Center for Grassland Studies

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Benefits of Corn Residue Grazing

by Mary Drewnoski, Department of Animal Science, UNL

In order to maintain or increase beef cow/calf and yearling production in Nebraska, improving the use of forage resources in a sustainable manner is essential. Integrating cattle production into cropping systems through grazing crop residues is a potential mechanism by which the shrinking forage base can be alleviated. Corn residue grazing can reduce cow winter feed costs, and with distillers grains supplementation, can be an economical way to grow spring-born calves. However, some producers are concerned that grazing will have an adverse effect on subsequent crop yields because cattle trampling could negatively affect soil physical properties, especially if cattle are grazed during the spring when the ground is thawed and muddy.

Figure 1. Grazing calves on corn residue and supplemented with distillers grains can be an economical way to produce yearlings and does not affect the yields of the subsequent crop.

Research conducted at UNL has shown that grazing corn residue does not reduce corn or soybean yields in irrigated fields. In fact, a long-term study at Mead, NE, showed slight improvements (2 to 3 bu/ac) in soybean production following grazing of corn residue when managed in a corn-soybean rotation (Tables 1 and 2). This result was the same regardless of whether cattle were grazed in the fall (November through January) or the spring (February through April). This is despite the fact that in the spring grazing treatment calves were grazed to remove 30% of the residue, or about 1.5 times the recommended rate.

In another study at Brule, NE, corn yields have been measured over a five-year period after cows were grazed during the fall in a field that was maintained in a continuous corn rotation. No effect on subsequent corn yields was observed (Table 3).

It is well documented that residue is needed to protect the soil from erosion. There are some corn fields, due to topography and/or low corn grain yield, that should not be grazed by cattle, but there are very few of those fields in Nebraska. In most instances, excess residue can impede soil warm-up in the spring as well as seed placement at planting. Residue grazing offers an alternative method for management of this excess residue.

About 45 to 50% of the above-ground biomass produced by the corn plant is stover (residue); the rest is grain. Thus for each bushel of corn produced, about 43 to 48 lbs of residue (DM basis) are also produced. If corn production is 150 bu/ac, then about 3 tons/ac of residue (DM basis) are produced, and if corn production is 200 bu/ac, a little more than 4 tons of residue (DM basis) are produced. Of this residue, about 40% is leaf and husk, which is highly digestible and a good source of cattle feed.

Cattle are selective grazers and will eat any remaining grain first (reducing the likelihood of volunteer corn the next year), followed by the husk and leaf. UNL recommendations for determining stocking are based on 50% utilization of the leaf and husk (8 lbs/bu), or about 20% of the residue. Some additional residue would disappear by trampling and other factors such as wind loss. For most fields in Nebraska, there would be no increased risk of erosion when this level of residue is removed. Further, with high corn yield, an excessive amount of residue can be produced and can have negative impacts on the subsequent crop by impeding seed placement and insulating the soil such that it remains excessively cold and wet in the spring, causing poor germination and slow emergence. Grazing corn residue can be used to manage residue levels without tillage and the resulting loss of soil structure and soil organic matter (resulting from oxidation by soil bacteria when exposed to air).

In summary, grazing of corn residue does not appear to affect the next year's crop yields. Therefore, grazing corn residues can benefit both cattle and crop producers. Corn residue should be viewed as an economical source of winter roughage for cattle that can provide an extra source of income for corn producers.

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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 Citizens Advisory Council.

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.

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From the Director

The United Nation's Food and Agriculture Organization (FAO) has declared 2015 the International Year of Soils. The goal of this year-long worldwide emphasis on soils by the United Nations (UN) is to increase awareness and understanding of "the importance of soil for food security and essential ecosystem functions." Soil is one of our most basic natural resources for production of our world's food, feed and fiber. Although soil plays a most important role in the health and welfare of society overall, it is frequently taken for granted.

Soil is the top layer of the earth's surface made up of rock (mineral particles), organic matter, air and water. The latter two fill the open spaces between the soil particles. All of humanity is dependent on this thin skin of covering on the earth's surface for their survival.

Different kinds of soil result from a number of factors taking place in soil development including parent material, climate, vegetation and topography. Soils differ because one or more of these factors was different during development. Soil health and quality are closely aligned and frequently are used interchangeably. The living component of the soil (its biota) represents a small part, but it is essential to many functions including overall health and quality.

Grasses are some of the most important vegetation available for building and improving the soil because of their fibrous and dense root system and topgrowth. Generally, soils with a high organic matter content and an adequate nutrient level are the most productive and healthy. These soils are usually the ones that have been covered with grasses for a prolonged period of time. Grasses and legumes that produce a large amount of biomass are especially good at improving the soil. Generous use of these types of plants in agricultural operations is highly recommended for maintaining and improving the quality of soil. Likewise, a healthy soil will improve germination, seedling establishment, growth, productivity and longevity of plants.

In addition to providing organic matter to the soil, grasses are able to slow down or eliminate wind and water erosion. When the soil is covered with grasses, legumes and other vegetation, it lessens the impact of both floods and drought. Slowing the flow of water from an area of land will allow more to percolate into the soil and be absorbed on the soil particles where it could be available later. If we could keep our sloping lands covered with grasses and legumes, our soil erosion problems would be largely solved.

Recognition of the importance of grasses and other vegetative cover to the health of our soil was slow to occur in our own country. "The Dust Bowl" in the 1930s brought it to everyone's attention and led to the formation of the Soil Erosion Service (predecessor of the Soil Conservation Service) headed by Hugh Hammond Bennett, who would come to be known as "the father of soil conservation." The name of the agency was changed in 1994 to the Natural Resources Conservation Service to better reflect the broadened scope of its concerns. In doing so, Congress reaffirmed the federal commitment to the conservation of the nation's soil and water resources, first made 75 years ago.

M. A. Massengale

Associate Dean to be New PGA Golf Management Director

It's not that we don't like the old one, but Dr. Alan Baquet, PGA Golf Management (PGM) Director since July 2009, is retiring from UNL June 30. We thank Alan for his excellent leadership and wish him well as he begins the next chapter of his life!

We welcome the new director, Dr. Dann Husmann, who will be coming to the Center for Grassland Studies from his split appointment as Associate Dean of the College of Agricultural Sciences and Natural Resources (CASNR – the college in which the PGM program resides) and professor in the Department of Agricultural Leadership, Education and Communication. Before joining the UNL faculty in 2000, Dann taught at the high school level (where he was an assistant golf coach) and had positions at the University of Wisconsin-Madison and South Dakota State University. In recognition of his commitment to education and his innovation in utilizing technological integration and engagement in the classroom to prepare college students to be high school teachers, Dann was honored with the Holling Family Senior Faculty Teaching Excellence Award at a banquet on March 3, 2015.

The inaugural PGM director, Dr. Terry Riordan, had a wealth of knowledge on the game of golf (having played at the college level) and turf science (he taught and conducted research on turfgrasses and consulted with golf courses on turf selection and management issues). Alan's expertise included economics and business as well as administration; he was also a certified life coach. In addition to teaching and advising high school and college students, Dann has experience in coaching golf, CASNR administration, leadership, educational methods, curriculum development and instructional improvement. The PGA Golf Management program has and will continue to benefit from what each director has and will "bring to the table."

Dr. Alan Baquet

Dr. Dann Husmann

Benefits of Corn Residue Grazing *(continued from page 1)*

Table 1. Effect of grazing corn residue in the spring over a 16-year period (1997-2013) on corn and soybean yields[1] from a field managed in an annual corn-soybean rotation at Mead, NE.

	Ungrazed	Spring Grazed	SEM	P-value[2]
Corn, bu/ac	214	214	2.6	0.96
Soybean, bu/ac	57.8^{b}	59.3^{a}	0.54	0.03

[1]Yields are based on 13% moisture for soybeans and 15.5% moisture for corn grain.
[2]Means with differing superscripts in a row are different (P < 0.05).

Table 2. Effect of grazing corn residue in the fall/winter or spring on corn and soybean yields over a 10-year period (2003-2013) from a field managed in an annual corn-soybean rotation at Mead, NE.

	Ungrazed	Spring Grazed	Fall Grazed	SEM	P-value[2]
Corn, bu/ac	207	209	211	3.9	.55
Soybean, bu/ac	62.1^{b}	63.5^{a}	65.5^{a}	0.54	<0.01

[1]Yields are based on 13% moisture for soybeans and 15.5% moisture for corn grain.
[2]Means with differing superscripts in a row are different (P < 0.05).

Table 3. Effect of corn residue removal on corn grain yield over a 5-year period (2009-2013) from a field used for continuous corn production at Brule, NE.

	Ungrazed	Fall grazing 1 AUM/ac	Fall grazing 1 AUM/ac	Baled	SEM	P-value[2]
Corn, bu/ac	148	152	155	147	6.7	0.16

[1]Yields are based on 15.5% moisture.

Evaluating the Latest Developed Buffalograss Cultivar: Sundancer

by Luqi Li, Department of Agronomy and Horticulture, UNL and Zac Reicher, Bayer Environmental Sciences

Buffalograss is a warm-season grass native to the Great Plains of North America. Once established, buffalograss requires infrequent mowing, as little as two pounds nitrogen per growing season and one inch of water per month to maintain an acceptable stand as a lawn. Its low growth habit and natural competitiveness allows it to be used in areas that require low maintenance or erosion control. Historically, non-turf-type buffalograss cultivars take two or more growing seasons before establishment, which was a negative characteristic of the specie that made consumers skeptical of its value. Fortunately, the later developed turf-type buffalograss cultivars with faster establishment, improved seed yield, sod strength and abiotic stress tolerance have improved the image of this cost-effective turfgrass specie.

UNL researchers have been developing and evaluating improved turf-type buffalograss cultivars for more than three decades. In its 30th anniversary year of the breeding program's collaboration with the United States Golf Association (USGA), the release of the latest seeded turf-type buffalograss cultivar, Sundancer, was announced in July, 2014. Sundancer establishes within one growing season, with darker green color and better canopy density compared to other seeded cultivars.

Before the official release, Sundancer had been evaluated over a period of years at the John Seaton Anderson Turfgrass Research Facility near Mead, NE. Our specific studies evaluated optimum seeding dates and rates for spring and dormant seeding, as well as herbicide tolerance when applications were made at or shortly after seeding. Results observed from these studies on Sundancer were encouraging.

Dormant seeding has been used in Nebraska for establishing cool-season turfgrasses. However, dormant seeding for establishing buffalograss, especially the later developed turf-type cultivars, had not previously been evaluated. Dormant seeding is defined as seeding late enough in the fall or winter that germination will not be expected until spring. It allows the dormant seeds to take advantage of early warming soil temperatures in the spring, thus maximizing establishment. We evaluated various seeding dates for establishing Sundancer buffalograss during late November to late May in 2013 and 2014. Multiple seeding rates were also evaluated when Sundancer was seeded in late November and early May in 2012 and 2013.

It is commonly recommended that seeding rate for dormant seeding be 10-25% higher than that used for spring seeding in order to account for seed loss via erosion, animal feeding, etc. However, our results with Sundancer clearly show that raising the seeding rate is not justified (Picture 1). Sundancer seeded in late November at the typical 3 lbs/1000 sq ft recommended rate resulted in similar cover as 4.5 and 6.0 lbs seed/1000 sq ft by 1 August. In addition, Sundancer seeded in both late November (dormant seeding) and early May (spring seeding) reached more than 80% cover by 1 August, regardless of seeding rates (Fig. 1).

Picture 1. Luqi Li explained how seeding rate affects dormant seeding of Sundancer buffalograss at the UNL Turf Field Day in July, 2013.

Picture 3. Weed control may be the most critical maintenance practice to maximize buffalograss establishment during the first year. Sundancer established in fall 2012 (left) compared to Sundancer seeded in May 2013, treated with 13 herbicides at different timings (right). Photographed in August, 2013.

Picture 2. Experimental plots at the John Seaton Anderson Turf and Ornamental Research Facility at Mead, NE. Sundancer buffalograss was seeded on various dates in the winter and spring, including 1 November, 1 January, 1 March and 1 May. Photographed on 1 May when irrigation was initiated.

Picture 4. Experimental plots at the John Seaton Anderson Turf and Ornamental Research Facility at Mead, NE. Safety and efficacy of 13 herbicides applied at zero, two or four weeks after seeding of Sundancer buffalograss were evaluated in 2012 and 2013. Photographed in August, 2013.

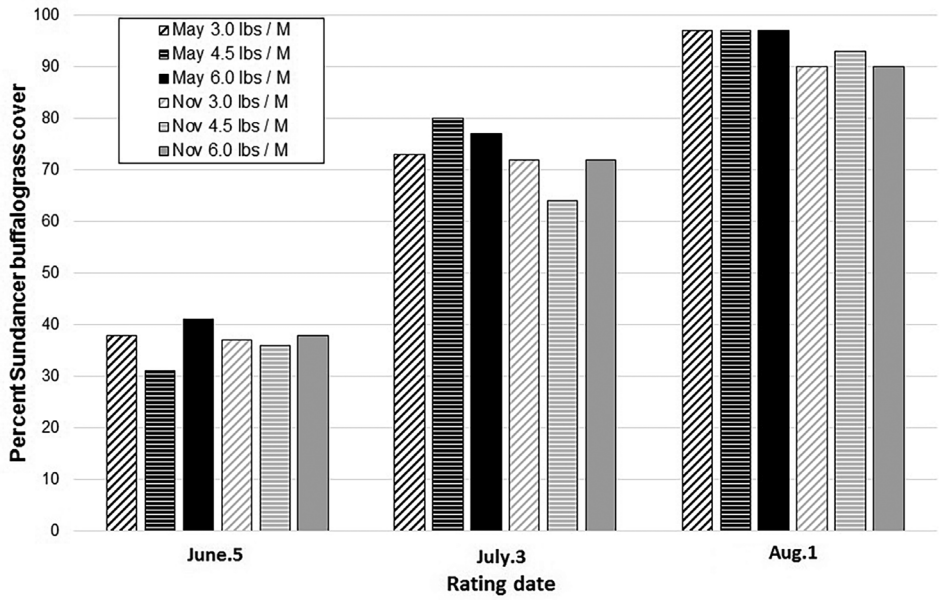

Figure 1. Percent Sundancer buffalograss cover rated on 5 June, 3 July or 1 August in 2013. Sundancer was seeded at 3.0, 4.5 or 6.0 lbs seed/1000 sq in 20 November in 2012 or May 1 in 2013. Results suggest increasing seeding rates may not be necessary for dormant winter seeding of Sundancer buffalograss.

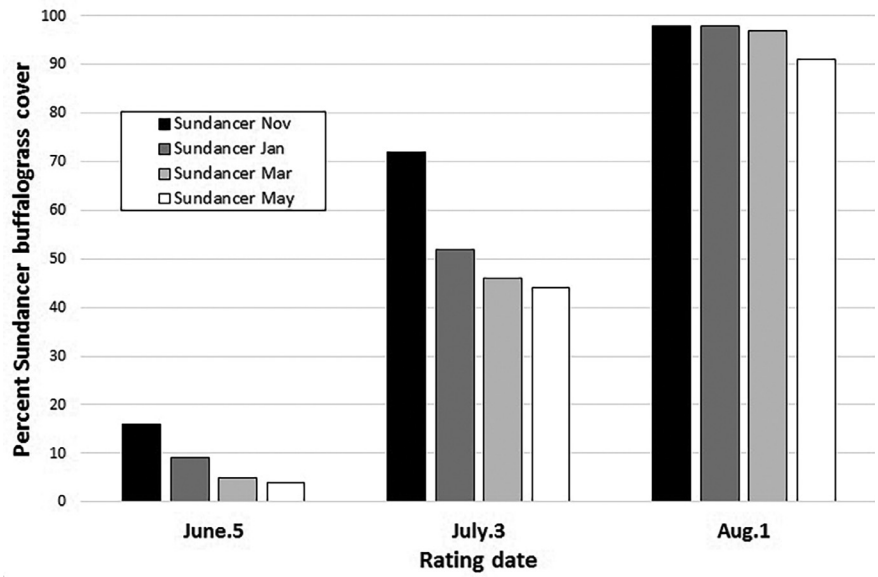

Figure 2. Percent Sundancer buffalograss cover rated on 5 June, 3 July or 1 August in 2014. Sundancer was seeded in November, January or March in 2013, and May in 2014. Dormant seedings filled in slightly faster than the May seeding when rated on 5 June and on 3 July. All plots produced more than 90% cover by 1 August in 2014.

We also evaluated seeding Sundancer on various dates in the winter and spring, including 1 November, 1 January, 1 March and 1 May (Picture 2). In the first year of the study, we saw few differences in establishment due to seeding date, with the dormant seedings filling in slightly faster than the May seeding. However, three late spring frosts during the first half of May, 2014 damaged Sundancer that was seeded the previous November, January or March because the seeds had already germinated and thus were slow to fill in during the summer. However, all plots eventually recovered and all seeding dates produced more than 90% cover by 1 August, 2014. Our plots were irrigated, fertilized and well managed, which may not be the case on larger scale buffalograss plantings. Even though late spring frosts like the one in 2014 are rare, they have caused us to rethink dormant seeding buffalograss and recommend it only when the risk can be justified (Fig. 2).

Weed control may be the most critical maintenance practice to maximize buffalograss establishment during the first year (Picture 3). During the summers of 2012 and 2013, we evaluated safety and efficacy of various herbicides applied at zero, two or four weeks after seeding Sundancer (Picture 4). Herbicide treatments included an untreated control and 13 herbicides at their high recommend label rates. Most of the herbicides were surprisingly safe on buffalograss and effectively minimized common purslane, redroot pigweed and/or yellow foxtail that were dominant on our site, and thus helped to maximize establishment of Sundancer. Our data clearly indicated that herbicide applications soon after seeding are most effective for minimizing weed pressure and result in faster buffalograss establishment. Though 13 herbicides were evaluated in our

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Call for Papers: National Conference on Grazing Lands

"Deep in the Heart of Grazing Lands" is the theme of the Sixth National Conference on Grazing Lands (6NCGL) being hosted by the National Grazing Lands Coalition and other sponsoring organizations December 13-16, 2015, in Grapevine, TX. The purpose of the conference is to heighten the economic and environmental awareness of beneficial grazing lands. The target audience includes producers, academia, consumers, government agency officials, conservationists, environmentalists, urban-based resource interests, grazing land managers, landowners, and others interested in effective and sustainable natural resources management systems. Cooperators or partners will comprise the public sector, natural resource agencies and entities, segments of the farming and livestock industry, and environmental conservation organizations.

The conference provides a forum for open discussion and exchange of information, technology transfer, identification of research and program needs, marketing of products, services, and other benefits of grazing.

There are four tracks for white paper and poster abstract opportunities: 1) western grazing lands; 2) central grazing lands; 3) eastern grazing lands; and 4) dairy grazing land management. Within each track, conference sponsors are accepting abstracts for both oral and poster papers in the following categories: ag/urban interface; cutting-edge grazing management; grazing land economics and marketing; public policy; and grazing lands/soil health. Abstract submissions must indicate the track and category that best fits the submission. Farmers and ranchers are particularly encouraged to present. All accepted papers and poster abstracts are eligible for publication in the conference proceedings. Abstracts should be 400 words or less, include a description of the presentation, and indicate whether it is an oral or poster presentation. The abstract submission deadline is May 1, 2015.

For more information, see the conference website, www.glci.org/6NCGL.html.

America's Grasslands: The Future of Grasslands in a Changing Landscape

The third biennial America's Grassland Conference, co-hosted by the National Wildlife Federation, Colorado State University and Rocky Mountain Bird Observatory, will be held in Ft. Collins, CO, September 29-October 1, 2015.

The event brings together researchers, natural resources professionals, farmers and ranchers, policy experts and conservationists to discuss the conservation of North America's grasslands. See the website for details, www.nwf.org/grasslandsconference.

Online Tool Features Beneficial Grassland Management Practices

For over a decade, the Commission for Environmental Cooperation (CEC) has supported grasslands conservation and beneficial management practices across North America. The CEC's grasslands work encourages sustainable ranching practices and grassland stewardship to maintain and enhance the resilience of this continentally-shared ecosystem, and the CEC is working closely with ranchers to pilot these practices.

The Grasslands Beneficial Management Practices Online Tool features nearly 100 practices for ranchers, conservation organizations, government and academic institutions in North America. It contains practical and innovative ideas to conserve and sustainably use grasslands and boost the economic stability of ranchers. Access the tool at www.cec.org/grasslands.

2015 Nebraska Grazing Conference Taking Shape

The 15th annual Nebraska Grazing Conference will be held August 11-12 at the Ramada Inn in Kearney. While the program was not finalized as this newsletter went to press, we can tell you that it will include the following topics/speakers. In the area of animal health, Dr. Richard Knight, formally with Colorado State University and now living in Arizona, will give two talks related to animal health, especially with regard to poisonous plants. Rangeland ecologists Dr. Dirac Twidwell, UNL, and Dr. Sam Fuhlendorf, Oklahoma State University, will address issues related to prescribed burning. Expanding grazing resources will be a topic discussed by two relatively new UNL faculty members that are part of a team working on integrated forage, crop and beef systems: agricultural economist Dr. Jay Parsons and agronomist Dr. Daren Redfearn. Lest you think all speakers are from academia, there will be several producers on the program, including Duane Pelster, who will represent the Pelster Family, recipient of the Nebraska 2014 Leopold Conservation Award. And the cowboy poet, R.P. Smith, will make a return appearance as the Tuesday night banquet speaker!

Registration this year will be done online. Anyone not able to register online will be able to call 402-472-5636 during business hours and have someone take their information over the phone. The deadline to receive pre-registration rates is August 1, which means if paying by check rather than credit card, payment must be postmarked by August 1. The full two-day pre-registration fee of $80 covers lunch both days, the evening banquet, break refreshments, and the conference proceedings. One-day registrations are also available. Registration fee will be waived for students who will still be in high school this fall and who pre-register by the August 1 deadline, compliments of the UNL College of Agricultural Sciences and Natural Resources. Reduced registration fees apply for other full-time students. Higher fees apply to registrations after August 1, which includes walk-ins.

Participants of any of the previous Nebraska Grazing Conferences as well as all Nebraska extension educators will receive a brochure in the mail in June. Others may contact the CGS office to be placed on the brochure mailing list. Information and the link to the online registration page will be on the conference website, nebraskagrazingconference.unl.edu. This event is a collaborative effort with many co-sponsors. Contact the Center for Grassland Studies, one of the underwriting sponsors, with questions.

Evaluating the Latest Developed Buffalograss Cultivar: Sundancer

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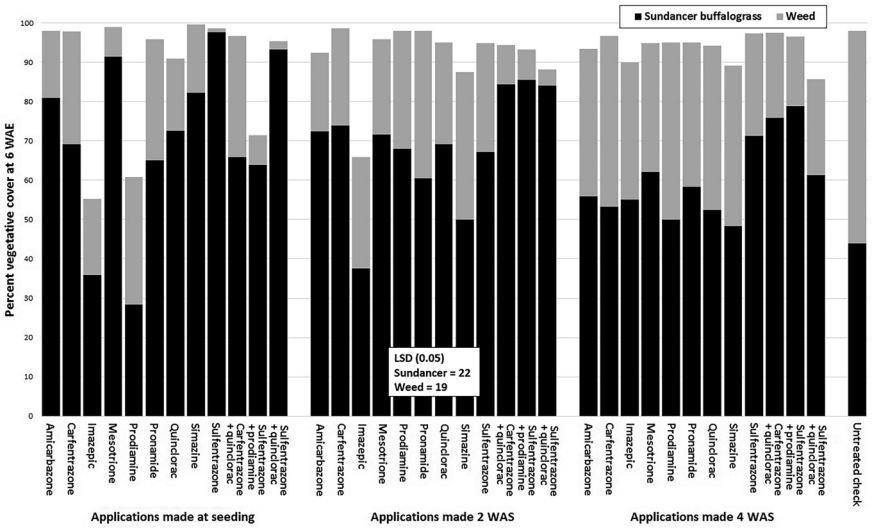

Figure 3. Percent vegetative cover of Sundancer buffalograss and weeds rated 6 weeks after emergence (6 WAE) of the treatment of 12 herbicides applied at seeding, 2 or 4 weeks after seeding (WAS). Most of the herbicides were safe on Sundancer and effectively minimized competition from common purslane, redroot pigweed and/or yellow foxtail that were dominant on our site. Herbicide applications soon after seeding are most effective for minimizing weed pressure and result in faster buffalograss establishment.

studies, some of the best performers were Tenacity™ (mesotrione), Drive™ (quinclorac), SquareOne™ (quinclorac+carfentrazone), and Dismiss™ (sulfentrazone) (Fig. 3).

The buffalograss breeding program at UNL is developing and evaluating new and improved cultivars to meet the demand of maintaining turfgrass with minimal management inputs. Sundancer is an example of advancements made in buffalograss development through strategic breeding efforts. Combining a breeding program with our research efforts to better manage these new cultivars will help increase adaption and improve the chances for long-term success.

Editor's Note: Li is working on a masters degree in the UNL Department of Agronomy and Horticulture. Reicher is a former faculty member in that department who became a regional technical specialist for Bayer Environmental Sciences in March 2015.

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CGS Associates

The UNL Center for Great Plains Studies has renamed its "Great Plains Book Prize" the "Stubbendieck Great Plains Distinguished Book Prize" to acknowledge its founder and 14-year director, Jim Stubbendiek, emeritus professor of grassland ecology at UNL and emeritus director of the CGPS. The prize has also doubled to $10,000. Stubbendieck has been a Center for Grassland Studies Associate as well as a member of its Policy Advisory Committee for many years.

At the Holling Family Award Program for Teaching Excellence in March, 2015, **Dann Husmann** and **David Wedin** received the Senior Faculty Teaching Excellence Award.

One happy and one sad note. Ranchers **Homer Buell** and **Sid Salzman** have been long-time members of our CGS Citizens Advisory Council. Buell was the 2014 inductee into the Nebraska Cattlemen Hall of Fame, receiving the honor at the NC's annual convention in December, 2014. Salzman, a true "force" in both the UNL and Brown County communities, died on February 21. His obituary said "Sid loved the native grasses… and golf… and was known for speaking his mind" – all qualities we found very useful to our advisory committee. The person as well as his contributions will be sorely missed!