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Using Legumes to Boost Quality of Smooth Brome grass Pastures

by Walter Schacht and Bruce Anderson, Department of Agronomy and Horticulture, UNL

Pastures in eastern Nebraska consist of primarily cool-season grasses, with most of them dominated by smooth brome grass. Smooth brome grass is a very productive, high quality grass throughout spring, but growth begins to slow and quality declines in the summer months. This is referred to as a "summer slump," when the availability of high quality forage is greatly reduced, leading to a decline in cattle performance. According to Greenquist et al. (unpublished data), yearling cattle grazing smooth brome grass pasture at the UNL Agricultural Research and Development Center (ARDC) gain as much as 2.5 pounds/head/day in May, but drop to as low as 0.5 pounds/head/day in late June and July.

Researchers at UNL have been exploring methods of diversifying smooth brome grass pastures to provide a more nutritious, continuous supply of forage through the summer. Interseeding a legume into cool-season grass pasture is one option to help reduce the problems of "summer slump" by extending the grazing season and making a higher quality forage available to livestock, especially in July and August. Most legumes adapted to eastern Nebraska continue to grow through the summer months when moisture is available, potentially providing an abundance of good quality forage during the "summer slump" period. Adding legumes to smooth brome grass pasture also reduces the need for nitrogen (N) fertilization. Legumes are able to fix atmospheric N into forms that are available to the pasture plant community. Grass-legume stands are commonly reported to be as productive as fertilized grass monocultures

because the legume fixes N at similar levels to what is supplied in fertilized pasture.

Plant community productivity and cattle performance have been compared on smooth brome grass pastures with and without legumes at ARDC. A study led by Dr. Bruce Anderson compared pasture and cattle performance on nitrogen-

fertilized monocultures of smooth brome grass and non-fertilized mixtures of smooth brome grass with alfalfa, birdsfoot trefoil, or kura clover. Three pasture replications of each of the four treatments were grazed by yearling cattle from late April into late September in each of three years. Forage quality and quantity, as well as cattle gains, were similar across treatments in May and June, but forage availability and quality were greater in the mixtures from July into September. As a result, beef gains for the grazing season were 25 to 40 pounds/

acre greater on the mixtures than on the smooth brome grass monoculture. Considering that there would have been about \$.45 to \$.50 additional net income for each extra pound of gain, there were about \$10 to \$20/acre of additional income. Since less fertilizer was used, production costs also were less.

Further research at ARDC is focusing on birdsfoot trefoil because it appears to be a promising pasture legume for eastern Nebraska. Birdsfoot trefoil is a logical choice for establishment in cool-season grass pastures because it is a non-bloating legume, palatable, and is adapted to a relatively wide range of soil and weather conditions. Birdsfoot trefoil also has proven

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Cattle grazing a grass-legume mixture at ARDC.

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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.

Note: Opinions expressed in this newsletter are those of the authors and do not necessarily represent the policy of the Center for Grassland Studies, the Institute of Agriculture and Natural Resources or the University of Nebraska.

Martin A. MassengaleCGS Director
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Anne Moore Newsletter Layout



FROM THE DIRECTOR

Organizations are built around people. It is people who get things done, who make things happen, who have creative ideas and who bring them to fruition.

The Center for Grassland Studies is a good working example of the above statement. A group of creative faculty had the idea of developing a Center where people who have a common interest in grasslands could come together to initiate, to develop and to implement multi-disciplinary programs involving all areas of grasslands, including native, cultivated and turf, and associated activities. After the Center was officially approved by the University Board of Regents, it has continued to depend on outstanding individuals to keep the programs active and growing. As with any organization, over time there is a turnover of good and productive people.

Very recently the Center lost two of its key Associates to retirement: Drs. Lowell Moser and Richard Clark. These two individuals were instrumental in the Center's establishment and have been on the Center's Policy Advisory Committee since it was formed in 1995. They contributed to the Center's mission in several important ways over the past decade. Dr. Moser provided leadership in the development and implementation of the Grazing Livestock Systems undergraduate major. Dr. Clark chaired the regional research project on improving beef grazing systems, and worked with us on several grant proposals. These are just a few examples of the many Center activities in which these faculty members were engaged. There are other Associates who have retired who also made important contributions to the Center. Needless to say, we miss the wise counsel and support of all these individuals, and wish them much happiness and relaxation as they now pursue their personal interests. Fortunately, new people continue to join our Associates group, and we look forward to their participation in Center activities.

Individuals from other organizations such as the USDA's Agricultural Research Service and Natural Resources Conservation Service, the Nebraska Game and Parks Commission, the Nebraska Department of Agriculture, wildlife and conservation agencies, agricultural producer groups, and other campuses of the university have been excellent cooperators and highly supportive of Center programs.

Of course, I would be remiss if I did not mention the Center's outstanding staff who keep the numerous activities moving forward. With nearly 100 students enrolled in the Professional Golf Management and Grazing Livestock Systems majors, which are administered by the Center, there is never a slack moment.

M. A. Massengale

The Grass is Always Greener: Consumer Preferences for Ornamental Grasses

by Kim Todd, Department of Agronomy and Horticulture, UNL

Many decades ago, purchasing phones and tennis shoes meant choosing between wall model or desktop, short or high top, black or white. Purchasing grass meant lawn turf – period, with a choice between sod and seed. There were few, if any, grasses for ornamental uses.

Today's landscape consumers are making their choices in an environment with instant global access to information, infomercials, and the products themselves. Their initial interest in a particular landscape plant is as likely to come from popular magazines or the Internet as it is from sound research or good trials. The resulting exposure to the hottest trends or the best media pieces whets consumers' appetites for what is new and different – more colorful or a different color, taller, shorter, longer-flowering – sometimes regardless of the appropriateness of the plant for the specific condition.

One of the difficulties, however, is that retailers must either anticipate or create these trends and the appeal of new or different plants in their markets, and pre-order from producers. To further complicate matters, creating, predicting and meeting demand must take into consideration the time required for production, which can take seasons or years despite advances in production techniques and landscape production "assembly lines." Missing a trend by either over-anticipating or under-anticipating demand may mean the difference between a successful year and a lean one. And the unpredictability of working with living things, which may not perform as expected at any point in the process, is coupled with increasing

expectations by consumers for the immediate gratification provided by great-looking plants available year-round in multiple sizes.

Major marketing strategists for large producers of landscape ornamentals such as Bailey Nurseries, Monrovia,



and Greenleaf have invested huge resources in attempting to predict and influence the behavior of consumers of nursery goods. Placing the "Flower Carpet" roses and "Endless Summer" hydrangeas in brightly-colored containers immediately focused consumer attention on those well-promoted plants, since the industry's standard container color was black or green. In those cases, the containers serve as a visual stimulus that attracts attention to the shrubs even when they are not blooming. Simply getting the consumer to look at the container allows the nursery to provide more information about the plant's characteristics – hopefully resulting in a sale. However, if consumer preferences for specific qualities of the plants themselves can be identified, breeders and producers may be able to target their research toward selecting or breeding such traits into plants, with a marketing gimmick such as container color as an extra retail edge. Consumers attracted to the plants for reasons such as color or form can then be taught about the other values of the plants, and retailers can use the combination of consumer preferences and education to promote them.

Identifying consumer preferences for particular characteristics of ornamental grasses may help promote their use. Despite the predominance of the grassland plant communities in the Great Plains, and catchy tourism nicknames for cities such as "The Prairie Capital," the use of ornamental grasses as landscape plants has been slow to catch on in many circles. There may be several reasons for this. People unaccustomed to the performance of ornamental grasses may expect them to be uniformly green and growing like their managed turf, even though their real beauty may not be apparent until well into autumn, when gardeners have run out of time, energy and money. Plant envy may manifest itself in mass plantings of hydrangeas and hollies, helped along by breathtaking images in glossy-covered magazines. A first and lasting impression of ornamental grasses may be of the neighbor's unfortunate

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attempt at installing a “meadow” in the parking frontage with the wrong plants and well-meaning but ineffective management practices. Grasses may be considered as invaders to be annihilated from agricultural row crops. Retailers who have boldly made forays into the ornamental grasses market by promoting the potential for low-input, multi-season interest inherent in excellent warm-season but still-dormant natives during the height of the spring landscaping season may also have found themselves placing their stock on summer clearance shelves or stuck with gangly, tangled masses of stems in early autumn.

In an effort to gain insight into the preferences of at least a portion of the gardening population, a multi-faceted consumer preference study is underway here at UNL.

The first two phases of the project are providing horticulture production major Jessica Ritter with a hands-on research experience through the UNL Undergraduate Creative Activities and Research Experiences (UCARE) program. Goals of the project include identifying for breeders and suppliers specific characteristics preferred by consumers, and developing more effective education strategies promoting the purchase and appropriate uses of ornamental grasses.

In 2003, 30 different grasses were donated by Bluebird Nursery. The grasses represented a mix of warm-season and cool-season species, straight species and cultivars, and native and introduced species. The grasses were managed in containers over the summer months, grown on, and over-wintered in a dormant state. In spring 2004, an initial personal survey of consumers was conducted – taking advantage of buyers attending the UNL Horticulture Club’s annual sale and using volunteer Master Gardeners to help gather answers to the survey questions. Participants were asked about their prior knowledge of the growth characteristics of ornamental grasses, including their understanding of the difference between cool-season and warm-season grasses, their willingness to purchase dormant grasses and grasses of various sizes for various prices, and whether they were using grasses in their landscape. They were also asked to identify the grasses they were most likely and least likely to purchase, and why. The grasses were then installed in field trials in a randomized block and given minimal care that included only weed control and occasional water. Over the 2004 growing season, Master Gardeners collected data on the quality of the grasses, including their vigor, color, time and effectiveness of bloom and seed head, and overall habit. The data gatherers also commented on their personal (consumer) preference for the grasses as the season progressed and the plants changed character.

In 2005, Bluebird Nursery donated additional species and cultivars not represented in the original sample. These grasses were managed through the winter months in the greenhouse, during which time they were repotted into uniform gallon containers, cut back, and watered and fertilized to maintain their health. Two different consumer groups were sampled in the spring of 2005, using questions from the 2004 survey. The

Spring Affair annual plant sale conducted jointly by the Nebraska Statewide Arboretum, the UNL Botanical Garden and Arboretum, and State Fair Park was one venue, and the UNL Horticulture Club annual plant sale was another. The majority of the grasses were in excellent “retail sales” condition, with good top growth. The grasses were then installed in the

field adjacent to those established in 2004, also in a randomized block. During the 2005 growing season, data continued to be collected by Master Gardeners on both trials.

A random selection of previous survey participants who had indicated their willingness to help with further research was made in late October 2005. These participants evaluated the grasses in the field, basing their observations on the habit and overall appearance of the grasses. The data gathered from this evaluation will be incorporated into a final report to be presented at the UCARE open house in April 2006. It will also be made available to producers, retailers and consumers.

Initial peeks at the data, and anecdotal comments gathered during open houses and evaluation sessions, reveal distinct style preferences. Some consumers show strong interest in grasses with burgundy, red or purple foliage. Others are attracted to a tidy, rounded form. Still others focus their attention on a wispy, open, ever-moving habit. Those who prefer grasses with dense, shrub-like characteristics counterbalance the preference of the latter. Silky white seed heads are beloved or maligned. And a small but significant group of consumers looks first at natives regardless of other characteristics. In other words, there is nearly as much difference of opinion as there is variety of choice. Nevertheless, trends in preferences are expected to surface as the data are analyzed.

In future years, additional grasses will be added to the field trials and evaluated. The grasses for which consumers show strong preferences will be displayed in visible locations, both as specimens and in combination with other ornamental landscape plants. Educational materials will be developed to further disseminate the results and promote the use of ornamental grasses.



Using Legumes to Boost Quality of Smooth Bromegrass Pastures (continued from page 1)

to be persistent in dryland pastures in eastern Nebraska and subirrigated meadows in the Sandhills. Our research at ARDC is characterizing plant and animal response in fertilized and non-fertilized smooth bromegrass pastures and different mixtures of smooth bromegrass and birdsfoot trefoil. Results indicate that annual forage production and intake by cattle, in a grazed situation, of a smooth bromegrass-birdsfoot trefoil mixture can be comparable to that of a fertilized (80 lbs. N/acre) monoculture of smooth bromegrass. This suggests that the N fixed by birdsfoot trefoil effectively substitutes for the N fertilizer in terms of forage production. Nearly 25% of the production in the mixture is birdsfoot trefoil herbage, with 80% of the birdsfoot trefoil produced from July into September. Including the legume in the mixture improves the distribution of the available forage through the entire growing season, reducing the proportion of the forage produced in the spring and early summer and increasing the amount of good quality forage (birdsfoot trefoil) available during the hot summer months. We should mention that the productivity of the mixtures is less than that of fertilized monocultures in some years or sites. Rainfall distribution through the growing season and early-season soil temperature likely are environmental factors affecting productivity of the grass vs. the legume.

Our research to date indicates that a minimum of 10 to 25% of above-ground production, by weight, of a smooth bromegrass-birdsfoot trefoil mixture needs to be birdsfoot trefoil to achieve the positive yield responses mentioned above. Mixtures with as little as 10% birdsfoot trefoil are consistently as productive as non-fertilized smooth bromegrass, but generally are as much as 30% less productive than fertilized smooth bromegrass monocultures.



Birdsfoot trefoil in a smooth bromegrass-birdsfoot trefoil mixture at ARDC.

Unfortunately, it is difficult to plant and establish legumes in existing smooth bromegrass pasture. Birdsfoot trefoil is especially slow to develop as a seedling. Research is continuing to improve the effectiveness of interseeding. The most recent research at ARDC is focusing on pest control and phosphorus fertilizer application methods as key factors affecting establishment and persistence of legumes in smooth bromegrass pasture.

This research was funded in part by the USDA regional research project, NC-1021, "Nitrogen Cycling, Loading and Use Efficiency in Forage-Based Livestock Production Systems."

Call for Papers, Third National Conference on Grazing Lands

The Third National Conference on Grazing Lands, to be held in St. Louis December 10-13, 2006, has issued a call for papers. The conference objective is "to heighten awareness of the economic and environmental benefits of grazing lands," and its theme is "Grazing Lands, Gateway to Success."

Target audiences include consumers, conservationists, environmentalists, urban-based resource interests, grazing land managers, landowners and others interested in effective natural resources management. Farmers and ranchers are particularly encouraged to present. Poster boards will be provided for poster paper presenters.

The conference sponsors are accepting abstracts through March 1, 2006 for oral and poster papers in the following categories: the building of partnerships between agricultural, grazing and urban communities; successful "cutting-edge" management technologies for grazing practices; economic and public policy implications of grazing; the optimizing of grazing land health for environmental and social benefits. More information, including how to submit an abstract, can be found at www.glci.org/2NCGLindex.htm.

PGM Enrollment More Than Doubles in Second Year

In Fall 2004 we began the first year of the PGA-accredited Professional Golf Management program with 31 students. We're very excited to report that this year we have a total of 74 PGM students who are busy attending class, studying, attending PGM meetings, and practicing and playing in tournaments at our partner courses.



High school students receive instruction on proper golf club grips at the first ever Nike Golf Camp in Lincoln.

Speaking of partner courses, as our program grows, so does the list of courses at which our PGM students can play as part of their PGM fees. That list now includes Wilderness Ridge Golf Course (the primary course for the PGM program), Hillcrest Country Club, Yankee Hill Country Club, Woodland Hills Golf Course, Crooked Creek Golf Club, Firethorn Golf Club, and Lincoln City Golf Course Operations (Jim Ager, Highlands, Holmes, Mahoney and Pioneers).

In a few months we will have a new PGM Golf Simulation Lab. Two state-of-the-art simulators will be installed in the building across from the PGM offices. Not only will this be helpful (and fun!) for our current PGM students, but will be a great recruiting tool as well. Also, Wilderness Ridge has added to its facilities; our students will have access to its nine heated hitting bays and an indoor putting and chipping green – just in time for the cooler weather!

PGM staff worked with Wilderness Ridge professionals to put on the first Sports Camp, Inc. (Nike) Golf Camp ever held in Lincoln. It was a huge success, with 35 high school students attending the week-long camp July 18-22. We see this as another valuable recruiting tool; several of the more experienced campers indicated they plan to come to UNL for the PGM program after high school graduation.

Planning: An Important Key to Native Planting Success

Native grass stand success can often be traced back to proper planning beginning with site preparation. Knowledge of tillage practices, crop rotation, soil fertility, and herbicide history of a potential site all contribute to the success of a native grass planting.

Proper seedbed preparation is second in importance only to favorable weather in grass establishment. The seedbed needs to be friable, firm, and without any herbicide residue carry-over. The cover crop or range planting should be delayed if detrimental herbicide residues are suspected to exist in the field. The seeding should also be delayed if soil compaction layers (plowpan or hardpan) exist in the field that would impair production or stand establishment of the desired plants.

A standing cover or surface mulch is also important for the success of any seeding in areas where lack of soil moisture and/or soil erosion is a concern. Cover crop residue helps maintain surface soil moisture that is critical to seed germination and permanent root system development. A cover crop or surface mulch application is required for any seeding on soil where erosion or moisture conservation is a concern.

Many named varieties of adapted native grasses and forbs have been developed and released and should be used when available. Where named varieties are not available, seed from

a source as near the area being seeded as possible should be used following distance and elevation requirements set forth in Natural Resources Conservation Service (NRCS) standards and specifications. It is also important that a valid seed analysis be provided with the native seed purchased.

When seeding native grass, all seeding operations should result in the seed being placed in contact with the soil in a firm seedbed and in a non-competitive situation. Planting with a drill equipped with double disc or coulter furrow openers with depth bands along with press wheels, cultipacker, or drag chains is the preferred method of application. Seed should be planted 1/8 to 1/2 inch deep depending on seed size. Broadcasting can be used on small acreages where drilling is not physically possible. Where broadcasting is used in lieu of drilling, the seed should be covered 1/8 to 1/2 inch deep by a single disc pulled straight, rotary hole pulled backwards, cultipacker, or other similar equipment.

For additional information on planning your native grass planting, contact your local NRCS field office. They can provide assistance in developing a native seeding plan and mix that will meet your objectives.

Editor's Note: Reprinted from the April 2005 Manhattan Plant Materials Center newsletter (USDA-NRCS).

5th Annual Nebraska Grazing Conference Covered Diverse Topics



About 200 people from several states gathered in Kearney, Nebraska August 8-9 for the 2005 Nebraska Grazing Conference.

After a warm welcome from Governor Dave Heineman, scientists, extension specialists, government employees, consultants and farmers/ranchers addressed several topics including using animal behavior to better manage grazing, cedar tree control, economic considerations in buying a ranch, monitoring cattle markets and input costs, irrigated pastures, grassland monitoring, rotational grazing without fences, increasing productivity with help from dung beetles and soil organisms, grazing and wildlife, pasture-finished/grass-fed beef production and marketing, and government cost-share programs.

Proceedings from the 2005 and previous conferences are still available for \$10 and \$5, respectively. They contain the



Nebraska Grazing Conference participants stop to chat in the exhibit room.



Dr. Stevan Knezevic keeps the after-lunch crowd awake as he entertainingly educates them about integrated management of redcedar.

material submitted by most of the presenters prior to the conferences. The CGS Web site, www.grassland.unl.edu, contains the programs for each conference. To order proceedings, send a check payable to *Nebraska Grazing Conference* to the CGS office. (For orders outside the U.S., check with the Center on cost prior to ordering.)

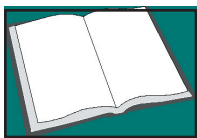
If you have not attended previous conferences but would like to be on the mailing list to receive notice of next year's conference, to be held in the same location on August 7-8, simply send your name and address to the CGS. As information about the 2006 conference becomes available, it will be put on the CGS Web site.

The Nebraska Grazing Conference has several sponsors including this year's conference underwriters: UNL Center for Grassland Studies, Nebraska Game and Parks Commission, and Nebraska Grazing Lands Coalition.

CGS Associates

The U.S. Bureau of Reclamation presented UNL Extension with the Commissioner's Water Conservation Award for its role in assisting farmers during recent water shortages through education seminars, field demonstrations and information-sharing through videos, news articles, conferences and publications. **Don Adams** accepted the award on behalf of UNL Extension, while recognizing several individuals including CGS Associates **Bob Klein** and **Steve Melvin**.

The American Society of Agronomy (ASA) recently announced that three CGS Associates had been elected to new positions: **Richard Ferguson**, Chair-Elect of the Soil Science Society of America (SSSA) Nutrient Management and Soil and Plant Analysis Division; **Roch Gaussoin**, Chair-Elect of the Crop Science Society of America (CSSA)/ Turfgrass Science Division; **Bob Klein**, representative from the ASA Extension Education Division to the ASA Board of Directors.



Resources

“The Nebraska Natural Legacy Project: A Comprehensive Wildlife Conservation Strategy Final Draft Submitted to

USFWS,” August 2005. The Nebraska Game and Parks Commission began work on a comprehensive wildlife conservation strategy in 2002 (see Fall 2004 issue of this newsletter). As the report foreword notes, the planning process was “...one of the largest collaborative efforts ever undertaken on behalf of wildlife in the state’s history. Sixteen public input meetings, a conservation practitioners workshop, and dozens of meetings with the state’s biological experts and conservation and agricultural leaders has culminated in a proactive conservation plan that is based on the best available science and has a high probability for successful implementation. This plan, for the first time, uses a comprehensive dataset to identify priorities for the conservation of the state’s rarest species and natural habitats. It also provides a roadmap to guide conservation work in those landscapes that offer our greatest hope for conserving the full array of biological diversity.” This 200-page report contains a wealth of information on wildlife and habitats, including detailed land-type data depicting the various ecoregions of the state. Available online at www.ngpc.state.ne.us/wildlife/programs/legacy. Hard copies are also available in various offices throughout the state; contact Kristal Stoner, 402-471-5780, kstoner@ngpc.state.ne.us.



Conservation Reserve Program (CRP) contracts on 559,567 acres in Nebraska are set to expire in 2007.



In FY05, Nebraska farmers and ranchers were awarded 1,719 EQIP contracts for a total of \$26,635,860. Overall this year, USDA conservation programs administered by NRCS (EQIP, WRP, WHIP, CSP, GRP) have resulted in \$48 million in financial assistance to Nebraska producers.

Calendar

Contact CGS for more information on these upcoming events:

2006

- Mar. 17-19:** Combination Nebraska Partnership for All-Bird Conservation symposium and “Rivers and Wildlife Celebration,” Kearney, NE, www.nebraskabirds.org
- Aug. 7-8:** 2006 Nebraska Grazing Conference, Kearney, NE,
- Dec. 9-13:** 3rd National Conference on Grazing Lands, St Louis, MO

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