

Illinois Grazing Manual Fact Sheet

GENERAL

How Plants Grow



What

A problem each livestock producer faces is knowing how short they can graze or mow their pastures and still obtain maximum productivity during an extended period. Varying climatic conditions, growth habits of different plants and livestock preferences for different plants, compounds the problem. The time of the year and age of the plant also affect plant growth when leaves are removed.

Leaf Growth

Plants manufacture food in their leaves through the use of solar energy. Yet some people wrongfully assume plants produce food in their roots. Plants pull water and minerals from the soil, but the “food factory” is located above ground in the leaves and green stems.

Minerals from the soil make up about 5 percent of the solid material in plant roots, stems and leaves. Carbon, hydrogen and oxygen from the air and water make up most of the other 95 percent.

The leaves take in carbon dioxide from the air through tiny pores. Using solar energy, the leaves re-combine the carbon with oxygen and hydrogen to make sugars and starches. The sugars then combine with minerals from soil to make fibers, proteins, plant oils, and fats. The plant uses these sugars, starches, proteins, oils and fats to grow and reproduce.

The ability of perennial grasses, legumes, and forbs to recover quickly after grazing or mowing makes these plants extremely valuable for forage production and soil protection. Removing too many leaves decreases forage production and reduces the extent of the plant’s root system. Plants eventually die if overharvest of the leaves continues.

Leaf Removal and Growth

Root growth is closely related to forage production. Plants maintain optimum root vigor and growth when grazing or mowing during the growing season removes no more than half their leaves. When the plant’s food producing mechanism is reduced, leaf and root growth is reduced accordingly.

In all grasses, the volume of leaf removed has a direct effect on the growth of new roots. Roots are the vital supply lines of moisture and minerals to the leaves. Perennial plants store food in the roots after seasonal growth. They use these reserves to live while dormant and make the first new growth the next spring.

A grass plant produces twice the volume of leaves that it needs to complete its growth and remain productive. Generally, when up to 50 percent of the plant, by weight, is grazed, root growth continues unimpaired. When 60 to 90 percent of the plant is removed, 50 to 100 percent of the root growth is stopped, respectively.

Other Growth Factors

Other factors influence plant growth. For instance, light grazing is usually more beneficial to plants than several years of no grazing because heavy plant residue depresses growth of many grasses.



Growing Plants

All plants have growing points where new cells are developed. The growing points of grass are located just above the last completed joints of each stem. Early in the season, the growing joints are situated at the base of the plant. As the season progresses, the joints of most species elongate and push upward to produce a seed stalk, elevating the growing point to a vulnerable position. Removal of the growth point by grazing or mowing forces the plant to send up new leaves from the base of the plant and to start over as if spring had just started. Adequate rest periods must be planned to maintain plant vigor.

The growing points of trees, shrubs, and forbs are located on the outer tips of branches.

Reproduction

Grazing management schemes can be used to favor the more desirable plants during their reproductive period. Plants reproduce in several ways. Such as:

Seed. All annuals, and many perennials, reproduce primarily from seed. Warm-season plants usually produce seed during late summer or fall. Cool-season plants produce seed near the end of their maximum growth period in midsummer.

Stolons. Some plants reproduce by stolons, which are prostrate stems, or above ground runners. The stolons grow on the surface of the soil, occasionally tagging down roots at the joints to secure the stolon and to begin a new plant. Bermuda grass reproduces by stolons.

Rhizomes. Several grasses reproduce by rhizomes, which are underground stems. Most sideoats grama strains have rhizomes. Big bluestem, Indian grass, and switchgrass have short rhizomes while smooth brome grass and Kentucky Bluegrass have rhizomes that are quite extensive.

Mixed methods. Many plants reproduce by stolons or rhizomes as well as by seed. Buffalo grass produces seed and stolons. Most sideoats grama plants produce seed and rhizomes. Common bermuda grass uses all three methods of reproduction.

Where to Get Help

For more information about hay and pasture management, contact your local office of the USDA Natural Resources Conservation Service, listed in the telephone directory under "U.S. Government," or the University of Illinois Extension.



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