

Characterisation of grazing oat cultivars for forage quality

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Introduction

Grazing varieties of cultivated oat (*Avena sativa* L.) are widely grown in eastern Australia during the winter months, providing high quality forage for livestock when native and improved pastures are dormant. The Department of Primary Industries and Fisheries in Queensland operates a breeding program to develop high yielding, commercial varieties of grazing oat. However, little information is available on the forage quality of commercial cultivars. In this study, we asked:

1. Does genetic variability exist for forage quality traits?
2. Has selection for high forage yield affected forage quality traits such as protein and digestibility?
3. Do fine-leaved prostrate varieties have better forage quality than broad-leaved erect varieties?

Methods

- Samples of cut forage were taken from a set of 12 varieties with varying plant type and yield level, for three selected cuts at three locations over three years
- Samples were dried at 60°C for four days, ground and analysed using an NIR spectrophotometer
- A representative subset of samples was sent to SGS Agritech Pty Ltd, Toowoomba, for wet chemistry analysis to determine crude protein, digestible protein, acid detergent fibre, neutral detergent fibre, digestible dry matter and soluble carbohydrate content
- Using the wet chemistry data, predictive data were generated for all samples from the NIR analysis
- For a preliminary data analysis, a subset of data was selected using six varieties over two years (2006, 2007), two sites (Eastern Downs – low yield, Lockyer Valley – high yield) and two cuts (early and late).

Discussion

- There were no significant differences between genotypes for any of the forage quality traits measured
- Site, year and cutting time effects were highly significant for most of the traits measured
- Samples from the low yield site (Eastern Downs) had a higher level of soluble carbohydrates than samples from the high yield site (Lockyer Valley)
- Crude protein content of samples from the early cut was higher than in the late cut
- Acid detergent fibre levels were higher in the late cut compared with the early cut, but there was no difference between varieties or between sites
- Neutral detergent fibre content (data not shown) was higher in the late cut compared with the early cut, and there were no differences between varieties or sites
- Conclusions:
 1. Variety selection within the grazing oat cultivars tested by this study is unlikely to produce a significant difference in live weight gain in cattle;
 2. Selection for forage quality traits within this breeding program is unlikely to be successful;
 3. Selection for high yield in this breeding program has not significantly affected forage quality;
 4. There is no significant forage quality advantage in varieties with a fine-leaved prostrate plant type.

Results

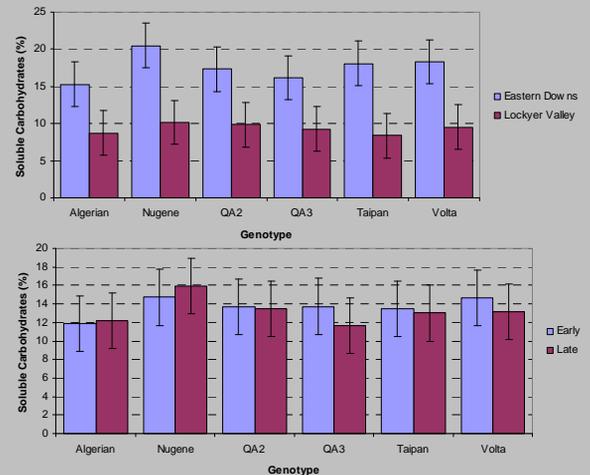


Figure 1: Soluble carbohydrate content of dried forage samples of six oat cultivars from two locations and two cutting times (early & late in growing season) in southern Queensland, Australia.

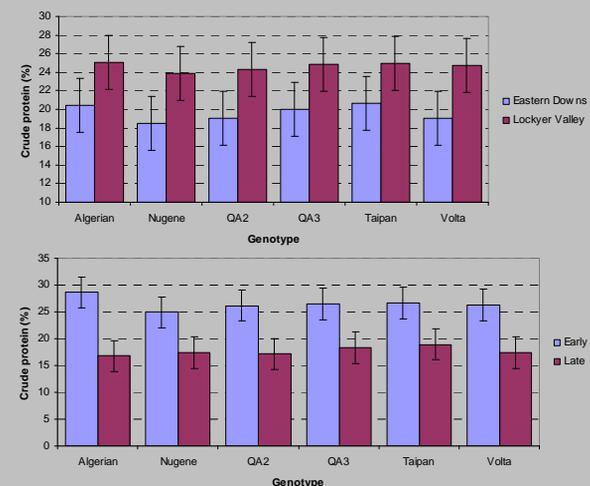


Figure 2: Crude protein content of dried forage samples of six oat cultivars from two locations and two cutting times (early & late in growing season) in southern Queensland, Australia.

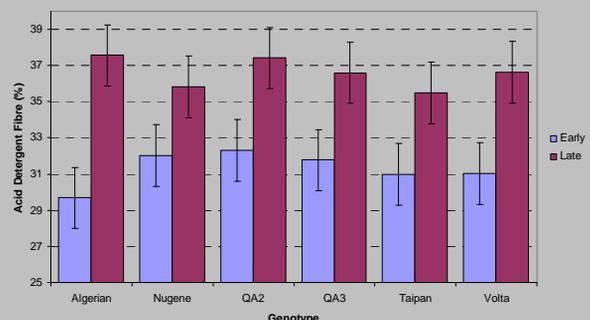


Figure 3: Acid detergent fibre content of dried forage samples of six oat cultivars from two cutting times (early & late in growing season) in southern Queensland, Australia.

