# Pasture Management in Western Oregon

Grazed forage from pastures is the basis of most livestock operations and results in efficient use of land resources. Forage is the basic product available for market, and the best way to do that is with livestock. Even so, pasture management often is relegated to low priority.

Western Oregon weather imposes variations and limitations in pasture management. On the average, fall rains break the summer dry period by early October. Forage growth is relatively slow and is limited by cool temperatures from that time through the winter. Sometime from mid-March to mid-April, depending on the location and the year, temperatures warm enough for plant growth to improve. In the 6-week period from late April to early June, more than half of the year's total production takes place on nonirrigated pastures. Then a dry period of about 3 months challenges the operator to find enough high quality feed.

This kind of weather pattern, with certain geographical exceptions, provides an exceptionally good environment for forage plant growth when compared to many other parts of the United States. What does one need to know in order to establish and maintain a productive pasture in this kind of environment? What are the requirements for productive plant growth? How can grazing animals best be managed so that both high plant and animal productivity occur? These and other management questions are answered here.

## Basic Principles

Grazing animals should be provided with forage plants they prefer to eat. Improved pastures will help make this possible. This is *fitting the resources to the animal.* In this case, we plant the desired species, apply appropriate kinds and amounts of fertilizers, irrigate if that is possible or practicable, and perhaps even mow or spray for weed control.

Conversely, when pastures have not been or cannot be planted with improved species, the effort must be to *fit the animals to the resources.* In such situations try to match the number of animals to the most opportune grazing time for the major forage species. Pasture fertilization, irrigation, and weed control generally are not part of the management program. Proper forage utilization becomes the key to successful management.

The land resources at your disposal and the intensity of management that you wish to give have a great bearing on overall productivity. For example, if a properly seeded and fertilized pasture is not given adequate grazing management, the potential for production will not be achieved. Likewise, well managed grazing of a seeded pasture, without correct fertilization and irrigation, will not result in the highest level of animal production.

### Plant growth processes

Each plant species undergoes a sequence of development from starting growth in the fall until completing it the following summer. All plants require water, nutrients, and optimum temperatures for best growth. These requirements vary somewhat from species to species. Fortunately, effective management schemes can be developed for many different pasture mixtures. Perennial species such as tall fesuce and perennial ryegrass are dormant after they mature. But annuals, such as subterranean clover, die after maturity. Annual plants survive by producing seed. Therefore, you should provide for seed production in order to perpetuate annuals. Perennials live from year to year because their roots and crowns stay alive over the summer dry period. The vigor of some perennials may be impaired, however, if the opportunity to restore root reserves is not provided.

Perennial grasses and legumes store carbohydrates in their roots and crowns and draw on that stored energy to make new growth. Each fall some of this stored energy is drawn for new leaf growth. There is a time in the growth cycle of perennial plants when the plant makes more energy than it uses. During this time the surplus energy accumulates in the roots and crowns. The process is at its peak at the time of flowering and is complete by the time seed has been formed.

Grazing at the wrong time, especially if too severe and too long, can damage the plant by not allowing it to restore energy

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reserves. If this practice is continued, the plant declines in vigor. This permits other, less palatable plants to increase and compete with the desired species.

Annual plants such as subclover develop a completely new root system every year. After germination, allow this root system to develop. But, once the annual has developed a root system, the tops can be grazed. It then is important to tailor the amount of grazing to the amount of top growth, since if all top growth were continuously removed, the plant would be greatly weakened. Relax the grazing pressure periodically to allow pasture plants to recover.

Many plants, whether perennial or annual, have an ability to tiller or "stool out." This is the plant's productioin of additional, new basal stems. Some plants tend to grow in a more prostrate form than others, and early grazing tends to stimulate this desirable habit of growth. As long as grazing pressure is not too heavy and openings are not made in the plant cover, damage will not result.

### Grazing management

Forage is often wasted through inadequate control of animals. The most common sign of wasted forage is patch grazing —a few areas overused while most of the pasture remains underused. Animals will graze regrowth repeatedly in small areas and allow other plants to reach maturity. This is because the regrowth is of younger, more succulent, and probably more nutritious plant tissue. Often more than 1 year's growth may accumulate, resulting in low quality forage. This can happen, and often does happen, even when only a single species is used in a pasture. Inefficient utilization can be avoided by matching the grazing pressure to the forage supply.

Efficient utilization can be accomplished by subdividing pastures, with fences, into several units and moving stock in accordance to a plan based on the kinds of pasture species. Close control of grazing livestock is the key to correct and proper utilization. Often, so much growth occurs during April, May, and June that it is desirable to make some of it into hay.

Pastures deteriorate for a number of reasons. Most often, part of the cause is improper grazing control. Underutilization by grazing animals can account for a decline in productivity. Do not allow the plant cover to open up, since this permits weed invasion and rodent infestation.

Sheep prefer fine, succulent forage, and generally concentrate on broadleaf plants, especially legumes. Mature cattle eat upright, coarse species better than do sheep. Young animals, whether calves or lambs, prefer young, green plants, and do not grow well when they are confined to more mature plants, even of the generally palatable species. Grazing animals will prefer regrowth of a plant to the same plant that has not been grazed previously.

Young plants contain higher levels of protein, phosphorus, and readily digestible carbohydrates than do older plants. Very immature plants during fall, winter, and early spring may contain so much moisture that high producing animals cannot obtain enough dry matter through grazing. Before the seedhead stage most grasses and legumes contain balanced amounts of protein, major mineral elements, and energy so that grazing animals seldom need a supplement other than trace mineralized salt. Immature stages of plants, however, can contain the highest levels of molybdenum, wide copper-molybdenum ratios, low selenium, and low calcium and magnesium, which could result in less than optimum animal nutrition. Consequently, you should monitor the condition of the animal regardless of stage of plant growth.

## Improved Pastures

Planting improved species (fitting resources to the animal) will result in greater forage production and forage more tolerant to grazing pressure than leaving a pasture in native species. In western Oregon more than 6,000 pounds of dry forage per acre is possible on dryland by seeding and good management. More than 300 pounds of lamb gain or 600 pounds of yearling steer gain per acre have been achieved in research studies. Proper management practices will provide these levels of productivity.

When you have made the decision to invest in the development and long term maintenance of seeded pastures, intensive management will be necessary in order to realize the greatest return for the investment of money, time, and effort. Thus, you should make the commitment to a high level of management at the time the project is started. An example of this is the difference between a pasture mixture of perennial ryegrass and subterranean clover and that of tall fescue and subclover. The former needs a higher level of management—fertilization and grazing control. Tall fescue will survive and persist if improperly managed, but, the clover will go out of the stand and the forage will be much less palatable and less digestible. Perennial ryegrass needs more nitrogen than tall fescue, preferably provided from associated legumes.

Irrigated pastures will be composed of different species than dryland pastures. Levels of production in irrigated pastures can be quite high (12,000 pounds dry matter per acre), which makes attention to grazing control extremely important. Whereas production from dryland pastures can be 6 to 8 animal-unit-months per acre, that from irrigated pastures is often 12 to 14 or more.

### Plant species selection

Only two considerations need be made regarding plant species selection: (1) What is the site adaptability, that is, will the plants grow and reproduce? and (2) What are the uses to be made of the forage? Answers to the first question will limit answers to the second.

The annual legume, subclover, often is planted on nonirrigated soils. With it, perennial ryegrass, tall fescue, and/or orchardgrass may be planted. All these species grow during winter, but make greatest growth in spring from March to June. More than half of the annual growth occurs from late April through May, which makes proper utilization with livestock difficult. Excess forage during this period is generally harvested for hay or silage and stored for winter feed. For irrigated pasture, white clover will replace subclover. It can be used on the more damp dryland areas. White clover is a perennial, spreading by runners and seed. Both subclover and white clover tolerate grazing well.

### Establishment

Thousands of acres of trees and brush have been cleared by bulldozing and improved pastures established without preparing complete seedbeds on lands freshly cleared. The soil surface often is both firm enough and smooth enough for successful establishment. Most operators, however, will be either replanting pastures or converting land from a crop to a pasture.

A fine, firm, weed-free seedbed is necessary. A rule of thumb is that your heel should not sink in more than ½ inch when you walk across a field ready for planting. Visualize planting your pasture as you would a garden or a new lawn. Once the seed is planted, it is too late to do much else to help it along. As a general rule, cultivation more than 6 inches deep is not necessary. Except for annual clovers, perennial species with relatively deep root systems, capable of penetrating uncultivated soil, are usually planted. Control of weed competition is important. Whenever practical, summer fallowing before planting the pasture will help greatly, since the purpose

is to stimulate germination of weeds and then cultivate them out. Often, planting a highly competitive interim crop will help suppress weeds. And, the interim crop will provide some needed livestock feed, too. Herbicides may help under special weed conditions, but usually are not necessary.

Test soil from the upper 4 to 6 inches well ahead of planting time so appropriate fertilizers and/or soil amendments can be added. Lime is often needed to counteract soil acidity. Work it into the upper 2 inches during seedbed preparation. Do not plow it under, since this will remove it from the seedling rooting zone. Incorporate fertilizers such as phosphorus, sulfur, and potassium into the seedbed. If a seeding drill with a fertilizer feeding mechanism is available, fertilizers can be banded during the drilling operation. Do not band boron, however, as high concentrations are toxic to seedling development. Where irrigation water can be applied following planting, light rates of nitrogen (approximately 35 pounds per acre) will be beneficial in getting grass off to a good start. Consult your county Extension agent for specific fertilizer recommendations.

Clean seed is a must. Percent purity is noted on the seed tag. Strive to get the cleanest, highest-percent-germination seed possible. Remember that desirable plants can come only from pure, live seed of the species and variety that you want. To ensure varietal purity, purchase certified seed whenever possible. Although seed prices may appear expensive, the seed cost per acre is relatively minor compared to cultural and fertilization costs.

Seeding conditions and seeding rates are both important. A good rule of thumb is to plant just deep enough so all seeds are covered. Soil should be firm both beneath the seed and above it. Only when soil is in close contact with seed will it have the opportunity to germinate rapidly and evenly. When soil is firm around seed, capillary action will allow existing soil moisture its maximum chance to provide germination conditions. And, when moisture does come, it will be more effective when seed is in close contact with soil.

Increase the rate of seeding if seedbed conditions are less than optimum. For example, when seed cannot be drilled precisely and must be planted either with poor equipment or broadcast and then covered, increase the seeding rate by 50 percent above that recommended for optimum planting conditions. Or, when severe soil conditions exist, such as occur with heavy clays or light sands, you should increase the seeding rate. When a dense stand is desired quickly, more seed is necessary. For most pasture species, however, there will be five or more seeds per square foot planted if only 1 pound were planted per acre. Subclover is an exception; it would have only 1.7 seeds per square foot if 1 pound per acre were planted. Consult a local Extension agent for recommended seeding rates.

Time of seeding is important. Plant dryland pastures in September, before fall rains, or just as soon as possible after fall rains. The objective is to obtain early germination of grasses and legumes so they will become as large as possible before cold winter weather. Where irrigation is possible, spring planting usually is preferable, although timing is less critical with irrigation.

Inoculate legume seeds with an approved inoculant before seeding. This is cheap insurance. Be sure the inoculant you buy is not outdated and that it has been kept cool in storage. Host-specific *Rhizobia*, applied to the seed, invade the small new root and cause the plant to form nodules. These bacteria have the ability to make the nitrogen in the air available for plant use. As the roots die, the nitrogen within the soil system becomes available to all plants. If legumes do not become well nodulated, their productivity is sharply reduced; quite often they do not establish if not nodulated. Even in soils that have adequate supplies of the right bacteria, legumes should be inoculated with the proper bacteria.

**Fertilization**

Add fertilizers, except nitrogen, in September, before fall rains occur. Needs on dryland grass-clover pastures are primarily for phosphorus and sulfur. Oregon State University Fertilizer Guides FG 1, 4, 58, and 68 will be helpful. Obtain and pay particular attention to the phosphorus, sulfur, and molybdenum recommendations. Extra winter grass growth can be stimulated with fall applied nitrogen but this is not a general practice. Nitrogen at rates of 30 to 40 pounds per acre, applied in March, will stimulate earlier spring grass growth when a vigorous clover stand is not present. However, reliance on nitrogen can stimulate grass to the detriment of clover. This is generally considered undesirable. As stated, maintenance of a dense clover stand should contribute to good soil nitrogen status. Where pastures are irrigated, applying nitrogen fertilizer several times during the growing season before irrigations is preferable to one large application. This will result in more uniform forage production rather than one large flush of growth with a tailing-off effect.

**Grazing management**

Proper grazing will have more to do with maintaining high production than any other single factor. The kind of animal used will have a large bearing on how well the total forage productivity can be utilized. Recognizing that more than half of the growth occurs in late spring and that summers are dry, with resulting low forage quality, the opportunity exists to tailor a fit between animal and forage.

First, some hay is generally necessary and desirable for winter feeding, regardless of the kind of animal you have. Hay can be cut from pastures in late May to early June; the earlier the cut, the better the nutritive quality will be. Pastures to be reserved for hay can be grazed to about mid-April. Grazing ewes is preferable to grazing cattle when soils are wet. Weaned calves are better than cows, since calves have less potential for damaging the soil's productivity by compacting wet soils. Moderate winter grazing seems not to delay spring growth, but close winter grazing does. If an abundance of early spring forage is desired, some reduction of winter use through hay feeding will be necessary.

Try to match animal requirements and seasonal forage supplies. For cattle the best fit is with yearlings, which should go on pasture in April and come off in early July. Next are cows with fall-born calves. Wean the calves when forage dries up. The poorest fit generally is with cows with spring-born calves. Calves are just starting to grow when forage dries, so the cow's milk flow slows and the calf's growth rate is far from optimum. Some better source of summer forage, such as irrigated pasture or summer annuals, is necessary.

Ewes with January-February born lambs, especially with a high percent of twins, are well matched to the forage production pattern. Lambs can be weaned when forage dries. Ewes do well on dry summer feed. Some extra management may be desirable during breeding in early fall, since pastures normally will not yet have started their new growth.

The most difficult thing about grazing management of improved pastures is to graze them uniformly. The problem usually develops when pastures are too large. This problem is relatively easy to solve through fencing. If properly stocked, rotation of livestock from unit to unit during the spring flush will result in more overall production than set stocking, according to research studies. This is primarily because the level of use can be controlled; whereas, if continuously grazed, either underuse or overuse generally occurs.

During summer, when forage is dry, management to maintain animal performance is probably more critical than management for the plants—with one important exception. A subclover-grass pasture *must* be grazed closely enough by the onset of fall rains so that the small, emerging clover plants will have good light and not be shaded by old litter. So,

whether the pasture is rotationally used or set stocked in summer depends on the animal performance desired. Dry ewes and dry cows can be rotationally grazed to clean up the excess growth. Yearlings would already have been sold. Spring-calved cows should not be stocked heavily, or calf performance will suffer. This class of cattle is not well suited to dryland improved pasture alone.

## Irrigated Pastures

Irrigation schedules should be set in relation to the species demand and the infiltration capability of the soil. For best pasture management, do not allow plant roots to dry. This means frequent, light irrigation, especially for clover-grass pastures. If a deep rooted plant such as alfalfa is the legume, heavy, infrequent watering is better. To reduce soil compaction, avoid irrigation when stock are on the pasture. However, sprinkling on light-textured soil while grazing is acceptable.

Keep vegetation at a height for optimum regrowth. To accomplish this, tight rotation grazing is a must. When growth gets ahead of the stock, either mow it or let a unit go and make hay. The important thing is—do not let forage plants become too tall. All plants attempt to reproduce, and irrigated plants have a better opportunity to do so than those under dryland conditions. Since mature plants are less palatable and nutritious, try to graze uniformly by moving stock from pasture to pasture.

The number of moves depends on the number of pastures. At least four are necessary and more are desirable. During the fast-growth period, the time between grazings will be shorter than at other times. Many irrigated pastures are grazezd 5 to 7 days and rested 14 to 21 days. This can be accomplished with four units.

Whether irrigated or dryland, well managed pastures contribute greatly to the health and productivity of your animals. Hungry livestock do not perform well. Watch both the condition of the pasture and that of the animal. Do not rely on the condition of the animal to control pasture rotation. Some of the time this will work successfully. Most of the time it will not. Therefore, closely watch the condition of the forage species and *move livestock in accordance to plant needs*. There will be a lag between the time stock should be moved to another pasture and the time their condition will show it. Animal condition is not difficult to recover when abundant nutritious forage is present. But forage plants, once depleted of energy, need time to recover. Consequently, moving stock too often or too soon will result in less total forage utilization. This is preferable to overgrazing.

## Unimproved Pastures

Most livestock operators desire a highly productive seeded pasture rather than an unimproved native or weedy one. A large acreage of unimproved pasture still exists in Oregon, however, and can provide valuable forage for livestock if properly managed.

Western Oregon unimproved pastures contain relatively few desirable native perennial forage plants. Often, the bulk of the forage will be resident annuals such as soft chess, ripgut brome, annual dogtail, and rattail fescue. In some cases, weedy perennial grasses such as bentgrass, velvetgrass, or sweet vernal grass predominate. Forage production from unimproved pastures normally will be much less than from seeded and fertilized pastures. Also, much less management flexibility will exist.

Plants in unimproved pastures do not make much winter growth so they should not be grazed until weather warms considerably. In this environment, where precipitation is 20 to 50 inches, winter moisture is seldom a limiting factor. In fact, soils usually will be too wet for safe cattle grazing from December through March. Sheep do not cause as much winter damage to the plant cover as cattle.

If annual grasses make up a significant part of the forage supply, grazing fairly heavily in April and May will be necessary for most efficient utilization. After annual grasses dry up they are not only less preferred but are much less nutritious. Grazing annuals heavily is acceptable as long as the soil surface is not bare.

Pastures that contain perennials should be grazed in relation to the stage of maturity of the most important species. Plants such as bentgrass are late maturing, whereas those such as velvetgrass, are early maturing. If you wanted to increase velvetgrass, for example, late grazing would be more beneficial than earlier use. Division of pastures into smaller units will permit management for more uniform forage utilization, as compared to one large unit. This will be so whether animals are grazed rotationally or set-stocked. Consider improving pastures by seeding to more productive species when more forage is a primary objective.

## Summary

Extension agents in each county will be able to give specific answers to your improvement and management questions. The general recommendations listed here should satisfy most of the pressing needs.

1. If possible, rework older pastures and introduce improved species such as subclover, perennial ryegrass, tall fescue and/or orchardgrass to increase forage production.

2. Simple mixtures of one grass and one legume usually are easier to manage than those containing more species. For example, a mixture of clover, tall fescue, and orchardgrass often will revert to fescue and clover because the orchardgrass will be preferred by the animals over fescue, and over time will not be able to compete successfully.

3. Cattle do well on more coarse, upright species than do sheep. Consider a mixture of tall fescue and subclover. Be patient while the fescue is becoming established, as it will take longer to establish than perennial ryegrass.

4. For sheep, a mixture of perennial ryegrass-subclover will not only provide high production, but sheep will be able to utilize them effectively. Orchardgrass can be used in sheep pasture. Tall fescue generally is not preferred by sheep.

5. Seed only into firm seedbeds and be certain soils have been tested and fertilized accordingly. Plant dryland pasture species before or just after first fall rains.

6. For high production in irrigated pasture, use a perennial legume such as white clover with a high producing perennial grass, tall fescue, or orchardgrass. Timing the planting is not so critical when irrigation is available to promote establishment.

7. High production requires adequate levels of available plant nutrients, especially phosphorus and sulfur for clovers. Apply P and S fertilizers in the fall before soils become damp. After several years of annual applications of P and S, levels should increase so that alternate year or even less frequent applications may be sufficient. Test soils annually fo'lowing the growing season and fertilize according to OSU fertilizer guides.

8. Have individual pastures small enough so close grazing control can be practical. Cut excess spring growth for hay rather than undergrazing.

9. Judicious management of grazing during winter should not damage overall production. When soils are wet, grazing can harm pasture stands by compaction. This is especially true when grazing cattle. Maintaining healthy, vigorous plants is the key to high forage production.

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