LEGUMES IN GRASS PASTURES

INTRODUCTION:
Much of the pastureland in the Midwest is neglected and abused, and the true potential is not realized. When cattle prices are down, it is important to make better use of existing forages to get the maximum return on investment.

It is 1.5 times more expensive to meet an animal’s nutritional need with hay as it is with grazing thus making the need for high quality pasture much more important.

By improving our existing pastures we can help offset low cattle prices, along with improving the quality and value of the land you depend on.

BENEFITS:
Improved animal performance, especially on infected tall fescue pastures.

Increased weaning weights; increases of 30 to 150 lbs. have been reported. Increased gains from 0.2 to 1 lb./day.

Nitrogen fixation from legumes adds nitrogen making it available to companion grasses. Very little N is transferred from living legumes directly to grasses. Grasses benefit from N fixed by legumes when the legumes decompose.

FOUR STEPS TO ESTABLISHING AND MAINTAINING LEGUMES IN MIXED PASTURES:

ENSURE ADEQUATE SOIL FERTILITY:
In general, legumes require higher fertility than do grasses.

Soil testing is very important if soil fertility is not known.
Pasture soil tests should be taken six inches deep to give a more adequate fertility reading. The top three inches may show high fertility due to accumulation of manure and plant litter and give a false reading of the true fertility of the soil.

Low soil pH is frequently the first limiting factor in legume establishment.
Optimum pH for pasture plant growth is 5.5 to 7.0 with ideal pH being 5.8 to 6.5. If pH is low, apply required lime six months in advance prior to interseeding legumes.
Nitrogen, phosphorous, and potassium make up most of the fertilizer applications used in the Midwest. Nitrogen is the key component of proteins and is often the most limiting nutrient in grassland systems, and is beneficial for plant cell division.

Phosphorous is essential to all energy conversions in plants, and is a key element in seedling growth. Phosphorous is also critical for maintaining legumes in mixed pastures.

Potassium is taken up by plant roots and is very important in plant water relations. K is also instrumental to plant vigor, disease resistance, and winter hardiness. Annual K applications are important to insure persistence of legumes in mixed pastures.

CONTROL OF EXISTING VEGETATION:
If legumes are to survive in grass sods, then the existing vegetation must be controlled. Competition exists both above and below ground. Above ground competition is for physical growth, space, and sunlight whereas below ground competition is for water and soil nutrients.

Keeping the grass short in the spring may not be enough to allow for successful legume establishment. Forward planning needs to be considered to weaken the existing root system. Existing vegetation can be managed through grazing, burning, chemical application, mechanical disturbance or a combination of practices.

GRAZING: If this method is considered for vegetation suppression, then timing is critical. If spring legume seeding is considered, heavy grazing in the fall and winter is needed to help weaken the grass root system to reduce grass competition in the spring. Follow fall and winter grazing with heavy spring grazing as early as possible to allow newly seeded legumes a chance to get started. Spring grazing should continue until legumes are up and are supporting a few leaves, then rotational grazing should be considered.

CHEMICAL CONTROL: Gramoxone or Roundup can be used to suppress or nearly kill existing sods in the spring. Chemical control is more effective in the spring if it is preceded by heavy fall grazing.
BURNING: This can be an effective tool in grass suppression if it is done at the proper time. The ideal time to burn grasses is shortly after greenup but before there is too much new growth to retard the spread of fire. At this stage, carbohydrate storage levels will be lowered and the plant will be weakened to allow for legume establishment. Burning at the wrong time can actually be detrimental to newly seeded legumes. Cool season growth can actually be stimulated if grass is burnt while it is in the dormant stage. If burning is delayed until several inches of new growth has occurred then fire will not burn effectively and grass will not be suppressed. To help maintain grass suppression, follow by grazing.

Caution should be taken before burning to prepare firebreaks and have adequate fire control personnel and equipment available in case the fire would get out of control.

TILLAGE: Sod suppression can be accomplished with minimal tillage if no other options fit your operation. A disk set at a moderate angle can provide adequate sod disturbance to reduce grass competition. If heavy fescue or bromegrass sods are being renovated, then several passes with a disk may be needed to assure good seed to soil contact for legumes. Spring tooth harrows or field cultivators may also be used for sod disturbance. The major advantage of the tillage option is that more species can be successfully broadcasted if the ground has been roughened.

SEED EFFECTIVELY:
Seed to soil contact is crucial to successful legume establishment. Several methods can be employed to accomplish this.

FROST SEEDING: Legume seeds, due to their denseness, will readily work into the soil with several freeze-thaw cycles. Success in legume establishment depends on the cold tolerance of the crop in the seedling stage. Due to their high seedling vigor and frost tolerance, red and white clover are the first choices for frost seeding. Lespedeza can be successfully frost seeded because it needs higher soil temperatures to germinate, and generally doesn’t germinate until the danger of the last frost has passed.

Alfalfa and birdsfoot trefoil are less cold tolerant than the clovers and lespedezas making them more susceptible to failure when frost seeded.
Frost seeding can be successful if seed is broadcast in early February in Southern Missouri and late February to early March in Northern Missouri. Seed to soil contact is most important for frost seeding to be effective; therefore, one of the vegetation control methods mentioned earlier must be implemented. Chemical suppression should be applied the previous fall, and grazing in the spring will allow some of the seed to be trampled into the soil if soil moisture is not excessive. If sod is killed in the spring, too much mulch may remain to prevent seed to soil contact. Pasture burning in the spring will usually occur too late in the spring to work well with frost seeding.

If a harrow is used in early spring to spread existing manure, broadcast seeding often works better than frost seeding. If the last frost is over, and a harrow is used to spread manure, then now would be the best time to broadcast alfalfa and birdsfoot trefoil. A high success rate can be achieved if slight soil disturbance through tillage is combined with broadcast seeding and harrowing.

NO-TILL DRILLING: This can be used after the last frost to establish any common legume in combination with any of the sod suppression methods already described. Quicker and more uniform stands can occur because the drill ensures good seed to soil contact. Alfalfa and trefoil can be sown with more confidence by using a no-till drill. Optimum dates for no-tilling legumes range from mid-March in the South to mid-April in the North.

MANAGEMENT FOR STAND MAINTENANCE:
Fertility maintenance and grazing management are necessary for proper legume existence in pastures. In a well managed pasture situation, most manure can be returned to the grazing area reducing the need for maintenance fertilization; however, soil nutrients will be concentrated in shade and watering areas making it necessary to soil test every two to three years.

Planned rest periods are needed to keep legumes present in grass pastures. White clover will persist to a certain degree under continuous grazing, but will be more productive if allowed periodic rest opportunities. Length of rest periods will vary depending on the legume and the growing conditions being as short as 20 days to as long as 40 to 45 days.
Short-lived perennials, like birdsfoot and red clover should be allowed to naturally reseed or be mechanically reseeded every other year. Natural reseeding requires a minimum of 40 days and can occur at any time of the growing season, but the best time is late summer. Seed production may be better in the spring but the quality of the forage will suffer with a long waiting period at that time of the year.

Pastures with alfalfa may require insect control for both alfalfa weevil and potato leafhopper. Chemical control or top grazing in a fast rotation can eliminate weevil infestations. Mobility of leafhoppers make them harder to control, but by grazing fairly short in midsummer when leafhopper problems usually occur, the pests can be driven to greener fields and damage kept to a minimum.

SUMMARY:
Several factors are involved in successful legume interseedings. First, meet the fertility requirements for the desired legume. If fertility is lacking add fertilizer and lime well in advance of seeding. Second, control the existing vegetation through either grazing, clipping, chemical control, burning, or tillage. Combine treatments if necessary. Remember to reduce the competition both above and below the ground. Third, do an effective job of seeding to ensure good seed to soil contact. Seeding date and method need to be scheduled to meet the needs of the individual legume species. Fourth, manage the fertility and grazing to favor legume growth.