

## **NUTRITIONAL VALUE OF RANGE FORAGE FOR LIVESTOCK**

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Grazing is the base of the nutritional program for range cow outfits. On some ranches, range forage is the only feed source cattle have except for salt and water. During periods of initial plant growth in the spring and summer all forage species are high in nutrient content although moisture content may also be high and limit dry matter intake. However, as plant growth stages advance, the nutritional differences among forages becomes more evident, especially during the fall and winter periods.

The nutrient value of range forages is best tested by their ability to provide for the nutritional requirements of the grazing animal during the various seasons of production. Plant nutritional values should be compared with the corresponding animal requirements during the year.

The nutrient evaluation of range forage can be based on how much protein, phosphorus and energy the plants contain. These, along with carotene (vitamin A) are the four principle nutrients that may be limiting on rangelands. These can best be discussed by dividing the plants into three common forage classes, grasses, forbs (broad-leaved, herbaceous plants, often called weeds), and shrubs.

Protein is calculated from the amount of nitrogen contained in plants. Grasses decline in digestible protein rapidly as

they mature. Nitrogen is moved by the grass plant from above-ground parts available to the grazing animal to storage organs below the ground as the current years grass growth matures. Shrubs, on the other hand, are good sources of protein even after they reach full maturity because nutrients remain in branches and leaves as well as below ground. Forbs, in general, are intermediate between shrubs and grasses with respect to protein content during most seasons.

Phosphorus, a macro-mineral, is often limiting in range forage plants. Grasses are low in phosphorus soon after they form seed. Shrubs are generally considered good sources of phosphorus for general animal maintenance and gestation, even when mature. Most forbs have a phosphorus content only slightly lower than that of shrubs. Phosphorus content of plants can fluctuate depending on the soil status. Soils high in phosphorus will allow plants to contain more phosphorus than where soils are limiting in phosphorus content.

Energy values of forage are commonly reported as Total Digestible Nutrients (TDN) or Digestible Energy (DE). Grasses are generally considered good sources of energy primarily because of their high content of cellulose. In very rank grasses however, digestibility will be so low as to reduce intake and thereby reduce total energy intake. Digestibility is the proportion of a dietary nutrient available for animal metabolism and indirectly tells us something about intake (as digestibility goes down, intake may go down). Shrubs are not considered good sources of energy after they reach fruit development. Again, forbs are intermediate between grasses and shrubs in furnishing energy. In my opinion, energy is more frequently a limiting factor to livestock production on

rangelands than is crude protein. The single biggest problem however, especially when forage plants are mature, is getting enough total nutrients into the animal each day.

Other factors may also affect the nutritive value of range plants. Range condition, for example, may alter total forage intake of grazing cattle. Research shows that protein and phosphorus are about the same in plants growing on good versus poor condition range. However, plant species on poor condition range may be less digestible than plant species on good condition range which can reduce total forage intake by livestock. The animals either can't or won't eat enough. An appropriate mix of grasses, shrubs, and forbs, is necessary to provide nutritious forage to livestock on a year-long basis.

Management factors such as stocking rate and specialized grazing systems can also influence grazing animal nutrition. Heavy stocking reduces individual animal performance and can result in damage to the forage resource. Although the influence of animal numbers can be altered by controlling the time the plants are exposed to grazing and allowing for adequate recovery periods, proper stocking rates are essential to long-term range livestock production levels.

Grazing systems may reduce or improve forage nutritive value. Although forage

reserves are a necessary part of ranch planning, and some amount of plant material should be left for resource protection, if pastures are allowed to accumulate a lot of old plant growth animal production may suffer. This can be offset by adjustments in stocking rates or changes in range condition. Carefully planned grazing can help increase diet quality. In grazing cells for example, the longer animals stay in a particular paddock the further diet quality is reduced. If grazing periods are shortened, be sure to consider the implications of the subsequently shorter rest periods.

Supplementation will probably be necessary to achieve high levels of livestock performance from rangelands although economic analysis should consider the bottom line before any decision on supplementing cattle diets is made. Even though total production may be reduced, profits may be maximized at lower input and offtake levels. When determining whether or not to supplement, cow as well as forage conditions should be considered, but remember, it is the nutrients provided by the range forage that are supplemented. Over-supplementation, especially of protein, or supplementing too late in the season to improve production are not uncommon practices.

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