouts that had green stems and at least one whole set of living leaves. The total number of seedlings in that one square foot was 2,779.

Over the summer, I simply let the seedlings cook in the sun, struggling for survival. The site was near the base of a south-facing hillside on deep soil heavy with clay. Moisture retention in the soil was not measured but appeared to be high. (There were a few wild oats plants — Avena spp. — nearby that stayed green all summer.) On November 5, 1995, I cut out another square foot from the same burn site. The second square foot had been burned in June as compared to the first foot cooked. A total of only 86 seedlings survived — a reduction of about 97%. Competition with other species was not a factor in this reduction since the small squares counted were brome monotonies.

The main conclusion, of course, is that there was enough brome left in that square foot to make a preserve manager's life miserable were nothing done to remove it. (Typical seedling height above ground at summer's end was 14 cm, with roots down to 9 or 10 cm also long.) Yet a surprising finding here is that nature will probably thin those horrifying "alfalfa sprout" seedlings by natural means. Weeds flourishing with green stems and dry sunny summer conditions. There is no need to panic. It's simple enough to come around anytime late in the summer with a brushcutter and tri-blade or an string trimmer and clear off the still-vulnerable seedlings.

Western Expert Educational Diagnostic System
Robert H. Callihan, Extension Weed Special Robert T. Dobbins, Programmer/Analyst; and Sherrill L. Carson, Laboratory Aide

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Agroforestry and the Conservation of Native Biodiversity
Roland C. de Gouvenain, USDN Bureau of Land Management

Exotic plant species have been introduced from one part of the globe to another throughout human history, many times with beneficial economic results, sometimes with disastrous ecological consequences. Perhaps the worst of these may be the loss of native biodiversity. The invasion of approximately 35 million acres of Australian farmland by the prickly pear (Opuntia sp.) in the 1920s or the current spread of salt cedar (Tamarix sp.) in the riparian areas of the American Southwest (Lowrie et al. 1995) are but two examples of the impacts exotic plants can have on native plant communities when they become weedy in their new environment.

Agroforestry, which has been adopted in many developing countries as one of the most promising land use systems in the fight against poverty and environmental degradation, has often focused on identifying species of trees that can produce food and fuel. Establishing these trees for people and fodder for livestock, among other things. Some of these trees, exotic species introduced because of their multipurpose value, have acquired the name of "miracle trees." Yet little is known about the impacts such trees may have on local native flora and fauna.

Some tree species associated with agroforestry, while providing beneficial uses in fields and gardens, have behaved as weeds in the surrounding countryside. Foroughbakhch (1992) describes that Espino Woodland, California, and Lemonade Creek Woodland, California, introduced in the past for fuelwood tree plantations are, respectively, "in the process of invading at the sides of roads, fields and the edges of the natural vegetation" and spreading "across the whole region, invading more humid parts of southern Mexico."

Biodiversity is more than the sum of the species present in a community. A habitat is not an ecosystem (1994) and food production is not the construction of exotic species into native communities. Furthermore, adding exotic species can contribute to the loss of native biodiversity, in fact reduce it in a loss of such diversity. For instance, what were previously different species assemblages within a common landscape may, after the introduction of exotic species in that landscape, share one or more of those exotic species and thus be similar to each other than before. He argues that "native diversity is inherently more valuable over the long term than artificial diversity and should be the primary focus of conservation efforts."

Yet the food and fuelwood crisis that is wakening in many developing countries is all too real. Gentry (1992) recognizes that many of the problems that have caused the decline of species diversity are the selective utilization of native resources may be the only alternative to massive social and economic disintegration and misery in many developing countries. In solving these social and economic problems, managed agroforestry systems, although less diverse than most "natural forests," have significant advantages over some other land use forms such as selective logging or forest invention (Padoch and Peters, 1993).

For some agroforesters, Gentry's (1992) challenge is met by the system of multiple use practices. For Osono (1992), the tree is treated as an engineered commodity more than as a biological organism. He emphasizes that agroforestry is above all a strategy "to produce the maximum amount of tree product and/or services in the shortest possible time than enabling maximum economic return." Shiva et al. (1991) argue that while production is a required objective of agroforestry, "the deliberate substitution of diversity by uniformity - of crops, trees, and livestock... has worsened the biodiversity crisis." They assert that biodiversity cannot be preserved if production systems are not themselves based on a policy of biodiversity conservation.

Other agroforesters have included native species in their search for multipurpose trees, often with the help of indigenous people. Rochelleau et al. (1988) reports on how local farmers in Kenya, although initially focusing primarily on exotic tree species, often came back to agroforestry staff with lists of local tree species and with suggestions on how to incorporate them in an agroforestry scheme. Aliretz and Morgan (1993) describe how naturally rich and diverse native agroecosystems are in Latin America, including traditional agroforestry systems such as those managed by some Amazonian ethnic groups, which often contain well over 100 plant species per field.

Reference
Who We Are

CalEPPC NEWS is published quarterly by the California Exotic Pest Plant Council, a non-profit organization. The objects of the organization are to:

- provide a focus for issues and concerns regarding exotic pest plants in California;
- facilitate communication and the exchange of information regarding all aspects of exotic pest plant control and management;
- provide a forum where all interested parties may participate in meetings and share in the benefits from the information generated by this council;
- promote public understanding regarding exotic pest plants and their control;
- serve as an advisory council regarding funding, research, management and control of exotic pest plants;
- facilitate action campaigns to monitor and control exotic pest plants in California; and
- review incipient and potential pest plant management problems and activities and provide relevant information to interested parties.

Newsletter Submissions

Letters to the Editor, notices, articles of all types, volunteer workshop schedules, photographs, and line drawings are welcome and may be submitted directly to the editor at the address to the right. We invite you to utilize CalEPPC NEWS as a forum for describing your project, asking for help, or bringing new issues or developments to the forefront. Electronic submission is gratefully accepted in PC-formatted 3.5" or 5.25" disk utilizing WordPerfect or Microsoft Word. Please enclose a quality hard copy with your disk. Copy for the Spring 1996 edition is due to the editor by March 15, 1996.

Upcoming Meetings of Interest

February 14, 1996

“Contacting Arundo donors in the Riparian Ecosystem: A Workshop and Discussion Forum” sponsored by the Sonoma Ecology Center’s Creek Restoration Program. 9:00-4:30 at the Westerbeke Ranch, 2300 Grove Street, Sonoma, CA. Guest speakers include Paul Frandsen, co-founder of Team Arundo, Nelroy Jackson, Ph.D., of Monsanto Company, and Gary Bell, Ph.D., of The Nature Conservancy, who will lead in presentations and discussions of the biology of the plant and the process of organizing a comprehensive Arundo control program on a watershed scale. For information contact Richard Dale at 707.996.3744.

February 27 - March 1, 1996

*Third National IPM Symposium/Workshop,* to be held at the Sheraton-Washington Hotel, Washington, D.C. Contact: Barry Jacobson, USDA IPM Coordinator, A. Box 2220, Washington, D.C. 20250-2220.

March 12-15, 1996

The Western Weed Coordinating Committee (WWCC) and the Western Society of Weed Science (WSWS) combined annual meetings will be held in Albuquerque, New Mexico. Registration fee is $90, with one-day fees available. For more information, contact Barbara Mullin (WWCC at 405.444.5400 or Gus Foster (WSWS) at 709.484.9825. To register for either or both meetings, contact Wanda Graves at 510.790.1252.

March 27-29, 1996

The Western Aquatic Plant Management Society, the western chapter of the North American Lake Management Society, and Portland State University will sponsor a "Symposium on Non-Native Organisms in Western Aquatic Ecosystems." The symposium will feature invited speakers who will discuss the biology, impact, and management of non-native organisms in aquatic ecosystems of the west. For more information, contact Mark Syrma, Program Chair, Biology Department, Portland State University, P.O. Box 751, Portland, OR 97207. Phone: 503.725.3853; FAX: 503.725.3864; e-mail: h2mt@isdn.rr.com.

April 16-18, 1996

"The Broom Symposium," jointly sponsored by the California Exotic Pest Plant Council (CalEPPC), the Pacific Northwest Exotic Pest Plant Council (PNW EPPC), the Oregon Department of Agriculture, and the Washington State Noxious Weed Control Board will be held at Portland State University, Portland, Oregon. The Broom Symposium will gather together a broad range of persons with interests in broom control and management and present information on control techniques, and the biology and ecology of brooms. Attendees are encouraged to bring a poster or display that addresses the biology and/or management of Scotch, French, Spanish, or Portuguese brooms. Speakers and participants will be from Oregon, Washington, California, British Columbia, New Zealand and Australia. For more information, or to volunteer contact Dennis Isaacson at 503.986.4621 or Laurie Penders at 206.872.2972.

April 28 - May 3, 1996


May 17 - 19, 1996


June 19-21, 1996

"Vernal Pool Conference," jointly sponsored by CNPS, SERCAL, and the western section of The Wildlife Society, will be held in Sacramento. For information, call Mark Skiller, 916.324.3816, George Clark at 916.355.4362, or Allen Barnes at 916.447.2077.

October 4-6, 1996

San Diego will be the site of CalEPPC Symposium ’96. Mark your calendars and save this weekend for another exciting and fun event!

October 30 - November 3, 1996

“SRCAL’s Fifth Annual Meeting” will be held in Yosemite National Park.
Exotic Pest Plants in the Press

Plant Invaders: the Threat to Natural Ecosystems

This book is the second in a new series of manuals in plant conservation which contribute to the People and Plants Initiative set up by the World Wide Fund for Nature (WWF), UNESCO and the Royal Botanic Gardens, Kew, England. The main aim of the initiative is to build up the capacity for work with local communities on botanical aspects of conservation of biodiversity.

The aim of this manual is to draw attention to the growing problem of invasive plant species, which are already a serious threat to the biodiversity of many parts of the world. Little is known of the factors that lead to biological invasions, making it difficult to predict which species will become invasive. There is, therefore, a need to increase public awareness of the threat to natural and semi-natural ecosystems, and numerous instances of invasion are given to indicate the nature of the problem. There is also the need to alert research and governmental organizations in order to focus and strengthen research and management strategies, and to give practical information and advice on how to deal with invasive plants. The use of case studies of important species is designed to illustrate the wide variety of invasions and control methods.

The subject is approached in the context of conservation and concentrates on plant invasion as a threat to wild biodiversity, rather than agricultural weeds. The intention is to change current thinking on invasive plants, from an obscure problem to a major hazard to biodiversity.