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Renovating Grass Sods With Legumes

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Many Missouri pastures have adequate grass stands, but they need legumes. If the soil is capable of growing them, legumes should be established in grass sods. Establishing clovers is cheaper than topdressing the grass with nitrogen.

Legumes have long been recognized for furnishing nitrogen to a companion grass. However, they have many other equally important qualities that are often overlooked. Legumes can:

- Increase animal average gain
- Increase weaning weight of calves
- Increase cow conception rates
- Decrease grass tetany risk
- Decrease herd health problems
- Increase protein yield per acre
- Furnish nitrogen for themselves and the companion grass
- Provide a higher-quality hay than grass alone
- Produce more forage during July and August to offset the summer slump in grass growth
- Decrease pasture production costs.

Pasture improvement with legumes is never final. Even under the best weather and management conditions, legumes will not last indefinitely. Drought is very damaging, especially to ladino, alsike and red clover.

Legumes are lost in pastures by overgrazing, disease, insects, lack of fertility, using the wrong analysis of fertilizer, excess moisture, drought or a combination of any of these.

Legumes can be established in grass sods without plowing and without completely losing one year's production.

If broadleaf weeds are a problem, spraying is the easiest way to control them. Spray before beginning the renovation — usually in spring or summer before legume establishment is started.

Methods of seeding legumes in sods

There are three general methods of re-establishing legumes in grass sods with a minimum production loss. These methods are similar in that the old grass sward is controlled so that the young legume can compete with the older grass plants. Success of new seedlings depends on adequate moisture, light and fertility.

Method 1
Overgraze grass during fall and early winter
Apply lime, phosphorus and potassium as needed prior to or during this period. Don't use nitrogen in the fertilizer mix because it stimulates the older grass and decreases the young legume's chances of becoming

established.

Broadcast the legume early enough in winter so that freezing or thawing will cover the seed. February seedings have a 50 percent better chance of success than April seedings.

Early grass growth should be immediately removed by grazing to allow the legume to establish roots. This step is necessary for success. Use large numbers of cattle and overgraze the grass quickly. This procedure should be repeated as necessary throughout late March (in southern Missouri) and in April and early May. Clipping will seldom substitute for grazing when this method of establishment is used.

Method 2
Till the sod in late fall or early winter so that 40 to 50 percent of it is disturbed
During winter, the legume seed is either broadcast or drilled into the partially opened sod. Don't apply nitrogen fertilizer. Remove the early grass growth by clipping or grazing.

Method 3
Use a chemical to retard the grass growth
Chemical expenses can be partially offset by not having to till.

Seeding is done with no-till equipment — western grassland drills or Midland Company zip seeders will work. No-tillage corn planters also work. Adjust your corn planter for 20- or 24-inch rows and split middles to get a 10- or 12-inch row spacing. Place the legume seed in the insecticide boxes and position the tubes so that the seed is dropped in front of the press wheels.

In most cases, paraquat has been the chemical used. This is a contact killer, so you must seed during the growing season — early spring or late summer. Rates of 1 to 2 pints of paraquat per acre are usually satisfactory. Too heavy a chemical rate is costly and also retards the grass too much, allowing summer weeds to invade. This can be as detrimental to the new seedlings as competition of the existing sod.

Fertility considerations

The first step in establishing legumes is to test the soil. Take soil tests early so any needed lime can be applied well ahead of seeding.

If you apply more than 2 or 3 tons of lime, disc or till it into the upper portion of the soil. The benefits of lime move downward very slowly, perhaps no more than 1 inch per year.

All legumes respond to lime if the soil pH is low, but some legumes have less exacting requirements for lime than others. Do not seed legumes into fields that have a salt pH of less than 5.5; in most cases a salt pH of 6.0 is more desirable.

Phosphorus is especially critical when legumes are established. Unless the soil tests medium to high, better stands usually are obtained if some phosphorus is applied just before or at the time of seeding.

Potassium is not as critical as phosphorus at time of establishment, but legume persistence is greater if adequate potassium is used in a topdressing program. The exact amount is best determined by a soil test.

Nitrogen should not be used when establishing legumes in a grass sod. It increases the growth and vigor of the grass and increases the competition for the new legume seedling.

Time of seeding

Be prepared to seed on time — early, timely seeding is essential to establishing a stand. Timeliness is especially critical when seeding on undisturbed sod.

You can obtain excellent stands by seeding in January and February on frozen ground. The soil does not necessarily need to be honeycombed. New seedlings occasionally are injured by a "late freeze," but this is usually less of a threat than seeding too late. Late seedings lack soil contact for good germination, and summer stress kills many undeveloped seedlings.

Seeding rates and mixtures

Use certified legume seed. Don't take a chance with inferior seed. Certified seed ensures varietal purity and proven performance. At times legume mixtures, such as ladino and alsike in wet areas, may be advantageous, but in most cases a single species is easier to establish and manage than a combination. When ladino is used, making hay is difficult.

When possible, match the right legume with the proper grass. Trefoil and alfalfa are much easier to establish in bluegrass, orchardgrass or timothy than in fescue. Usually ladino or red clover is a better choice to use with fescue because of their aggressive seedling nature.

Seedings of some legume species are more aggressive than others, and when mixed with less aggressive ones, they interfere with establishment. Ladino and red clover are much more aggressive than Birdsfoot trefoil or alfalfa and are easier to establish in thick, heavy stands of grass.

Establishing legumes in heavy fescue stands is more difficult than in most other grasses. Legumes can be established much more easily in bunch grasses such as orchardgrass or timothy. Also, legumes can be easily established in bluegrass because of its lack of height, even though it is a rhizomatous species.

The rate of seeding is determined by the method of sowing

Alfalfa

- 10 pounds broadcasting on undisturbed soil
- 8 pounds broadcasting on tilled soil
- 6 pounds drilling on prepared seedbed

Ladino

- 1.5 pounds broadcasting on undisturbed soil
- 1 pounds broadcasting on tilled soil
- 0.5 pounds drilling on prepared seedbed

Lespedeza

- 25 pounds broadcasting on undisturbed soil
- 20 pounds broadcasting on tilled soil
- 15 pounds drilling on prepared seedbed

Red clover

- 10 pounds broadcasting on undisturbed soil
- 8 pounds broadcasting on tilled soil

- 6 pounds drilling on prepared seedbed

Trefoil

- 8 pounds broadcasting on undisturbed soil
- 6 pounds broadcasting on tilled soil
- 4 pounds drilling on prepared seedbed

Don't forget to inoculate. Numerous seedlings fail because of poor legume inoculation. Use moisture to apply the inoculum to the seed. Mixing the dry inoculum with the seed without moistening the seed will fail more times than it will succeed.

Legumes for pasture use

Ladino
The easiest legume to establish in most grass sods is ladino clover. Ladino will grow on almost any soil that is well supplied with phosphorus, potash and lime. It is high in quality and a heavy nitrogen fixer.

Ladino has two serious drawbacks. It is more likely to cause bloat than other legumes and it does not produce well during the dry summer months. It is somewhat less drought tolerant than most other legumes but has more drought tolerance than is commonly believed.

Red clover
Red clover is relatively easy to establish and has many desirable characteristics needed for a pasture legume. It will grow on a relatively wide range of soils. It is of high quality, does not present the high bloat risk of ladino or alfalfa and has medium drought tolerance.

The most serious drawback to red clover in pastures is that it needs to be re-established every two or three years. Some new varieties, such as Kenstar with its longer persistence, will give red clover more popularity as a pasture legume.

Alfalfa
Alfalfa grown with grass makes an excellent-quality, drought-resistant pasture legume. It is also useful as a hay crop. Alfalfa has more exact needs than other legumes for high fertility, lime and soils with good internal drainage. Also alfalfa grown for pasture, or grown for hay, requires spraying for alfalfa weevil control. This limits its popularity for pasture.

Birdsfoot trefoil
In most of central and northern Missouri, birdsfoot trefoil probably comes closest to being the perfect pasture legume. It is extremely palatable and high in quality. It will persist for many years with proper management and has never been known to produce bloat. It will grow under a wide range of soil conditions and fertility regimes and is one of the most drought-tolerant of the legumes.

However, birdsfoot trefoil is less persistent than other legumes, such as annual lespedeza and clover. This lack of persistence is caused by root and crown rot, as well as by mismanagement. Birdsfoot trefoil should be managed as a short-lived perennial. It should be allowed to reseed in September.

Sweet clover
Sweet clover is not usually considered a quality legume, but it does deserve some consideration for use in extremely droughty pastures. It has been used in states west of Missouri with some success. It is biennial and needs to be reseeded frequently. It can also be attacked by the sweet clover weevil.

Alsike clover
Alsike clover is especially short-lived on upland, droughty soils, although it is a perennial when used on low, wet soils. Basically a one-cut clover, it does not produce regrowth into summer except under very moist conditions. It is best used as a specialty legume for wet, poorly drained areas. Under these conditions, 2 or 3 pounds of alsike plus 1/2 pound ladino per acre is an excellent choice.

Annual lespedeza
Lespedeza has a wide range of adaptation from very fertile soils to those extremely low in nutrients. It responds to fertility, but at high fertility levels does not produce as much as other legumes. It is very palatable, produces high animal gains and does not produce bloat.

Lespedeza can die out due to high soil pH, allowing other crops to compete. Also, Korean lespedeza can die out because of disease susceptibility and Kobe lespedeza can die out because of late flowering, causing poor reseeding.

Management of new seedings

Continue to graze new seedings in the spring until livestock begin to bite off the young legumes. Then rest the pasture for four or five weeks. Practice rotational grazing following the rest period until about Sept. 1 to Sept. 10. At that time, avoid grazing a new stand of legume until cold weather has begun. Don't overgraze during the establishment summer.

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Related MU Extension publications

- G4515, Annual Lespedeza
  http://extension.missouri.edu/publications/DisplayPub.aspx?P=G4515
- G4550, Alfalfa
  http://extension.missouri.edu/publications/DisplayPub.aspx?P=G4550
- G4638, Red Clover
  http://extension.missouri.edu/publications/DisplayPub.aspx?P=G4638
- G4639, White, Ladino and Sweet Clover
  http://extension.missouri.edu/publications/DisplayPub.aspx?P=G4639
- G4640, Birdsfoot Trefoil
  http://extension.missouri.edu/publications/DisplayPub.aspx?P=G4640
- G4652, Seeding Rates, Dates and Depths for Common Missouri Forages
  http://extension.missouri.edu/publications/DisplayPub.aspx?P=G4652

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