KONZA PRAIRIE Research Natural Area

Tallgrass Gazette

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"The Newsletter for Docents and by Docents"

How Bison Grazing Habits Affect Plant Composition

Across the south section of Konza, the presence of bison becomes apparent. Beyond the actual bison themselves, a knowing eye can detect their wallows and even grazing patterns.

Native to the prairie, the last wild bison was seen in this area in 1848. Bison were re-introduced to Konza in 1987. What started as a 30-head herd from Ft. Riley has grown to more than 230 animals.

A portion of this herd has been the subject of a study on how bison and cattle affect tallgrass prairie vegetation.

Bison Grazing, photo by Valerie Wright

For the past six years, **Dr. Gene Towne** and other K-State research personnel have examined the animals' respective effects on the tallgrass prairie. Towne recently addressed this topic at the Annual Experience Docent Roundup. Eight 12-acre pastures have been set aside in which four bison or four cattle are grazed from May 1 to October 1. Towne and his co-workers match up the animals pound for pound to equalize the grazing pressure on each pasture. About 2,200 pounds of bison or 2,200 pounds of cattle graze each pasture. To accomplish this, two year old bison bulls are matched up with yearling steers.

By grazing season long rather than year long, this study removes the impact of management and its influence on grazing patterns.

Bison have a tendency to "grub down" an area, searching for the newest blade of grass. They establish and maintain large grazing patches where they spend most of their time. Cattle graze in small patches that are more uniformly distributed throughout the pasture.

Vegetational trends are slowly developing in the pastures. There was little difference in the vegetation between bison pastures and cattle pastures until the third year of grazing. Since then, trends in the vegetation have became more obvious. Species richness (the total number of plant species detected) is higher in bison pastures than in cattle pastures. However, the increase in species richness comes from the annual forb component (i.e., "weeds"). There are significantly more annual forb species in bison pastures than in cattle pastures. Composition of big bluestem has begun to slowly decline in bison pastures but remains stable in cattle pastures.

In every year of the study, there has been significantly less grass remaining in bison pastures than in cattle pastures at the end of the season. There also is more forb biomass remaining in bison pastures than in cattle pastures. This is because bison tend to eat more grasses and less forbs than cattle, and repeated close grazing in bison patches reduces competitiveness of the perennial grasses and thus favors forb growth.

All pastures are burned yearly in the spring but there is insufficient fuel to carry a fire through the grazed patches in bison pastures. However in cattle pastures, fire carries more completely through the area and kills those species not tolerant of fire (i.e., annual forbs). Kentucky bluegrass, a species reduced by fire, also is more abundant in bison pastures than in cattle pastures.

Bison and cattle do not eat in the same way. Bison eat more like horses, using their lips to graze, whereas cattle use their tongue to select grass.

In summary, when they are managed the same, bison and cattle have different impacts on the vegetation. The current grazing study will continue for at least another year; but at the current stocking rate, bison pastures are slowly degrading and will eventually be unable to support four animals through the growing season.

by Tawnya Ernst and Gene Towne

Prairie Patter

Dr. Valerie Wright
Education Coordinator

Renovation Grant

The Kansas Department of Commerce and Housing, Travel and Tourism Division, has granted $27,850 to the Konza Environmental Education Program for the renovation of the Hokanson Homestead barn and installation of a public sanitary facility. Plans are underway to stabilize the walls of the stone barn, add a new roof, doors and windows and a concrete floor. The inside will remain as original as possible (although cleaner). The barn will act as a shelter against the weather for groups on the Nature Trail. It will also be the staging area for various activities showcasing the natural and social history of the site. Along with the new well installed last year and the sanitary facility, the site will become a useful part of the education program.

Docent **Dave Redmon**, *master of the chain saw, takes down a tree with the help of Boy Scout* **Harrison Otto**

Chainsaw Troop

As part of the Hornaday Project, **Wade Walker**, Eagle Scout, organized a clean-up and workday at Hokanson Homestead last Friday, February 11. Thanks to the volunteers from Troop #74, we removed several trees growing right next to the barn walls. The big pile of brush we stacked will be put through a chipper and the resulting product used for the Homestead Trail. A portion of the creek that has been overflowing into the barnyard was reformed to keep water within the banks and out of the barn. Bayer Construction (**Neil Horton**) loaned us their talented skidloader operator, **Dave Gibson**, to smooth out the creekbed.

There is also more material on the driveway to accommodate future vehicles of future work crews. **Mike Schilling** of Schilling Construction donated a couple of loads of gravel to help us out.

On February 18, the children at Amanda Arnold Elementary and volunteers from Walmart will build about three dozen bird houses and feeders to put around the Homestead Trail and outside the lean- to wildlife observation area (OWLS project). The stone lean-to walls will be stabilized along with the barn by **Mel Borst** and his staff of restoration engineers. They will have help from the Kansas State Student Chapter of the Association of General Contractors, who have volunteered 200 hours toward the project. Many of us will be there to help as well.

Watch for announcements of more workdays in the near future.

National Honors for Grad Students

In recent national competition, research by five Kansas State University entomology graduate students earned the Entomological Society of America's top awards. Two of the students do research on Konza Prairie.

David Stagliano received first place for oral presentation: Behavior and Ecology, for research titled "Aquatic insect productivity and trophic structure in a tallgrass prairie stream." Stagliano studied aquatic insects in a prairie ecosystem by collecting samples from the headwaters of Kings Creek. Stagliano sorted insects found in the water samples according to feeding roles and thus determined the insect distribution, one more typical of a forested headwater than prairie. That finding may be related to 1998 having been a wetter than average year. He is pursuing a master's degree in aquatic entomology and fishes.

Clint Meyer received second place for his oral presentation: Behavior and Ecology, for "Secondary production and energetics of a dominant grass-feeding grasshopper in a tall grass prairie." Meyer compared the grasshopper production on burned and unburned pasture. He found more grasshoppers on unburned land, and they have a feeding preference for the bluestem grasses. Compared to the amount of grasses the bison consume, he found that grasshoppers remove from one to two percent of that amount. Meyer is pursuing a master's degree in the ecology of tallgrass prairie.

Excerpted from Kansas State University News

Snippets of Konza Prairie Research Projects

Shrews on Konza Prairie

Shrews, of the order Insectivora, are often mistakenly thought to be rodents. However, unlike rodents, shrews have a velvety coat, a pointed snout, and barely visible eyes and ears.

Two of the four species of Kansan shrews live on the Konza; the Elliot's short-tailed shrew (*Blarina hylophaga*) and the least shrew (*Cryptotis parva*). Both of these shrews have very small eyes and poor vision. The short-tailed shrew is larger (100 mm, 4 inches) and heavier (10-15g) than the least shrew and has velvety, gray-black hair. Unique to the short-tailed shrew is it's venomous saliva. The venom may aid shrews in preserving cached prey or in subduing their prey of invertebrates such as earthworms, beetles, grasshoppers, spiders, cicadas and several small vertebrates (the venom only causes mild swelling in humans). The least shrew differs from the short-tailed shrew in its smaller size (70-90mm, 2½-3½ inches) and weight (4-6g, about the weight of a nickel), long and narrow snout, and brown coat. They too eat insects and other invertebrates.

In 1981, as part of the Long Term Ecological Research (LTER), a small mammal sampling program was initiated to establish a baseline of information on small mammal populations. It showed that the Elliot's short-tailed shrew were more abundant than the least shrew. A special shrew study was developed in 1997 employing a system of live traps and a special pit-fall bucket collector. Initial indications show that populations are highest in wet years and decrease in drought years. Abundance of these shrews are low in recently burned and overly grazed locations.

The recent study is designed to further examine the influence of physical (moisture, temperature, slope, aspect, and topography) and biotic (plant litter and prey abundance) factors on the population of short-tailed shrews on Konza Prairie. Specifically, the new research will look at the influence of these factors on not only the abundance of these shrews but location in the prairie.

Contact Ray Matlack (Ph. D. candidate), rsm@ksu.edu

Nest Predation and Nest Placement

For years, one common view of bird communities was that bird species coexistence is made possible because they do not utilize the same food resources. Recent studies suggest that bird species coexist in communities where they can minimize nest predation by segregating nest sites between species.

Shrub patches on the Konza prairie were used to answer two questions about nest site segregation. First, do different shrub nesting bird species place their nests in different types of sites on the tallgrass prairie? Second, do nest predators in these shrub communities search for nests based on shrub variables in a systematic fashion?

This study utilized areas of shrub growth in less frequently burned watersheds of the Konza Prairie. Nest success of Field Sparrow (*Spizella pusilla*), Dickcissels (*Spiza americana*), Bell's Vireos (*Vireo bellii*), and Brown Thrasher (*Toxostoma rufum*) were observed. Although Field Sparrows and Dickcissels do not nest exclusively in woody vegetation, only nests placed under woody vegetation were used.

One hundred and thirty seven nests were located and visited every three days for the duration of their use. At each visit to the nests, eggs and/or nestlings present were counted. Signs of predation were also noted. When nests were vacated, measurements were made which characterized the vegetation in the surrounding nests.

This study established the presence of nest site segregation among shrub-nesting species on the Flint Hills tallgrass prairie. Field Sparrow nests appear to be associated with woody clumps including corralberry, many small stems, and deep liter. Dickcissels in this study were likely to place their nests in the presence of plum in woody plants with higher than average diameters surrounded by many stems in the immediate vicinity. Bell's Vireo nests were associated with closed canopy, low litter, and little grass cover. The preferred woody vegetation appears to be taller and larger than average. Woody clumps with lots of dogwood and many dead stems are associated with Brown Thrasher nests. The thrasher nests themselves tend to be placed in large diameter shrubs away from deep litter of the grassy prairie or prairie edge.

Dickcissel

Predation in the shrubs of the tallgrass prairie does not seem to be the same as in in some forested areas. No evidence was found that predators in this system are a selective force driving nest site placement. Research by John Zimmerman found that the principal nest predator on the Konza tallgrass prairie are snakes. Zimmerman made the convincing argument that these snakes search in a haphazard, non-systematic manner for nests. If this is the case, then the absence of any pattern in the location of successful versus depredated nests is to be expected.

Summary of a 1997 research project *Nest Predation and Its Relationship to Nest Placement in Tallgrass Prairie Shrub Patches* by Timothy Parker. Contact John Zimmerman (jozimmva@aol.com)

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We encourage our readers to contribute articles, photos, snippets or ideas for future issues.You may contact us at: sbale@oz.oznet.ksu.edu or ternst@oz.oznet.ksu.edu

Interpreting Interpretation

Offhand, the word interpretation might conjure up images of foreign language translators. But interpretation has an altogether different meaning that Konza docents might apply each time they hit the trail. Interpretation is an educational activity that aims to reveal meanings about our cultural and natural resources. Guided tours, talks and exhibits are just a few of the forms of interpretation.

Interpretation takes a visitor beyond straightforward facts, it tells the story behind the scenery or history of a place.

Ted Cable, K-State professor in horticulture, forestry and recreation resources, presented a number of the basic principles of interpretation to Konza docents February 17.

The principles are derived from Freeman Tilden, a devotee of conservation and author of the interpretation "bible", "Interpreting Our Heritage."

- ❏ To spark an interest, interpreters must relate the subject to visitors' lives.
- ❏ The purpose of interpretation goes beyond providing information to reveal deeper meaning and truth.
- ❏ The interpretive presentation as a work of art, should be designed as a story that informs, entertains and enlightens.
- ❏ The purpose of the interpretive story is to inspire and to provoke people to broaden their horizons.
- ❏ Interpretation should present a complete theme and address the whole person.
- ❏ Interpretation for children, teenagers, and seniors, when these comprise uniform groups, should follow fundamentally different approaches.
- ❏ Every place has a history. Interpreters can bring the past alive to make the present more enjoyable and the future more meaningful.
- ❏ Perhaps one of the most important ingredients of interpretation is passion. Love of the resource and the people who visit.

Sunflower in Winter, photo by Valerie

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