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Managing Virginia's Steep Pastures

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Virginia has about 1.5 million acres of steep pastures (figure 1). Simply turning livestock onto these pastures to graze requires little management. However, **managing** these pastures to provide year-round grazing in the quantity and quality needed requires sound planning, excellent judgment, and an understanding of how to balance the plant-animal relationship so that both will benefit.

Figure 1. Cattle and sheep grazing on typical steep pasture in Virginia. Photo provided by Eric Bowen, Virginia Cooperative Extension.

In managing steep pastures, a distinction should be made between soils capable of growing high-quality, productive pastures, and shallow, rocky areas that support primarily weeds and turn brown during even mild droughts. Those pastures on productive soils should be given the highest priority for management inputs such as fertilizer, fencing, and water-source development.

Fit Pasture Into 12-Month Forage Plan

A well-planned **forage system** makes use of pasture, hay, and silage crops to provide an adequate and reliable supply of forage for livestock throughout the year. Such a forage plan must be based on the requirements of the animals and must be fitted to the topography, soils, and other characteristics of the farm. Availability of labor, capital, and harvesting, storage, and feeding equipment also influence the system utilized.

Well-managed pastures can provide grazing year-round. To obtain this much grazing without overgrazing, it may be necessary to supplement cool-season pastures with summer grazing crops, such as Caucasian Bluestem, Switchgrass, sorghum-sudangrass hybrids, sudangrass, and pearl millet. It is often possible to reduce grazing pressure during critical periods by changing the population and type of livestock, e.g., selling lambs or yearling calves after the spring growth of pasture is utilized. Winter annual crops such as rye, or a mixture of rye and barley, can provide additional late-fall and early-spring grazing. Stockpiled tall fescue can provide grazing through the winter months.

In selecting grasses and legumes, consider how each pasture fits with other forages on the farm, the grazing management it will receive, and the suitability of the soil for the species in the stand. Fortunately, most forage mixtures adapted to Virginia conditions lend themselves to more than one use. For example, alfalfa-orchardgrass is primarily a hay or silage mixture, but it also makes excellent pasture. Harvesting surplus spring pasture for silage, baleage, or hay begins to build stored feed supplies early in the season when climatic conditions are best for the growth of most pasture plants.

Forage plants and mixtures differ in growth habits and in the amount of feed they produce during different seasons of the year. No forage mixture provides adequate grazing for the entire season, but by recognizing the growth habits of each forage species, mixtures can be selected to meet grazing needs and provide silage, baleage, or hay.

The summary in table 1 provides seeding rates, adaptation, and general management recommendations for forage plants suitable for pastures in Virginia, west of the Blue Ridge Mountains, and in the northern Piedmont.

Table 1. Forage Mixtures and Their Management West of the Blue Ridge Mountains and in the Northern Piedmont.

Number	Use	Mixtures and Seeding Rates in Pounds Per Acre	Soil Adaptation	Management
1	Grazed Continuously	Kentucky bluegrass 6 Orchardgrass 6 Timothy 2 White clover 2 Red clover 2	All types of well-drained to somewhat poorly drained soils. Also, areas too steep for making hay for silage.	Seed August 15 to September 15 or March 1 to April 15. If grazed continuously, pasture will be white clover-bluegrass. Productivity of the taller plants may be increased by rotational grazing.
2	Rotational grazing or hay or silage followed by rotational grazing (will become ladino clover-orchardgrass mixture).	Orchardgrass 5-8 Ladino clover 1-2 Red clover 2-3**	All types of well-drained to somewhat poorly drained fertile and limed soil.	Seed August 1 to September 15 or March 1 to April 15. Graze continuously until June, then rotate grazing. Graze to 3 inches, then let recover to 6-12 inches. The spring crop may be cut for silage or hay, then the pasture may be grtazed rotationally. Red clover or alfalfa increases total yields for about 2 years.
3	Continuous grazing or rotational grazing (furnishes more summer and late grazing than mixture 1 or w).	Tall fescue 6-10 Ladino clover 1-2 Red clover 2-3	Better for excessibley well-drained (shale) and poorly drained soils than mixture 1 or 2.	Seed August 1 to September 15 or March 1 to April 15. Graze continuously until June, then rotate grazing. Graze to 1 inch to 2 inches, then let recover to 6-10 inches. Tall fescue is more tolerant of close and continuous grazing than orchardgrass.
4	Rotational or continuous grazing or rotational grazing and hay.	Annual lespedeza 10 Ladino clover 1 and Tall fescue or Orchardgrass 6-10	Suitable for all types of soils and better than above mixtures for infertile soils. Use fescue on dry (shale) or poorly drained soils and lespedeza for altitudes below 1,500 feet.	Seed lespedeza in February or early March 1 to April 15. Graze continuously until June, then rotate grazing. Graze to 1 inch to one 1/2 inch, then let recover to 6-10 inches. Tall fescue is more tolerant of close and continuous grazing than orchardgrass.
5	Silage-rotational grazing or silage-hay-rotational grazing.	Alfalfa 10-15 Orchardgrass 3-5 Ladino clover 1	Fertile, limed, and well-drained soils suitable for alfalfa.	Seed August 1 to September 15 or March 1 to April 15. Silage in spring, then rotate grazing. Cut the first cop for silage when orchardgrass heads, then let alfalfa reach 1/10 bloom before grazing or harvesting for hay. Stock small fields heavily to graze pasture down in a bout 1 week. Heavier rotational grazing as for mixture 2 will result in a loss of alfalfa stands.
6	Rotational grazing - hay	Caucasian 3-4 Bluestem or Switchgrass 3-4	Wide range - medium to high fertility; low pH	Seed June 1 - July 1. Cut for hay or graze in the boot stage. Rotationally graze 8-inch stubble for Switchgrass, 3-4 inch stubble for Caucasian Bluestem.

*Mixtures 2, 3, 4, and 5 are fertilized as tall grass-ladino pasture. Mixture 1 is fertilized as bluegrass-white clover. Rates of fertilization based on soil type and soil test are shown in table 4.
**Alfalfa may be substituted for red clover at 5-8 lbs per acre, provided soils are suitable, and the alfalfa weevil is controlled.

Liming and Fertilizing

The most common fertility problem on Virginia's mountain pastures is low P_2O_5. Although K_2O is usually not a limiting factor, it may be in some instances. Applying P_2O_5 to soils containing low levels of this nutrient, but capable of high production, encourages growth of the grass and white clover. Grass growth will be further stimulated by N fixed by the clover. Clover is also high in feed value and improves the intake and digestibility of the mixture. Calves often gain an additional 50 pounds when grazing grass-clover rather than pure grass stands.

Most mountain pastures low in P_2O_5 require an application of this nutrient at least every 3 to 4 years. An example of the yield response to fertilization of pastures on productive soil is shown in Table 2. Note that a 41% increase in forage production was obtained over a 3-year period as the result of one application of fertilizer that was primarily P_2O_5. Much of this increase was caused by increased clover in the stands.

Since very small amounts of P_2O_5 and K_2O are actually removed from the pasture by grazing animals, soil fertility levels remain relatively constant once they are built up by fertilization. This is an important consideration when evaluating the economics of pasture fertilization.

Table 2a. Yield Response of Pasture on Steeply Sloping Westmoreland Soil - Tazewell, Virginia, 1968-1970. Pounds of 12% moisture forage per acre.

Treatment	1968	1969	1970	Total
No Fertilizer	2,538	3,288	1,891	7,697
300# 0-38-18/ acre	3,480	4,848	2,549	10,877

Table 2b. Increase in Forage Yield.

Increase	1968	1969	1970	Total
Pounds (lbs)	942	1,560	658	3,180
Percentage (%)	38%	47%	35%	41%

*Fertilized March, 1968. Soil Test pH - 5.8, P_20_5-L, K_20-M.

Have the soil tested to be sure pH, P_2O_5, and K_2O are not limiting. Whenever possible, lime to maintain a soil pH of at least 6.0 except for Caucasian Bluestem and Switchgrass. Response to fertilizer will be small if the soil pH is below 5.4, so such areas should have a low priority for fertilization unless lime can also be applied. If the pH is below 5.0, do not fertilize unless lime is applied. It is especially difficult to keep clover in the stand if the soil is acidic. Fertilizer and lime can be effectively applied any time of the year, but between October 1 and April 15 is ideal. Tables 3 and 4 provide guidelines for P_2O_5 and K_2O applications based on soil test results.

Table 3. Fertilizer Rates in pounds per acre for Annual Applications on Tall-Grass/Ladino Pastures on Group II Soils.

Soil Test Class	N	P_2O_5	K_2O
L	0	110	110
M	0	80	80
H	0	0	0
VH	0	0	0

Table 4. Fertilizer Rates in pounds per acre for Application Every 3-4 Years on Bluegrass/White Clover Pastures on Group II Soils.

Soil Test Class	N	P_2O_5	K_2O
L	0	175	175
M	0	100	100
H	0	0	0
VH	0	0	0

Some steep areas have soils capable of high pasture production but are inaccessible to conventional equipment. However, many areas within steep boundaries can be reached with conventional applicators (figure 2). Such areas should be treated first since they are often the most productive soils.

Figure 2. Liming and fertilizing a steep pasture. Photo provided by Eric Bowen, Virginia Cooperative Extension.

On marginal soils, priority should be given to fertilizing slopes with a northern rather than a southern exposure. Slopes facing south green-up earlier in spring and grow longer in fall than slopes facing north. However, southern slopes are the first to turn brown during dry periods because of higher summer temperatures. Cool-season plants, such as bluegrass, cannot survive the higher temperatures and dry conditions that often accompany them.

The fertilizer dollar for pastures can generally be best spent on P_2O, K_2O, and lime. In some instances, particularly for stockpiling tall fescue for winter grazing, N fertilization is practical. In deciding how much N to apply, the decision should be governed by the percent clover in the stand, the need for early and late grazing, the stocking pressure on the pasture, and the type of livestock grazing the pasture. If the clover stand is poor and additional grazing is needed, managing the pasture temporarily as a pure grass stand is often best. Apply up to 120 pounds of N per acre each season on orchardgrass or tall fescue stands and 100 pounds of N per acre on the native grass stands. Apply half of this N in early spring and the other half in late summer or early fall. If the clover stand is strong of clover growth is to be encouraged, do not apply N.

Grazing Management

Sound grazing management increases pasture yields and prolongs the life of grasses and legumes in the stand. Well-managed pastures result in the **utilization** of the forage produced. This is essential if an economic return is to be gained from fertilization and other expenditures on pastures. The growth habits of a particular plant determine the method of grazing that it can withstand and still be productive.

Grazing management is based on light interception and organic food reserve. Leaves intercept light from the sun and, through the process of photosynthesis, manufacture food for the production of new leaves and other plant parts. Food in excess of that needed for growth is stored in the lower portion of the plant as organic food reserves and is used later when there are not enough leaves to furnish adequate food for growth. If the leaves are not allowed to develop because of overgrazing or are removed too early by grazing or mowing, the plant does not have sufficient time to manufacture organic food in amounts necessary for the growth and replenishment of food reserves. Thus, the plant is weakened, regrowth is slow, and some plants may be lost.

Kentucky bluegrass, white clover, and other low-growing species can be grazed continuously if not grazed closer than 1/2 - 1 inch. Such plants produce leaves so close to the ground that animals cannot easily remove them. These leaves maintain a partial supply of food necessary for new growth after the upper portion of the plant has been removed, thereby reducing the drain on the plant's food reserve.

Mountain pastures that are predominantly Kentucky bluegrass can usually be grazed continuously or in long rotations. Before a pasture is grazed so short that livestock are not getting enough to eat and the plants are being injured, rotate the livestock to other pastures or supply additional feed. It is difficult under continuous grazing to avoid overgrazing some areas while undergrazing others, resulting in wasted forage.

Tall-growing grasses and legumes, such as orchardgrass, ladino clover, and alfalfa, grow erect. Since leaves on these plants are high above the ground, they can easily be removed by grazing or clipping. After leaves are removed, the food for new growth comes from reserve food in the roots and stubble. This means that tall-growing species should be grazed rotationally to give them a rest period after they are grazed or cut. This gives them time to replace the sugars and starches. The goal should be to graze pastures down within seven days and then allow about 15 days of rest in spring and 30 days of rest in summer. Ladino clover usually replaces its food reserve when it grows to a height of 4-6 inches. Orchardgrass usually restores its reserve food by the time it reaches a height of 6-10 inches.

More livestock product can be produced per acre if pastures are stocked heavily enough to use spring growth. When stocked this heavily in spring, it is usually necessary to have some way to lower the grazing pressure during mid-summer or during periods when pastures are short. Having reserve silage or hay, selling off cattle or lambs, and making additional acreage available for grazing are methods of lowering grazing pressure during these periods. Grazing steep areas heavily in spring and cutting hay or silage from accessible areas to be grazed later in the season is an effective system.

As illustrated in table 5, heavy grazing pressure gives lower gains per animal during the grazing season, but more beef is produced per acre than with light grazing pressure. However, when grazing pressure is too heavy, both animal and pasture production suffer. Work toward a compromise where both per-acre and per-animal gains are acceptable.

Table 5. Effects of Grazing Pressure on Gain per Animal, Carrying Capacity, and Gain per Acre of Bluegrass/ White Clover Pasture - Blacksburg and Glade Spring, 1967, 1968, 1969.

Grazing Pressure	Daily Gain per Animal (lbs)	Grazing Days per Acre	Beef Gain per Acre (lbs)
Light	1.28	199	267
Medium	1.06	280	336
Heavy	0.88	354	332

*Stocking rates were: Light, 1.3; Medium, 2; Heavy, 2.3 heifers/ acre. These rates were reduced by 50% in July.

The goal of proper pasture management is to maintain and utilize vigorous forage plants that will produce adequate amounts of high-quality grazing for livestock year after year. A guideline for the carrying capacities of pastures of different levels of productivity assuming 70% of utilization is:

Level of Productivity	Acres per Animal Unit
Excellent	1.0
Good	1.5
Average	3.0
Poor	6.5

*1 Animal Unit = one 1,000-pound cow with calf, two 500-pound steers, five ewes with lambs.

To obtain the optimum benefit from productive pastures, the growth must be utilized while it is of high quality. Allowing cool season pasture to get ahead of grazing animals, especially during the period of rapid growth in the spring, results in tough, fibrous growth of low quality that is often wasted (table 6). At the same time, the tall growth frequently crowds out clover, and weeds grow that would be eaten under heavier grazing pressure. Grazing only those pastures actually needed in the spring and stocking those heavily enough to keep up with the growth results in higher quality grazing and greater utilization of plant growth.

Table 6. Stages of Plant Growth as Related to Feeding Value of Mixtures Used for Pasture.

Attribute	Vegetative Stage	Bud or Heading Stage	Full Bloom Stage
Steminess	Low	Medium	High
Protein	High	Medium	Low
Minerals	High	Low	Low
Digestibility of Dry Matter (%)	65–75	55–60	47–53
Fiber and Lignification	Low	Medium	High
Palatability	High	Medium	Low
Kind of Supplements Needed	Energy or None	Energy	Energy and Protein

Pastures not needed for grazing in the spring should be harvested as silage or hay when heads emerge from the boot. This results in higher-quality stored feed and greater regrowth for grazing than when the plants are harvested at a more mature stage. These excess pastures will also produce higher-quality feed if not partially grazed, trampled down by cattle, and contaminated with manure.

Tall fescue should not be allowed to grow taller than 6-8 inches during the spring and summer. It decreases in palatability rapidly if it becomes too tall, especially during the summer months. It is especially critical to maintain clover in tall fescue stands to reduce the possibility of poor livestock performance.

Do not seed tall fescue in mixtures with orchardgrass or Kentucky bluegrass. Given a choice, livestock will leave the tall fescue ungrazed and often overgraze the other species. The tall fescue then becomes clumpy and low in quality.

Provide a reliable water source for each pasture. In some instances, this may require the use of natural springs or the planning and development of other water sources. Even high-quality pasture areas are often underutilized if they are too far from water sources. Locate salt boxes in under-utilized portions of the pasture to encourage livestock to spend more time there.

Other Management Suggestions Maintaining Clover-Grass Balance

The maintenance of clover in pastures should be the goal of every good manager. The legume provides its companion grass with nitrogen and improves the feed value of the pasture. Clover is vital in tall fescue pastures to improve livestock performance.

If the clover is thinning out, keeping the pasture grazed or clipped encourages clover growth. Be sure soil pH and K_2O levels are adequate. Clover, like other legumes, requires a pH of at least 6.0. When K_2O is limited, grasses and weeds use most of the available supply and cause the clover to be lost from potassium starvation.

If the grass is thinning out, let pastures grow to 8-12 inches in the spring before grazing or, better still, cut it off silage or hay. Avoid overgrazing and undergrazing during late summer and fall. Use 25-50 pounds of N in a complete fertilizer for topdressing.

Renovating Pastures

A combination of lime, liberal use of a complete fertilizer, and reseeding is the most effective way to rejuvenate a run-down pasture. Existing stands composed of approximately 50% desirable species can be thickened by reseeding in late winter-early spring. Apply a herbicide the previous fall if it is necessary to kill weeds and fertilize as needed. Graze the sod very closely by late winter before seeding to reduce competition with the new seedlings. Seed the grass-clover mixture into the sod with a no-till drill or ordinary grain drill capable of placing the seed in the sod (figure 3).

Figure 3. Seeding using a no-till drill. Photo provided by Cory Guilliams, Natural Resources Conservation Service.

If a satisfactory stand of grass is present, make the same preparations as when drilling a grass-clover mixture, then broadcast clover and/or lespedeza seed on the sod surface in late winter while the soil is freezing and thawing (figure 4). Grazing the existing sod closely in the spring favors the development of the seedlings.

If there is less than half a stand of desirable grasses and legumes, it is generally best to completely reseed. This may be done by tilling a seedbed or by killing the old sod with herbicides and seeding no-till.

Figure 4. Broadcasting clover seed in late winter. Photo provided by Cory Guilliams, Natural Resources Conservation Service.

Control Undesired Spread of Tall Fescue

Tall fescue has several desirable traits, the most important being its ability to grow and produce forage on marginal soils and its suitability for winter grazing. However, livestock performance is usually less than desirable when grazing tall fescue during the summer months, particularly if the tall fescue is infested with the endophytic fungus. If other grasses are suited for use in a particular forage system, no more than 1/3 of the forage acreage should be devoted to tall fescue.

Many bluegrass and orchardgrass pastures have been invaded and taken over by tall fescue. It is a very vigorous and persistent species that typically crowds out other pasture grasses once it becomes established. Since livestock usually graze other pasture plants in preference to tall fescue, it often produces seed in pastures. This encourages its spread. Tall fescue hay made from mature plants contains large quantities of seed. Consequently, pastures that have such hay fed on them are unintentionally but very effectively seeded with tall fescue. Also, seed will readily germinate after passing through livestock. Manure from animals that have eaten tall fescue seed heads, either from standing plants or mature hay, is a source of new tall fescue plants.

Preventing tall fescue from producing mature seed heads is the key to limiting its spread to unwanted areas. Livestock having access to mature seedheads should not be permitted on pastures where tall fescue is not wanted.

Clipping

When pastures are stocked heavily enough to utilize plant growth, clipping is rarely necessary. If horses alone are grazing the pasture, or if it is not stocked heavily enough to use the growth, pastures should be clipped to remove older unpalatable growth and to control weeds. Mowing should be done when the grass heads are in the best stage or are just beginning to emerge (figure 5). Clipping at this time encourages more vegetative growth and generally reduces the period of semi-dormancy that follows after most grasses mature seed. Clip high enough to leave the grass leaves for future grazing, particularly if the clippings are not going to be saved for silage or hay. The seed heads and stalks are the only portions of the grass that need to be removed. Clipping is not necessary after each grazing for rotationally grazed pastures.

If late summer weeds are a problem, clip them to prevent their seeds from spreading. Usually, 1 to 3 clippings a season are sufficient.

Figure 5. Mowing under-grazed pastures reduces weed seed and encourages vegetative pasture growth. Photo provided by Eric Bowen, Virginia Cooperative Extension.

Stockpiled Winter Grazing

Winter feeding costs, particularly for beef cows, can be significantly reduced by utilizing winter grazing to lower the need for stored feed (figure 6). Tall fescue is particularly well-suited for winter grazing since it responds well to late summer fertilization, withstands heavy grazing, and retains its quality during the winter.

Tall fescue pastures to be stockpiled should be grazed down to about 2 inches by mid-August and topdressed with 75- 100 pounds of N per acre alone or in a complete fertilizer if P_2O_5 and K_2O are needed. Some nitrogen fertilizers (urea and urea-based fertilizers) are not as efficient for fertilizing tall fescue in the late summer or early fall due to the potential for volatilization of substantial amounts of nitrogen back to the atmosphere. Therefore, application of these forms of nitrogen should be made immediately before significant rain and should be limited to 60 pounds of N per acre. Ammonium nitrate is the most efficient form but but is often not available in many areas of Virginia.

The stockpiled growth should not be grazed until other pastures are grazed down in late fall. One acre of stockpiled growth per animal unit can provide up to 120 days of winter grazing.

Strip grazing the stockpiled tall fescue with a single electric fence stretches the supply of winter forage and assures that high-quality grazing will still be available when the last of the growth is grazed. Since the tall fescue is not actively growing, no back fence is required. Provide enough forage in each strip to last 7-for 7-10 days.

Most tall, if not all, fescue pastures in Virginia are infected with an endophyte that leads to fescue toxicosis in livestock. Stockpiling does not eliminate this problem. Due to the adverse effect on performance, stockpiled fescue is best utilized with brood cows.

Figure 6. Cows utilizing stockpiled tall fescue for winter grazing. Photo provided by Cory Guilliams, Natural Resources Conservation Service.

Creep Grazing

Providing openings in the pasture fence (figure 7) or simply raising the fence to permit calves to leave their dams and creep-graze another pasture of higher quality is a very sound, practical technique for ensuring that high-quality grazing is available to the growing animals that need it. Where it is not practical or feasible to improve a particular pasture, cows can often be forced to utilize lower-quality grazing and keep weeds down. At the same time, calves graze an adjacent pasture of higher nutritional value than the cows need. It is often practical to fertilize, seed, and otherwise improve a relatively small area in or next to a large pasture boundary specifically to provide creep grazing for calves. Hayfields adjacent to pastures provide excellent creep grazing.

Figure 7. A gate that permits creep-grazing. Photo provided by Matt Booher, Virginia Cooperative Extension.

Fencing

It is nearly impossible to truly **manage** pastures and control the grazing animals without adequate fencing. Implementation of the most desirable management practices is dependent upon controlling the grazing pressure on a particular pasture. There is no optimum pasture size since this depends on the numbers and types of livestock, quality of pasture, use to be made of the particular pasture, availability of water, distance from other pastures, and many other practical considerations. For a given group of livestock, it is desirable to have 3-6 different pastures available during the year. This includes hay fields that can also be grazed as needed. Upland or mountain pastures need to be fenced separately from more level, usually higher quality, pastures to force livestock to graze the steep pastures. This is particularly important for brush control. In many instances, the level pastures can be harvested for hay if they are not needed for grazing at particular times during the grazing season.

Graze Various Classes of Livestock

Sheep are close grazers that will eat many woody plants and weeds left by cattle. Goats are browsers that will consume many plants that cattle will not eat. Horses are notorious spot-grazers because they prefer to graze short plants. Most livestock prefer not to graze areas where their feces and urine have fallen but will often graze such areas soiled by other livestock. Different animal species can be grazed together in the pasture or in sequence to improve the utilization of pastures.

Weed Control

Weeds compete strongly with desirable pasture plants for light, soil nutrients, and moisture. Weedy plants are low in palatability, reduce the quality and yield of pastures, and, in the case of spiny weeds, prevent livestock from grazing desirable plants.

The first step in controlling weeds in pastures is to maintain a thick, vigorous stand of desirable plants by proper fertilization and grazing management. Many weedy plants thrive under conditions of low fertility as a result of little competition from desirable pasture plants. Fertilizing such pastures stimulates the growth of desirable plants, often forcing out such weeds as broomsedge. Combine fertilization with proper grazing to put additional pressure on weeds. Livestock will graze many weeds after fertilization, especially if grazing pressure is heavy. Most weeds cannot withstand grazing, which helps eliminate them. Overgrazing weakens the desirable plants and permits the invasion of weeds.

An increasingly serious problem with steep pastures is the invasion of woody plants, such as cedars, locusts, multiflora rose, and other invasive species. Placing extreme stocking pressure on brushy areas for short periods can help force livestock to eat shoots and leaves, thereby controlling the growth of these plants. In many instances, this is the only physically possible or economically feasible technique, assuming that hand digging or cutting is not an alternative.

Feeding hay, particularly large bales on brushy areas, encourages livestock to eat brush and clear out such areas. Manure and urine deposited in the area, plus seed that may be in the hay, help to develop the pasture sod. Hay used for this purpose should not contain large quantities of weed seed.

Timely clipping will help to control many weeds. Clip annual weeds at the early bloom stage, before seed production occurs, to prevent them from reseeding the pasture.

Many weeds cannot be controlled by clipping or grazing. Herbicides should be considered for these. Since recommendations for the use of herbicides change frequently, consult your Virginia Cooperative Extension agent for up-to-date chemicals and application rates for use on pastures.

In considering a chemical application, the first step is to identify the weeds found in the pasture. The weed species will determine which chemical should be used, the application time, and the rate of application. Some weeds may require two or more applications. Seed from

some weeds remain alive in soils for several years, while others have largely fleshy tap roots or many rhizomes that produce new growth. It may take more than one season of spraying to control such weeds.

Using chemicals to control weeds is a sound practice for improving pastures. However, their use is only one management tool and should not be considered a replacement for management procedures that maintain a dense, vigorous stand of desirable pasture plants that can resist weed invasion.

Select and use pesticides carefully. Before using any pesticide, read the instructions printed on the label of its container; follow those instructions, heed all cautions and warnings, and note precautions about residues.

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