PRODUCTION OF FODDER GRASSES AND LEGUMES IN INTENSIVE RUMINANT PRODUCTION SYSTEM

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Introduction

Land size is a constraint faced by many ruminant livestock producers. To maximise fodder production in a limited land area, fast-growing grasses are often planted with heavy application of nitrogen fertilisers. In grazed pastures, legumes are sometimes used in place of nitrogen fertilisers but this is not commonly practised for cut fodder. King grass (*Pennisetum purpuroides*) is a high-yielding fodder grass hybrid between napier grass (*P. purpureum*) and pearl millet (*P. typhoides*). The objective of this project is to compare forage production and quality of king grass planted with legumes with that grown as nitrogen-fertilised pure swards. Two shrub-type legumes were used, namely *Leucaena leucocephala* (Leucaena) and *Gliricidia sepium* (Gliricidia). Use of legumes in place of inorganic nitrogen will reduce production costs besides curbing environmental pollution from surplus nitrates draining into waterways.

Materials and Methods

The experiment was conducted in an area with an existing a 5-yr old stand of leucaena and gliricidia. Treatments comprised i) King grass alone without N fertiliser (control), ii) King grass with 300 kg/ha N, iii) King grass in interrows of gliricidia, iv) King grass in interrows of leucaena, v) Gliricidia grown alone, and vi) Leucaena grown alone. Plot size was 9m x 4m and planting rows were 1 m apart. Foliage of grasses and legumes were harvested at 6 weekly intervals over a period of 21 months. A total of 15 harvests was taken during the course of the experiment. Harvested samples were weighed after drying and analysed for protein, neutral-detergent fibre (NDF), acid-detergent fibre (ADF) and lignin concentrations.

Results and Discussion

Yield of king grass planted in interrows of either legume was significantly higher than that grown alone even with fertiliser N. Dry matter yield of king grass in t/ha/year (sole-crop equivalent) was 35.5, 36.8 for those planted with gliricidia and leucaena, respectively. When planted alone, king grass yielded 22.5 and 17.0 t/ha/yr with and without N fertilisers, respectively. In addition, king grass planted with legumes gave a significantly greater protein content (8.4%) compared to those grown alone (6.4%). No difference was found between treatments in terms of NDF and ADF and lignin concentrations. The results indicate that planting king grass in interrows of legumes was beneficial not only in terms of dry matter yield but also its nutritive quality. The positive effects of legumes may not arise solely from its nitrogen-fixing capability as yield and protein concentration of N-fertilised king grass were inferior to those planted with legumes. The deeper roots of legumes which had been planted earlier may enhance grass growth through reduced plant competition for water and nutrients. The legumes may also be able to bring up nutrients from the lower horizons of the soil. Dry matter yield of legume forage (between 5 to 7 t/ha/yr) was not significantly affected by the presence of king grass in the interrows. This supports the view that the two species are competing for different 'space' and the benefit to one species is not at the detriment of the other.

Conclusions

Planting king grass in the interrows of shrub legumes brings benefit to the livestock farmer in terms of increased yield and protein content. In addition to the grass, he also has access to a protein bank provided by the leguminous forage.

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