

Biological Control of Weedy Exotic Thistles and Its Ecological Side Effects in the Sandhills: Observations

by Svata Louda, School of Biological Sciences, UNL

This is the first of a two-part series. In the next issue Dr. Louda discusses testing and policy implications for use of introduced biological control agents. —ed.

Heavy weed infestations in grasslands can reduce productivity. Thus weed management is an important challenge for rangeland managers. Chemical control may be a viable option in intensively managed crops. However, reliance on herbicides in rangelands and nature preserves is usually not economically or ethically justified. Alternatives include mechanical removal, improved grass management, augmentation of existing natural enemies, and importation of additional natural enemies.

Importation of a weed's natural enemies from the area in which the weed originated is called classical biological control. Many of our worst weeds, including weedy thistles such as Musk and Nodding thistles, are foreign in origin. Classical biological control, using self-perpetuating populations of plant-feeding insects or pathogens, has been used effectively on several weeds, including Klamath weed in the Pacific Northwest and cacti in Australia. Advocates of biological control argue that it is an environmentally friendly, cost-effective strategy to reduce weed densities below the level at which they reduce forage productivity. Effective biocontrol can limit weed densities and reduce the area covered. About 40% of biological weed control programs provide some control and 20% are reported as providing significant control.

How safe is the deliberate introduction of exotic insects

and plant pathogens? Accidental introductions of insects such as the Gypsy moth and the Japanese beetle, and of plant pathogens that cause Chestnut blight and Dutch elm disease, have devastated native American plants and changed the character of our natural ecosystems. Introduced plant-feeding pests also threaten crops. Unintended "nontarget" effects can be minimized by deliberate introduction of species with narrow feeding range.

Unfortunately, we still know very little about the side effects of most introduced insects and pathogens. Such information requires long-term studies before and after introduction. Biological control practitioners argue that USDA has done its job well and no side effects have occurred with insect introductions. Skeptics argue that few observations have been made on native and horticultural plants fed upon by several biocontrol agents. Since significant nontarget effects have the potential to disrupt functioning of grasslands, endanger species, reduce biodiversity, alter pollination processes, and release new weeds, environmental side effects are important.

Our discovery and documentation of major unexpected ecological side effects of the Musk thistle biocontrol program in the Nebraska Sandhills and several National Parks in the upper Great Plains have stimulated national concern. Our study (*Science*, 22 August 1997) presents the first intensive, long-term data set that clearly and unambiguously documents significant impact of a biological weed control agent on native plants and their native insects.

(continued on page 6)



Platte thistle



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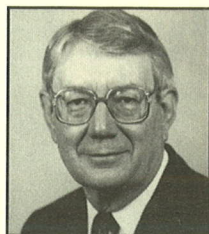
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The Center for Grassland Studies is a unit within the University of Nebraska-Lincoln Institute of Agriculture and Natural Resources. It receives guidance from a Policy Advisory Committee and a 50-member Citizens Advisory Council. This newsletter is published quarterly.

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From the Director

In this issue of the newsletter I wanted to share with you two activities that I have participated in recently.

First, I was pleased to have represented the University of Nebraska at Ataturk University's 40th anniversary celebration in Erzurum, Turkey last fall. This university, which is located in eastern Turkey, was assisted in the first ten years of its development by the University of Nebraska through a grant from the United States Agency for International Development. Ataturk University has grown and developed nicely during its first 40 years and now with its 30,000 students is larger than UNL.

The University is located in an agrarian region where grasslands predominate. The primary grazing animals are sheep, and they are essentially all "fat tail" sheep. The winters are long and there is little forage available for grazing. These sheep are able to survive under the conditions because they store fat in the tail during the grazing season and then use that fat to live through the winter.

Another interesting fact is their grazing lands are essentially "common" grasslands. They are owned, for the most part, by the government, and individuals have little control over how they are grazed. Thus, there is no incentive for herd owners to use improved management practices. Most of the sheep are slaughtered directly after feeding on grass. I was impressed with both the taste and quality of the meat served.

Also, I have just completed a term as President of the Grazing Lands Forum. The Forum is composed of a group of individuals representing various federal and state agencies, universities, private and public organizations, non-profit corporations, and private citizens who are interested in grasslands and primarily grazing lands. The group meets annually in Washington, DC.

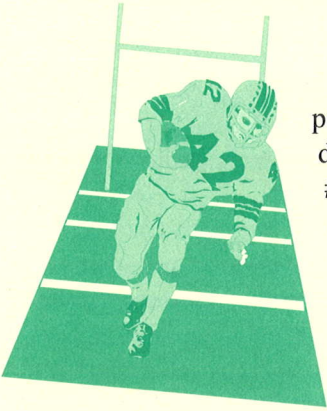
Forum members attempt to identify topics of high priority to grasslands and then develop programs or discussion panels around these topics. Also, they try to foresee emerging topics relating to grasslands and plan future discussions around those. The group is heavily oriented toward user concerns and I believe will stay focused in that direction. More information can be found on the Grazing Lands Forum Web page, which is accessible through our CGS Web page (see masthead).

These experiences are mentioned here because they serve to help keep me and Center personnel abreast of priorities and concerns relating to grasslands both nationally and internationally.

M. A. Massengale

Cutting Edge Technology Used for UNL Football Practice Field

by Roch Gaussoin, Department of Horticulture, UNL



Forget the National Championship controversy. As the debate continues over who is the #1 college football team in the country, a much greater controversy may have found a resolution. Arguments over the advantages/disadvantages of a natural grass vs. synthetic playing surface have been

ongoing ever since the invention of Astroturf®. Recent advances in athletic surface technology may have found a surface that offers the safety and “feel” of real grass with the durability and wearability of a synthetic surface. This technology is marketed under the trade name SportGrass®. The SportGrass system consists of a 100% natural grass playing surface grown in a layer of amended sand. Within the layer of sand are polypropylene grass blades tufted into a woven backing. Because the roots of the grass grow down through the synthetic blades and the woven backing, theoretically, the crown and root system of the plant are protected. Even during heavy play, SportGrass (again, theoretically) maintains a consistent and level playing field. The synthetic blades and the woven backing form a matrix with the root system of the natural grass. If the natural grass blades are temporarily worn away, the stability of the field is retained, and play can continue.

The first major installation of the SportGrass system was at the University of Utah. This field has been in use for several years, and except for some minor problems that require modifications in management, the installation has been considered a success. Other installations include the

fields on which the Baltimore Ravens and Green Bay Packers play. According to the 1996 NFL Players Association Survey, the Ravens team was the only one in the NFL that gave its home field a 100% excellent rating. That SportGrass field was ranked #1 in the league by the five teams that played there at the time of the survey.

In 1996 a 7500 square foot test plot of SportGrass was installed and monitored by UNL turf specialists on a practice field near Memorial Stadium in Lincoln. The players and coaches were satisfied with the performance of the test plot, and in 1997 an entire football practice field was converted to a SportGrass surface. This included installation of an independent irrigation system and a sand-based root zone. The SportGrass was originally to be grown at a sod farm near Dallas, but a late frost slowed the growth and limited the availability of sufficient SportGrass to cover the desired area. In search of an alternate source of grass, we discovered there was extra sod from the SportGrass being grown for Lambeau Field in Green Bay. Ultimately, a combination of the SportGrass grown in Dallas and Green Bay was used for the installation of the UNL practice field. The field was sodded in late spring of 1997 and used for practice that August. The field appeared to hold up well under intense player traffic. The major complaint of coaches was that the surface was harder than they anticipated it would be.

SportGrass Inc. continues to monitor and update this interesting concept. Perhaps the debate over natural vs. synthetic turf can be put to rest with a marriage of the two surfaces. More information on SportGrass is available at its Web Site: <http://www.SportGrass.com/sghome.html>.

Bison/Buffalo Information

First — a clarification: The American Buffalo is not a true buffalo. Its scientific name is *bison* and it belongs to the bovine family. The National Bison Association encourages the use of the term *bison* to differentiate the American Buffalo from the Asian Water Buffalo and African Cape Buffalo.

Speaking of the National Bison Association, you can learn more about this organization by visiting its Web page at <http://www.nbabison.org/>. More regional in scope is the recently formed Great Plains Buffalo Association, which just published its first newsletter (January-February 1998). This organization's Web site is <http://www.gpbuffalo.org/>.

And did you know there was a Center for Bison Studies at Montana State University? That Web site is <http://www.montana.edu/~wwwcbs/index.html>. All of the above Web sites have good information and links to other sites.

The Center for Great Plains Studies and the CGS co-sponsored a seminar January 21, 1998 by John Hansen, manager of one of the ranches owned by Ted Turner. “Buffalo Ranching on the Great Plains” is available on videotape. Also, in 1997 the UNL College of Journalism and Mass Communications published a special report on buffalo (see Resources).

Early-summer Grazing Effects on Defoliation and Tiller Demography of Prairie Sandreed

by Andrew Cullan, Patrick Reece and Walter Schacht, Department of Agronomy, UNL

Historically, stocking rates recommended by the Natural Resources Conservation Service (NRCS) for rangeland were based on six-month, continuous "summer" grazing programs. When grazing seasons are five to six months long, grazing pressure during the growing season is relatively low because grazing is distributed over many days and the amount of forage consumed by the herd per acre per day is low. Grazing pressure is defined as animal unit days (AUD) per unit weight of current-year herbage.

During the past 15 years, the length of "summer" grazing seasons in Nebraska has declined. Many ranchers remove calves and yearlings 30 to 60 days earlier than in past decades to avoid reduced gains or weight losses when forage quality declines with advanced plant maturity. Interest in placing relatively heavy yearlings on high-quality, early-summer forage for one to three months before cattle enter feedlots has increased. With a shorter grazing season, number of animals per unit area on a given day (i.e., stocking density) has been increased to keep the same stocking rate (total AUD per unit area for the season). Grazing pressure increases with increased stocking density, especially early in the growing season before plant growth has been completed. The increased grazing pressure can have a negative impact on key forage species that will be more heavily used than they would at the recommended stocking rate over a longer grazing season.

In a previous study at the UNL Gudmundsen Sandhills Laboratory (GSL) near Whitman, Nebraska, grazing pastures at heavy seasonal stocking rates in June or July caused measurable reductions in the vigor of prairie sandreed [*Calamovilfa longifolia* (Hook) Scribn.], which is a key forage species throughout the 4.9 million ha (12 million acres) of the Nebraska Sandhills and the sandy prairie soils of the northern and central Great Plains. In the Sandhills, prairie sandreed can provide 25 to 40% of all the herbage produced on range sites in good to excellent condition. Using stocking rates recommended by the NRCS for a six-month, continuous grazing, "summer" program will result in an average grazing pressure of 21 AUD per metric ton (t) of current-year herbage. When seasonal stocking rates are concentrated into three months or less, grazing pressure can be as high as 90 AUD t⁻¹.

In a recent study conducted at the GSL, it was learned that grazing pressure has a significant impact on how intensively prairie sandreed is defoliated in June or July. Grazing pressure ranged from 10 to 90 AUD t⁻¹. Utilization of prairie sandreed increased rapidly from 27% at very low

grazing pressure (10 AUD t⁻¹) to 50% at 28 AUD t⁻¹, and plateaued at about 67% from 60 to 90 AUD t⁻¹. Physiologically, damage to growing grasses is generally stated to be minimal until defoliation exceeds 50%.

When pastures are grazed every summer, the potential for overgrazing prairie sandreed increases as grazing pressure increases during early summer. Livestock performance will generally not be reduced when prairie sandreed is overgrazed during June and July because of seasonally high forage quality. Critical grazing pressures for livestock performance in early summer are near 40 AUD t⁻¹. Utilization of prairie sandreed in the Sandhills will be about 60% at 40 AUD t⁻¹. Initiating one- or two-month grazing periods in June in the Sandhills at traditional NRCS seasonal stocking rates will cause overgrazing of prairie sandreed nearly every year because of excessive grazing pressure in June or July. Sustainable stocking rates for prairie sandreed for one- or two-month grazing periods initiated in June will be 30 to 50% of traditional NRCS stocking rates. Cattle will overgraze prairie sandreed in some dry years when three-month grazing seasons are initiated in June at traditional stocking rates. This study did not examine the effects of deferment on sustainable levels of utilization. General observations on Sandhills ranches indicate that vigorous populations of prairie sandreed can be sustained with intermittent, heavy use in early summer if pastures receive full-growing-season deferment every two to three years.

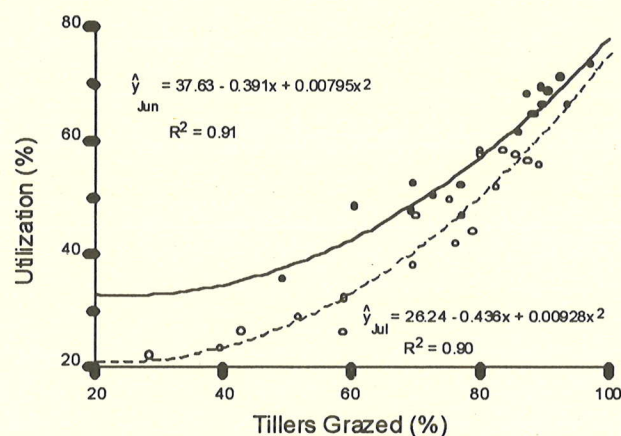


Figure 1. Relationship between percent of prairie sandreed tillers grazed and use of prairie sandreed populations in pastures at the UNL Gudmundsen Sandhills Laboratory, near Whitman, Nebraska, after grazing in mid-June (●) or mid-July (○) in 1995 and 1996.

East Meets West in 1999: SRM/AFGC Joint Meeting

by Heidi Carter, Center for Sustainable Agricultural Systems, UNL



The Society for Range Management (SRM) and the American Forage Grassland Council (AFGC) will sponsor a joint meeting in Omaha, Nebraska, February 21-26, 1999. *Building On Our Heritage* was the theme chosen by the planning committee to show how much both groups have worked to better production agriculture.

Jim O'Rourke, agronomy professor at Chadron State College, explained: "We are having a combined meeting in the center of the U.S. because the organizations' goals are similar. SRM has people who are interested in the rational use of rangelands and forests, and AFGC is

dedicated to the profitable production and sustainable utilization of quality forage and grasslands. It also gives public and private land managers a chance to interact."

"After all," added Paul Meyer, a commercial alfalfa producer near Westpoint, Nebraska, "we all want to increase profitability from forage crops. As a producer, the biggest reason I attend is to network with people from different sectors. I want to get ideas from researchers, industry reps, agency folks, and other farmers."

According to planning committee co-chairs O'Rourke and Meyer, a real effort has been made to make the meeting producer-oriented by presenting practical topics. For example, they have proposed symposia on hay marketing, a grazing short course, forage quality, and alternative agriculture opportunities in western Nebraska. Some of the subjects to be covered in technical sessions and posters are soils, vegetation management, nontraditional forage use, grazing management, and wildlife. A trade show, events for high school and college students, and social functions round out the agenda. For details, contact Jim O'Rourke, Chadron State College, 61 Country Club Road, Chadron, NE 69337, 308-432-6274, jorourke@csc1.csc.edu.

Early-summer Grazing *(continued from page 4)*

The probability of sustaining vigorous populations of prairie sandreed in the Sandhills at moderate to heavy seasonal stocking rates increases as the turn-out date is delayed from spring green-up and/or the length of the "summer" grazing season increases. Sustainable stocking rates in August could be as high as 1.3X NRCS recommended stocking rates. After killing frost (mid-October), vigorous populations of prairie sandreed can be sustained with heavy seasonal stocking rates (1.5X) using any length of grazing season or grazing period.

Stocking rate is a poor criterion for effective early-summer grazing management decisions for prairie sandreed. An efficient method of monitoring livestock use of prairie sandreed is needed when the potential for high grazing pressure occurs during June-July. Utilization of prairie sandreed was highly correlated with percent of prairie sandreed tillers grazed ($R^2 = 0.90$) over a wide range in species composition and grazing pressures in our study (Fig. 1). About 75% of prairie sandreed tillers were grazed when utilization was 50% in June or July. It should be possible to estimate use of prairie sandreed in June or July from percent of tillers grazed with limited labor resources and with a high degree of repeatability. Grazing pressure can be used to select dates at which monitoring should begin. Daily monitoring may be necessary in Sandhills pastures when intensive rotation grazing is used during June or July.

Field Trip Course on Ecology of Grazing

UNL will participate in a new study-travel course titled "Ecology of Grazing Land Systems." This graduate level course will be offered in cooperation with Texas Tech University May 28 through June 7, 1998.

The trip into Texas, Oklahoma, Kansas, Missouri and Nebraska will provide an opportunity to learn about (1) ecology of grazing lands extending from the semi-arid region of the southern Great Plains, through tall grass prairies, and into humid temperate regions, (2) research needs and objectives in a wide range of geographical and climatic areas, (3) techniques used by other scientists in soil-plant-animal research, and (4) forage-livestock ecology and systems with both native and introduced forage species, and under intensive and extensive systems. Students will interact with many individuals active in forage-livestock research, teaching, extension, industry and production. The instructor handling the course and traveling with the students will be Dr. Vivien Allen of Texas Tech.

Students sign up for an independent study course (three credit hours) through their home institutions. Course requirements include reading assignments, discussion participation, forage species collection, a post-trip summary session and a final exam. Prior course work in soils, animal nutrition, and forage crops is highly desirable.

In addition to tuition, students will be responsible for room and board, although attempts will be made to keep these expenses to a minimum by using sleeping bags (each student brings own) and many meals provided by the various hosts.

Enrollment is limited and is filling up fast. For more information, contact the CGS office, or Dr. Vivien Allen, 806-742-1625, felician@ttacs.ttu.edu.

Biological Control of Thistle *(continued from page 1)*

We have been studying native thistles in the Sandhills since 1984. No native thistles are serious weeds in well-managed grassland. In fact, when I've asked ranchers in Arthur and Brown Counties about problems caused by Platte thistle (*Cirsium canescens*, white-flowered with gray-green furry foliage), or by Wavyleaf thistle (*Cirsium undulatum*, large-headed, deep purple flower), they laugh. One rancher told me his horses love to eat the flowerheads. Both native thistles occur sporadically in patches when soil is disturbed, but they get eaten by leaf- and bud-feeding insects and gophers, and more than 90% of their seeds are demolished by native insects. Could the natural enemies be limiting them in a healthy grassland community? Birds depend on the large seeds to feed their young, and small native bees and bumble bees use the nectar-rich flowers to tide themselves over when other sources are scarce.

Our studies have focused on why native thistle species do not create the weed problems that introduced ones do. We hypothesize that native thistles are controlled by a combination of good grass management and consistent feeding pressure by native insects. Experiments and census data demonstrate that the insects limit the number of seeds, which then limits the number of plants. These insects are most effective where the grass is in good shape, dense enough to slow the growth of thistles that do establish. Grass in such situations leads to small thistles whose seeds the insects can "finish off," so native thistles are not a problem in well-managed rangeland.

In 1993 we found a few weevils we had never seen before. In 1994 we found more of the weevils, and in 1995 we found even more. By 1996, we found hundreds of weevils on the native species, especially Platte thistle. Population growth had clearly become exponential. We identified the new weevil as the biological control agent *Rhinocyllus conicus*, introduced into Nebraska in 1969-72 to control Musk thistle. But we did not have any Musk thistle at either of the two Sandhills sites! We sent specimens to one of the best weevil taxonomists in the world, Dr. C.W. O'Brien at USDA, who verified the identifications. We soon learned similar increases were occurring on other native thistles in three National Parks in South Dakota and Colorado.

What were the consequences of this outbreak? Weevils lay their eggs on developing flowerheads, and young larvae develop while feeding on the head, flowers and developing seeds. In 1996, Platte thistle at my study sites produced only 14% as many seeds as flowerheads with no weevils or only native insects, an 86% reduction in the seeds needed to maintain even low numbers of the native thistle. Since number of plants is directly related to number of seeds, this dramatic reduction caused by the new weevil

is expected to cause a major reduction in native thistles. The weevil's effect was seen over a wide range of conditions — from a grazed pasture in Brown County to an ungrazed preserve in Arthur County.

The new weevil looks like it is out-competing one of the native insects. The numbers of the golden picture-winged native fly (*Paracantha culta*) have dropped precipitously. Since the second generation each year feeds on later-flowering native thistles, the lower population of flies early in the season could release later-flowering thistles from one of their natural controls, creating new problem weeds. Basic research on functioning of native plants in prairie grasslands in the Sandhills has provided the best documented study of nontarget ecological effects available to date. These effects ripple through the system, changing the abundance and importance of other native species.


Our study suggests other potential problems associated with the spread of this biocontrol agent. First, Platte thistle is restricted to sandy soils in the Nebraska Sandhills, eastern Wyoming and eastern Colorado; widespread attack by the biocontrol weevil could jeopardize its persistence. To evaluate this possibility, we began a study in 1996 of the geographic pattern of plant growth and weevil feeding. Second, Platte thistle is closely related to the threatened Pitcher's thistle around Lakes Michigan and Superior. The similarity between Platte and Pitcher's thistles suggests this threatened species could be in even more trouble, even driven extinct, if the weevil is introduced or migrates into Michigan.


In summary, our study shows that a deliberately introduced species, which was supposed to be environmentally beneficial, can reduce seed production and reduce the density of a sparse prairie plant, can reduce the numbers of native insects that depend on it, and jeopardize an already threatened species. The weevil is clearly reducing resources for native birds and pollinators, and could make weed problems out of presently innocuous late-flowering native thistles. This is a challenge for the biological control community to rethink and improve the criteria used to find safe exotic organisms for deliberate release in integrated pest management programs.


"Grass is the forgiveness of nature, her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of canon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass grown like rural lanes, and are obliterated. Forests decay, harvests perish, flowers vanish, but grass is immortal. Its tenacious fibers hold the earth in its place."


— John James Ingalls


Info Tufts


 Nine-Mile Prairie on the outskirts of Lincoln, Nebraska contains 200 acres of remnant (never broken) prairie. Its name comes from the fact that it is located nine miles from downtown Lincoln.


 The University of Nebraska State Museum, founded in 1871, is a library of Nebraska's plants and animals that offers insight into the state's changing ecology. CGS Associate Patricia Freeman points out that changes in water use and land burning have led to differences in wildlife distributions across this region. For example, the whitetail deer and cardinals, which were previously found in eastern Nebraska, are now as far west as Denver due to more wooded waterways.

 According to CGS Associate Peg Bolick, native prairie grasses and forbs generally produce less pollen than cultivated grasses or weeds and therefore cause less allergic reactions like hay fever. Contrary to popular belief, the Nebraska state flower, goldenrod, does not cause fall hayfever; the real culprit is ragweed.


 The Nebraska Heritage Program tracks 382 plants, 179 animals and 60 natural communities in the state. For information on the program, contact CGS Associates Gerry Steinauer or Rick Schneider at the Nebraska Game and Parks Commission.

 CGS Associate Jim Stubbendieck tells us that the rare Nebraska Sandhills plant, blowout penstemon, was first collected in 1857, thought to be extinct in 1940, rediscovered in 1968, and added to the Federal Endangered Species List in 1987. A committee in Washington, DC designated this plant as the most attractive endangered species.

 In January media mogul Ted Turner more than doubled his land holdings in Nebraska. He now owns approximately 1.34 million acres of ranchland in Montana, Nebraska and New Mexico; his 12,000 buffalo make up the largest private herd in the world.

 In a restructuring move for the coming century, the National Audubon Society has opened its first state office in Nebraska at: 140 N. 8th St., Suite 217, Lincoln, NE 68508, 402-475-1177, dsands@audubon.org, <http://rip.physics.unk.edu/audubon/nebraska/>.

Resources

 Tapes of the following presentations from the CGS Fall 1997 Seminar Series may be viewed in or checked out from the CGS office:

- **Matching the Cow to Forage Resources**, Dr. Don Adams, Ani. Sci. Dept., UNL
- **Nothing to Sneeze at: Interaction of Grasslands, Pollen and Allergies**, Dr. Margaret Bolick, U. of Nebraska State Museum
- **Matching Animal Genetics to Forage Resources**, Dr. James Gosey, Ani. Sci. Dept., UNL
- **Role of Fire and Grazing in the Dynamics and Biodiversity of the Tallgrass Prairie**, Dr. David Hartnett, Konza Prairie and Biology Dept., Kansas State U.
- **Integrated Weed Management Practices for Rangelands**, Dr. Robert Masters, USDA-ARS and Agron. Dept., UNL
- **Fauna of Lowland Grasslands along the Platte River**, Dr. Julie Savidge and Tammy Vercauteren, School of Natural Resource Sciences, UNL
- **On the Verge of Extinction: Blowout Penstemon**, Dr. James Stubbendieck, Center for Great Plains Studies and Agron. Dept., UNL

Copies of these videos, as well as the January 1998 Hansen seminar (referenced elsewhere in this newsletter), and the Spring 1998 Water Resources Seminar Series which the CGS is co-sponsoring (see <http://ianrwww.unl.edu/ianr/cgs/SEMWAT98.htm>) are available for purchase (\$10), or rent (\$5). Contact the CGS office for details.

Back From Oblivion. Depth Report tells the story of the resurgence of the buffalo on the Great Plains, published in October 1997 by the UNL College of Journalism and Mass Communications. For a copy, contact editor Kelly Johnson, 116 Avery Hall, University of Nebraska, Lincoln, NE 68583-0132, 402-472-8597, kelly@yoda.unl.edu.

1998 Nebraska Beef Report contains 37 research articles on a variety of topics related to beef production, including several on grazing. Summaries may be obtained from Nebraska Extension educators, or on the World Wide Web at <http://ianrwww.unl.edu/ianr/anisci/beef/beef.htm>. For a copy of the report, contact the CGS.

The National Plant Materials Program (see Summer 1997 CGS Newsletter) now has a Web site: <http://plant-materials.nrcs.usda.gov>.

State of the Land. The subtitle of this new USDA-NRCS Web site is "Analysis and insight on the health of America's private lands." You can access maps and reports based on the Natural Resources Inventory, Census of Agriculture, and other databases. See <http://www.nhq.nrcs.usda.gov/land/home.html>.

CGS Associate News

At the 1997 ASA/CSSA/SSSA (Agronomy meetings) in November, **Stephen Baenziger** received the Agronomic Achievement Award-Crops, **David Baltensperger** was named an ASA Fellow, **Jeff Pedersen** was named a CSSA Fellow, **Lowell Moser** became President-Elect of the Crop Science Society of America, and **Martin Massengale** was elected chairman of the Board of Directors of the Agronomic Science Foundation. The publication *Integrated Turfgrass Management for the Northern Great Plains* edited by **Fred Baxendale** and **Roch Gaussoin** received a Certificate of Excellence in the 1997 ASA Educational Materials Contest.

At the Nebraska Cooperative Extension Association annual meeting last fall, **Don Steinegger** received the Distinguished Extension Specialist Award, and **Charles Shapiro** was among those recognized for their special accomplishments.

Scott Hygnstrom received the Epsilon Sigma Phi Early Career Award.

Ken Vogel was honored by USDA for his work with perennial grasses. He was one of only five scientists in the U.S. to receive the award in 1997.

Martin Massengale received a Gamma Sigma Delta Award of Merit.

In November Frank Bruning, president and chairman of Bruning State Bank, received the first outstanding agricultural leader award from the American Bankers Association. Frank is a member of the CGS Citizens Advisory Council.

Calendar

Contact CGS for more information on these upcoming events:


1998

- Feb. 24-25:** 1998 Platte River Basin Ecosystem Symposium, Kearney, NE
- Feb. 26-27:** 28th National Alfalfa Symposium, Bowling Green, KY
- Mar. 7-11:** American Forage and Grassland Conference, Indianapolis, IN
- Mar. 9-11:** 27th Nebraska Water Conference - Nebraska Water 2000, Kearney, NE
- July 5-9:** Soil and Water Conservation annual conference, *Balancing Resource Issues: Land, Water, People*, San Diego, CA
- July 13-16:** Society for Conservation Biology 1998 meeting, Sydney, Australia
- July 23-27:** Society for Range Management summer meeting, Crested Butte, CO
- July 27-30:** American Society of Animal Science annual meeting, Denver, CO
- Sep. 28- Oct. 2:** Monocots II and 3rd International Symposium on Grass Systematics and Evolution, Sydney, Australia (e-mail: karen@rbgsyd.gov.au)
- Oct. 18-22:** ASA, CSSA, and SSSA meetings, Baltimore, MD

1999

- Feb. 21-26:** Society for Range Management/American Forage and Grassland Council joint meeting, Omaha, NE
- Apr. 11-16:** International Symposium on Nutrition of Herbivores, San Antonio, TX
- Jul. 19-23:** VI International Rangeland Congress, *People & Rangelands: Building the Future*, Townsville, Australia (<http://irc.web.unsw.edu.au>)

If you have articles, events, resources, CGS Associate News, or other items you would like to submit for inclusion in future issues of this newsletter, please contact the editor, Pam Murray, at the CGS office.



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