

Putting the Punch Back in Your Pastures: Pasture Renovation

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Pasture renovation can be defined as a series of practices that will result in long-term improvement in the health, productivity, and botanical composition of pastures. These practices may include interseeding legumes and grasses, fertilizing, liming, controlling weeds, and improving grazing management. Successful renovation requires planning, time lines, and attention to detail. **It is important to determine why the previous stand did not persist before reseeding pastures.** It is essential that these problems be addressed in a long-term pasture management plan.

Pasture renovation does not always mean reseeding. Often, simply resting, fertilizing, liming, controlling weeds, and implementing rotational grazing can improve weak pastures. For this to work, desirable plant species must be present in adequate densities. Pastures that have large spaces between plants (> 6") may require reseeding to thicken stands. Also, because introducing legumes into grass-dominated pastures is highly desirable, a thin grass stand might be viewed as an opportunity to accomplish this objective.

Control weeds prior to reseeding. Weeds are "opportunistic invaders" that occur in pastures for a number of reasons, including poor fertility, overgrazing, and use of forages that are not adapted to the region and soil conditions. It is critical that these issues be addressed before reintroducing desirable grasses and legumes. Weeds are controlled most effectively by identifying the target weed species and implementing appropriate control methods in the season prior to renovation. Perennial broadleaf weeds can be controlled by using herbicides, but severe injury to desirable legumes will occur. It is essential that broadleaf weeds be controlled prior to interseeding legumes. For more information on herbicides for pas-

tures see *Pest Management Guide, Field Crops*, Virginia Cooperative Extension publication 456-016, available at <http://pubs.ext.vt.edu/456-016/>.

Adjust soil fertility prior to seeding. Testing soil is an important first step in pasture renovation. Without proper soil fertility, pasture renovation will not be successful. Apply lime and fertilizer according to soil-test recommendations. Phosphorus and potassium are especially important in the establishment and maintenance of legumes in pastures. Soil acidity is a major factor limiting pasture growth in Virginia. Acidic conditions reduce nutrient availability, root growth, and nitrogen fixation by legumes. Maintain soil pH between 6.2 and 6.4 for grass-legume mixtures. Lime not only corrects soil acidity, but also supplies calcium and magnesium while reducing the availability of toxic nutrients such as aluminum and manganese. Make applications of lime in the season prior to reseeding to allow adequate time for it to react with the soil. In situations where more than two tons of lime per acre are needed, apply one-half prior to reseeding and one-half after reseeding. **Do not apply nitrogen fertilizer just before or after seeding. Nitrogen will encourage the growth of established sods resulting in increased competition for light, water, and nutrients that will, in many cases, kill developing seedlings.**

Suppress sod and reduce surface residue prior to reseeding. The existing sod must be suppressed and plant residue reduced prior to seeding. Sod can be suppressed by hard grazing in late fall and early winter. Overgrazing reduces the competitiveness of the sod and eliminates plant residue. This allows for seed to reach the soil surface and establish good soil-seed contact, which is essential for germination and emergence.

Vegetation can also be suppressed using a low rate of a nonselective herbicide, but killed pastures with high levels of residue may need clearing via burning or mechanical removal before seeding can be successful. For more information on sod suppression using herbicides see the *Pest Management Guide, Field Crops*, Virginia Cooperative Extension publication 456-016, available at <http://pubs.ext.vt.edu/456-016/>.

Choose adapted forage species and use certified or proprietary seed. Successful pasture renovation requires forage species that are adapted to the soil conditions in the pasture and the region where they will be grown. If the forages are not adapted, the chance of maintaining a healthy sod is low. Unless appropriate grazing management will be exercised, it will be important to select forage species that will tolerate close and frequent grazing. Use certified seed or proprietary varieties that are adapted to your climatic region. Use of certified seed will ensure you are getting high-quality, weed-free seed. For more information on adapted species and varieties see the *2000 Agronomy Handbook*, Virginia Cooperative Extension publication 424-100, available at <http://pubs.ext.vt.edu/424-100/> and current variety trial reports available from your local Extension office or at <http://www.ext.vt.edu/resources> under Crops and Grains, Forages.

Inoculate legume seed. Legumes form a symbiotic relationship with nitrogen-fixing bacteria in which nitrogen from the air is fixed into a plant-available form. There is no need for nitrogen fertilizer when legumes make up more than 25 percent of a pasture stand or 35 percent of a hay stand on a dry-matter basis. A visual rating of legume percentage is a good estimate of clover on a dry-matter basis for taller growing species such as ladino or red clover; however, it is easy and common to overestimate the percentage of (Dutch) white clover. Therefore, pastures where common white is the predominant clover may require nitrogen fertilization even when a visual rating indicates more than 25 percent clover. **Legume seed should always be inoculated with the proper strain of nitrogen fixing bacteria before seeding.** In many cases, legume seed comes preinoculated. If the seed is not preinoculated or has been exposed to adverse conditions (high temperatures), a prepackaged inoculum (preferably clay based, which are available from the seed dealer) should be mixed with the seed just prior to seeding.

Ensure good soil to seed contact. There are a number of different seeding methods, but the objective is always

the same: to achieve good soil-seed contact. This helps to ensure that the seed will germinate and emerge in a timely manner. For more information on seeding methods see *No-Till Seeding of Forage Grasses and Legumes*, Virginia Cooperative Extension publication 418-007, available at <http://pubs.ext.vt.edu/418-007/>.

Frost seeding is accomplished by broadcasting seed onto the soil surface in late winter to early spring. Soil surface freezing during the night and thawing during the day will cause small cracks to form. These cracks incorporate the seed into the soil. Frost seeding is enhanced by dragging and cultipacking during or after broadcasting the seed. In order for frost seeding to be successful, the seed must reach the soil surface. Therefore, it is critical that you reduce plant residue on the soil surface. In addition, seed must be broadcast early enough for adequate freeze-thaw cycles to take place to incorporate the seed. In Virginia, frost seedings are most successful when seed is broadcast in late January to early March, depending on your location. This method works best with clovers and annual lespedeza. It does not work as well with grasses and alfalfa. Seeding rates are shown in Table 1.

Minimum-tillage seeding is accomplished by disturbing 40 percent to 60 percent of an established sod. This can be done using a disk, field cultivator, or other tillage implement. The implement does not need to penetrate the soil more than 2 to 4 inches. Tillage helps to suppress the sod and expose bare soil. After tillage, broadcast the seed onto the soil surface and follow with dragging and/or cultipacking. This seeding method can be used to reintroduce both perennial grasses and legumes or to overseed annual grasses and legumes into an established sod. Depending on the species being established, this seeding method can be successful in either late summer or early spring. Seeding rates are shown in Table 1.

No-tillage seeding is accomplished by using a no-till drill. This seeding method requires more effort and attention to detail, but generally produces more consistent results than frost seeding. No-tillage seedings can be made in either late summer or early spring. Because no-tillage seeding does not disturb the sod, it is especially important to suppress the sod and reduce residue prior to planting. **Placing the seed too deep in the soil is a common mistake that results in stand failures.** It is critical that the seeding depth is checked every time the drill is used since it can vary with soil conditions. A general rule is that if a little seed cannot be seen

Table 1. Seeding rates for grasses and legumes commonly used for pasture renovation in Virginia.

Plant Species	Seeding Rate -----lb/A-----
Red Clover alone	8-10
Ladino Clover alone	1-3
Alfalfa alone	10-12
Red Clover + Ladino Clover	4-6 + 1-2
Annual Lespedeza alone	15-20
Annual Lespedeza + Ladino Clover	8-10 + 1-2
Red Clover + Ladino Clover + Orchardgrass	4-6 + 1-2 + 8-10
Alfalfa + Orchardgrass	6-8 + 6-10
Red Clover + Ladino Clover + Tall Fescue	4-6 + 1-2 + 10-15
Alfalfa + Tall Fescue	6-8 + 10-15
Annual Ryegrass	20-35
Small Grain	90-120
Small Grain + Annual Ryegrass	90 + 15

beside the slit, then the seeding depth is too deep. No-till drills often can be rented from local soil and water conservation districts and farm cooperatives. For more information on no-tillage seeding see *No-Till Seeding of Forage Grasses and Legumes*, Virginia Cooperative Extension publication 418-007, available at <http://pubs.ext.vt.edu/418-007/>.

Control post-seeding competition. Regardless of the seeding method, it is absolutely essential that competition from the existing sod and weeds be controlled after the seed has germinated and the seedlings have emerged. Failure to control competition during establishment allows weeds and established vegetation to successfully compete for water and nutrients and shade new seedlings. **This will lead to stand failure.** Competition can be controlled successfully by frequently clipping the sod or weeds to a height just above the growing seedlings. Flash grazing can also be an effective way to control competition. Flash grazing is accomplished

by restricting a large number of animals to a relatively small area for a short period of time. This results in the quick removal of competing vegetation in a uniform manner. In order for clipping and flash grazing to be successful, they must be implemented before the sod or weeds become too tall and on a regular schedule until seedlings become established. Clipping and grazing may damage or kill some seedlings, but the losses will be far less than if the competition is not controlled.

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Pasture Renovation at a Glance

- Renovation does not always mean reseeding.
- Simply resting pastures and improving management can significantly improve pasture stands.
- Control broadleaf weeds.
- Test soil and adjust fertility.
- Suppress existing sod and decrease surface residue.
- Ensure good soil-seed contact.
- Seed at the recommended rate and on the proper date.
- Use certified or proprietary seed of an adapted species.
- Inoculate legume seed.
- Never drill small-seeded forages deeper than ½ inch.
- Control post-seeding competition from weeds and established sod.
- Do not apply nitrogen fertilizer just prior or just after seeding.