GRASSLANDS

The Newsletter of the California Native Grass Association | No. 3 | October 1991

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 spacial 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 at 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 forbes, 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-

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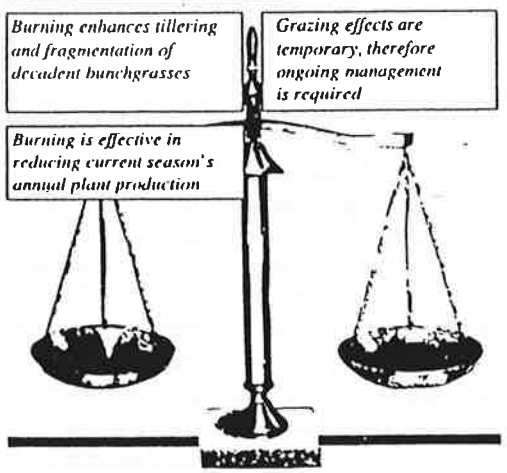
Balancing the Risks and Benefits of Grassland Management (Burning and Grazing)

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



INSIDE

PRESIDENT'S MESSAGE

by Robert Delzell

CNGA Tackl Marketing Issue. CNC is working to provi information and elim nate confusion in t labeling and use (*Bromus carinatus*). Tv different grasses, California native Bron and Deborah Sweet Brome are both label and marketed as California Brome, Brom carinatus. The technical paper in this iss of Grasslands documents significant phen logical and growth differences and makes clear the need to eliminate duplication naming.

CNGA in Southern California. August 20th, a meeting was held and pr gram developed to meet the needs of members. It was a good meeting! The gro planned for two workshops to be held 1992. Tim Ross will coorinate for a gr workshop to be held tentatively the wee end of May 9th and 10th 1992 at the Sar Anna Botanical Gardens in Clairmor Tom Ryan, US Forest Service, Angel National Forest, will lead a workshop post burn seeding technique. Gerha Bombe, County of Orange, will help coor nate, design, and photograph our n CNGA information brochure and pictor guide. Many thanks to those of you w attended this meeting and to the acti enthusiastic, and talented members w help CNGA reach its goals.

Roadside Workshop a Success. O 100 people attended! What a crowd a what a great day we had at Hedgerow Far in Winters Ca. John Anderson, Dave Amn Robert Bugg, Paul Kephart, and Sc Stewart gave presentations on planni planting, and managing roadside appli tions of native grasses. Time ran out bef John Haynes could make his presentation erosion control technique. CNGA "ov him one" for this missed opportuni Wendy Halverson gave an interesting p

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Grazing

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oriented grazing systems to maintain and mprove the status of the stand once established. Some of the recent approaches suggested by holistic resource planned management schemes are appropriate here.

Grazing and fire management research on grassland at the UC Hopland Field Station and more recently at the CCSNRS Jepson Prairie (Menke and his students Ahmed, Fossum, and Langstroth) provide a basis for a native perennial grass management program today. Herbivory and periodic burning are natural and necessary processes in grassland. Management of native perennial grasses in the matrix alien exotics requires strategic application of several time-controlled disturbances to accomplish the primary objective— **Increasing the abundance of native perennial grasses.** Increasing abundance can be accomplished by treatments that enhance the vigor of mature plants thereby fostering their longevity, by promoting clonal fragmentation of decadent, over-mature plants into two or more vigorous daughter plants, or those treatments that cause enhanced production of native grass seed and increased establishment success of seedlings, or most likely that combination of treatments that do all three.

Monitored growth, short duration grazing (2-4 days/year) in early spring with adequate post-grazing time allowances for native perennial grass flowering and seed set is most favorable to increasing live crown cover, reducing decadent dead-center (in bunchgrasses) growth forms, and improving the light quality reaching tiller bases which promotes basal bud growth and new vegetative and reproductive tiller formation. These plant responses promote what managers term improved plant vigor. Summer dormant-season grazing is a second alternative which also accomplishes the removal of dead stem bases typical;l of plants in ungrazed grassland. Grazing in either season directly consumes the litter buildup, but hoof action and trampling of litter that simply puts dead material in contact with decomposer bacteria and invertebrates in the soil increase soil nutrient cycling and litter turnover. Infrequent short-duration grazing in spring, or summer grazing when native grasses are dormant or nearly so, ensures that the perennial grass plant carbohydrate balance is not severely disrupted. Allowing at least one month to six weeks growth after grazing when soil moisture does not become severely limiting largely sets the schedule for spring grazing (we have used late March grazing at Jepson Prairie near Dixon, CA), but plant response will vary by site. If summer grazing is selected it should occur in mid-summer (we have used late August) at maximum plant dormancy, realizing that most native perennials don't go fully dormant. This treatment alternative is potentially low risk, but because it does not benefit from reduced outputs of seed from alien annual plants like that for spring grazing (see below) is a second choice alternative. These grazing prescriptions constitute the primary component of the first phase of a perennial grass maintenance or restoration program; prescribed fire will be discussed below. Once target densities are reached more frequent grazing and practical use of the forage resource is possible depending upon the objectives for the landscape. So long as post grazing rest and regrowth is possible each year, established native perennial grasses are resilient to grazing disturbances.

Prescribed burning in the late spring or summer reduces alien annual plant seed production or the size of the seed bank, respectively, and timings of burning benefit perennial grass seedling establishment by litter removal. Other researchers (Bartolome and students) have shown that burning in the late spring when seeds are still in the enfloresence is a way to reduce annual plant density and competition with perennial grasses. Substantial density reductions in annual grasses with flammable caryopses (seeds) is a primary objective of summer burning. Results to date indicate that summer burning stimulates perennial bunchgrasses to fragment into two or more vigorous daughter plants. However, some consideration needs to be given to the fuel load before burning. On productive sites where above ground biomasses can reach high levels, some previous grazing or mowing may be necessary before summer burning to avoid high (20% or more) mortality of mature perennial grasses due to high fire intensities; in any case a 1-3% mortality can be expected with summer fire but because of fragmentation a higher density of vigorous individuals will be present post-fire.

While fire causes a reduction in seeds produced by existing mature perennial grasses, by the second or third year after fire this effect is gone. Although some perennials are lost during burning, benefits of seedling perennial plant establishment with young vigorous plants make up for this loss. Overall there is a net benefit from periodic burning. Literature from other grasslands

PRESIDENT'S MESSAGE

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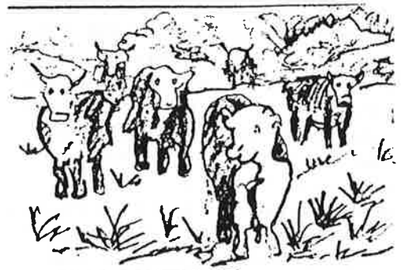
sentation on managing vegetation monocultures with herbicides on California Department of Water Resources Land. The open and free exchange of technical information seemed to be the primary highlight for the participants. Many thanks to Pacific Turf Equipment for joining our group and displaying their products.

Incorporation status. The last of the paperwork designating CNGA as a non-profit, public benefit corporation is underway. We expect IRS approval before the end of 1991.

This president's message is a reminder of the faith, efforts, and financial support of our membership. The CNGA board and thank you.



GRAZING CONTINUED

and other data (Menke and Rice) indicate that volitization of nitrogen and sulfur, may be such that burning more frequently than every third year is too often. This is about the disturbance life of a fire in California grassland, the composition of alien annual species typically returns to a pre-fire status within three years.

While seeding and other plant establishment procedures are possible on depauperate perennial sites, prescribed grazing and burning are useful tools to maintain or increase the abundance of native perennial grasses in the California grassland. Perennial grasses lengthen the period of green forage availability, they have greater capacity to stabilize surface and sub-soil once established, they hold nutrients more tightly and recycle them more efficiently than annuals, and they help to build soil organic matter thereby increasing site fertility and productability. Additionally, they they present a more aesthetically pleasing textured landscape appearance and increase biodiversity of the flora and associated fauna. (Research at the Jepson Prairie that forms the basis for this paper was supported by The Nature Conservancy, the Hewlett Foundation, and the UC Division of Agriculture and Natural Resources Experimental Station.

PROFILE: George Work

This Grasslands profile features George Work. George is a Holistic Resource Management rancher, near Paso Robles. Known for active participation and leadership in his community; George is sharing information, education, and observations from his ranch. Bridging the gap between ranching communities and environmental activists with a cool determination and committment, George defuses hot grazing issues with common sense and patience.

Oak regeneration and native bunchgrass management are incorporated in George's Holistic Resource Management approach. This past year George has seen young blue oak seedlings two to five years old growing at the center of perennial bunch grasses (Stipa pulchra, Poa scabrella, and Sitaneon jubatum). He also noticed native grasses establishing under severe conditions such as graded roads and roadcuts where all top soil was mechanically removed. "*Establishment of native grasses appears to be a function of the absence of annual grass rather than, as most people observe the absence of a grazing animal. Rather than remove the annual grasses by mechanical or chemical means, we are replacing annuals with native perennials through livestock management. We are exited about perennial grass seedlings we have seen establish despite the drought.*"

Why is all this important? Concern for the environment is key to future livestock industry success. This year at the Paso Robles Fair, George interviewed neighboring ranchers about these issues. Twenty ranchers surveyed managed a combined land base of over 100,000 acres. Questions asked were: "*Do your livestock utilize native perennial grasses?*" (14 yes and 5 no, 1 unsure) "*Do you consider them a valuable feed source?*" (14 yes and 5 no, 1 unsure). Many of the ranchers surveyed were interested in learning more about managing relict stands of native grasses. "*If native grasses and perennial grass management are to be of interest to the livestock producer they must have value.*" When asked why native perennial grass forage is important, George said, "*Research has shown the same amount of forage can be produced with perennial climax species with 1/4 amount of water as with annual species. This means more water to recharge ground water, more water available to others for non forage uses, and healthy riparian areas for wildlife.*"

After several years of drought, range conditions are poor and watersheds are suffering. Available range lease land is rapidly becoming scarce. Government agency grazing policy issues are heating up in this state and environmental activists are pointing the finger at the livestock industry. George, and others involved in Holistic Resource Management are looking at planned grazing programs that will improve watershed vitality. The grassland management programs focus on perennial grass rather than exotic annual grass. George sees the benefits of managing native perennial grasses. They have higher forage value than annuals in 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.

Watershed vitality is of concern to us all. We all realize the troubles of our environment; poor oak regeneration, endangered plants, and bunchgrass prairies sacrificed during drought. While some bury their heads in the sand, some people like George make a difference.

George says, " *People are apart of the land, the land to be managed consists of; economics, people and land. Land resource managers should hold the land as an honor. This land ethic is more important to our environment than the state of financial situations or legal governmental controls. Resource management should be a philosophy rather than a law.*"

CNGA Report

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1991-92 RESEARCH

John and Jenifer Menke reviewed native grass seeding and management trials conducted at Davis by Burle Jones and Merton Love in the 1940's and 50's. SCS PMC file at Lockeford is the most comprehensive record of native grass evaluation in California. Ted Adams, U.C. Extension Researcher and Cini Brown PhD candidate in the Department of Agronomy and Range Science, U.C. Davis, will conduct review and evaluations of records.

Dennis Bowker, Resource Conservationist of Napa County RCD, will lead an effort to adapt a CNGA research questionaire (Data Base), from programs developed by the Sustainable Agriculture Research and Education Program.

Dave Dyer, SCS PMC, has developed a final draft of the Native Grass Adaptability Rating Table for 10 grasses. The CNGATC table will describe the grasses in terms of, region, climate, ecotype, suitability, and plant characteristics. Information on 40 native grass species has been requested by our membership.

CNGATC staff are preparing research criteria for mapping grass populations and descriptions. Staff conducted a state wide collection of seed and plant material this year. All CNGA seed and plant material collected is recorded with location, soil type, and number of parent plants collected. We have many collections of Stipa pulchra, S. cernua, S. lepida. Additional collections enclude: Bromus carinatus, Elymus glaucus, Hordeum brachyantherum, Melica Californica, M. imperfecta, M. torreyanna, M. hardfordii, and M. aristada, Poa scabrella, Sitanion jubatum, Festuca Idaoensis, F.rubra, F. Californica, F. occidentalis. These collections represent many different regions and elevational transects.

Using Livestock to Manage Yellow Starthistle in Grasslands

By Craig Thompsen 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 star thistle *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 star thistle. While horses should not be allowed to graze star thistle, 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 wether 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, prespiny 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-spiny 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 spiney 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 tend ed to be favored in ungrazed areas and th combined effect of the grasses and high den sities of starthistle strongly suppresse many dicots that were otherwise found i the spring flora. Most notable last sprin was the complete suppression of *Lupinu bicolor* at one site and *Limnanthes douglas* (meadow foam) at another site. In graze areas adjacent to the ungrazed treatments these two native species were the dominan components at their respective sites. Th suppression observed of these low-stature species by tall-statured ones is consisten with other studies where grazing has bee excluded in Californis grasslands dominate by intraduced annual species (Heady 1977) When taller-statured alien species dominat a site and are left standing, their skeleton and residues accumulate, forming dens thatch-life mulches that supress man species with high light or heat require ments. Murphy and Ehrlich)1989) pointe out that grazing research in native grasslan communities is useful and should b encouraged. They suggest that while over grazing is destructive, some grazing is ofte necessary to maintain intermediate levels o succession. In mid-successional grasslands there is often greater plant diversity which i turn supports a greater diversity of anima life.

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

Livestock grazing is not without it problems and difficulties. Obtaining an handling livestock may add a level of man agement complexity that is either impracti cal of not possible. On the other hand where appropriate, they represent a powe ful weed management tool that may b more economical and environmentall benign than conventional methods. In addi tion to managing weeds like yellow starthis tle, controlled grazing can be an aid in pro ducing grassland landscapes with greate floristic diversity.

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CNGA TECHNOLOGY COMMITTEE REPORT

Committee Chairman: David Amme

COMMITTEE STATEMENT OF PURPOSE: PROMOTE THE DEVELOPMENT OF TECHNOLOGY TO RESTORE AND/OR REHABILITATE GRASSLAND ECOCOLOGY USING NATIVE GRASSES AND ASSOCIATED SPECIES.

CNGATC PROGRAM 1991-92

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

1989-91 PROJECTS

CNGA learned a lot from native grass seedings and management in the last two years. The Cherry Island Golf Course seeding north of Sacramento taught us: **use the right plants at the right site ! !** California brome, *Bromus carinatus* Blue wild rye, *Elymus glaucus* Meadow barley, *Hordeum brachyantherum* and Molate Fescue, *Festuca Rubra* are not adapted to heavy clay soil with extreme compaction (golf carts and foot traffic), not to mention relentless 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 moving into certain sites after two years. This relates to: soil type, site preparation, initial weed control and flooding.

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/annual grass competition and maintaining perennial stand vigor. A four year 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 ect.) and promoting the spread of native meadow barley and creeping wild rye.

Seeding trials and common garden plantings are on display at **Hedge Row Farms** (Winters), **Elkhorn Ranch** (Moss Landing), **ConservaSeed** (Rio Vista), **UC Berkeley Gil Tract** (Berkeley), and **SCS** (Lockeford). Gardens planned for 1992 are located at **The Student Experimental Farm U.C. Davis** and in Southern California at **Inland Empire RCD.** (For information to visit common gardens nearest you, call 415 526 9257).

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Starthistle

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Considering Native grasses? Heres a Checklist.

By Charlotte Glenn

Selecting the right varieties: Choose the natives that will work under your conditions and meet your objectives. These may be to control erosion, improve wildlife habitat, provide forage, or create an aesthetic landscape. Analyze your site for conditions and consider factors such as: 1.present vegetation. 2. soil type and condition. 3. fertility. 4. water availability. 5. end use.

Of the many perennial grasses to choose from, several native California grasses are available. Meadow Barley (*Hordeum Brachyantherum*), Purple needle grass (*Stipa Pulchra*), Squirrel Tail (*Sitanion Jubatum*), California Brome (*Bromus carinatus*), Creeping Wild Rye (*Elymus triticoides*), and Blue Wild Rye (*Elymus glaucus*). Recognizing the interest and need of California native grasses, seed producers are selecting and releasing additional species and cultivars each year. If you require help in determining varieties to plant, check with your local Soil conservation service or University Cooperative Extension agent in your area. Or contact the Native California Grass Association. We have technical advisors to help you.

Determine the source. Check the performance of the varieties you wish to plant. By doing this you can make value judgements whether your conditions parallel those of the source. Moisture requirements should match precipitation for your area. Additionally, seed source should not vary more than 1000 feet in elevation from intended planting sites.

Choose only high quality seeds. Look for labels noting germination, purity, and noxious weed content. Conscientious buyers purchase on a pure live seed basis.

DREMANS CALIFORNIA BUNCHGRASS INDEX

Who lives or has lived on the California prairies?

- Animal biomass in California during ice age; average in pounds per square mile: 40,000
- Percentage of animal biomass that became extinct when herbaceous food plants dried up, grasslands spread, and animals were unable to utilize grasses: 88%
- Native animal biomass from end of Ice Age to 1760 AD., including humans, in pounds per square mile: 10,000.
- Total animal biomass including humans in California in 1991, in pounds per square mile: 47,000
- Animal biomass in 1991 in California, percentage that is introduced humans: 44%
- Animal biomass in 1991, percentage cattle: 44%

NEWS BRIEFS & TRENDS

HABITAT RESTORATION

The Elkhorn Slough Foundation needs volunteers all or part-day to help with habitat restoration. Join us at 8:30-5:00 pm. Bring lunch, shovels, and gloves. Also, bring your camera and field guides. Carpool with a friend from Elkhorn Slough Preserve parking lot. Restoration site is at 466 Elkhorn Rd. For information call Jo Guerrero at ESF 408 728 5939.

RESTORING THE LAND - THE NATIVE GRASS CONNECTION

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

Authoritative 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 Grasslands.

EDITOR'S NOTES:

GRASSLANDS NEWSLETTER provides CNGA members with current research information, highlights CNGA activities, and advertises product information. Grasslands is an open-forum for all contributors.

The winter issue of Grasslands will focus on integrating native grasses in the urban landscape. Grasslands welcomes your comments, insights, and suggestions.

Some of you will no longer receive the Grasslands newsletter and we hope you have enjoyed your complimentary copies. If you would like to become a member of CNGA and continue receiving Grasslands, see the membership form on the back page.

LETTERS:

Dear Grasslands editor,

The article in July 1991 Grasslands by Judith Lowry, (Notes on Native Grasses) paints a glowing, and well-deserved picture of native perennial grasses. However, the article also presents some difficulties. It characterizes cattle and sheep as part of a "gang of four" that is supposedly responsible for the disappearance of our native grasses, and particularly recommends places where these animals have been excluded for good displays of native bunchgrasses. And it claims that the natural grazing/browsing fauna with which our native grasses evolved was proghorn-elk-deer.

Long before that devastated, remnant grazing/browsing fauna became important, our native grasses were intimately a intricately related (over some millions years) to a stuctually complex megafau In the Late Pleistocene, and until so 12,000 years ago, this wonderf menagerie included mammoth; bison (p sibly two species); 2 other cattle siz bovids; horse; and elk— a diverse group grazer-browsers (admitting that there some debate about trophic emphasis individual cases); plus a number with more straight-forward emphasis in indivi ual cases); plus a number with a mo straight-forward emphasis on browsin mastodon; large and small camel Breameryx; 2 kinds of proghorn; deer; a three kinds of ground sloths. Contrary the attack on cattle and sheep, it is pos ble that the most natural situation could promote today would employ ma agement strategies involving horses, catt sheep, elk, deer, and prohorn. The m significant differences between mode and prehistoric grazing regimes are prob bly fences and "modern" range manag ment styles. There were no fences to bo in the Pleistocene megafauna.

The point is made in Ms. Lowry's artic that ares where livestock grazing has be excluded— especially fencerows and righ of-way— are the places to look for nati grasses. In my experience, such plac tend to be good for native grasses becau they coincide with unproductive soils- roadcuts exposing bedrock or lithosol compacted roadbeds; gravelly slopes, e On such sites, competition from exot annual grasses is reduced; and, probabl growth rate of bunchgrasses is slowed, that they are in less need of being "clean up" (and re-invigorated) by grazing, th they would on a productive soil. If w make fair comparisons, between compar ble soils/slope aspectson both sides fences,the grazed side is often in better shape—even on se pentinite. On the other hand, if we con pare an overgrazed (or historically plowe pasture with a rocky roadcut or thin-soil slope oputside the fence, naturally the be ter native grass association will be outsid Is that a fair comparison?

We must distinguish between overgra ing, undergrazing, and grazing. M Lowrys's article is not helpful when attacks livestock grazing. Overgrazing an undergrazing are the killers of biodiversit Enlightened ranchers and range manage can use livestock wisley as tools to pr mote native biodiversity. In other word grazing properly is always an option. Isn it time to stop attacking livestock, whic are innocent and to put the blame where belongs—namely with people who mi manage livestock?

Steven W. Edwards

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 sold in California as B. carinatus. While there 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 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.

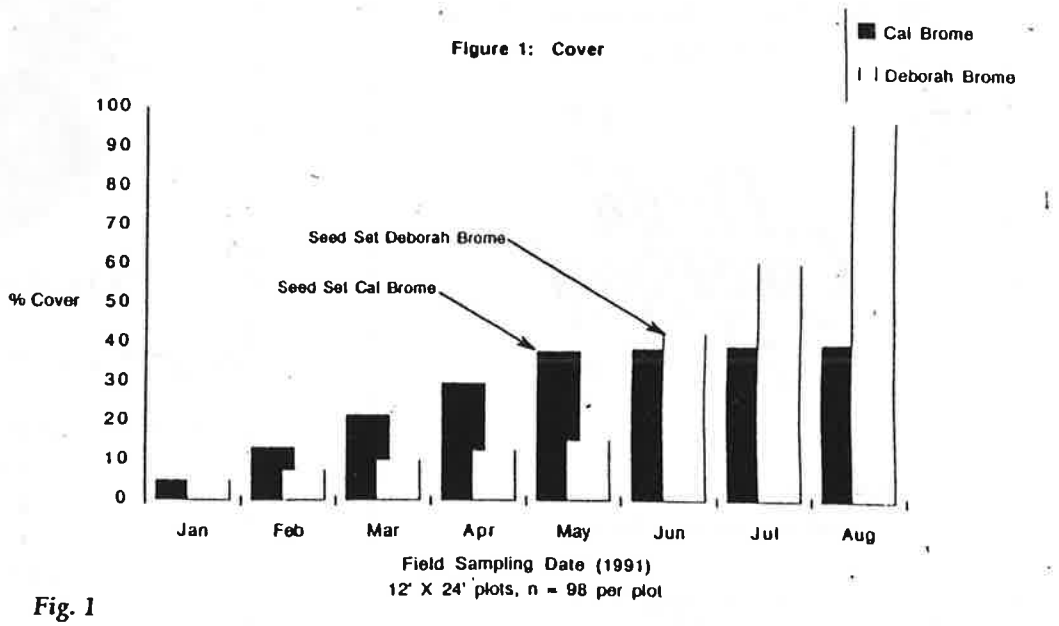
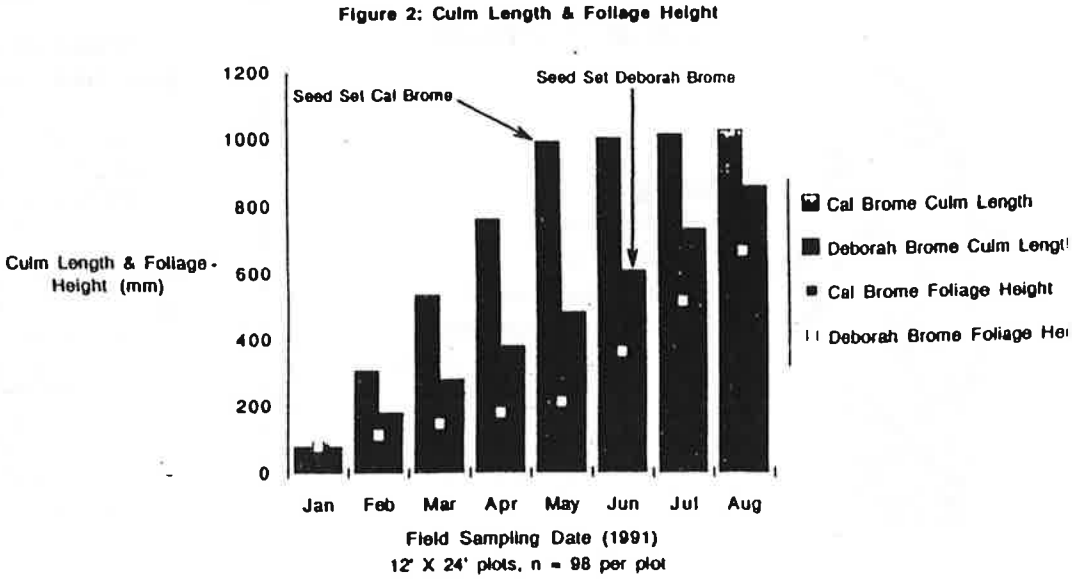


Fig. 1

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.



CALIFORNIA NATIVE GRASS ASSOCIATION PRESENTS
1991 ANNUAL MEETING OPEN TO ALL MEMBERS

JOIN US ON NOVEMBER 22nd. 1991 AT HEATHERFARMS IN WALNUT CREEK

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 DISSCUSION
"TIME WITH THE NATIVES"

DIRECTIONS: Heatherfarms is located at, 1540 Marchbanks Dr. in Walnut Creek. To get there from Interstate 680; take the Treat-Geary 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
RESISTRATION- 9-9:30.
DEADLINE FOR PREREGISTRATION IS NOV. 6TH.

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

Preregistration Fees: $25.00 encludes lunch.

Late Registration or at the door $35.00

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

NAME _____

TELEPHONE _____

I would like table and space to dislay 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 Burke, 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.