

ROLES OF CLOVERS IN SOUTHEAST U.S.A. PASTURES

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ABSTRACT

Grasses dominate pastures in the Southeast U.S.A.; research and farmer experience have shown that the addition of legumes to grass dominant pastures can improve environmental, agronomic and animal parameters. Legumes grown in mixtures with grasses can increase yield, improve forage quality and animal performance, convert atmospheric nitrogen into a form useable by plants, extend the grazing season, and offset certain animal disorders. As livestock producers continue to strive for more sustainable feed production and utilization programs with greater emphasis on grazing, legumes will play an even greater role in Southeast U.S.A. agriculture.

KEYWORDS

Legume, renovation, grazing, mixtures

INTRODUCTION

Cool and warm season perennial grasses dominate the pasture lands throughout the Southeast U.S.A. (Ball, 1991; Lacefield, 1993, 1995). Legumes grown alone or in mixtures with grasses have played an important role in animal agriculture throughout the region. Their role and importance are expanding with greater emphasis on sustainable agriculture and grazing, biological nitrogen fixation and environmental issues. Their future roles will be even more important as we exploit the unique characteristics of these special plants.

ROLES OF LEGUMES

The overall role of legumes in Southeast U.S.A. pastures is to improve grass pastures. These improvements involve environmental, economic or agronomic parameters. Studies have shown many advantages for growing legumes in association with grass throughout the Southeast U.S.A. (Ball, 1991; Hoveland, 1989; Matches, 1989; Lacefield, 1993, 1995 and Evers, 1986). Although many advantages exist for growing legumes with grass, the most important include: improved forage quality, biological nitrogen fixation, extended growing season, increased forage yield and offsetting of certain forage-related disorders.

Improve forage quality. Adding legumes to grass dominant pasture fields usually improves quality over grass alone (Ball, 1991; Lacefield, 1993, 1995). This added quality includes increased palatability, intake and digestibility. Research has shown that legumes improve animal growth rates, reproductive efficiency and milk production (Hoveland, 1981; Ball, 1991, 1993; Lacefield, 1993, 1995).

Biological nitrogen fixation. A unique and vitally important relationship exists between legumes and *Rhizobium* bacteria. This symbiotic relationship results in the conversion of atmospheric nitrogen into a chemical form that the legume plants can use to make many nitrogen containing compounds. The most significant and agronomically important of these nitrogen compounds is protein. The amount and value of nitrogen "fixed" per hectare depends on legume species, growing conditions and price of nitrogen fertilizers (Matches, 1989; Ball, 1991; Lacefield, 1993, 1995). In addition to the nitrogen for the legumes, some of the "fixed" nitrogen is available to the grass plants growing in association with the legumes.

Increased forage yields. The total yield of forage per hectare is likely to be increased from legume-grass mixtures over grass alone, unless high levels of nitrogen (N) fertilizer are used on the grass. Studies conducted in the Southeast U.S.A. comparing tall fescue (*Festuca arundinacea*) nitrogen with tall fescue grown in association

with red clover (*Trifolium pratense*) have shown increased yields (Hoveland, 1981; Ball, 1991, 1993; Lacefield, 1993, 1995). Total yield of tall fescue-clover was higher than tall fescue fertilized with 180 Kg N Ha⁻¹.

Improved seasonal distribution of growth. Most cool-season grass growth occurs during spring and autumn. In general, cool season forage legumes make more growth during summer than cool season grasses. The amount of growth during summer varies with growing conditions and legume species. Alfalfa (*Medicago sativa*) with its deep root system makes excellent growth during summer and can provide high quality pasture when cool-season grasses are relatively unproductive.

Addition of cool season annual legumes to warm season grasses permits production of quality feed during winter and early spring when pastures would otherwise be unproductive. Seeding cool season legumes into warm season perennial grass sods can substantially lengthen the grazing season.

Nutrients in the form of pasture are usually significantly cheaper than for stored feed. Improving the seasonal distribution of pasture and lengthening the grazing season can have a positive effect on production cost by reducing the amount of stored feed required.

Offsetting of livestock related disorders. Legumes can play an important role in reducing the effect of various livestock disorders resulting from grazing grass alone (Lacefield, 1980, 1993; Ball, 1991). A survey (Lacefield, 1993) showed "growing legumes with tall fescue" is the number one strategy used by beef cow-calf producers to offset disorders caused by the endophyte of tall fescue. Grass tetany is another animal disorder reduced or eliminated by the presence of legumes in the diet of grazing animals (Lacefield 1980; Ball 1991).

Other roles of legumes include: improved soil tilth, improved production of other crops in rotations, nectar and pollen for bees, food for wildlife and aesthetics. While these roles are less frequently discussed, they too are important and add to the overall benefits derived from using legumes.

SUMMARY

Legumes have played an important role in animal agriculture for decades. They offer numerous unique benefits which complement the perennial grasses which dominate pastures in the Southeast region. These benefits have not changed. Scientists fifty or more years ago would have stated the same reasons for using legumes as have been discussed in this paper. However, it appears that recent sociological, technological, and economic developments have increased the value of the benefits forage legumes offer and thus the incentives for using them within the Southeast in the future are greater. Livestock producers today are under pressure to minimize expenses, improve animal performance, and develop more sustainable operations. It appears that it is appropriate to place renewed emphasis on these special plants and further exploit their unique characteristics.

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