

Yield and quality of annual ryegrass grown in pure stand and in mixtures with squarrosium clover

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Introduction The objective of this study was to evaluate the importance of growing annual ryegrass in mixtures instead of ryegrass alone in order to reduce nitrogen application and thereby lowering production costs, and environmental pollution.

Materials and methods The treatments consisted of annual ryegrass as pure stand (AA), 75% of annual ryegrass + 25% clover squarrosium (25% TS), 50% of annual ryegrass + 50% clover squarrosium (50%TS), 25% of annual ryegrass + 75% clover squarrosium (75%TS). In each treatment there were four sub-treatments of nitrogen levels applied after seeding and each harvest: 0, 50, 100 and 150 kg/ha. The experiment was conducted under rainfed conditions for two years (2001/02 and 2002/03). The first year was a normal year (598 mm) with a very rainy autumn, and the second year was dry (478 mm), as compared to the average for 1941/70 (574 mm). The field trial was conducted as a split-plot design at “Revilheira” Farm, 60 km from Évora. The soil type was a vertic luvisol with 16 and 16 mg/kg of available phosphorus, 70 and 104 mg/kg available potassium, 1.16 and 1.26% organic matter, and pH (H₂O) values 6.2 and 5.6, respectively in 2001 and 2002. Dry matter (DM) yield, crude protein, and DM digestibility were determined according to Lourenço & Palma (2001).

Results Dry matter yields (Figure 1) tended to increase with nitrogen application especially for ryegrass alone and the mixture with 25% TS, at the two highest nitrogen levels, probably because when nitrogen is applied the grass benefits more than the legume (Vallis *et al.*, 1977). The greatest benefit of increasing *Trifolium squarrosium* in the mixture occurred with respect to crude protein yield (Figure 2) when nitrogen applied was lower than 50 kg/ha. The trends for digestible DM yield (Figure 3) were similar to those for DM yield.

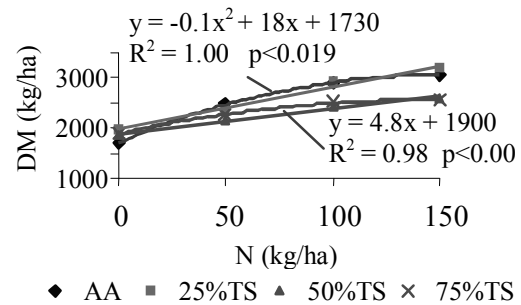


Figure 1 Dry matter yield over the two-year period

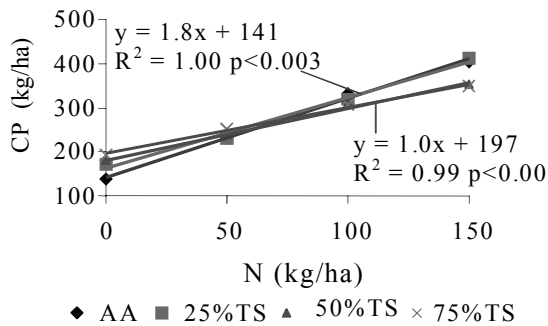


Figure 2 Crude protein yield over the two-year period

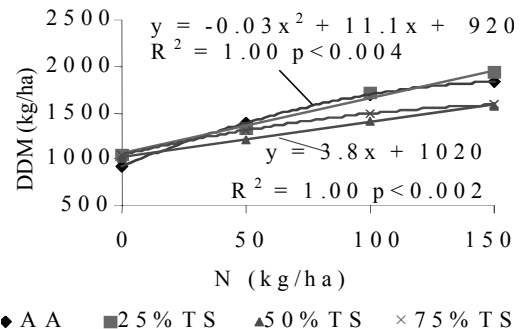


Figure 3 Digestible dry matter yield over the two-year period

Conclusions This study shows the importance of increasing the percentage of the clover in the mixtures, at the lowest nitrogen levels, especially with respect to crude protein yield. As the nitrogen rates were increased, there was a trend to get higher yields with ryegrass alone and with the mixture with 25% *Trifolium squarrosium*.

References

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