

Keys to Successful Pasture Management

T.C. Griggs

Dept. of Plants, Soils, & Biometeorology

1. What do you expect from a pasture system? Common expectations are provision of economical and high-quality livestock feed and livestock products; cover for soil stabilization, control of surface runoff, improved water infiltration, and weed competition; nutrient recycling; clean footing and resting areas for livestock; wildlife habitat; and esthetic values. If livestock performance or carrying capacity are a priority, what levels of daily forage growth, consumption, and animal performance are you planning on?

2. Identify existing limitations and constraints. Environmental factors like soil structure, slope, salinity and alkalinity; limited or poor-quality irrigation water; harsh winters; and other site conditions may limit species choices. Do you already have forage resources that you are trying to match a livestock enterprise to, have a livestock enterprise you are trying to find suitable forage species for, or do you have the flexibility of designing an integrated pasture-livestock system from scratch?

3. Use adapted grasses and legumes (including non-bloating). Sod-formers offer more soil coverage while bunch grasses often compete less aggressively with legumes in mixtures. Species vary in their tolerance of defoliation timing and severity, partly because of differences in basal leaf area and locations of growing points and stored reserves for regrowth. Species that are more grazing-sensitive include timothy, smooth brome grass, intermediate wheatgrass, and alfalfa. Species that are more grazing-tolerant include orchardgrass, tall fescue, meadow brome grass, Kentucky bluegrass, crested wheatgrass, and white clover. Species also vary in their seasonal growth patterns. Those with limited summer regrowth include smooth brome grass and timothy, while those with more uniform seasonal growth distribution include orchardgrass, tall fescue, meadow brome grass, and alfalfa. Most cool-season grasses do not grow well during the hottest parts of summer due to heat stress, in spite of irrigation and fertilization. Tall fescue and alfalfa maintain productivity during high temperatures to a greater extent than most other species.

4. Meet plant requirements in order to accomplish pasture objectives. Requirements include nutrients, water, timing of defoliation, amount of residual leaf area or stubble following grazing, and length of recovery before a plant is regrazed. Many pasture plants lose productivity and stand density under continuous stocking, even at moderate stocking rates. Rotational stocking, the successive movement of livestock through pasture subdivisions, allows plants to recover leaf area, root length, and energy reserves before the next defoliation. Rotational stocking also provides higher livestock carrying capacity than continuous stocking. General guidelines are to initiate grazing when plants are 6-10 inches tall, limit grazing in a subdivision to no more than 7 days, remove grazing animals when stubble is 3-4 inches tall, and allow at least 14-28 days of regrowth before regrazing. These guidelines are easier to implement if pastures have at least five subdivisions. If spring growth rate exceeds forage consumption, part of a pasture can be reserved for mechanical forage harvesting, then brought back into the grazing rotation when pasture growth is slower. Balance can also be achieved by adjusting animal numbers.

Pasture plants obtain energy for initial regrowth from residual live green leaves in the grazed stubble or from stored sugars in above-ground stem bases (grasses) or taproots (alfalfa). Residual stubble heights should be maintained, rather than grazed down, during winter for plant winter survival and more rapid spring regrowth. If plants have been grazed too closely (below 2-3 inches) or often, there may not be enough green leaf area to capture sunlight energy to support regrowth, and plant energy reserves can become depleted. As a result, plant productivity and stand density decline. Plant species vary in amounts of green leaves remaining below grazing height (Fig. 1). In species with fewer residual green leaves near ground level, taller stubble heights (at least 3-4 inches) should be left following grazing, particularly in fall so that plants have adequate winter reserves. High residual levels also facilitate high animal intakes.

Pasture plants that are grazed too closely or often will have shallower, sparser root systems than plants that are properly grazed (Fig. 2). Roots of overgrazed plants do not capture nutrients and water as effectively or from as deeply as properly-grazed plants. These shallower root systems must be irrigated more frequently, and irrigation water, as well as nitrogen and sulfur, are more likely to be wasted by moving beyond the root zone. Before investing in pasture renovation or reseeding, implement plans to meet plant requirements and change management as necessary to improve pasture performance.

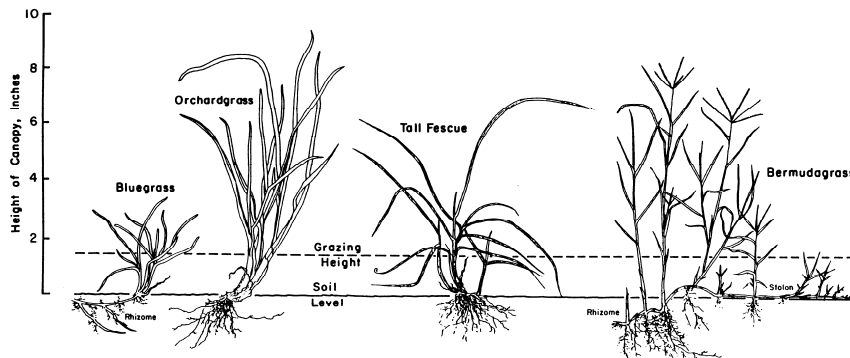


Figure 1. Differences in live green leaves remaining in stubble for capture of sunlight energy following grazing at approximately 2 inches.

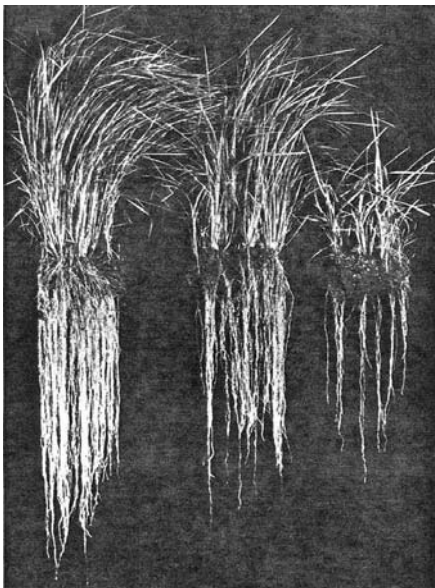


Figure 2. Roots mirror shoots. Root density and depth decline as shoots are grazed more frequently and severely. Plants with shorter, sparser root systems regrow more slowly and must be irrigated more often. Plants with limited root systems are not as well buffered against drought conditions as those with more extensive roots.

5. Stock pastures according to seasonal forage production patterns and livestock requirements.

Pastures typically grow more rapidly, and can be stocked more heavily, in spring than in summer. As pasture growth rates change, stocking density should be adjusted to match forage supply. If livestock require only maintenance intake, daily pasture access may need to be limited to prevent excessive consumption. Overstocking leads to declining pasture productivity and stand density, weed encroachment, environmental degradation, and greater likelihood of weed consumption. If a pasture is not large enough to support a given number of livestock, limit access to maintain leaf area, plant productivity, stand density, and competitiveness with weeds. Pastures that have been overstocked can regain productivity if density of desirable plants is still adequate and plants are permitted to recover leaf and root area.

6. Also see a) Comparative Characteristics of Forage Species in Montana:

<http://animalrangeextension.montana.edu/Forage/forage.htm>

b) Plant Guides & Fact Sheets in USDA NRCS National PLANTS database:

<http://plants.usda.gov/index.html>