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The Lesser Prairie-chickens of Kansas' Sandsage Prairies

by Paul Johnsgard, Regents Professor/Professor Emeritus
School of Biological Sciences, University of Nebraska-Lincoln

In the early spring of 2001 I was once again feeling my recurrent need to watch the dawn courtship displays of prairie-chickens, an annual ritual of mine going back some 40 years, or ever since I moved to Nebraska. However, after a controversial hunting season in eastern Nebraska, the population of greater prairie-chickens frequenting my favorite lek near Burchard Lake in southeastern Nebraska had dropped to a discouraging all-time low of only four males. Therefore, I decided to head south to Kansas in order to observe and study the displays of its nearest relative, the lesser prairie-chicken. I had never seen lesser prairie-chickens courting on their leks, and had indeed only ever seen a few of these birds at all.

Although once occurring in the sandy grasslands of southwestern Nebraska, lesser prairie-chickens have since retreated into a still-diminishing core of their original range, the sandsage and shinnery oak brushlands. This habitat type extends locally from the Arkansas and Cimarron Rivers of southwestern Kansas and adjoining Colorado south through the rolling

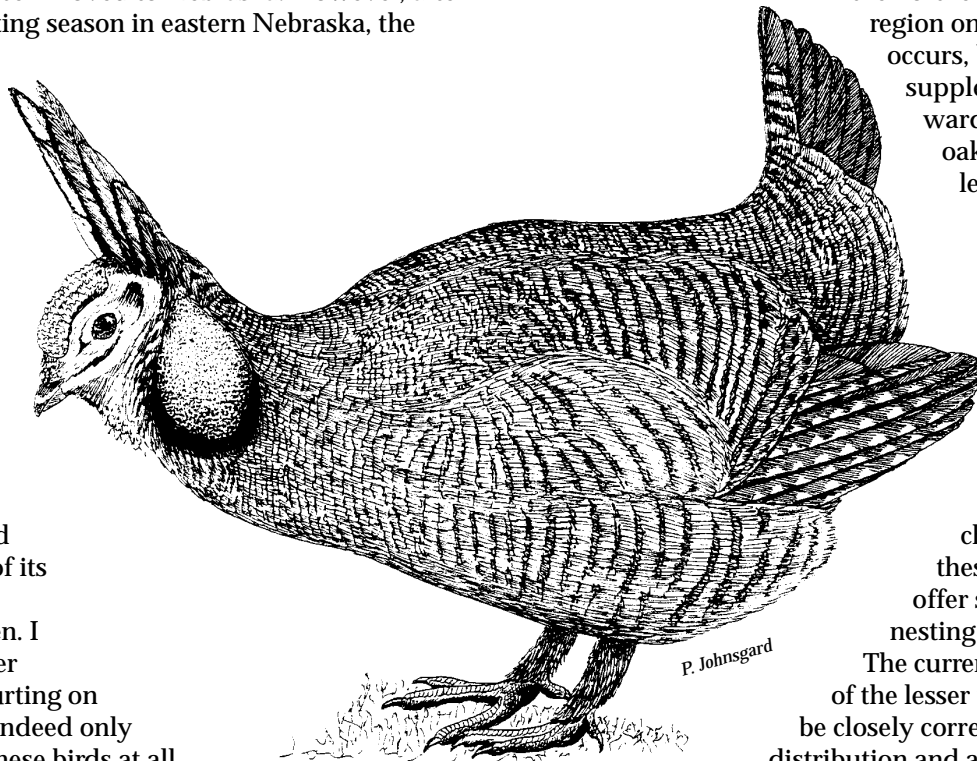
plains of western Oklahoma and the northern panhandle of Texas to the Staked Plains arid grasslands along the border of northwestern Texas and southeastern New Mexico. In

the northern part of this region only the sandsage occurs, but where it is supplemented southwardly by shinnery oak, the population of lesser prairie-chickens is generally higher. The leaves of the sandsage and the acorns of the shinnery oak provide nutritious all-season foods for the lesser prairie-chicken, and both of these brushy plants offer summer cover for nesting and brood-rearing.

The current remaining range of the lesser prairie-chicken can be closely correlated with the distribution and abundance of these two native plants.

All the accounts I had read about the courtship of lessers suggested to me that they must be quite different from greater, but I wanted to see this for myself, as written descriptions are usually inadequate to satisfy one's curiosity about any unknown bird. I also worried that

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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. Massengale CGS Director
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FROM THE DIRECTOR

During the summer months, most of our activities and thoughts associated with recreation turn to outdoor activities such as family picnics, lawn parties, baseball, soccer, golf, etc. To add to the aesthetics and enjoyment of these activities, it is important to have high quality turf. The quality of turfgrass is often taken for granted until we experience a deteriorated condition and then we become concerned.

Many variables have a significant impact on the quality of our turfgrasses such as temperature, moisture, soil fertility, diseases, insects and the variety of grass, as well as the management they receive. Turf areas are among the most highly used of any cultivated area and require intensive management practices for maintaining high quality.

The turfgrass and landscape industry contributes more than \$500 million to Nebraska's economy each year. Our excellent turfgrass science team at the University of Nebraska-Lincoln is assisting that industry by studying many of these aforementioned variables and making recommendations to eliminate or lessen their impact. Nebraskans and citizens in surrounding states enjoy improved turf as a result of their work.

Our turfgrass team members also host an annual conference and have field days each year to help turfgrass managers, producers and users keep up-to-date on their latest research results and information. The Nebraska Turfgrass Field Day and Equipment Show attracts nearly 700 turfgrass professionals each year. Our students in turfgrass science, in preparation for their future careers, take courses in turfgrass breeding and management, diseases and insects, weed control, irrigation management and soil fertility along with other related areas.

We are now evaluating the possibility of beginning an additional new program in professional golf club management supported by the Professional Golfers Association of America. This program would deal more with the training of club professionals and helping them with management of both the pro shop and the course. This would be an interdisciplinary program with training in turfgrass sciences, business management, personnel skills and professional golf.

As the population expands and agricultural areas continue to be urbanized, the need for recreational areas will increase along with the need for more residential turf. The future will require more parks, more lawns, more school playgrounds and more super highways—all of which require turf. Turfgrass continues to play an increasingly important role for leisure activities, as well as physical and mental health. As standards of living continue to rise in an increasingly wealthy nation, the demand for high quality turfgrass will also increase. Hopefully, we at the University will be able to assist the industry in serving that need.

M. A. Massengale

Revisiting Nebraska's Mammals

by Patricia Freeman, University of Nebraska State Museum

The geographic area bounded by Nebraska is situated just north of center in the United States and the Great Plains. Eastern forests creep into the state on the Missouri River side and western ponderosa pine forests come in on the Pine Ridge side. Northern and southern habitats also meet in this geographic area, with the vast, unique Sand Hills prairie sandwiched in between. Short grasses in the drier west graduate to tall grasses in the moister eastern portions, and fingers of riverine forests penetrate further and further west along the rivers that cross this part of the plains.

In the 1950s and early sixties, an intensive survey of mammals in the state was done by Lincoln native J. Knox Jones and his many field crews. Jones was a prominent mammalogist who received his undergraduate degree from UNL and his doctorate at the University of Kansas. He was Professor, and later Vice Chancellor for Research, at Texas Tech University. He was president of the American Society of Mammalogists, Journal Editor for the *Journal of Mammalogy*, and awarded the Society's highest awards. He produced 376 publications (including eight books) in his lifetime, and had an enormous worldwide impact on the field of mammalogy. He was an avid naturalist and scientist throughout his life, and his 1964 publication, "Distribution and taxonomy of mammals of Nebraska" (*Publications of the Museum of Natural History, University of Kansas 16:1-356*), is the published result of that benchmark study of Nebraska mammals. Knox was very thorough and no slouch when it came to collecting. The specimens on which the study is based reside both in the University of Nebraska State Museum and The Museum of Natural History, University of Kansas, and can be visited by anyone wanting to further research the specimens. Without this study, there could be no baseline against which to compare future surveys and research.

My colleagues and I compared new distributional records of mammals with the Jones survey and found interesting shifts in the distributions of the mammals of Nebraska (Benedict R. A., H. G. Genoways, and P. W. Freeman. 2000. Shifting distributional patterns of mammals of Nebraska. *Transactions of the Nebraska Academy of Sciences 26: 55-84*. For an electronic copy of this paper, e-mail pfreeman1@unl.edu.).

Twenty of about 85 species of mammals typically found in the state have new patterns of distribution that reflect the northern, southern, eastern, and western influences that affect all flora and fauna in this unique geographic area. Because the state is essentially a national crossroads, these shifts are concrete evidence that the environment around this node is changing. Actually, two-thirds of the mammals in the state reach their distributional limits within the boundaries of the state. Monitoring subtle and not-so-

subtle shifts is important and can help people make informed decisions regarding land and water management. Most new records show evidence of expanded ranges of mammals. Contraction of ranges, although more difficult to quantify, can be seen in simply the lack of presence in an area where a species was present nearly fifty years ago.

Mammals that require large tracts of undisturbed prairie appear to be contracting in geographic range in Nebraska. These include the large, diurnal or obvious mammals such as white-tailed jackrabbit, black-tailed prairie dog and northern pocket gopher, and smaller mammals such as the plains pocket mouse and plains harvest mouse that are easily trapped, if present. These five species are absent now from parts of their historical ranges; the exact reasons are unknown.

Westward expansion by opossum, northern myotis, evening bat, red bat, woodchuck, white-footed mouse, and gray fox is probably in response to the westward extension of forests along the river systems that provide these mammals with the wooded environment to which they are accustomed. Woodlands along the rivers are occurring because there is more damming that reduces the scouring effect of spring floods, and the elimination of fires that historically would burn right up to the river banks and stop the succession of woody plants. Previously, woodchucks, which are large and diurnal, were uncommon in the eastern one-fourth of the state and are now moderately common throughout nearly the entire eastern half of the state. White-footed mice are worth tracking from year to year because they can be a vector for Lyme disease. Our data suggest they move westward along the rivers at a rate of about six miles a year.

Shifting down from the north are the meadow vole, masked shrew, and least weasel. We think this is occurring in response to new prey species and changing microclimates. Both vole and shrew are found commonly in dense grasses along roadways. The meadow vole, which previously came down only to the Platte, is now well south of the Platte in most of the southern, eastern half of the state and well into Kansas. The least weasel is moving explosively southward throughout southern Nebraska and well into Kansas, and is likely contacting new prey species that come from the east and south.

The eastern woodrat, typically a woodland-loving, southerly mammal, is expanding northward into eastern Nebraska in the woodland corridors along the Big and Little Blue river drainages. Armadillo and hispid cotton rats are also expanding northward, perhaps for the same reasons. The northernmost record of "the little armored one" in the United States was collected in Ord, Nebraska. Armadillo have been on the move from South America for

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The Lesser Prairie-chickens of Kansas' Sandsage Prairies (continued from page 1)

the lesser prairie-chicken might become extinct within a few years, just as the related heath hen of the Atlantic coastal prairies already has. The Attwater's prairie-chicken of the coastal Texas prairies is becoming perilously close to joining it in oblivion.

Since mid-April is the peak period for display among greater prairie-chickens in southern Nebraska, I decided that a week or so earlier in April should be perfect for Kansas birds. I knew that by leaving Nebraska then, I would be missing my chance for a final look at the sandhill cranes of the Platte Valley, which were then already moving out for migration staging areas farther north. Actually, as I drove west on I-80 and followed the Platte River, I could see a few remaining flocks of cranes still feeding in the nearby fields, but already the fields were being punctuated with territorial male red-winged blackbirds and a few scattered western meadowlarks. Then I turned south, past Harlan County dam, with its slowly gyrating flocks of American white pelicans and its dark chevrons of migrating double-crested cormorants, and entered central Kansas.

I was headed toward Garden City, the nearest area that lesser prairie-chickens were still to be found in good numbers. Here the Arkansas River cuts a lazy, undulating path through western Kansas, strewing sand deposits along either side of its course. Sandsage shares these sites with a variety of native grasses and occasional yucca plants. In more open areas and slightly heavier soils, black-tailed prairie dogs and burrowing owls still find hardscrabble habitats, at least in those counties where land owners are not required to eliminate prairie dogs.

There was a bright moon in early April, and I approached the display ground, or lek, where I had already set up a small blind, almost an hour before sunrise. The males were already present on the ground, calling in a way that I might not have even recognized as coming from prairie-chickens if I hadn't already heard recordings of their calls. As darkness gradually gave way to dawn, it was evident that nearly 20 males were present, just as I had hoped. They paid almost no attention to the blind, except when camera sounds startled them. Their performance struck me as something resembling a choreographed drama that I had previously witnessed, but that now was being performed in an entirely distinctive manner, and on a very different ecological stage. The birds' movements were surprisingly fast and their aggressive cacklings were unusually high-pitched. The repeated threats made by the males at their territorial boundaries were apparently mostly bluffs; in contrast to the greater prairie-chicken, I never saw an actual fight.

The reproductively most successful male of any prairie grouse lek is that individual old enough, experienced enough, and strong enough to establish dominance over every other male in the lek. Thereby this single alpha-level male can establish a centrally located territory, and one that

other males dare not enter should a female be attracted to him. When a female is soliciting in the dominant male's territory, no other male dares challenge him, but a female soliciting in the territory will never provoke an attack by the dominant bird. Such "master cocks" must also be virile enough to fertilize most if not all the females coming to visit the lek—sometimes as many as several females in a single morning. Here, survival of the fittest simply means mating of the fittest, in one of the clearest examples of Darwinian sexual selection to be seen among all North American birds.

Darwin's concept of reproduction by the fittest is thus played out on a daily basis on slopes and hilltops such as these every spring in the Great Plains. Being able to witness these performances is an auspicious act in the classic sense in that the behavior of the birds provides a reliable prediction of the likely future fortunes of the species. The leks of prairie grouse thereby offer a highly evolved mechanism dedicated to attaining efficient and appropriate pairing and mating. In that sense of having a specifically ritualized and dedicated function, the increasingly rare leks of prairie grouse also represent sacred natural sites.

A new national wildlife refuge, or comparable state or private preserve, is certainly needed for the lesser prairie-chicken. Such a preserve could well be located in the now unprotected sandsage grasslands of the Arkansas River Valley from Garden City west to at least the Colorado border, a region representing the best of the species' remaining Kansas range, and one not yet seriously affected by cattle overgrazing or the incursion of center-pivot agriculture. Such a preserve would offer the best hope of saving at least the Kansas flock of the lesser prairie-chicken from the disastrous recent history of the Attwater's prairie-chicken, when the federal government delayed far too long before starting to acquire critical habitat for its preservation. Protecting the lesser prairie-chicken there would also help protect the rapidly declining national populations of lark, grasshopper and Cassin's sparrows, burrowing owls and black-tailed prairie dogs. It thus encapsulates the entire sandsage ecosystem, one of the rarest and least studied of the Great Plains vegetational complexes. In southwestern Nebraska, that ecosystem has now been almost completely eradicated, along with the lesser prairie-chicken, which was already gone from the state by the mid-1920s. Let the history of Nebraska's once-thriving sandsage community provide a lesson to Kansas before it is too late.

Editor's Note: *Ranch Conversations: A Blueprint for Conserving Species and Rural Lifestyles*, describes a pilot project that involved willing land owners in developing plans to help recover the lesser prairie chicken in five states. The May 2001 publication of the Western Governors' Association (WGA), High Plains Partnership for Species at Risk, and Lesser Prairie Chicken Interstate Working Group is available on the WGA Web site, www.westgov.org/.

Revisiting Nebraska's Mammals *(continued from page 3)*

the last several million years and are now breeding in Kansas. No evidence of breeding has yet been found in Nebraska; as typically cold-intolerant animals, they are prevented from reproducing in areas that experience extreme winters. Cotton rats appear to have reached their northern climatic limit, and may now even be retracting in range as it encounters new species of predators like the least weasel.

Shifts to the east by more western mammals are occurring in northern grasshopper mice, porcupine, Merriam's shrews, bobcat, and mountain lion. Mountain lions are expanding eastward into extreme western Nebraska. However, a recent record in early 2001 was taken in Howard County, southeast of the state's center; six lions have been either collected or sighted. Increased cover along the rivers may also assist their expansion. A little known but very interesting mouse, the grasshopper mouse, is expanding into the extreme eastern part of the state and

beyond. The reasons this howling, insect-eating mouse is expanding eastward are unclear, but may be partially attributable to the expanse of cultivated land.

Shifting geographic distributions have been the rule for many mammals found in Nebraska over the last century. Large herbivores (bison and elk) and large predators (wolves and bears) have been eliminated from the prairies because of the impacts of a variety of human activity. Riparian and early successional forests penetrate deeply into the plains. Mature oak/hickory forests have been logged, grazed, and converted to croplands. With such dramatic changes, it is no surprise that a quarter of the distributions of Nebraska's native mammals have shifted substantially. Most are associated with woodlands and forest edge, but others requiring large tracts of prairie are decreasing in abundance. We do not know how severely their ranges have contracted, nor all the reasons why they have contracted.

CGS Citizens Advisory Council Tours Southeast Nebraska

CGS Citizens Advisory Council member Dave Stock of Stock Seed Farms in Murdock hosted the first stop on this summer's tour on June 12, attended by about two dozen Council members and CGS Associates. Dave and his foreman Rod Fritz showed several pieces of equipment and explained how they are used in their operation.

Next we visited the site of the Arbor Links Golf Course being constructed in Nebraska City. Council members Bill Kubly, president of Landscapes Unlimited of Lincoln, and Steve Merkel described the history, current activity and future plans of this joint program with the National Arbor Day Foundation.



CGS director Martin Massengale (center) and Dave Stock (right of Massengale) listen as Bill Kubly and Steve Merkel (left of Kubly) describe construction of the Arbor Links Golf Course.



Tom Bragg (center) and Ann Antlfinger (far right) discuss current research and future plans at Allwine Prairie.

After lunch at the Nebraska Lied Center, we proceeded to the farm of veterinarian and producer Harold Vonderfecht in Plattsmouth to learn about the grazing methods he has developed over the years.

Our final stops were the Allwine and Stolley Prairies north of Omaha where our hosts were CGS Associates Ann Antlfinger and Tom Bragg with the UNO Biology Department.

We wish to extend our thanks to the above people as well as CGS Associates Dick Gray, Tiffany Heng-Moss and Dennis Brink for their contributions to another successful summer tour.

Beef and Forage Specialists Tour Nebraska Sand Hills

Regional research groups recently held their annual meetings in the North Platte, Nebraska area. NCR-87, Beef-Cow-Calf Nutrition and Management Committee, and the MINK (Missouri, Iowa, Nebraska, Kansas) Forage/Livestock Consortium met on June 5. NC-225, Improved Grazing Systems for Beef Cattle Production, met June 7. In between, these two groups toured the University of Nebraska Gudmundsen Sandhills Laboratory (a research ranch) and two commercial ranches. The combined group consisted of university researchers and graduate students and USDA scientists from nine states and two foreign countries.



June 6 tour participants stand knee-deep in waving grass while they listen to Wayne Eatinger (center) describe management practices on his family's ranch.

Don't Forget the Nebraska Grazing Conference!

The 2001 Nebraska Grazing Conference is just around the corner. It will be held at the Holiday Inn in Kearney on August 13 and 14. The previous issue of this newsletter gave details on topics and speakers, but if you missed it, you can go to the Center for Grassland Studies Web site for information and a registration form, or you can contact the CGS office for a brochure.

Landscape Ecology Symposium in April 2002

Several hundred ecologists, landscape architects, geographers, planners and other professionals from across the continent and beyond are expected to attend *Landscapes in Transition: Cultural Drivers and Natural Constraints*, the 17th Annual Symposium of the International Association for Landscape Ecology – United States Regional Association. The symposium, which will be held in Lincoln, Nebraska on April 23-27, 2002, is inviting proposals by members interested in organizing special sessions (oral or interactive) that highlight or complement the Symposium theme. Of particular interest are the following topics: agroecology, agroforestry, and the landscape ecology of grasslands; recent innovations in geospatial information technologies as applied in landscape ecology; historical and contemporary landscape ecology of the Great Plains; landscape ecology and biodiversity; the changing ecology of lakes, rivers, and wetlands in central North America; landscape ecology and natural disturbances (e.g., severe storms, hail, fire); and landscape ecology and natural history museums. The deadline for special session proposals is September 7th, 2001. Learn more at www.calmit.unl.edu/usiale2002/, or contact Jim Merchant, 402-472-7531, jmerchant1@unl.edu.

CGS Associates

Don Adams received the Wendell Burgher Beef Industry Award in recognition of his excellent research efforts in range beef cow-calf nutrition and his contributions to the beef industry.

Funding Opportunity

CGS Associates: Proposals to the Nebraska Research Initiative program are due in mid-November. The category that most closely relates to the CGS mission is: "Water, Environmental Quality and Sustainable Development." Subtopics include: contamination and remediation of surface and ground water, conjunctive water use, global warming, global environmental change, environmental restoration, ecology and evolutionary biology, elevated levels of ultraviolet radiation, site-specific management using advanced information technologies, remote sensing technologies, geographic information systems, and development of management for pollution prevention. If you are interested in exploring the possibility of an interdisciplinary proposal to be submitted through the CGS, please contact our office and we will be happy to assist you.

Info Tufts



CGS Citizens Advisory Council member Jim Jenkins is the new executive director of Nebraska Corn-Fed Beef, a program created by cattle producers to put a Nebraska brand and guarantee on some of the state's best steaks.



Nebraska researchers found that annual net income for a dairy farmer raising cows on pasture netted \$274 more per animal than those raised in a confinement dairy (see www.sare.org/highlight/2001/index.htm).



The USDA Natural Resources Conservation Service conducts its Natural Resources Inventory every five years. Analysis of the 1997 inventory shows:

- Developed land in Nebraska increased by 94,400 acres from 1982 to 1997; that's an 8% increase compared to 25% nationally.
- Irrigated lands in Nebraska increased from 6.89 million acres in 1982 to 7.75 million in 1997; that's a 12.5% increase compared to 0.35% nationally.
- Nationally our land use is composed of (in million acres): 402.1 Federal land; 377 crop land; 407 forest land, 406 of range land, 12 of pasture land, 98.3 of developed land, and 32.7 land in the Conservation Reserve Program.

To learn more about our land conditions and trends, see www.nhq.nrcs.usda.gov/NRI/1997.



About 350 golf courses opened every year during the 1990s, bringing the number of courses in the U.S. to more than 17,000 today.



Little Bluestem was designated the official state grass of Nebraska in 1969.



In April, the Prairie Plains Resource Institute (prairieplains.org), headquartered in Aurora, Nebraska, was awarded a \$500,000 grant from the Nebraska Environmental Trust Fund for land acquisition, ecological restoration, and stewardship along the Platte River.



According to Nebraska State Conservationist Steve Chick, history shows that Nebraska wetlands have been reduced from 2,910,500 to 1,905,500 – a 35% loss.



In a recent speech, Secretary of Agriculture Veneman pointed out, "In 1985, this country spent 97 cents out of every conservation assistance dollar to enhance the management of lands producing crops and livestock. Today, only 15 cents out of every dollar are spent for that purpose. The remaining 85 cents are spent on idling environmentally-sensitive cropland."

Grazing Sudangrass, Pearl Millet, and Sorghum Hybrids

by Bruce Anderson, Department of Agronomy and Horticulture, UNL

Most of the sudangrass and sorghum-sudan hybrids planted this spring will be ready to graze soon, but they contain a compound called prussic acid that is potentially poisonous. Prussic acid often is higher during dry weather, so use a few precautions to avoid problems.

Most importantly, do not turn hungry animals into sudangrass or sorghum-sudan pastures. They may eat so rapidly that they could get an overdose of prussic acid.

Secondly, since the highest concentration of prussic acid is in new shoots, let the grass get a little growth on it before grazing to help dilute out the prussic acid. Begin grazing sudangrass at about 18 inches in height, but wait until sorghum-sudan hybrids are 20 to 24 inches tall before grazing because they usually contain a little more prussic acid. If you planted pearl millet, there is no need for grazing precautions because it does not contain prussic acid. So let your animals graze pearl millet when it reaches 12 to 15 inches tall.

Summer annual grasses respond best to a simple, rotational grazing system. Divide fields into three or more smaller paddocks of a size that permits your animals to finish grazing each paddock within seven to ten days. Graze plants down to about 8 or so inches of leafy stubble before moving to the next paddock. Repeat this procedure with all paddocks, but if some grass gets too tall, either cut some for hay or rotate animals more quickly so grass doesn't head out.

A well-planned start, a good rotation and a little rain will give you good pasture from these grasses the rest of the summer.

Source: July 16, 2001 item on UNL Beef Cattle Production Web site, beef.unl.edu/.

Resources



Agri-Environmental Policy at the Crossroads: Guideposts on a Changing Landscape. Over the past 20 years, a wide range of policies addressing the environmental implications of

agricultural production have been implemented. Those policies have played an important role in reducing soil erosion, protecting and restoring wetlands, and creating wildlife habitat. This USDA-ERS report identifies the types of policy tools available and the design features that have improved the effectiveness of current programs. It provides an indepth analysis of one policy tool that may be an important component of a future policy package — agri-environmental payments. Available online at www.ers.usda.gov/publications/aer794/.

Our Fragile World: Challenges and Opportunities for Sustainable Development. \$380. A set of two hardback printed volumes with CD-ROM that presents integrated knowledge and world views related to the state of the earth's natural, human, cultural, institutional, economic, financial and technological resources. All orders received until 31 December 2001 will receive a 20% discount and will be eligible for complimentary, single-user online access to the Inaugural Edition of the Encyclopedia of Life Support for two years. Further information is available at www.eolss.net (click on About OFW).

2001 Nebraska Beef Report. This annual report contains many research articles on a variety of topics related to beef production, including several on forage and grazing. See online at www.ianr.unl.edu/ianr/anisci/beef/beef.htm, or contact the Center for Grasslands Studies for a printed copy of the report.

CGS 2001 Seminar Series

The theme for the Fall 2001 Center for Grassland Studies Seminar Series is "Impacts of Grasslands on Soil, Water and Air Quality." All seminars, which are open to the public, will be 3:30-4:30 p.m. on most Mondays September 10 through December 10 in the East Campus Union. Students interested in taking the course for credit should contact the CGS office. When the list of speakers and topics is finalized, it will be available at www.ianr.unl.edu/ianr/cgs/seminars.htm, or call the CGS office for a copy.

Calendar

Contact CGS for more information on these upcoming events:

2001

- Aug. 13-14:** Nebraska Grazing Conference, Kearney, NE
- Aug. 29-30:** Grazing Retreat, Franklin, NE
- Oct. 13:** Festival of Color Landscape Design Workshops, Lincoln or Mead, NE
- Oct. 21-25:** ASA-CSSA-SSSA (Agronomy) Annual Meetings, Charlotte, NC
- Nov. 6-7:** Fourth National Conference on *The Practice of Restoring Native Ecosystems*, in Nebraska City, NE, www.arborday.org/programs/callRneNatConf.html

2002

- Feb. 13-19:** Society for Range Management Annual Meeting, Kansas City, MO, www.oznet.ksu.edu/srm2002
- Apr. 23-27:** Landscapes in Transition: Cultural Drivers and Natural Constraints, 17th Annual Symposium, International Association for Landscape Ecology - United States Regional Association, Lincoln, NE

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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