Extending pasture quality later into the season

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ABSTRACT

The feed quality of 4 annual pasture legume species - *T. michelianum* (balansa clover cv. bolta), *T. subterraneum* (subterranean clover cv. Leura), *T. resupinatum* (Persian clover cv. nitro) and *T. vesiculosum* (arrowleaf clover cv. Arrowtas) - was determined for 4 sampling periods between June 1998 to January 1999. Arrowleaf clover maintained significantly ($P < 0.05$) higher levels of dry matter digestibility and produced significantly ($P < 0.05$) higher dry matter yields later into the season than the other 3 species. There were no significant differences between the species for crude protein. The superior yields and feed quality of arrowleaf clover were attributed to its later maturity. These results have implications for increasing farm profits by extending the growing season and enabling farmers to maintain higher stocking rates throughout the year.

KEY WORDS

Arrowleaf, balansa, Persian, subterranean clover, crude protein, dry matter digestibility.

INTRODUCTION

Animal production (beef and sheep) in south-western Victoria is reliant on subterranean clover and perennial ryegrass based pastures with the main growing season between April/May and November. The need to provide supplementary feed to stock during the summer and autumn periods (January to April) adds significantly to the cost of production for farmers. One way to reduce this cost is to extend the life and quality of the pasture and thus reduce the length of the summer/autumn 'feed gap'. This may be achieved in the high rainfall zone through the introduction of high quality, late maturing pasture legume species (1, 3). Experiments conducted at Streatham in south-western Victoria suggest that *Trifolium vesiculosum* (arrowleaf clover) may fulfil this role.

MATERIALS AND METHODS

Four pasture legume species *T. michelianum* (balansa clover cv. bolta), *T. subterraneum* (subterranean clover cv. Leura), *T. resupinatum* (Persian clover cv. nitro) and *T. vesiculosum* (arrowleaf clover cv. Arrowtas) were selected from the National Annual Pasture Improvement Program (NAPLIP) evaluation trials based on superior dry matter yields and persistence. Legumes were sown as monocultures in plots 4.5 m x 10 m in May 1997 at Streatham (average annual rainfall – 600 mm; soil type - fine sandy clay loam with pH 5.8 in $CaCl_2$). The trial was a randomised block design with 4 replicates. Dry matter yields were determined 4 times during the year; winter (growth from June to August), mid-spring (September to October), late spring (November) and summer (December to January) using an electronic pasture probe and quadrat cuts. Plots were not grazed during the sampling period. Harvested legume material was oven-dried to a constant weight at 60°C and ground to 1.0 mm in a cyclotec mill. Percentage crude protein (CP) and dry matter digestibility (DMD) were analysed through near infra-red spectrophotometry (NIR) (4). Statistical analysis of data was performed using analysis of variance (2).

RESULTS AND DISCUSSION

Both CP and DMD of all species decreased as the season progressed. Mean CP levels ranged from 29.9% in winter to 15.6% in summer. Mean DMD levels ranged from 77.8% in winter to 53.8% in summer. There were no significant differences between legume species for either CP or DMD early in the season. However, as the season progressed, the arrowleaf clover maintained a significantly ($P < 0.05$) higher DMD

level than the other 3 species. There were no significant differences between the species in CP (Figure 1).

Arrowleaf clover also produced significantly ($P < 0.05$) higher dry matter yields between September 15 and November 25 (total 9.6 t/ha at 135 kg/ha/day) compared to cvs. bolta (6.1 t/ha at 86 kg/ha/day), nitro (6.4 t/ha at 90 kg/ha/day) and Leura (1.1 t/ha at 16 kg/ha/day) (Figure 2).

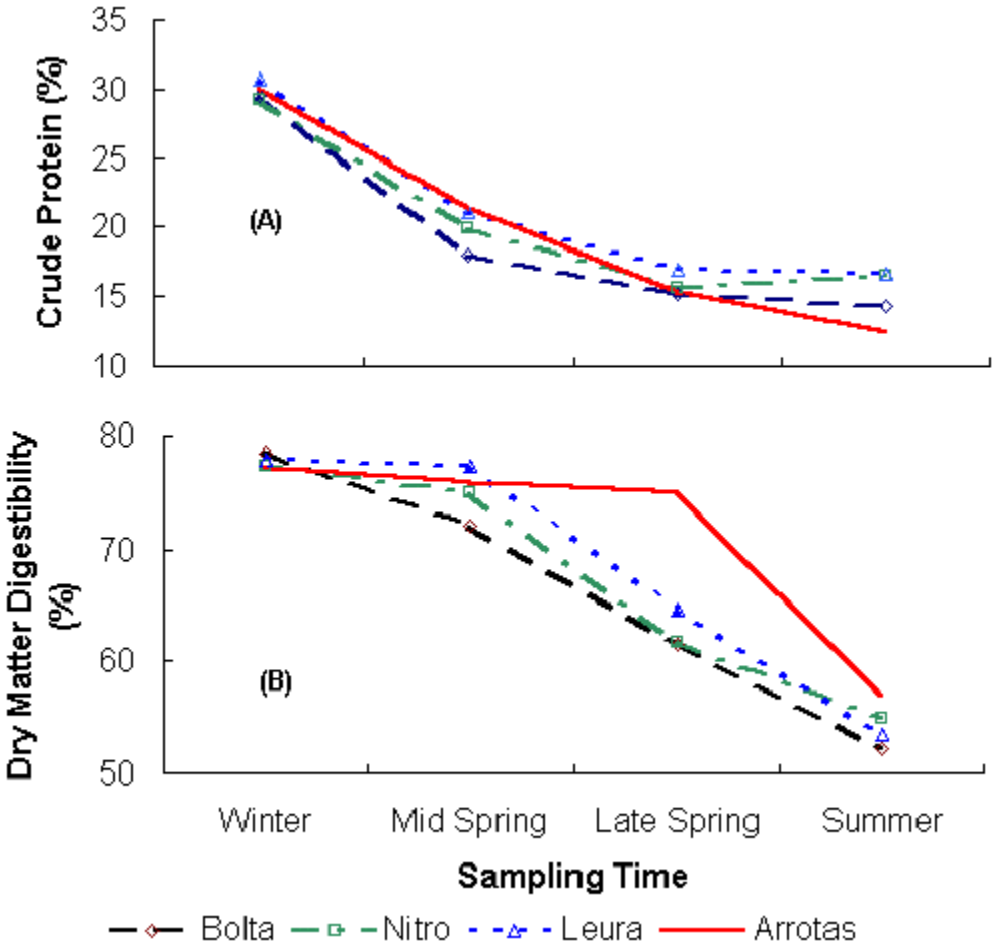

Figure 1. Percentage crude protein (A) and dry matter digestibility (B), of arrowleaf clover (cv. Arrowtas), Persian clover (cv. nitro), balansa clover (cv. bolta) and subterranean clover (cv. Leura) at 4 sampling times at Streatham, south-western Victoria.

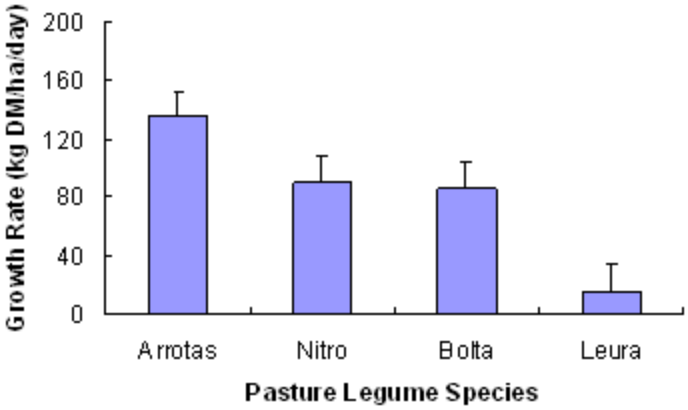

Figure 2. Dry matter growth rates (kg/ha/day) of arrowleaf clover (cv. Arrowtas), Persian clover (cv. nitro), balansa clover (cv. bolta) and subterranean clover (cv. Leura) between September 15, 1999 and November 25, 1999 at Streatham.

The superior feed value and higher yields of arrowleaf clover later into the season were attributed to its' later maturity with the number of days to flowering from October 1 being 59 days compared to 20 days for both bolta and nitro, and 33 days for Leura.

Future experiments will be conducted on a larger scale to determine animal production and the ability to increase annual stocking rates through the use of arrowleaf clover.

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