

Effects of forage chicory (*Cichorium intybus*) on farmed deer growth and internal parasitism

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Introduction Internal parasitism (particularly lungworm - *Dictyocaulus* sp) significantly limits post-weaning growth of deer. Endoparasite control using anthelmintics may be unsustainable, due to the increasing risk of anthelmintic resistance and the risk or perception of chemical residues in animal products. Chicory has a high feeding value and contains sesquiterpene lactones and low levels of condensed tannins, both with anti-parasitic activity (Molan *et al.*, 2003). Grazing chicory during autumn may reduce the requirement for anthelmintic treatment of young deer compared with grazing ryegrass-based pasture (Hoskin *et al.*, 1999). The objective of this study was to investigate the effect of withholding anthelmintic treatment of young deer grazing grass-based pasture or chicory on autumn growth and internal parasitism.

Materials and methods Newly weaned red and wapiti hybrid deer (*Cervus elaphus*) calves (n=68) were allocated to a 2x2 factorial design, rotationally grazing either perennial ryegrass (*Lolium perenne* cv Grasslands Nui, 90%) -based pasture or chicory (*Cichorium intybus* cv Grasslands Puna, 75%) *ad libitum* from March to May 2002 and receiving either the topical anthelmintic Moxidectin ("treated") monthly or remaining untreated ("control"), unless criteria for individual deer treatment were triggered on the basis of fortnightly monitoring (Hoskin *et al.*, 2003). During May, when clinical parasitism became evident in the pasture-grazed control group, five sentinel deer were randomly selected for slaughter from each group. Adult lungworm recovered from the lungs and gastrointestinal (GI) nematodes recovered from the abomasum, small and large intestines were counted. Data were compared by ANOVA (GLM, SAS Institute Inc, USA) with forage type, anthelmintic treatment, animal sex and genotype and interactions as factors.

Results Growth of deer grazing chicory exceeded that of deer grazing pasture (P<0.001) and growth of treated deer exceeded growth of control deer on pasture (P<0.001), but not on chicory (Table 1). A significant type of forage by anthelmintic treatment interaction was found for deer growth (P<0.05). Clinical parasitism was not observed in deer grazing chicory, resulting in zero anthelmintic usage in control deer, whereas 35% of control deer on pasture required anthelmintic. Table 1 also shows that the control deer grazing chicory had half the lungworm population of deer grazing pasture and also harboured 18% fewer GI parasites (both P<0.10).

Table 1 Mean liveweight gain, percentage of control animals requiring anthelmintic and total lungworm and gastrointestinal (GI) nematode populations per animal of deer grazing either ryegrass-based pasture or chicory

Forage	Pasture		Chicory		SEM
	Treated	Control	Treated	Control	
Anthelmintic treatment	Treated	Control	Treated	Control	
Liveweight gain (g/d)	134 ^a	60 ^b	208 ^c	175 ^c	11.8 ¹
Clinical parasitism (%)	-	35	-	0	¹
Lungworm (no.)	1	643	0	311	115.2 ²
GI nematodes (no.)	0	2642	52	2240	373.7 ²

^{abc} letters designate significant differences between treatments (P<0.05 or better). ¹n=17, DF=32, ²n=5, DF=8.

Conclusions There is an important potential role for alternative forages in sustainable deer production systems. Further research is required on the relative contributions to endoparasitism of secondary-compound-mediated, direct anthelmintic effects, compared with indirect nutritional, plant morphological and sward structure effects.

References

- Hoskin, S.O., T.N. Barry, P.R. Wilson, W.A.G. Charleston & J. Hodgson (1999) Effect of reducing anthelmintic input upon growth and faecal egg and larvae counts in young farmed deer grazing chicory and perennial ryegrass/ white clover pasture. *Journal of Agricultural Science, Cambridge*, 132, 335-345.
- Hoskin, S.O. W.R. Pomroy, I. Reijrink, P.R. Wilson & T.N. Barry (2003). Effect of withholding anthelmintic treatment on autumn growth and internal parasitism of weaner deer grazing perennial ryegrass-based pasture or chicory. *Proceedings of the New Zealand Society of Animal Production*, 63, 269-273.
- Molan, A.L., A. Duncan, T.N. Barry & W.C. McNabb (2003). Effect of condensed tannins and crude sesquiterpene lactones extracted from chicory on the motility of deer lungworm and gastrointestinal nematodes. *Parasitology International*, 52, 209-218.