

IMPORTANCE OF REST IN GRAZING MANAGEMENT

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Success of a range livestock operation depends heavily on the stockman's knowledge of how to produce an abundance of high quality range forage. Artificial seeding, spraying, and other cultural practices can produce a limited amount of such forage. Most of it, however, can be generated only through proper management of grazing. Proper grazing management is also the means of maintaining high forage yield, whether the forage is produced culturally or through management of grazing. An essential element of good grazing is periodic resting of the range from use.

Forage production and grazing capacity on western ranges has declined on the order of 50 percent in the last 100 years or so since the West was settled. Many factors caused this reduction. Important among them has been livestock grazing.

High value forage plants, mainly grasses on cattle ranges and broad-leaved herbs and shrubs on sheep ranges, have been greatly reduced in amount and replaced by inferior plants. Some of these less desirable plants are sagebrush, rabbitbrush, snakeweed, creosote bush, mesquite, juniper burrograss, cheatgrass, halogeton, locoweed, buttercup, bisquitroot, tarweed, sunflower and skunkcabbage. Soil erosion has accompanied plant changes in most cases, resulting in loss of soil fertility and lower forage production.

Most livestock forage on western ranges comes from perennial plants although annuals are important in some areas. The stockman's principal problem is to keep the perennials vigorous and reproducing under grazing use. This calls for an understanding of the growth requirements of plants and the grazing habits of livestock.

Perennial plants live for many years. They sprout new growth each year--grasses and herbs from the root crown and woody plants from a branch or twig. Most important perennial forage plants on western ranges reproduce from seed. These present the most critical problems of forage production.

To cope with these problems we must remember that changes in plant composition occur because plants are killed and the ground vacated by them is taken over by other plants. Plants die under improper grazing use because their food supply is diminished and finally exhausted. In effect the plant starves to death.

Being a living organism, the plant requires food for growth and sustenance as does an animal. In fact it uses the same basic food materials--namely, carbohydrates, proteins, and fats. Animals get these materials by eating plants or other animals. Plants, on the other hand, have capacity to make these materials. They make them principally in the leaves and only when the plants are green.

The plant first makes a carbohydrate--the sugar glucose. Using this sugar as a building stone, it makes all the other carbohydrates and the proteins and fats found in the plant. Some important carbohydrates in plants in addition to glucose are fructose (fruit sugar), sucrose (cane or beet sugar), starch, and cellulose. Cellulose comprises most of the roughage in forage. Proteins make up most of the living material in plant cells. Protein is a yellow-white viscid material. Egg white is protein. Fat is vital to the plant and is found in all cells, usually in small amounts. It is concentrated in some seeds and fruits such as cottonseed and avacado.

The process by which glucose is formed is called photosynthesis. The plant takes carbon dioxide gas from the atmosphere. From the soil, it takes water and certain chemical elements--such as nitrogen, potassium, phosphorus, calcium, sulfur, magnesium, copper, iron, and zinc. In the presence of sunlight it combines these ingredients, and forms glucose in the cells.

Energy to do the work of making this sugar comes from sunlight. Some of the energy absorbed by the plant is stored in the sugar molecule and in all other food materials made by the plant. When the plant uses its food, this energy is released in the plant to do work, for example, to build tissue during growth, and to maintain the living condition of the plant.

The plant makes food materials during daylight hours when it is green, but it uses food materials all the time, even when it is dormant in the cold part of winter or in the dry part of summer. The process by which food materials are broken down to smaller compounds and by which energy is released is called respiration.

Perennial plants use some food materials immediately as they are made for growth and for energy, but they also store some for future use, for example, to start growth in spring and to keep the plant alive when it is not making food. Carbohydrates, proteins, and fats are all stored. The bulk of the reserves consist of starch. In animals the principal reserve is fat. In herbaceous plants the reserves are stored in the roots; in woody plants, in stems and twigs as well as the roots. Enough reserves are stored to keep the plant alive for several years-- in many plants up to 5 to 10 years or longer.

Close use of the crown of the plant during the green period year after year prevents the plant from making and storing adequate food materials. As reserves are gradually depleted by respiration, ^{and growth} the plant gets weaker and smaller and finally dies.

Grazing is more critical at one time of the season than another. It is most damaging when the plant is about half grown. At this time food reserves are lowest. Unfortunately, this is also about the time the plant has highest nutritive value and produces greatest weight gains in livestock.

The plant completes storing food for the year several weeks after top growth is completed. In some grasses this is 6 or 7 weeks after seed ripens when the plant is about half dry. Grazing any time from the start of growth until food storage is completed--essentially the green period--interferes to some extent with food manufacture and reduces the amount of reserves.

Tests have shown that a plant can make and store adequate food reserves for normal growth even though some of the crown is removed. An attempt has been made to capitalize on this fact in management of grazing. It has been hoped that by stocking the range at a suitable level, proper degree of use could be made of the plants. This has not been possible because of the grazing habits of livestock.

Livestock graze the range selectively. They concentrate on the more palatable plants and preferred grazing areas and invariably graze some plants closely, if not completely, under any stocking rate. The same plants tend to be grazed closely year after year because of the habits of the animals. Plant vigor is decreased and seed production prevented. Thus, under continuous grazing the best forage plants on the best grazing sites are ultimately destroyed at any stocking level. Then less desirable plants take over.

The only way desirable forage plants can be maintained and increased is to interrupt this cycle of continuous grazing. This means we must rest the range from use periodically. In this way all plants have opportunity to (1) make and store food--that is, recover vigor and capacity for maximum growth, (2) produce seed for reproduction, and (3) establish reproduction. Grazing management that provides adequately for plant growth requirements is called rest-rotation grazing.

The amount and timing of rest is dictated by the kinds of plants on the range and the objectives of management. A grazing formula incorporating the right amount of rest has to be worked out for each range, for no two ranges are alike.

To apply rest-rotation grazing management, the range has to be divided into pastures--usually from 3 to 6. In some cases, more pastures may be needed, depending on the kind of vegetation and objectives of management. One or more of the pastures is rested and the remainder grazed in a given year. Different pastures are grazed and rested each year, hence rotation is involved. The grazing capacity of the range is determined by the yield of forage in the pastures opened for use during the year. Under this type of grazing management, the range can be used almost any time that best meets the needs of the producer.

Clearly, the only way maximum sustained production and use of forage can be realized on rangelands is through a form of rest-rotation grazing. Periodic resting of the range from use is vital for continued growth and reproduction of high-quality forage.