FEEDING BY REDLEGGED EARTH MITE AND SHEEP ON SIX SUBTERRANEAN CLOVER CULTIVARS

T.J. RIDSDILL-SMITH[Ac], *S.K. BAKER*[Bc] *and R.A. DYNES*[BC]

[A]CSIRO Division of Entomology, Private Bag, PO Wembley, W.A. 6014
[B]CSIRO Division of Animal Production, Private Bag, PO Wembley, W.A. 6014
[C]CLIMA, The University of Western Australia, Nedlands, W.A. 6009

Loss in production of subterranean clover (subclover), *Trifolium subterraneum*, caused by redlegged earth mite (RLEM), *Halotydeus destructor* (Tucker) (Acari: Penthaleidae) (Nicholas and Hardy 1976), and rate of intake by sheep (Dynes *et al.* 1993) both vary with subclover cultivar. In laboratory studies, feeding by RLEM and intake by sheep were determined on the same 6 cultivars of subclover (Table 1).

There were similar mite experiments in 1992 and 1993; 100 older stage RLEM were added to plants that were 3 weeks old (in pots 13 cm in diameter) and after 5 weeks in the glasshouse, feeding damage was scored and mites were counted (Ridsdill-Smith and Gillespie 1993 for methods). In 1992 eating rate by sheep was determined in tests of *ca* 2 minutes each with plants 6 weeks old (in boxes 80 x 50 x 40 cm) (Dynes *et al.* 1993 for methods and experimental design). Concentrations of soluble sugars, soluble nitrogen, starch and phytoestrogens in the 1993 mite experiment, and of soluble sugars and starch in the sheep experiment, were determined in ethanol extracts of harvested foliage.

Table 1. Feeding damage score and numbers of redlegged earth mite after 5 weeks, and eating rate by sheep (g fresh weight/minute), on 6 cultivars of subterranean clover

Subclover cultivar	Mites (1992) (n = 10)		Mites (1993) (n = 10)		Eating rate by sheep (n = 12)
	Feeding damage	Number mites	Feeding damage	Number	
Dalkeith	2.1^{a}	275^{a}	1.7^{a}	354^{a}	58^{bc}
Daliak	1.7^{a}	244^{ab}	1.3^{b}	167^{bc}	61^{bc}
Clare	1.9^{a}	250^{a}	1.1^{b}	207^{b}	76^{a}
Trikkala	1.3^{b}	153^{b}	0.7^{c}	222^{b}	66^{b}
Dinninup	1.0^{bc}	51^{c}	0.5^{c}	69^{c}	54^{c}
Geraldton	0.8^{c}	46^{c}	0.6^{c}	78^{c}	54^{c}

Different letters within columns indicate differences at $P < 0.01$.

Mite feeding damage and numbers of mites produced were greatest on cv Dalkeith, and lowest on cvs Geraldton and Dinninup in both experiments, whereas eating rate by sheep was greatest on cv Clare and lowest on cvs Geraldton and Dinninup (Table 1). Concentrations of chemicals differed among cultivars ($P < 0.05$). We suggest that, if these differences between cultivars are reflected by production responses in sheep and by mite abundance in pastures, it may be possible to select existing cultivars, or to develop new cultivars, for pastures, with characteristics which are favourable to sheep production, but not to RLEM abundance. For instance, there was a negative correlation between numbers of mites and levels of the phytoestrogen Biochanin A ($r^2 = -0.681$, 4 df, $P < 0.05$), whereas eating rate by sheep (g fresh weight/minute) was best explained by $22 - 1.9(\text{cultivar}) + 9.1\ (\text{sugar}) + 1.2(\text{sward height})$ (adj $R^2 = 0.29$, $F_{3,68} = 10.44$, $P < 0.001$).

"The Wool Research and Development Corporation provided support for these studies.

DYNES, R.A., BAKER, S.K., PURSER, D.B. KLEIN, L. and WANG, X.R. (1993). *Proc. N.Z. Soc. Anim. Prod. 53:* 7-9.

NICHOLAS, D.A. and HARDY, D.L. (1976). *J. Agric. West. Aust.* **17: 33-4.**

RIDSDILL-SMITH, T.J. and GILLESPIE, D.J. (1993). *In* "Pest Control and Sustainable Agriculture," (Eds S.A. Corey, D.J. Dall and W.M. Milne) pp. 326-9 (CSIRO: Melbourne).