

PASTURE RENOVATION

Agronomy Facts Series: AF-08

Pasture renovation can be defined as a series of actions that lead to a permanent or long-term change in the botanical composition of a pasture. The intended changes are designed to improve the species composition or to increase the population of a selected species in the pasture. Successful pasture renovation can extend the productive life of a pasture, improve pasture quality, increase pasture carrying capacity, and/or replace old or diseased pasture species with healthy improved varieties. The renovation of pasture or hay fields must be carefully planned well ahead of the target planting date to ensure successful renovation. With this in mind, several questions should be answered before proceeding with renovation. These questions include the following:

- What are my current fertility levels?
- Does my pasture need total or partial renovation?
- Which legume or grass species/variety should I use?
- What renovation technique is best?
- When should I renovate?

SOIL FERTILITY

Soil fertility information is critical to successful pasture renovation. Soil testing early in the planning process or the use of a recent (within the past 18 months) soil test permits the grower to evaluate the fertility status of the area in question. If there are significant soil fertility problems, these must be corrected before proceeding further into the renovation planning process. Nutrient imbalances or deficiencies or improper soil acidity levels will negate any attempt at improving pasture composition or performance.

For soil testing procedures and/or soil test bags, growers should contact their local county agricultural Extension agent. call The University of Delaware Soil Testing Laboratory at (302) 831-2532, or visit <http://www>

Soil acidity as measured by the soil pH value is most important when introducing legumes into pastures. However, even grass crops require that the soil pH level be within a certain range. For most pasture crops the ideal (target) pH ranges are as follows:

- Grass pastures 5.6 — 6.2
- Legume pastures 6.0 — 6.6
- Alfalfa pastures 6.4 — 7.0

When an application of lime is needed to raise the pH to the target level, the lime should be applied at least 6 months in advance of the expected seeding or renovation date.

Adequate soil phosphorus (P) and potassium (K) levels are important in stimulating and maintaining strong root systems and healthy, winter-hardy plants. Strongly tap-rooted legumes such as alfalfa and red clover require high levels of P and K to successfully compete with fibrous rooted grasses for these nutrients.

The composition of forage from a grass/legume field can be significantly affected by P and K fertilization. Low N rates and high P and K rates can increase the proportion of forage from legumes (either volunteer or seeded legume species). With this in mind, it is very important that mixed grass/legume pastures or hay fields receive sufficient P and K fertilizer to maintain the field's legume component.

Generally, adequate levels of calcium (Ca) and magnesium (Mg) will be present when the target soil pH is reached. However, imbalances between Ca and Mg can occur if soil tests are disregarded and only one source of lime [dolomitic (supplying Mg as well as Ca) and calcitic (supplying mostly Ca)] is used for long periods of time. If adequate Mg is not present, grass tetany can result in ruminant animals, especially in cold, wet springs on grass pastures.

Another important nutrient especially under intensive management (high yield) conditions is sulfur (S). Sulfur is most likely to be a yield-limiting factor on loamy sand and sand-textured soils. High yield alfalfa fields are heavy users of S so fields with loamy sand or sand textures should be tested for S content before renovation. To test for S, a 2 foot or 3 foot sample will be needed. Contact your local county agricultural agent or The University of Delaware Soil Testing Laboratory for approved test procedures for S.

RENOVATION TYPE

Renovation can be either partial or total. Partial renovation will generally be when poor stand establishment, winter injury, drought, or flooding destroy a portion of the field. In such cases, many times no-till drills will be used to reseed these areas. Another instance in which the distinction between partial and total renovation is blurred is when one or more species are no-till seeded into the existing pasture. In this case, one or more grass species can be added to a legume field or vice versa.

Total renovation in its purest sense can be defined as the destruction of the sward followed by reestablishment of either the same species or another species. An example of this type of renovations when an endophyte-infected tall fescue pasture is destroyed (chemically or with tillage) and the field is replanted with endophyte-free tall fescue seed.

SPECIES SELECTION

Grasses: The predominant pasture grass in the northern portion of Delaware is Kentucky bluegrass. This species is a good choice for cooler areas that generally receive summer rainfall. In the southern portion of the state, most pastures consist of either tall fescue, orchardgrass, or a mixture. Tall fescue can be infested with an endophyte fungus that reduces animal performance (often referred to as 'summer slump' on fescue pastures).

Old fescue pastures should be tested for the endophyte fungus if problems with animal performance or reproduction have been noted. Contact your local county agricultural agent for testing information. New seedings of tall fescue should use only certified endophyte-free seed. Most varieties are now available as endophyte-free seed.

Orchardgrass and tetraploid or perennial ryegrass have been used as a supplement to declining alfalfa fields. Both species boost yields and provide high-quality forage either as hay, graze, or greenchop. The ryegrasses will generally remain in the pasture only for a couple of years but are excellent choices for extending the useful life of legume fields. Early spring seedings of these grasses, although usually successful, will not substantially contribute to alfalfa yields until the last harvest or two. This is because the established alfalfa plants compete vigorously for light, nutrients, and water and it takes an extended time for the grasses to establish. Fall seedings should contribute to yields sooner.

Another grass species that should not be overlooked is reed canarygrass. New low-alkaloid type varieties provide palatable, highly nutritious forage when harvested at the proper maturity. This species has had a poor reputation among producers since old stands and old varieties resulted in poor animal acceptance and quality due to high alkaloid content. The new varieties allow growers to use this species which has both excellent tolerance to wet soil conditions and to drought. It does require frequent N applications to maintain the stand under frequent grazing or harvesting.

Other choices among the cool-season grasses include timothy and brome grass. Both species will likely be short lived under Delaware conditions. Timothy is often used with red clover for horse hay.

Legumes: New varieties of alfalfa are constantly released. Some varieties are now designed for use under grazing conditions. Select a variety adapted for conditions in Delaware. Contact your local county agricultural agent for a copy of the most recent alfalfa variety report.

For pasture renovation, the most frequently seeded legumes are white or Ladino clover and red clover. Contact your local county agricultural agent for a copy of the most recent clover variety report. Alsike clover has also been successfully interseeded but should be avoided in horse pastures. Birdsfoot trefoil is a bloat resistant legume that tolerates grazing well. Although birdsfoot trefoil yields less than alfalfa, it may be a good choice in northern Delaware.

Legumes should be seeded early. For spring seedings, early seeding will help reduce competition from weeds and accompanying grasses so establishment is complete before the hot, drought-prone summer weather. Early seeding in late summer/early fall encourages good establishment before the winter and helps in winter survival and disease control.

If a legume species has not been present in the pasture in the last 3 to 4 years, the appropriate rhizobia inoculant should be applied to the seed just prior to seeding. Always

use fresh inoculant and remember that it is a live organism and should be treated with care. Keep the inoculant in a cool dry place until it's used and do not place it in contact with fertilizer during seeding.

RENOVATION TECHNIQUES

There are three basic techniques used in renovation. These are frost-crack seedings, seedbed preparation using some form of soil disturbance, and no-till techniques. The first and least expensive but most risky of the techniques is frost-crack seeding. This technique is generally most successful with small seeded legume species such as white clover. Frost-crack seeding consists of broadcasting the seed over the intended renovation area. Seeding should be done in late winter/early spring when daily cycles of freezing and thawing can open cracks in the soil in which the seed falls. Moist springs and a long period of frost cracking weather will be most favorable for success.

Soil disturbance can range from plowing with conventional seedbed preparation to light diskings to deep tillage plus seedbed preparation. This renovation technique would be used for total renovation when the previous sward is to be destroyed. Disking can be used with partial renovation to prepare smaller areas for reseeding.

No-till drills have significantly increased the opportunities for pasture renovation. No-till drills allow the introduction of additional species into a pasture without having to destroy the sward. This permits the introduction of legumes into grass swards to improve pasture quality and the introduction of grasses into declining alfalfa fields to extend their useful life span.

RENOVATION TIMING

Frost-crack seedings are limited to the late winter/early spring when normal freezing and thawing cycles crack the soil surface open enhancing seed:soil contact. Cold winters can delay seeding until mid- to late March while mild winters can advance frost-crack seedings into early February.

For all other seeding techniques, the ideal time to seed is in late summer and early fall when adequate soil moisture is available. Seeding at this time of year reduces competition from summer annual weeds and germinating perennial weeds. If a seeding must be made later in the fall, research indicates that no-till seedings are more successful than conventional seedings in surviving winters.

The second option for these other seeding techniques is a spring seeding. Spring seedings are most successful when planted from late-February through March. Weather conditions at the time of seeding will dictate how soon in this period that seeding should take place. Late-spring seedings are often less successful due to heavy weed pressure. Late-spring seedings can benefit from seeding a companion crop such as spring oats along with the forage species. The companion crop can reduce weed competition for the establishing forage crop but in dry years can also lead to stress conditions on the forage.

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