

PASTURE MANAGEMENT: UNDERSTANDING PLANT AND ROOT GROWTH IN THE FALL

*By Gene Pirelli, Extension Animal Scientist, Oregon State
University*

*Steve Fransen, Extension Forage Agronomist, Washington
State University*

Forage is a vital resource for a livestock operation. It is a cheap source of feed for grazing animals and the best way to stay economically viable. The basis of any successful livestock grazing system is learning to manage the forage or pasture within environmental limitations, grower skills and knowledge. Selecting pasture species that are best adapted to your microclimate, and learning to manage growth habits of those crops, is critical to successful pasture sustainability

A sustainable and long-lived pasture is dependent upon proper management of grazing animals and attention to soil fertility needs. This is a year round effort for successful grazing managers. There are many critical periods during the year that affect the amount of forage that is produced on a pasture. One of the most critical periods for western Oregon pastures, eastside irrigated pastures, and hay meadows is autumn. Management decisions made at this time affect the ability of the plants to overwinter, they determine when new growth is initiated in the spring, and how much total forage growth will be produced over the entire season. Overgrazing or excessive forage harvesting in the fall inhibits root system rebuilding and the formation of shoots for spring growth.

Why is fall one of the most critical period of the forage cycle? The answer is that two major plant activities occur during fall growth. One is root regeneration and the other is the formation of the shoots or growing points. Allowing the plants to store carbohydrates in the fall is essential for long-term forage production. The lower stems (or crown) rather than the roots are the major storage unit of complex carbohydrates in perennial grasses. The new root system will take up water from the soil plus important nutrients that nurture those new growing points. Both plant systems must work together to sustain pasture growth in the next grazing season.

To support a high level of forage production, the root system is vital. Just as the parts of the grass plants that we see above ground have a growth cycle, so do the roots. This is also a time when plant root systems are rebuilding from summer shedding. The actual time of new root growth varies depending upon the amount of moisture either by irrigation or rainfall, shortening day-lengths, and the residual stubble height.

You can determine if your pasture plants are undergoing root rebuilding by looking for new white roots developing from the crown tissue in the fall. New roots will be variable in length but easily seen if dug out of the ground with a shovel and washed free of soil with water.

Growing points are developing in the fall to provide next spring's forage growth. These young grass shoots, or tillers, are much like babies. Both need a steady supply of nutrients and protection from stress. In the fall, nutrients are supplied from the previous season's tillers, which have stored carbohydrates in the bottom 3-4 inches of the plant. Often these older tillers are dormant and brown at this time of year, but they aren't dead, and their storage function is critical. These older tillers also provide physical protection to the new tillers.

If pastures are grazed or mowed lower than a 3-4 inch stubble height in the fall, these reserves are reduced, and the new tillers are starved, as well as being exposed to weather extremes. Usually root formation will slow or stop, and in the following spring these tillers will grow slower and have fewer roots to support themselves.

Grass plants can be grazed down to a minimum height as shown in Table 1, but not grazed below that height. These recommended minimum stubble heights allow the plants the ability to store carbohydrates for vigorous re-growth in the fall. Grazing below this height will decrease your fall feed and subsequent spring growth.

Table 1. Recommended residual heights for some grasses during dormant periods

<u>Grass</u>	<u>Minimum Stubble height</u>
Orchard Grass	3-4 inches



Smooth Brome	3-4 inches
Meadow Brome	3-4 inches
Tall Fescue	3-4 inches
Bluegrass	3-4 inches
Perennial Ryegrass	2 inches
Timothy	4-6 inches

Fall is a great time to take soil samples to test the fertility of the pasture soil. Soil tests should be taken during the same month each year for consistency. Early fall is also a good time to apply nutrients based on your soil test. Oregon State University Extension Fertilizer Guides can help you decide the type and proper amount of nutrients. Manure or other sources of nitrogen can be applied based on plant nutrient needs, but just make sure that you do not apply too much nitrogen. Vigorously growing plants, resulting from high nitrogen applications late in the fall, are more susceptible to winter damage because the growth retards winter dormancy. An excessive nitrogen application will inhibit the plant from starting into its over-wintering response. High nitrogen tends to reduce sugar concentrations so the plant tries to refill its depleted stubble sugar bank account. If plants are not allowed to rest and prepare for winter, they are very susceptible to winter injury or death from the first major cold winter event. As temperatures change in the fall, plants protect themselves by producing a type of "antifreeze" called "Proline". This "antifreeze" will accumulate in every living plant cell during the winter period only if excessive nitrogen is not available.

Eastern and western Oregon grass hay growers should follow the same recommendations as folks with pastures. Many grass hay growers with cattle like to move the animals onto the hay field after the last cutting has been removed. This long held practice may do more damage than you realize. The remaining hay stubble is high in storage sugars, just like in the pasture. Livestock tend to readily eat this plant portion because it tastes good. Without adequate storage of basal sugars prior to winter, those plants will have a distinct disadvantage in the spring. If you must graze hay fields in the fall, make sure you've given the field adequate time for regrowth to occur and to follow the same guidelines of stubble height minimums as for pastures.

For long-term survival of pastures and hayfields, remember to keep an eye on stubble heights and don't graze below them. Allow roots to rebuild and shoots to develop by not grazing hard in the fall. Make plans to get on a soil testing schedule, which is usually a test every three to five years. Use that information to make the most economical fertilizer applications. By following some of these management tips, your pasture should be productive for many years.