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BRIEF COMMUNICATION

Effect of grazing undrenched weaner deer on chicory or perennial ryegrass/white clover pasture on gastrointestinal nematode and lungworm viability.

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Internal parasites can reduce animal performance (Moss & Vlassoff, 1993) and lungworm has been known to cause death in young deer (Mackintosh et al., 1984). Increasing numbers of drench resistant parasite populations being found on farms throughout New Zealand (Sangster, 1999) and pressure from consumers to reduce anthelmintic input for fear of residues in pastoral-based food products (Williams, 1997), signifies a need to find alternative methods of internal parasite control. Hoskin et al. (1999) found that undrenched weaner deer grazed on chicory did not have impaired growth rates and faecal egg counts were lower compared to similar animals grazed on perennial ryegrass/white clover pastures. This suggests that chicory has the potential to be used in farming systems to reduce the negative impact of internal parasites.

This study looked at the viability of internal parasites that had travelled through the digestive tracts of deer grazing chicory (Cichorium intybus) or perennial ryegrass (Lolium perenne)/white clover (Trifolium repens)-dominant pasture. The hatching ability of gastrointestinal nematode eggs, the development of gastrointestinal nematode and lungworm larvae and the motility of L1 lungworm larvae were measured. The study also determined the effect of adding condensed tannins (CT), extracted from chicory, to rumen and abomasal fluid on L1 lungworm larval migration. CT are a group of phenolic secondary plant compounds found in chicory at concentrations of approximately, 4.2g/kgDM (Terrill et al., 1992).

In Experiment 1, 24 undrenched weaner deer were randomly allocated to chicory or pasture and monitored for heavy internal parasite burdens using the parameters of Hoskin et al. (1999). Faeces were collected from 13 male deer after 45, 57, 65 and 67 days grazing using harnesses and bags. Faeces were pooled for each forage group and were used to obtain gastrointestinal nematode eggs and L1 lungworm larvae. The gastrointestinal nematode eggs were used in egg-hatch assays (EHA) to test hatching ability and in larval-development assays (LDA) to investigate the ability of larvae to develop into subsequent larval stages. EHA and LDA were carried out using the methods of Hubert & Kerboeuf (1992). LDA were also carried out using L1 lungworm larvae but no nutritious medium was used as lungworm larvae do not feed during their development to L3 larvae (Urquhart et al., 1973). Data were analysed using General Linear models of SAS (SAS version 6.12).

There was no difference in the hatching of eggs obtained from the faeces of deer that had grazed on chicory compared to eggs from the faeces of deer that had grazed pasture. Only the LDA using lungworm from the faeces of chicory-fed deer had significantly fewer L2 larvae developing to infective L3 larvae compared to the larvae sourced from deer on pasture (P<0.05).

The presence of eggshell protecting the gastrointestinal nematode eggs may be the reason that no differences were observed between forages for the EHA and LDA assays using these eggs. The finding that grazing chicory reduced the development of deer lungworm L2 larvae to L3 (infective stage) larvae suggests that grazing chicory will reduce the degree of forage contamination with infective larvae. Reduced numbers of infective larvae on grazed forages may lower the dependence on anthelmintics by providing “safe” pastures which have numbers of infective larvae, low enough to avoid clinical disease or significant impairment of productivity (Bisset et al., 1991).

In a second experiment, faeces were collected from six of the undrenched male weaner deer from Experiment 1 (three grazing each forage). Two other deer, fistulated in the rumen, and one deer, fistulated in both the rumen and abomasum, were also grazed on each forage so rumen and abomasal fluids could be collected. Faeces and fluids were collected from the deer and the fistulated deer then swapped between forages, and subsequent sampling of faeces and fluids occurred 16 days later. This avoided any animal effects from having only one abomasal-fistulated deer on each forage. Fluids and faeces were pooled for the animals in each forage group. Fluids were centrifuged at 10,000 rpm for 10 minutes and stored at 4°C overnight for use in Larval-Migration-Inhibition (LMI) assays with the L1 lungworm larvae obtained from the faeces the next day.

The LMI assays tested the ability of larvae to migrate through sieves with 25 µm pores and were carried out using the method of Rabel et al. (1994). Using a factorial design, the larvae from the faeces of chicory- and pasture-grazed deer were placed in LMI sieves and incubated in rumen or abomasal fluids from the deer grazing the two forages. For each fluid type (rumen or abomasal) and source (chicory or pasture) combination, four treatments were applied: (1) 400µl fluid + 100µl larval solution, (2) 350µl fluid + 50µl CT + 100µl larval solution, (3) 300µl fluid + 50µl CT + 50µl polyethylene glycol (PEG) + 100µl larval solution and (4) 350µl fluid + 50µl PEG + 100µl larval solution. The 50µl of chicory CT and PEG were equivalent to 0.25µg and 0.5µg respectively. The CT had been previously extracted from chicory (Molan et al., 2000). PEG was added to inactivate CT to establish if CT effects could be reversed. The difference between the number of larval placed in sieves and passing through
the inhibitory effects on larvae in the rumen of deer while other secondary compounds are likely to take effect in the abomasum. It can be concluded that feeding chicory in a grazing system is a potential tool for controlling internal parasites in deer with reduced anthelmintic input.

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REFERENCES


SAS. 1996: Version 6.12, SAS Institute, Cary, NC, USA.

