

CHAPTER 5 ~ PASTURE RENOVATION AND ESTABLISHMENT

PASTURE RENOVATION

Taylor and Barczewski (1998) define pasture renovation as a series of actions that lead to a permanent or long-term change in the botanical composition of a pasture. The changes are designed to improve the species composition, or to increase the population of a selected species in the pasture, which leads to an overall improvement of pasture quality and yield (Lawson 2004). The key to a successful renovation is to plan all aspects well before the planting date.

The following questions should be asked when planning a renovation:

1. Which legume or grass species/variety is best adapted?
2. What renovation technique will give me the best results?
3. When should I renovate?
4. What are the current fertility levels, especially for pH, phosphorus (P) and potassium (K)?

Once the decision to renovate has been made, the choice of a method of renovation depends on the following factors (Undersander et al. 2002):

1. What is the current condition and species composition of the existing pasture?
2. How long can the pasture be out of service?
3. What is the maximum acceptable waiting period for good establishment?
4. Are tillage and/or herbicides acceptable options?
5. How much money and effort should be spent?

ASSESSING CURRENT CONDITIONS

Is renovation the answer to improved pasture productivity? Depleted pastures are often the result of improper grazing management, poor soil fertility or poor drainage. If forage species are introduced without addressing the other issues, then the success from renovation will be short term and limited. Renovation should be part of a long-term solution that includes improving the grazing management and soil fertility.

Good soil fertility is the foundation to successful pasture renovation, so soil test early in the planning process. A soil test will give you the information required to correct any nutrient imbalances or deficiencies, or soil acidity, which will adversely affect any attempt at improving the pasture.

To get the best results in forage establishment and growth, a pH range of 5.8 to 6.5 is considered most beneficial.

When an application of lime is needed, the lime should be incorporated at seeding when soils are tilled or at least six months in advance when overseeding or no-till seeding.

Adequate soil phosphorus (P) is required for good seedling establishment and root development. This is especially important when overseeding or in no-till seeding. Potassium (K) levels are also important in maintaining strong root systems and healthy, winter-hardy plants.

The grass/legume balance can be significantly affected by P and K fertilization. Low nitrogen (N) rates and high P and K rates can increase the proportion of legumes (either volunteer or seeded legume species) in the existing sward. With this in mind, it is very important that mixed grass/legume pastures receive sufficient lime, P and K fertilizer to establish and maintain the sward's legume component.

See Chapter 4 Nutrient Management and Pasture Fertility for specific information on pasture fertility requirements.

TYPES OF RENOVATION

Pasture renovation can be classified into two groups: complete tillage and re-seeding or overseeding. Overseeding includes frost seeding, no-till seeding and livestock seeding.

Complete Tillage and Re-seeding

This method involves the complete destruction of the existing sward with the intention of seeding in a new stand and usually involves primary tillage. A benefit of this type of renovation is that large amounts of manure and lime can be incorporated at the time of ploughing. Though the success of establishment is often greater than with other methods, total destruction can be an expensive method of renovation and should only be chosen if other methods cannot meet the required levels of fertility and/or productivity. Specifically, if P, K, organic matter or pH are in the "Low" to "Low to L minus range, it is best to have incorporated them into the soil, making tillage the preferred method.

When choosing to do a complete renovation of a pasture, it may be advantageous to seed in a break crop. An annual crop such as annual ryegrass or a brassica (turnip or kale) can be used to break disease cycles, add organic matter, reduce weed populations, and allow for the incorporation of nutrients.

A more economical method may be to do a partial renovation: renovating only areas of the pasture where there is poor yield, winter injury, drought, or where flooding has destroyed a portion of the pasture. Moderately productive pastures can also be improved with rejuvenation: adding fertility and seeding in new species into the entire stand.

If soil fertility levels are good and the pastureland would not benefit from primary tillage, the area can be burned down with a chemical spray in the fall. The following spring, the pasture can be reseeded using a no-till drill. This method will reduce the cost associated with primary tillage and provided the sod is completely killed by the burn down, a successful stand is often achievable.

Overseeding

Frost Seeding

Frost seeding is generally most successful with aggressive species such as red clover, white clover and meadow fescue and consists of broadcasting the seed on to the existing sward. This should be done in late winter/early spring (usually in late March to early April) in the early morning when frost is still in the ground. The daily thawing and nightly freezing action will open small cracks in the soil into which the seed will fall. Moist springs and several frosty nights will be most favorable for success.

No-till Seeding

No-till drills are best used when little disturbance of the soil and existing sward is desired. This seeding method allows legumes and grasses to be introduced into declining pasture swards. The drill inserts the seed into a small slice that the drill has made, increasing the seed-to-soil contact and improving the chance of seedling establishment. Establishment of new seedlings into live swards can be improved by managing the pasture for the new seedlings. This can be achieved by mowing or grazing after seeding to reduce competition and shading by taller plants. Tests have shown good success using a no-till drill for red and white clover, as well as grasses like annual ryegrass, orchardgrass, meadow fescue and Kentucky bluegrass.

Livestock Seeding

Using livestock to seed legumes into a pasture is a slow process, often taking several years to see a benefit. However, this method may be the only choice for land not accessible by equipment. Only the hard seed will pass through the animal's digestive tract and will come through in 24-72 hours, so some planning is required in order to renovate the correct pasture. A study in Ontario found that of the hard seed that is passed through the digestive system, about 10% will germinate (Winch 1960). Also, the seeding will not be consistent, especially in more extensively grazed systems.

RENOVATION TIMING

The ideal time to seed is early spring (late April to mid May) as adequate soil moisture is available. Late summer (mid August to early September) seeding can also be done, but results are less predictable since moisture levels can vary and winter survival of fall established seedlings can be poor. The upside of seeding in late summer is soil temperatures are higher, which is better for seed germination. This method also reduces competition from summer annual weeds and germinating perennial weeds.

FALL SEEDING FORAGES

The best time to fall seed forages is from mid to late August. Forages sown after early September do not have sufficient time to establish before winter. Most legume seedlings and many grass seedlings other than timothy and brome grass are susceptible to winterkill when sown in the fall. As a general rule, fall seeded mixtures should contain a high percentage of timothy and/or brome grass to ensure good winter survival.