

## Grass Growth Basics I

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**W**hat do plants, including grasses, need in order to grow and reproduce? They need light from the sun, water from the soil, carbon dioxide from the atmosphere, and minerals (nitrogen, phosphorus, potassium, etc.) from the soil.

Grasses consist of roots, leaves, stems, and seeds (together called a tiller) with each being important for growth and survival. The functions of roots are to anchor plants to the soil and to absorb water and nutrients (minerals) for plant growth.

Leaves serve as a factory, producing energy for plants from raw materials they obtain from the air and soil. Leaves contain a green pigment called chlorophyll that absorbs light, and through a process called photosynthesis the leaves convert light energy into chemical energy. Carbon dioxide taken into the leaves through small holes called stomata combines with hydrogen from water and forms the simple sugar glucose, which is a carbohydrate. A by-product of photosynthesis is oxygen, which passes out of plants through the stomatal openings in the leaves.

Other physiological processes form more complex carbohydrates, proteins, and lignin. Minerals absorbed by the roots from the soil are used in many of these physiological processes. For example, nitrogen is used in the formation of amino acids and proteins. Fertilizers often are advertised as plant food, but they are not. They are simply minerals that plants need for various physiological processes in order to grow and reproduce. Carbohydrates and proteins are used by plants to produce new leaf tissue, stems, roots, and seeds and for basal bud development that is the precursor for the following year's growth. Lignin is used by the plant for structural support. Stems are high in lignin.

Photosynthesis generally produces more energy than grasses need for growth, thus a portion of their leaves can be harvested by grazing or haying for animal food. However, some green-leaf material needs to be present throughout the growing season to produce an adequate amount of energy for plants to grow roots and additional leaves and to produce seed. If there is too little green-leaf material present, a plant may have to mobilize carbohydrates from stem bases, lower leaves, and rhizomes or stolons to meet its energy needs. This can delay subsequent new leaf growth, thus reducing forage yields, especially when temperature and moisture are conducive to active growth. This delay in new leaf growth by a plant during the



growing season can result in reduced root growth and the development of basal buds that are the precursor to the following year's tillers.

A reduction in root growth can be critical. Roots of perennial grasses live year round, but they do not live forever. On the average a grass root lives for only three to four years, therefore new roots need to be grown in order for the plant to survive. Because roots can comprise up to 80 percent of the total biomass of a perennial grass plant, a significant amount of new root material needs to be grown each year. Generally as much or more new root material is grown in a season as leaves and stems. Loss in roots not only reduces the ability of grasses to explore the soil for water and minerals but can also allow for the invasion of non-desirable plants. In addition, a reduction in root mass compounds the negative effect of drought and often results in the loss of plants.

Seed yield may also be curtailed if there is not adequate green-leaf tissue to provide energy for seed development. Although many perennial grasses are not solely dependent upon seed production for survival, new plants from seeds help maintain the genetic diversity necessary for healthy populations. For some grasses, seedlings are the only way for them to maintain their population.

For grasses to remain healthy and productive whether in rangeland or in irrigated pastures, they need to have a sufficient amount of green-leaf tissue present throughout the growing season to produce energy for their above- and below-ground growth, for the development of basal buds for the following year's tillers, and for reproduction. Proper management of grazing is necessary so that a sufficient level of green leaves is present throughout the growing season.

For more information on the basics of grass growth, contact a local University of Wyoming Cooperative Extension Service educator.