Effect of dairy effluent on turnip nutritive characteristics

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Introduction In southern Victoria, high summer temperatures and low rainfall lead to low pasture growth and a decline in nutritional value until rainfall commences in autumn. Annual forage crops such as turnips often are used to fill the summer feed gap. Jacobs & Ward (2003) observed that dairy effluent applied at low rates could improve turnip DM yields and crude protein content. Results from the first two years of a 3-year study comparing a range of effluent application rates on turnip leaf and root nutritive characteristics are reported.

Materials and methods This study was conducted on a commercial dairy farm (38°14'S, 142°55'E) in western Victoria on a Mottled-Sodic, Eutrophic, Brown Chromosol (Isbell 1996) soil. In both years (2002 ,2003) following silage harvesting, the experimental area was grazed and ploughed. Within a week, the area was power harrowed and sown to turnips (*Brassica rapa* cv Barkant) at a rate of 2 kg/ha. From 6–8 weeks after sowing, effluent was applied at 15 mm/ha/d, providing six treatment levels of 0, 15, 30, 45, 60 and 75 mm to random plots (12 m x 12 m) replicated 6 times in a randomised block design. To determine nutritive characteristics, 6 quadrats (1.0 m^2)/plot were collected and sub-sampled for leaf and root 14 weeks after sowing. An analysis of variance (ANOVA) (GenStat Committee 2000) with significance declared if $P<0.05$ was conducted.

Results In both years, dairy effluent contained approximately 29 kg P, 156 kg N, 545 kg Na and 460 kg K/ML. In year 1, leaf (L1) and root (R1) CP was increased ($P<0.05$) at 60 mm compared with the control (Figure 1). In year 2, leaf (L2) CP was increased ($P<0.05$) at 45 mm and higher compared with the control. Leaf water soluble carbohydrate (LWSC) content was reduced ($P<0.05$) at the highest rate of effluent application, compared with all other treatments (Table 1). Root (R2) CP was increased ($P<0.05$) at 45 mm and higher compared with the control, whilst NDF content (RNDF) was higher ($P<0.05$) in the control compared with all effluent applications, except the 15 mm.

Table 1 Effect of dairy effluent on turnip leaf water soluble carbohydrate (WSC) content and root neutral detergent fibre (NDF)content (%DM) in year 2

	0	15	30	45	60	75	l.s.d
L WSC	24.1	23.0	23.5	22.4	22.3	18.9	2.05
R NDF	21.2	21.0	18.9	19.4	19.7	18.9	1.02

Conclusions The application of dairy effluent had a marked effect on turnip leaf and root CP content. Pasture CP content during summer is often low (<10%) and cost of purchasing additional CP is high. The reduction in NDF content is unlikely to be an issue given the fibrous nature of available pasture and conserved feeds used at this time. The use of dairy effluent on turnips may provide greater flexibility in feeding options to maintain milk production during summer.

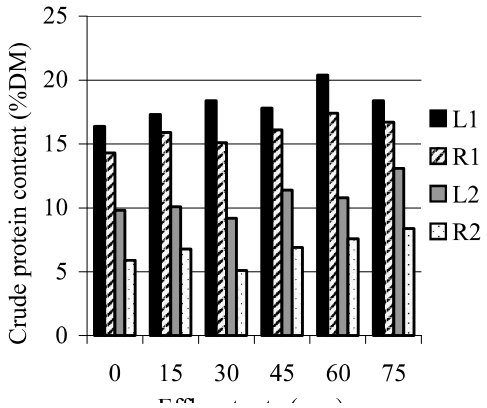

Figure 1 Effect of dairy effluent on turnip leaf and root crude protein content (%DM)

References

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