Grazing and Fire Management

By John W. Menke

Alien annual plant populations present a formidable obstacle to restoration and enhancement of native perennial grasses in California Mediterranean grasslands. Their immense seedbanks regularly stock sites with ten-thousand or more plants per square meter. Their diverse range of plant growth forms and phenologies cause fierce resource competition for light and water beginning soon after fall germination and lasting for the entire growing season each year. Specialized alien species appear to exist for nearly every temporal and spatial resource 'opportunity' (niche). For example, summer annual weeds capitalize on abnormally high late-spring rainfall or runoff to swale sites with heavier textured soils, and in the case of yellow star thistle, the seed viability can last for up to eight years. Native grasses are confronted with both a short and long-term adaptive legacy in these competitors, especially the capability for producing some seed under the most adverse weather regimes and grazing disturbances.

Historical and rather minimal efforts in California to reestablishing native perennial grasses have not been fruitful. Hindsight indicates that grazing and fire management was not given adequate investigation as to their roles and potential beneficial impacts. Use of an ecological basis for designing a management scheme was largely ignored and new methods of time-controlled grazing were not available when native plant introductions were previously attempted. Too often intense grazing practices, known to be tolerated by alien grasses and forbs, and sometimes an emphasis on close seasonal grazing to maintain seeded annual clovers in grass dominated communities led to unsuccessful grazing prescriptions for natives. To little effort was devoted to designing what might be called a phased grazing management plan, where special measures would be taken over one or more years to establish a stand, and secondly, the design of objective.

Balancing the Risks and Benefits of Grassland Management (Burning and Grazing)

Benefits | Risks/Costs
--- | ---
Grazing reduces match, annual seed bank, and annual plant transpiration | Grazing reduces mature and average seed weight
Spring grazing causes lower Siga seedling mortality | Summer grazing reduces seedling survivorship
Burning increases average seed weight of Siga | Burning reduces seed numbers and mature reproductive tillers
Burning increases seedling emergence and survival | Burning causes partial mortality of Siga bunches
Flowering enhances Eriachne, a potentially beneficial neighbor plant | Burning reduces native grasses
Burning enhances tillering and fragmentation of deviant bunchgrasses | Burning effects are temporary, therefore ongoing management is required
Burning is effective in reducing current season's annual plant production |

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Grazing programs focus on perennial grass rather than exotic annual grass. George sees the benefits of native perennial grasses. They have higher forage value, produce more biomass during the summer and fall, have the potential to produce green feed all year, and have deep tap roots that utilize nutrients from a deeper soil horizon.

Wetlands viability is of concern to us all. We all realize the troubles of our environment; poor rangeland ranges, dying prairie grasses, and bunched grass prairies sacrificed during the dustbowl. When some of these people in the dustbowl try to get George a difference.

George says, "People are apart of the land. The land to be managed consists of; economics, people and nature. We must striking a balance. We must hold the land as an honor. This land ethic is more important to our environment than the state of financial situations or legal government controls. The land ethic should be a principle rather than a law."

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CNGA Report continued from page 9

John and Jenny Maleke reviewed native grass seed selecting and marketing trials conducted by Boles and Jones in the 1980s and '90s. The results of these trials have shown that grazing significantly impacts the composition of native grass communities. The composition of alpine meadow species typically returns to a pre-burn status within three years. While grazing and other environmental treatments are possible on degraded pastureland, the costs of these treatments are often prohibitive. Grazing can be an effective tool for improving the composition of native grassland communities. The Goodland, Kansas, demonstration projects have shown that grazing can be an effective tool for improving the composition of native grassland communities. The Goodland, Kansas, demonstration projects have shown that grazing can be an effective tool for improving the composition of native grassland communities. The Goodland, Kansas, demonstration projects have shown that grazing can be an effective tool for improving the composition of native grassland communities.
Using Livestock to Manage Yellow Starthistle in Grasslands

By Craig Thompson and William A. Williams

Conventional biocontrol of weeds focuses on the use of plant-eating insects, fungi, and nematodes to control undesirable plants. Although often overlooked, livestock can be effective control agents, provided management conditions are met. While the activities of livestock may contribute to increased weed presence (Thomsen 1985) many noxious weeds in grasslands of the western United States have been suppressed by controlled livestock grazing. In this paper we discuss considerations for using livestock as a tool to manage yellow starthistle Centaurea solstitialis, a major noxious weed that infests about 8 million acres in California.

When livestock are considered for controlling weeds in grassland ecosystems, the following criteria should be met: 1) target plants must be acceptable to livestock as forage, 2) grazing should be timed to inflict damage at vulnerable periods in the plants life cycle, 3) replacement plants for erosion control, wildlife habitat, forage, and or nitrogen fixation should be present or introduced to replace the target species. 4) stock water must be readily available, and 5) livestock should be controlled (adapted from Brock, 1988). The control of livestock refers to stocking rate, grazing and rest periods, and class of animal. In addition, paddock size, location, and configuration are factors to be manipulated according to weed presence and other management goals.

Prior to the introduction of portable electric fences, many of these grazing management possibilities were beyond the practical control of the manager.

Because of Yellow starthistle’s spiny habit in the flowering stage, it is often assumed that grazing to manage infestations is not an option. Similarly, the fact that horses can develop “chewing mouth disease” a fatal nervous disorder, when they have eaten 86-200% of its body weight (Cordy 1978) reinforce the impression that domestic livestock should not consume starthistle. While horses should not be allowed to graze starthistle, studies have shown that star thistle is an acceptable component of a ruminant’s diet and that ruminant animals (cattle, sheep, and goats) readily graze yellow starthistle at stages of growth prior to spine production. Because it is palatable to livestock in the vegetative stages, the opportunity to suppress its growth through grazing does exist.

For the past four years we have studied

the use of grazing management as a tool at three sites in northern California to determine whether yellow starthistle could be controlled by repeated heavy defoliation at specific growth stages. We compared the relative effectiveness of cattle, sheep, and goats in managing starthistle and altered timing and frequency of grazing periods according to plant growth.

We used intensive grazing management treatments aided by New Zealand style portable electric fences in a randomized complete block experimental design.

Our results show that intensive grazing is effective provided grazing periods are closely timed to starthistle’s bolting, pre-spyng stage and several follow up grazings to remove regrowth. For example, we found that three to four high-intensity, short duration cattle grazings beginning in the bolting, pre-spyng stage significantly reduce plant size, flowerhead densities, and summer and fall spiny canopies. Contrary to what might be anticipated, this grazing regime did not denude the site. Because the grazings occurred after resident annuals had matured, yellow starthistle was preferentially grazed and appreciable amounts of plant residue were left on the ground.

Results for one year of goat grazing were similar. The first grazing timed with bolting and then a follow up grazing three weeks later. Significant mortality was obtained. Part of starthistle’s success as a weed on grazing lands can be attributed to its tremendous ability to regrow following severe defoliation.

In another trial sheep were used as the control agent. Where grazing periods were timed to the rosette stage of growth, (April-May) starthistle was not sufficiently suppressed. During three separate grazing periods, sheep heavily defoliated the young plants and the regrowth that followed. However, two inches of rainfall after the sheep were removed from the trial recharged soil moisture at the site, and the invigorated plants produced their characteristic spiny flowerheads and a large seed crop. In general, yellow starthistle is favored under early grazing regimes because neighboring plants are also defoliated, and since they regrow more slowly the competition they provide is reduced.

In addition to starthistle response, we monitored the response of the resident spring flora in our ungrazed controls versus grazed treatments. Where grazing was excluded, yellow starthistle increased in density and in much of the treatment paddocks produced hard-to-penetrate spin stands. Taller-statured annual grasses tended to be favored in ungrazed areas and the combined effect of the grasses and high densities of starthistle strongly suppressed many dicots that were otherwise found in the spring flora. Most notable last spring was the complete suppression of Lupinus bicolor at one site and Limnanthes douglasii (meadow foam) at another site. In grazed areas adjacent to the ungrazed treatment these two native species were the dominant components at their respective sites. The suppression observed of these low stature species by tall-statured ones is consistent with other studies where grazing has been excluded in California grasslands dominated by introduced annual species (Heady 1977). When taller-statured alien species dominate a site and are left standing, their skeleton and residues accumulate forming densethatch-life mulches that suppress many species with high light or heat requirements. Murphy and Ehrlich (1989) point out that grazing research in native grassland communities is useful and should be encouraged. They suggest that while over grazing is destructive, some grazing is often necessary to maintain intermediate levels of succession. In mid-successional grasslands there is often greater plant diversity which in turn supports a greater diversity of animal life.

In conclusion, we found that timing of grazing is more important than class of animal used and that late rains favor starthistle recovery following grazing. While well-timed cattle grazing is effective in managing large stands of yellow starthistle on an annual basis, long-term control require additional measures.*

Livestock grazing is not without its problems and difficulties. Obtaining an effective handling livestock may add a level of management complexity that is either impractical or not possible. On the other hand where appropriate, they represent a powerful weed management tool that may be more economical and environmentally benign than conventional methods. In addition to managing weeds like yellow starthistle, controlled grazing can be an aid in producing grassland landscapes with great floristic diversity.

continued on page
**Committee Statement of Purpose:**

**Committee Chairman:** David Amme

**NGA Technology Committee Report**

**CGTAC Program 1991-92**

The main objectives of CGTAC are: 1) State-wide Collection of native grass seed and material; 2) Evaluation of material in common gardens of regional location; 3) Record and demonstrate native grass planting and performance.

**1989-91 Projects**

CGTA learned a lot from the native grass seedings and management in the last two years. The Cherry Island Golf Course seedling north of Sacramento taught us: use the right plants at the right site!! California brome, Bromus carinatus Blue wildrye, Elymus glaucus, Meadow barley, Hordeum bulbosum, Cheatgrass, Bromus tectorum, Mesquite, Hesperus Rubra are not adapted to heavy clay soil with extreme compaction (golf carts and foot traffic), nor to withstand extreme heat or hot summer temperatures.

Successful native grass habitat seeding for Sacramento County Water Quality Division along Interstate 5 continues to be monitored by Roger Jones. Roger is observing small areas of annual grasses growing into certain sites after two years. This relates to seed type, site preparation, initial weed control, etc.

Follow-up management of a seeding is important to the success of the seeding. Where livestock grazing or prescribed fire are not possible, mowing is effective for controlling weed growth, grass competition and maintaining perennial stand vigor. A year round seeding and mowing management project at The Nature Conservancy's Elkhorn Slough Preserve, managed by Paul Kephart, is demonstrating mowing height and frequency for control of noxious weeds (poison hemlock, thistles, mustard etc.) and promoting the spread of native meadow barley and creeping wild ryegrass.

Seeding trials and common garden plantings are on display at Hedges Farm (Winters), Elkhorn Ranch (Moss Landing), Conservario (Rio Vista), UC Berkeley Gil Traci (Reckley), and SCS (Locoford). Gardens planted for 1992 are located at The Student Experiment Farm U.C. Davis and in Southern California at Inland Empire RCD. (For information to visit common gardens nearest you, call 415 526 9257).

**Habitat Restoration**

The Elkhome Slough Foundation needs volunteers to plant native grasses at its project site, Lake Tahoe. A call goes out at 8:30-9:00 pm. Bring lunch, shovels, and gloves. Also, bring a camera and field guides to check from Elkhome Slough Preserve parking lot. Restoration site is at 466 Elkhome Slough Drive. Call information: Jo Gonzalez at (608) 728 933.

**RESTORING THE LAND - THE NATIVE GRASS CONNECTION**

Reserve May 16th on your calendar for the 1st annual CGA Educational Conference at Elkhome Ranch in Moss Landing, Ca. on the beautiful Monterey Bay between Monterey and Santa Cruz.

Audience speakers and demonstration of planting & harvesting practices including equipment. Field presentations on Grass identification and research plots. Guided tour of restored habitat on ranch. Look for Pre-registration info in winter issue of Grassland.

**Editor's Notes:**

Grasslands Newsletter provides your local chapter and current research information, highlights CGA activities, and advertises product information. Grasslands is an issue for all California. The winter issue of Grasslands will focus on integrating native grasses in the winter landscape.

**Display Ads:** $75.00 Size: 3 and 1/4" by 4 and 5/8". Budget size: $40.00 Size: 3 and 1/4" by 2". Classified Section: $50 per word, no restrictions.

**Deadlines:** Winter issue: December 1st Spring issue: March 1st Summer issue: June 1st Fall issue: Sept. 1st

Send camera-ready copy and checks to Editor, Grasslands, Circle M Ranch, Big Sur, Ca., 93920. A written confirmation of ads received will be provided.
Brome Alert!
by David Amme and Susan Camel • graphics by Susan Camel

Recently California Brome (Bromus carinatus) is available on the California seed market. This has become possible through the efforts of native California seed producers and the California Native Grass Association (CNGA) who have been working to promote the use of California native grasses. As seed availability increases state agencies, resource managers, and seed retailers request California Brome in their specifications where grasses for erosion control, revegetation after fire, restoration, and landscape stabilization. Unfortunately a non-native, Debra Brome, is being marketed and used in California as B. carinatus. While here are taxonomic similarities between California Brome and Deborah Brome, they exhibit significant phenological differences and growth characteristics in the field.

In cooperation with CNGA, the authors established a brome evaluation trial in Yolo County in January 1991. Several accessions of native California Brome along with Deborah Brome were planted together in an irrigated common garden. Figures 1 and 2 illustrate pertinent phenological differences found in the trial. Native California Brome grew quickly and reached 40% cover before flowering, seeding and becoming summer dormant at the end of May. On the other hand Deborah developed slowly maintaining low percent coverage until early summer when rapid growth and flowering was initiated. Coinciding with the summer growth phase, Deborah reached nearly 100% cover by the end of August (see Figure 1). Figure 2 shows similar developmental trends in terms of flowering culm length and foliage height. Deborah Brome's changes in foliage height and cover reflect active summer leaf production in contrast to native California Brome which remains dormant throughout summer despite irrigation.

The differences demonstrated in the brome evaluation trial directly impact marketing and field applications for B. carinatus.

In the California Mediterranean environment native California Brome rapidly completes its cycle of establishment, seeding, and dormancy. These are preferred traits when specifying a grass for restoration, erosion control and revegetation after a fire. If irrigated pasture or hay crop is required, Deborah Brome may be one appropriate choice.

Deborah Brome has Plant Variety Protection (PVP) status as a B. carinatus, described as a hybrid of "two ecotypes of B. carinatus", one from the Andes in South America and the other from the Thames valley in the United Kingdom. Bromus carinatus is a California taxon and the name applies to plant material originating in California. Taxonomists unfamiliar with the B. carinatus species complex are applying this name to material from other parts of the world. Researchers who compiled the PVP application stated that Deborah should not be classified California Brome because of important varietal differences. Yet Deborah Brome is now being and marketed in California by Daehnfeldt, Inc. as "The only PVP 'native type' Bromus carinatus". The Daehnfeldt information packet reproduces the B. carinatus description from Hitchcock's Manual of the Grasses of the United States including the common name, California Brome as a reference. Today whenever B. carinatus is specified in a seed mix, many suppliers are substituting Deborah for the California Brome without informing buyers of varietal differences. Specifications requiring a native California Brome must specifically request the native variety and directly state that Deborah is not an interchangeable option.
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KEYNOTE SPEAKER: KIRK HENDERSON Kirk is the public relation and information coordinator for Iowa Roadside Vegetation Program.

ANNUAL ELECTIONS

PLANT DISPLAY AND SALE

TOPICS FOR PANEL SPEAKERS AND WORKSHOPS

URBAN LANDSCAPING WITH NATIVES

RESTORATION WITH GRASSES

OPEN FORUM AND DISCUSSION “TIME WITH THE NATIVES”

DIRECTIONS: Heatherfarms is located at, 1540 Marchbanks Dr. in Walnut Creek. To get there from Interstate 680; take the Treat-Geyar off-ramp (east). Turn right on Bancroft. Turn right on Ygnacio Valley Rd. Turn right on Marchbanks and look for CNGA signs along the way.

TIME: 9-330
REGISTRATION- 9-9:30.
DEADLINE FOR PREREGISTRATION IS NOV. 6TH.

SEND REGISTRATION TO:
CNGA P.O. BOX 566
DIXON, CA. 95620

Preregistration Fees: $25.00
includes lunch.

Late Registration or at the door
$35.00

Vendor information:
Dave Gilpin at (510) 463-1188

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I would like table and space to display posters or educational information.

Address

ASK NOT...

Would you be willing to serve as a director or officer of CNGA for one year? Each year, at our annual meeting, an election will be held to chose seven directors and four officers — a president, vice president, secretary, and treasurer. Our Board of Directors generally meets 4-6 times a year; the Executive Committee, composed of four officers and plus one board member, meets more frequently.

The Nominating committee headed this year by Mary Burko, is receiving the names of CNGA members willing to serve in an elected position. Working from a list of willing participants, the committee will nominate members to be introduced to CNGA members at our annual meeting November 22, 1991. Nominations will also be received from the floor at the meeting. Please take time to fill in your election ballot below.

California Native Grass Association
Nominating Ballot for Officers and Board of Directors

Name of nominee:

Address:

Telephone number:

Nominee for (circle one): President  Vice President  Secretary  Treasurer  Director

1-3 sentences describing your qualifications and explain why you feel you will serve CNGA well.

Membership Memos......

Those who joined (or plan to join) CNGA in 1991 become “Charter Members” and received an attractive card or certificate. If you joined CNGA over one month ago and have not received your card or certificate, please contact Gail Newton at 916 323 8564. A special offer for this year only: Those who join between August first and December 31st, 1991, also receive a 1992 membership at no extra cost. And a friendly reminder for the rest of us that joined prior to August 1991, our membership fees are due by January 1, 1992.

— Gail Newton, membership CNGA.