

The Value of Prairie Plants

Why is Plant Diversity Important?

What Does This Mean in Forage Grazing Systems
and to Wildlife Survival?



Prairie Plant Ecology

Soils, fire, grazing, and local climate shaped the plant composition of native prairie which once covered all of Kansas. The diversity of native plant species provided sustenance for early indigenous peoples and native wildlife, produced the rich soils that our modern agricultural economy is based on, and is the foundation of the Kansas livestock industry.

The state of Kansas has 2,000 plant species. Grassland forbs, or broadleaf plants other than woody species, account for 72 percent of the plant species in Kansas. Grasses compose 12 percent of the species, woody plants are 10 percent, and sedges 6 percent. Broadleaf forbs make up a small portion of the plant biomass production on rangelands, but they represent the majority of species.

The importance of the dominant native grasses in forage grazing systems is widely recognized. The value of prairie forbs, often considered weeds, is not as commonly understood. Prairie forbs can benefit grass production in many ways. Legumes comprise a large percentage (the third largest plant family in Kansas) of the grassland forb species. Most legumes are able to fix nitrogen from the air and enrich the soil. Some perennial forbs improve hay quality (many-flower scurfp pea is excellent in cured hay). Native forbs do not compete with the grasses for moisture or nutrients because the forb root structure extracts water from deeper soil horizons than grasses. The deep rooted forbs have been called a nutrient pump because they bring trace elements up from deep below the reach of most grasses. Maintenance of perennial forbs could reduce the need for livestock supplements. Many plants regarded as weeds by cattle producers can be a forage source for livestock and an important component of the grassland ecosystem.

Wildlife also requires native plants for both food and shelter. Upland gamebird brood rearing success depends on nesting cover and a forb-rich habitat. Forbs harbor insects which are critical in the diet of newly hatched birds. Songbirds, fur and game mammals, small mammals, and hooved browsers rely on native prairie plants.

Once the native prairie is lost by plowing, replanting prairie grasses can never replace the full compliment of associated flora and microfauna as the original. Replanted native prairies when compared to virgin prairies for forage purposes are not equal. Cattle will choose the original complex of plants for reasons that we do not fully understand. This fact is easily observed where part of a pasture is original native prairie and part has been broken and replanted to native grasses. Clearly something vital is lost that is difficult to measure, but foraging animals can tell the difference.

Some of the benefits of native plants include 1) preventing soil erosion and filtering water, 2) providing a carbon sink to store carbon dioxide, a greenhouse gas, 3) a reservoir of useful herbs and a storehouse for potential medicinal plants, 4) providing forage for livestock, 5) providing food and habitat for wildlife (birds such as upland sandpiper and prairie chicken; insects such as monarch butterfly), and 6) last, but not least, the aesthetic value of plants and flowers which add beauty and color to our lives.

Rangeland

What appears to be idle wandering of animals while grazing actually involves much discrimination. Herbivores respond to specific nutrients and other factors when foraging. It is no surprise that different species of grazing animals have different forage requirements and that animals of the same species at different ages have different nutritional needs.

It is no less noteworthy that individual animals of the same age and same species have different foraging habits and nutritional requirements. Additionally food preferences change considerably throughout the year in response to changing needs of each animal. To meet these requirements a diversity of plant choices is vital. The kinds and mixtures of plant species influence food intake and animal performance.

Range managers often think that the major grasses (big bluestem, little bluestem, Indian grass, switch grass, and side oats grama) are the only plants required for foraging livestock. In reality the average prairie pasture may contain 300 to 500 plant species and all contribute in some way to livestock performance.

Native plants other than grasses are frequently regarded as weeds. Most “weeds” are actually beneficial to livestock and wildlife. The consequences of their removal should be considered before a control program begins.

Accurate identification of potentially undesirable plants is essential. Only a relatively few, very aggressive, non-native, invasive plants require expensive herbicide treatment. Infestations of undesirable plants are often the symptom of underlying problems in management. A change in grazing practices should be considered before the use of herbicides. Grazing management is the most economical way to manage weeds. Herbicides may kill both desirable and undesirable shrubs and forbs.

The most beneficial range plants are known as decreasers because they are very palatable to livestock and will decrease under heavy grazing. Examples of these would be compass plant, catclaw sensitive briar, perennial sunflowers, and bundleflower. All of these plant species are rare on livestock pastures but common along roadsides. It would be impossible to list all the plants individually and, in truth, we really don't know all of the reasons why some plants are necessary in a healthy herbivore diet. Listed below are only a few of the plants utilized by livestock.

Plants considered nutritious and palatable:

Leadplant (utilized by cow/calf but not steers)

Slender lespedeza (easily confused with noxious sericea)

Partridge pea (legumes are high in protein)

Bundleflower

Tickclovers

Roundhead lespedeza

Prairie clovers

Catclaw sensitive briar

Goat's rue

Black Sampson

Maximillion sunflower

Serrate-leaf evening primrose

Compass plant

American vetch

Plants eaten only during the early growth stage:

Heath aster	Blue sage	Ragweed
Daisy fleabane	Stiff goldenrod	Yucca eryngo
Gayfeather	Prairie petunia	Beardtongue
Yellow coneflower	Many-flower scurfpea	

These lesser used native plants will increase with heavy grazing and are best controlled by a thick vigorous stand of native grasses:

Gumweed	Camphorweed	Broomweed
Ironweed	Beebalm	Hoary verbena
Bitter sneezeweed	Blackeyed susan	Stiff goldenrod

Most annual weeds are controlled by maintaining a dense vegetative ground cover so there is no bare soil for seeds to germinate. But many annual weeds are important wildlife food sources.

Toxic Plants

Some native plants are toxic. Animals have little trouble limiting intake of toxic plants as long as they have nutritious alternatives. It is believed that poisonous plants may play a roll in the animal diet. Just as humans used and continue to use various toxic plant compounds internally (from such plants as cardinal flower and milkweeds) in small amounts to cure illness, animals appear to do the same. Poisonous plants are a problem only when animals lack alternatives. Therefore, it is wise to provide plenty of diverse grazing forage for livestock.

Wildlife

A broad mix of prairie plants is required by waterfowl, marshbirds and shorebirds, upland gamebirds, songbirds, fur and game mammals, small mammals, and hoofed browsers in our state. Much wildlife is omnivorous and can subsist on a variety of plants, buds, berries, bark, seeds, and sometimes a high percentage of invertebrates. Forbs are not only nutritionally crucial but also attract the insects which are essential in many animal diets. As with livestock, wildlife food preferences change considerably by age of the individual and through-out the year.

The following group of plants, in order of rank, is the most utilized for food by all types of combined wildlife in the prairie region: sunflower, foxtail, panicgrass, goosefoot, hackberry, knotweed, ragweed, pigweed, prickly pear, croton, blackberry, and sedge. Wild strawberry, sumac, nightshade, dogwood, wild grape, poison ivy, and elderberry are also heavily used.

Of the 21 grasses in the wildlife diet, foxtail (mostly introduced annual species) tops all others in value to wildlife. Bluestems rank as number 12 on the list and are utilized by 12 species, most commonly by browsers and some songbirds.

Crotons are some of the most important plants for upland gamebirds. Croton can be as much as 25 percent of the mourning dove diet, as can pigweed and foxtail. Early buttercup, tickseed, bedstraw, stargrass, knotweed, wild rose, buckbrush, prairie petunia, and spurge are also favored by the prairie chicken. The bobwhite uses more than 100 different plants as food, but gets 25 to 50 percent of its diet from ragweed and lespedezas. Tickclover, smartweed, prairie trefoil, and umbrella sedge are also preferred by quail.

Acorns are highly selected by wild turkeys, but dogwood, wild grape, spurge, and goat's rue are utilized.

Hackberry, sunflower, and ragweed are very popular with songbirds. The following birds use plant foods as the primary part of their diet: cardinal, dickcissel, goldfinch, cedar waxwing, towhee, junco, longspur, horned lark, catbird, robin, brown thrasher, redwing blackbird, sparrows (song, tree, vesper, chipping, field, & white crowned). Most birds supplement their diet with insects. Others, as the meadowlark and upland sandpiper, feed mostly on invertebrates. Broadleaf forbs are key to providing the protein-rich insect diet required by many birds and small mammals.

A few of the wild Kansas plants used by hummingbirds are beardtongue, evening primrose, vervain, cardinal flower, blue sage, columbine, larkspur, clematis, morning glory, phlox, four-o'clock, paintbrush, and beebalm.

Herbivorous furbearers such as muskrats utilize sedges, rushes, cattails, arrowhead, beggar-ticks, marsh seed box, and roots of swamp milkweed as food.

Hoofed browsers eat vegetation exclusively. In spring and summer, pronghorns rely heavily on forbs, depending on sagebrush and cacti in the winter. Deer browse many types of buds, leaves, and sedges. Whitetail deer will select and consume dogbane leaves which are listed as toxic to people and livestock.

Two important forb species with outstanding value to wildlife are sunflower and ragweed. Seeds of sunflower and ragweed have higher energy content than wheat and sorghum. Western ragweed has a very high wildlife value. Plants contain over 20 percent crude protein. The ragweed seeds are rich in oil and seed production per plant is enormous. Ragweed is a valuable winter food because seeds persist on the plant and remain available when other foods are covered by snow.

It is not hard to imagine why plants are important as cover, shelter, and for nesting. Height and density of the vegetation determine which animals can use the shelter and cover that plants provide. Bobwhites, for example, need an area to have a range of 25 to 75 percent herbaceous canopy cover that is 10 to 20 inches tall. Again, diversity in height and spatial density provides the most benefits overall.

Conclusion

The plant community tells a lot about the native range, its condition, and the direction it is going. Livestock and wildlife benefit by creating a landscape mosaic with numerous habitat types. Maintaining the integrity of healthy and diverse native prairies in Kansas is good business and a wise investment in our natural heritage.

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Scientific names of plants in this report:

All are native unless otherwise noted.

- American vetch – *Vicia americana*
arrowhead – *Sagittaria* spp.
beardtongue – *Penstemon* spp.
bedstraw – *Galium* spp.
beebalm – *Monarda* spp.
beggar-ticks – *Bidens frondosa*
bigflower coreopsis – *Coreopsis grandiflora*
bitter sneezeweed – *Helenium amarum*
black sampson – *Echinacea angustifolia*
blackeyed susan – *Rudbeckia hirta*
blue sage – *Salvia azurea*
bluestem – *Andropogon* spp.
broomweed – *Amphichyris* (*Gutierrezia* spp.)
buckbrush – *Symphoricarpos orbiculatus*
bundleflower – *Desmanthus illinoensis*
camphorweed – *Heterotheca latifolia*
cardinal flower – *Lobelia cardinalis*
catclaw sensitive briar – *Mimosa* (*Schrankia nuttallii*)
cattail – *Typha* spp.
clematis – *Clematis* spp.
columbine – *Aquilegia canadensis*
compass plant – *Silphium laciniatum*
croton – *Croton* spp.
daisy fleabane – *Erigeron strigosus*
dogbane – *Apocynum cannabinum*
dogwood – *Cornus* spp.
early buttercup – *Ranunculus fascicularis*
elderberry – *Sambucus canadensis*
evening primrose – *Oenothera* spp.; serrate-leaf, *Calylophus serrulatus*
four-o'clock – *Mirabilis* spp.
foxtail – *Setaria geniculata* is native, all other spp. are introduced
gayfeather – *Liatris* spp.
goat's rue – *Tephrosia virginiana*
goosefoot – *Chenopodium berlandieri*, *C. disiccatum*, *C. gigantospermum*, & *C. standleyanum*
gumweed – *Grindelia squarrosa*
hackberry – *Celtis* spp.
heath aster – *Symphotrichum* (*Aster ericoides*)
ironweed – *Vernonia baldwinii*
knotweed – *Polygonum* spp.
larkspur – *Delphinium* spp.
leadplant – *Amorpha canescens*
lespedeza – slender, *L. virginica*; roundhead, *L. capitata*; *L. repens*, *L. stuevei*, & *L. violacea*
many-flower scurfpea – *Psoralea tenuiflora*
marsh seedbox – *Ludwigia palustris*
morning glory – *Ipomoea* spp.
nightshade – *Solanum* spp.
paintbrush – *Castilleja* spp.
panicgrass – *Panicum* spp.
partridge pea – *Chamaecrista fasciculata* (*Cassia chamaecrista*)
phlox – *Phlox* spp.
pigweed – *Amaranthus arenicola*, *A. graecizans*, *A. palmeri*, & *A. rudus*
poison ivy – *Toxicodendron* spp.
prairie clover – *Dalea purpurea*, *D. candida*, *D. aurea*, & *D. multiflora*
prairie petunia – *Ruellia humilis*
prairie trefoil – *Lotus purshianus*
prickly pear – *Opuntia* spp.

ragweed – *Ambrosia psilostachya*, *A. bidentata*,
& *A. artemisiifolia*
rush – *Juncus* spp.
sedge – *Carex* spp.
smartweed – *Persicaria* (*Polygonum* spp.)
spurge – flowering, *Euphorbia corollata*; toothed,
E. dentata
stargrass – *Hypoxis hirsuta*
stiff goldenrod – *Solidago rigida*
sunflower – *Helianthus maximiliani*, *H.*
petiolaris, *H. rigidus*, *H. mollis*, *H.*
grosseserratus, *H. salicifolius*, & *H.*
tuberosus
swamp milkweed - *Asclepias incarnata*
tickclover – *Desmodium canadense* & *D.*
illinoense
umbrella sedge – *Cyperus* spp.
vervain – *Verbena* spp.
wild blackberry – *Rubus* spp.
wild grape – *Vitis* spp.
wild strawberry – *Fragaria virginiana*
yellow coneflower – *Ratibida columnifera*
yucca eryngo – *Eryngium yuccifolium*