

## VARIABILITY IN NUTRITIVE VALUE ALLOWS BETTER SELECTION OF PERENNIAL PASTURE LEGUMES

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The major criteria for selection of improved forage varieties for ruminants have been to optimize yield and digestibility along with the need to minimise disease susceptibility and maintain other agronomic traits (Beever 1993). Relatively little regard has been given to the deliberate selection and breeding of plants for other components of feeding value for ruminants. Feed quality (digestibility, protein and fibre content) and presence of anti-nutritional factors are major determinants of animal performance and grazing preference. It is important to ensure that new releases of pasture legumes have desirable feed qualities and do not contain compounds that cause illness or taint animal products, eg. coumerins, tannins and cyanogens. This study aims to characterise a diverse range of alternative perennial pasture legumes for quality and anti-nutritional characters and to demonstrate the variation that exists within and between these plant species with a view for exploitation through selection and breeding.

Whole plants were sampled from the Department of Agriculture (WA) Perennial Pasture Legume Breeding Program at Medina, 30kms south of Perth. Representative samples were taken from approximately 100 accessions, ranging across 27 species, in June and October 2000. Samples were analysed for *in vitro* dry matter digestibility (IVDMD), crude protein (CP), and tannin content.

There was substantial variation between and within species in all quality traits (Table 1). Many of the accessions (eg *Trifolium* spp) had very low levels of tannin while some (eg *Dorycnium*) had very high levels that would be likely to result in reduced intake and digestibility by ruminants (above 6% total tannin). The ranking of accessions did not remain consistent at both harvest dates, and hence the selection of superior genotypes may be complicated; it will be necessary to assess them at strategic times throughout the year. Correlations between different traits were only weak when present, and hence selection for progress in one trait may not ensure progress in another.

**Table 1. Average (and range) in *in vitro* dry matter digestibility (IVDMD), crude protein (CP) and total tannin content of some alternative perennial pasture legumes harvested in June and October 2000.**

Species name	Common name	June			October	
		IVDMD (%)	CP (%)	Tannin Content (%)	IVDMD (%)	CP (%)
<i>Dorycnium hirsutum</i>	Hairy canary clover	52.3 (47–55)	12.9 (11–14)	3.87 (1.8–6.7)	55.4 (49–61)	13.6 (6–19)
<i>Hedysarum coronarium</i>	Sulla	69.8 (65–74)	17.3 (17–18)	3.02 (1.3–4.7)	68.7 (66–70)	15.3 (13–18)
<i>Lotus corniculatus</i>	Birdsfoot trefoil	67.1 (50–75)	15.7 (7–20)	1.80 (0 <sup>a</sup> –6.1)	66.7 (51–77)	16.5 (6–21)
<i>Lotus tenuis</i>	Narrow-leaf trefoil	72.8 (67–77)	17.5 (12–20)	0.26 (0 <sup>a</sup> –0.7)	69.4 (55–77)	18.1 (11–24)
<i>Melilotus officinalis</i>	Yellow sweet clover	72.9 (69–76)	14.5 (11–17)	0.07 (0.02–0.15)	75.8 (74–79)	19.6 (7–29)
<i>Trifolium fragiferum</i>	Strawberry clover	74.9 (72–79)	21.7 (19–25)	0.15 (0.05–0.25)	76.2 (75–78)	17.9 (17–19)
<i>Trifolium hybridum</i>	Alsike clover	77.8 (74–82)	18.8 (15–21)	0.08 (0.05–0.11)	75.5 (76–80)	19.4 (12–27)

<sup>a</sup>Tannin content undetectable (less than approx 0.01 %).

There is substantial variation in the nutritive value of perennial legumes that could be exploited through strategic selection and breeding. Rapid, inexpensive screening techniques such as near infrared reflectance spectroscopy (NIRS) are now being developed that will greatly enhance our ability to screen genotypes earlier in the breeding program.

BEEVER, D.E. (1993). *Proc. XVII Int. Grassld Congr., New Zealand*. p. 535-42.

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