

Are Annual Clovers Ready for the Nitrogen Fertilizer Crises?

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In May 2008, the cost of a pound of nitrogen fertilizer had risen to over 70 cents with further increases expected. At that price it is probably not economical to apply commercial nitrogen fertilizer to grasslands that are used for grazing livestock. The economic value of annual clover benefits and interest by livestock producers has never been higher.

Benefits of overseeding annual clovers on warm-season perennial grasses have been reported in many studies throughout the southeastern United States. When overseeded on a warm-season perennial grasses clovers 1) extend the grazing season by 4-6 weeks which reduces the winter feeding cost, 2) provide higher nutritive forage than grasses which improves animal performance, 3) add atmospheric nitrogen to the pasture system through symbiotic N₂-fixation, and 4) provides some spring weed control though plant competition. A 4 year grazing study in southeast Texas comparing 150 lb of N/acre on dallisgrass with a white clover-dallisgrass pasture system showed the economic value of using a clover at almost \$200/cow-calf pair.

Nitrogen contribution by the clover is the main reason for producer interest in clovers. However it is the least understood clover benefit by producers and researcher alike. The presence of an infective and effective *Rhizobia* strain that varies with clover species is essential for good N₂-fixation. Maintaining viable *Rhizobium* on the seed until germination is essential. Because the *Rhizobium* are dependent on the legume plant for energy, any factors affecting legume growth influences the N₂-fixation process. Clover growth is influenced by soil pH, nutrient deficiencies, moisture, temperature, grass and weed competition, diseases, insects, and defoliation by livestock.

Factors that limit the expanded use of clovers by livestock producers in the southeastern United States are 1) more intensive management is required for a clover-grass system than a nitrogen-grass system, 2) annual clovers are more soil specific than grasses and therefore numerous clover species are needed for the southeastern United States, 3) annual clovers must be planted each fall or managed for reseeded, 4) herbicides for weed control in clovers are vary limited and generally ineffective, 5) Grazon P+D, a popular herbicide for warm-season perennial grasses, will persist in the soil and can be phytotoxic to emerging clover in the fall.

The future of annual clovers is bright because high nitrogen fertilizer prices are forcing livestock producers in the southeastern United States to grow legumes. Information on species adaptability, establishment, and management is available. The most urgent research need is for identifying effective *Rhizobium* strains, enhance their survival, and gain a greater understanding of the symbiotic N₂-fixation process.