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Mohair Research Update No. 22

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Internal parasite management for Angora goats on annual pastures

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Introduction

Gastrointestinal nematodes limit the growth, production and welfare of goats but there are few reliable sources of information for recommending management practices across flocks. Gastrointestinal parasitism of goats, grazed intensively on small farms, in higher-rainfall areas of Australia (>600 mm per annum), has been a major source of lost production, deaths in young goats and animal welfare concern and is a likely cause of farmers leaving the industry. The use of browse plants to reduce ingestion of pasture larvae has limitations, including the feasibility and cost of maintaining browse.

This report summarises a grazing experiment conducted to evaluate the long-term effectiveness of gastrointestinal-nematode control measures and the relationship that exists when Merino sheep and Angora goats are grazed together. This complements earlier reports of the effects of rate of stocking and the mixed or separate grazing of goats with sheep on pasture production and composition, live weight, fleece production and other aspects of animal production and welfare.

Methods

The experiment was located at the Animal Research Institute, Werribee, Victoria, Australia (annual rainfall 549 mm). The climate is of the Mediterranean type, with a growing season of ~7 months (April to October) and a relatively dry summer. The pasture composition was primarily annual rye grass (Lolium rigidum) and subterranean clover (Trifolium subterraneum), with volunteer grasses.

The treatments were as follows: three grazing combinations: Merino sheep, Angora goats, sheep and goats at the ratio of 1:1; and three stocking rates: 7.5, 10 and 12.5 animals/ha, obtained by varying the area of each plot. Each of the 9 treatments was replicated twice. The stocking-rate design was based on the recommended stocking rate for sheep on similar annual temperate pastures at Werribee, to be 10 dry sheep equivalents/ha. Saxon Merino sheep were chosen as their body size is smaller than that of other strains of Merino sheep and more similar to the body size of the Angora goats.

Goat and sheep were carefully managed to remove the gastrointestinal parasites they had when purchased and then grazed together to acquire similar populations of parasites. All experimental plots were then grazed equally with goats and sheep before the experiment began. Worm egg counts (WEC) were taken into account when animals were randomly allotted to treatments.

WEC were monitored five times per year on 110 of the 180 animals in the experiment for over 3 years of the experiment. At the end of the experiment in December, goats and sheep were slaughtered to enable the counting of all the parasites in the gut (nematode burdens).

Findings

The experiment has shown that mixed grazing of goats with sheep and increasing the stocking rate of goats significantly affect the level of gastrointestinal parasitism in grazing Angora goats and Merino sheep. Mixed grazing with goats resulted in beneficial effects for sheep but mixed grazing with sheep provided beneficial or harmful effects for goats, depending on the stocking rate.

Effect of animal-species host

The same genera of nematodes were found in both goats and sheep. WEC and nematode burdens of each genus were similar in goats and sheep at the start of the experimental but, thereafter, were consistently greater in goats than in sheep. Sheep had a greater proportion of nematodes as Teladorsagia spp. and goats a greater incidence of Trichostrongylus spp. Both goats and sheep developed resistance to Nematodirus spp. during the course of the experiment.

Stocking rate

Increasing the stocking rate increased WEC of goats and mixed-grazed goats significantly, but with sheep, the increases were not significant. During the experiment, WEC declined at 7 and 10 animals/ha but increased at 12.5/ha. Increasing stocking rate increased the numbers of Trichostrongylus spp. and altered the ratio of Teladorsagia spp. and Trichostrongylus spp. nematodes. This finding for the effect of stocking rate on WEC of goats accords with those of most previous studies with sheep.

Mixed grazing

The WEC of mixed sheep were significantly lower than those of separately grazed sheep. This indicates that goats per se are not gastrointestinal hazards to sheep. During the experiment, the WEC of mixed-grazed sheep declined faster than the WEC of separately grazed sheep but the WEC of separately grazed goats at 12.5/ha and of mixed grazed goats at 10 and 12.5/ha increased. The resistance that mixed-grazed sheep developed to Nematodirus spp., to Trichostrongylus spp. and, to a lesser extent, to Teladorsagia spp., after their first year was able to withstand the increased larval challenge that they must have been exposed to when grazing with goats because the WEC of mixed goats was always moderate to high. These findings may be explained in part by reference to pasture and live weight data. Mixed-grazed sheep had access to more pasture than did separately grazed sheep and were heavier than separately grazed sheep. While these mixed-grazed sheep had lower concentrations of nematode eggs in their faeces than did separately grazed sheep, this may be partly explained by greater feed intake, as shown by higher mean live weight and faster rates of growth, and, consequently, greater faecal DM output of the mixed sheep.

August 2013
Grazing sheep with goats had a beneficial effect of the general level of parasitism. This was shown in the significantly reduced nematode burdens of mixed-grazed goats at 7.5/ha, compared with separately grazed goats. However, in mixed-grazed plots at 12.5/ha, sheep out-competed goats, and the pasture was much shorter and less pasture was available for goats than in the separately grazed 12.5/ha goat treatment. It appears that the grazing pressure exerted by the sheep at 12.5/ha had such a deleterious effect on the condition of the goats that their ability to resist gastrointestinal nematodes was reduced. These goats had higher adult nematode burdens and WEC than did those goats that grazed alone at the same stocking rate and this became evident within 18 months of applying the treatments.

**Effectiveness of drenching strategy**

The three-drench program (June, December, February) was not effective in preventing the heavy build-up of larvae on the 10 and 12.5/ha goat treatments. Goats separately and mixed grazed at 12.5/ha were subject to severe internal parasitism in late winter and early spring, to such an extent that they lost 1.6 kg (6%) live weight during a period when their live weight gains would be expected to be greatest. Goats at 10/ha also experienced parasitism but were able to maintain live weight. At this time, goats at 7.5/ha gained 1.8 kg live weight. Deaths occurred at both 10 and 12.5 goats/ha. Additional anthelmintic treatments were necessary and prevented further deaths and reduced WEC to moderate levels for the remainder of that year. The seasonal conditions in “good springs” coupled with the relatively high stocking rate combined to provide a serious gastrointestinal-nematode challenge. The implication being that goat producers need to undertake constant surveillance, particularly during winter and spring, or year-round at high stocking rate, to quickly detect and respond to potential high levels of gastrointestinal-nematode challenge. At the highest stocking rate, the pastures where shorter than at the lower stocking rates. As trichostrongyloid larvae are found in the lower stratum of herbage, animals grazing below 12.5 cm in height cannot avoid ingesting them. Results of associate studies (Jallow et al. 1994) showed that the different grazing pattern of goats may cause the ingestion of far more larvae when the pasture was contaminated by sheep faeces, whereas the reverse did not occur.

The WEC of sheep were usually low. Increases in WEC of sheep in late spring were effectively reduced by the two summer drenches. As sheep developed resistance to the nematodes, WEC declined to low levels.

Had this experiment had a breeding flock, with susceptible kids grazing these pastures at moderate and high stocking rate, internal parasitism would likely have been much more severe than in the present work using non-breeding wethers.

**Recommended strategy for goats grazing annual temperate pastures**

Under the management and pasture conditions of the present experiment, to minimise internal parasitism, maintain live weight gain during spring and to prevent deaths, goats should not be grazed above stocking rates of 7.5 goats/ha. Grazing goats with sheep reduced WEC in goats at 7.5 and 10/ha by 12% and 35%, respectively, and reduced nematode burdens at 7.5/ha by 50%, which generally avoided the need to provide additional anthelmintic treatment. Grazing goats with sheep is, therefore, likely to delay the development of anthelmintic resistance in goats grazed at low or moderate stocking rate, reducing the need for additional anthelmintic treatments and reducing nematode burdens and challenge.

The results indicated that goat producers need to monitor the need for additional anthelmintic treatment, especially during winter and early spring and at higher stocking rates. It is clear from this experiment that mixed grazing at 10 animals/ha, i.e. five goats/ha plus five sheep/ha (about the recommended stocking rate for sheep in this environment) resulted in complementary grazing in terms of increased pasture production, more favourable pasture composition, increased animal production, increased fleece production and improved gastrointestinal-nematode status of sheep and goats. Mixed grazing at higher stocking rates was competitive and resulted in goats having reduced live weight, reduced production, increased internal parasitism and increased mortality.

**Conclusions**

Under the environmental and pastorial conditions examined, Angora wether goats should not be grazed at stocking rates above those recommended for wether sheep. The impact of gastrointestinal nematode infections in goats was reduced at lower stocking rates. Further, mixed grazing of Angora wether goats with wether sheep at or below the recommended stocking rate resulted in reduced gastrointestinal parasitism for both sheep and goats, compared with monospecific grazing conditions. Goats did not represent a gastrointestinal-nematode hazard to sheep.

**Acknowledgments**

The Victorian Department of Primary Industries, Rural Credits Development Fund (1981–1984), Australian Mohair Co., Australian Mohair Research Foundation Ltd and Rural Industries Research and Development Corporation provided financial support.

**References and further reading**

This is a summary of the following report. More details can be emailed to interested farmers by contacting the author at: bruce.mcgregor@deakin.edu.au
