Lesson 1: An Introduction to Grasslands

Grasslands cover much of the earth. On every continent, various types of grasslands spread over vast areas wherever environmental conditions favor these plant communities over forest and desert. Much of the best cropland, pasture, and range used for agricultural production was originally native grassland. As a natural resource, grasslands are priceless.

Grasslands play an important role in Missouri. Agriculture is Missouri's largest industry, and livestock accounts for more than half of Missouri's total agricultural production. Grasslands contribute more than half of the total amount of feed used by this industry. Besides forage for livestock, grasslands provide other benefits, including wildlife, recreation, and conservation of soil and water. The key to providing these benefits at the highest sustainable level is good management.

What is a Grassland?

Ecologically, a grassland is any plant community dominated by grasses, whether they exist naturally or because of management practices. In this sense, pastures, golf courses, and front lawns can all be considered grasslands.

Agriculturally, grasslands are areas managed to grow grass, legumes, or other pasture or range plants. Most agricultural grasslands are artificially established plant communities planted for forage production, though some are established for soil and water conservation and wildlife habitat. These uses usually can be combined successfully with proper planning.

What is a Forage?

Forages are plants, primarily grasses and legumes, grown as feed for livestock. In contrast to feed grains, the soft vegetative parts of forages—mainly the leaves and stems—become feed. Thousands of species of grasses and legumes exist worldwide, and most have value as forage. They are harvested by grazing and by mechanical mowing. While feed grain is not normally considered forage, the vegetative parts of grain plants are sometimes used as forages after harvest.

Natural Factors Affecting Grasslands

Climate, soil, plants, grazing animals, and fire all interact to determine what vegetation occupies a given area and how well it grows. Humans also have a huge impact on grasslands. By changing how these factors interact, grasslands can be improved or abused, created or destroyed. Understanding the natural system is necessary to manage grasslands for greater productivity.

Climate – Grasslands compete with other types of vegetation for growing space. They usually dominate in areas averaging 10 to 30 inches of rainfall annually. The local environment can have a great effect, however. For example, grasses may dominate in a forest region with rainfall exceeding 30 inches if other factors create a harsh environment for trees. Most of Missouri receives 35 inches or more, which is at the transition point between grassland and forest. Trees and shrubs will invade most Missouri grasslands if they are not managed properly.

Soil – Since Missouri is at a transition point between grassland and forest, soils play an important role in determining the type of vegetation found in a particular area. Some soils, such as those that do not hold moisture because they are shallow or coarsely textured or have hardpan (a dense layer of soil) close to the surface, may discourage tree growth even when enough rainfall exists. Soils with high water tables inhibiting the root systems of trees may also favor grasses.

Plants – Grasses may make up the bulk of the vegetation found in a grassland community, but a rich diversity of broadleaf plants may also be present. These plants can be nutritionally valuable for livestock. Relatively few are problem species that require control, and most of these species only become a problem in pastures that have been abused. A mixture of grasses and broadleaf plants is especially important to wildlife, which depend on them for a variety of foods and cover. Pure stands of legumes like alfalfa are sometimes planted on grasslands. They are usually used for hay or silage rationed to livestock along with other feed.

Many grassland plants have adapted to their environment by becoming dormant when conditions are harsh and

producing new growth when conditions improve. Healthy plants can usually survive losing the current year's growth if allowed time to grow back. This process allows grassland species to survive damage from fire, grazing/browsing, drought, and high winds, all of which can kill or limit the growth of trees and shrubs.

Because most forage plants are perennials, the long-term health of the plants must always be a management priority. Excessive harvesting may yield more income one year, but overusing the plants year after year will cause the grassland to deteriorate and future productivity to decline.

Grazing – Grazing is natural to grassland communities. Before European settlement in Missouri, buffalo, deer, and elk grazed and then moved on as they depleted the forage, allowing plants to grow back. Unlike trees and shrubs, which can be severely damaged by grazing and browsing, grassland plants adapted to this cycle. The adaptation of grassland plants to grazing makes forages an important part of a productive farming operation. Grassland plants can produce an abundant crop for harvest while surviving to repeat the process. With good management, this harvest and renewal can go on indefinitely.

Fire – Grassland plants tolerate fire better than trees and shrubs and often depend on fire to maintain their dominance. With their most important parts insulated underground, they are better able to recover even if fire destroys living tissue. Grasslands are so well adapted to burning, they actually create dry conditions that favor fire at just the right time. Where fire occurs often enough to limit tree growth, grasslands usually dominate. If fire is excluded and not compensated for through practices like grazing, haying, disking, seeding, or prescribed burning, grasslands deteriorate in quality and productivity and begin to be replaced by forest.

Native Grasslands

Native grasslands are those that existed in America before the arrival of European settlers. For example the prairies of the Great Plains were originally one vast native grassland. These grasslands are sometimes called natural grasslands, but Native Americans are believed to have used fire extensively for thousands of years in ways that extended the natural range of grasslands. Therefore, human actions may have caused many of Missouri's original grasslands.

The trend toward conservation farming has led to new interest in native grasslands and their plants. Native plants and plant communities are well-adapted to Missouri's environments. When included in a farm plan and properly managed, native species can provide forage that is nutritious and palatable. The forage may be available for grazing when traditional pasture species are dormant. They can also provide better wildlife habitat and ground cover that is more effective in building soil and conserving water.

Missouri's native grasslands include several different plant communities. Most of them are prairies, glades, or savannas.

Prairies

Prairies are large, continuous native grasslands in which trees and shrubs are nearly absent. While grasses dominate, prairies support a rich diversity of grasses, legumes, and forbs. Before European settlement, more than 250 species of native grasses, legumes, forbs, and wild flowers thrived on prairies. Wildlife depended on these plants for survival. The prairies of the Great Plains reached well into Missouri and in some areas mingled extensively with forests, depending on local conditions. Prairies originally dominated nearly 27 percent of the state.

Different kinds of prairies develop on different sites. Drier sites support shorter grass species, such as little bluestem and sideoats grama. Most of these drier prairies have been converted to pasture, and much of it is improperly grazed. Wetter sites support taller species like big bluestem and indiangrass, which can reach 6 feet or more in height. Most moister prairies have been converted to cropland.

Overgrazing, invasion by woody plants, and conversion to cropland and other uses have made native prairies very rare. The result has been the loss and endangerment of many species of native plants and wildlife. However, native prairies are receiving new appreciation for their plant diversity and their production of summer forage when cool-season grasses are dormant.

Glades

Glades are relatively small, isolated native grasslands that form on hilltops and southwest-facing slopes where rocky outcrops, exposure to sunlight, and thin, dry soils create harsh, desert-like conditions during the summer. Dry conditions and fire keep them mostly clear of trees. Prairie grasses and forbs dominate, but plants and animals from western prairies and deserts like yuccas, cacti, tarantulas, and scorpions can be found.

Glades are rare environments found only in the central Midwest. They occur in prairie regions but are more obvious when found in forests. Different types of glades develop over different bedrock. Each of these communities is unique. The precise balance of environmental factors that create a glade also makes them fragile and easily disturbed by overgrazing, total exclusion of fire, and the introduction of nonnative plants.

Savanna

Savanna is a specialized community intermediate between grassland and forest with widely spaced trees, a noticeable absence of small trees and shrubs, and grasses as the main ground cover. Early settlers described parts of Missouri as park-like expanses of trees with grasses beneath them that were easily traveled on horseback. They were native savannas, once common along the edges of prairies and glades where grassland and forest met.

Savannas result from site conditions and a fire history that keeps many woody plants from reproducing while others manage to reach a size resistant to fire damage. They have become rare due to overgrazing, logging, replacement by true forest, and conversion to pasture, cropland, and other uses. If recognized and managed properly, savannas can provide wood and valuable wildlife habitat as well as forages for livestock.

Managed Grassland

Managed grassland is any area currently managed for forage, pasture, or grassland habitat. Most grassland in Missouri today can be considered managed, whether it consists of native grassland or an artificially established community. Even areas identified as "wild" grasslands must be intensively managed because human actions have altered the natural forces and cycles that created them.

More than 95 percent of grasslands in Missouri are privately owned. Most of them are used for forage; pasture is the most common type of grassland. Very little is managed as native grassland. However, because of improvements in management practices, native grasslands and pastures with native species can increase productivity.

Grassland Management and Conservation

Grassland management is the use and care of grasslands. As with any agricultural crop, grasslands must be cared for to keep them productive. Grassland management involves managing the plants, animals, equipment, and practices needed for the successful use of grasslands in an agricultural operation.

All grasslands are natural resources and require good conservation practices. Grassland conservation is the wise use of grasslands and other natural resources found on them to ensure long-term productivity and sustainability. Good management seeks to achieve the highest productivity while maintaining the system that provides it. Pushing that system beyond sustainable limits will cause the system to break down. Plants and soil will not suddenly disappear, but grasslands overgrazed or otherwise abused will decline in productivity over time. Properly managed grasslands maintain their productivity and even increase it by helping to build healthy plant communities. In addition, well-managed grasslands conserve soil, water, and wildlife.

Research and development into improved practices is a continuing effort, and grassland managers need to remain informed about new techniques that can improve their operations. Special grazing systems for livestock have been developed that protect grassland while improving production. Research is also showing how native species can increase production while protecting natural resources.

Introduction to Grassland Management

Summary

In agriculture, a grassland is an area managed to grow grass, legumes, or other pasture or range plants for forage production. Forages are primarily grasses and legumes used as feed for livestock. Several basic environmental factors—climate, soil, plants, grazing, and fire—influence the growth of grasslands. Native grasslands, including prairies, glades, and savannas, once covered much of the state, but most have been converted to other uses. Most of Missouri's grasslands now consist of pastures of nonnative plants, although native grasslands and native plants are showing new promise in livestock operations. The key to success in grassland farming is proper management, which focuses on sustaining the productivity of forage plants.

Credits

Castilon, David A. *Soil Formation and Distribution in Missouri*. Jefferson City: Missouri Department of Conservation, 1984.

Castilon, David A., and Jack C. Woodhead. *Biogeography of Missouri*. Jefferson City: Missouri Department of Conservation, 1991.

Heath, Maurice E., et al. *Forages*. Ames: Iowa State University Press, 1974.

Nelson, Paul W. *The Terrestrial Natural Communities of Missouri*. Jefferson City: Missouri Department of Natural Resources, 1985.

Odum, Eugene P. *Fundamentals of Ecology*. Philadelphia: W.B. Saunders Publishing, 1971.

Schroeder, Walter A. *Presettlement Prairie of Missouri*. Jefferson City: Missouri Department of Conservation, 1982.

Woodhead, Jack C. *Prairie Life of Missouri*. Jefferson City: Missouri Department of Conservation, 1991.