Small lungworm infections of sheep in southeast South Australia

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Introduction
Small lungworm infections of sheep are often detected at post-mortem examinations and at abattoirs but thought unimportant because they cause few obvious clinical signs. However, heavy lungworm infections may cause production loss, either directly or by worsening other respiratory diseases, such as pneumonia. This suggests that treatment or prevention may be warranted if prevalence is high. Strategies for the treatment and prevention of small lungworm in sheep in Australia have not been described to date. Anthelmintics can have some effect, but higher or repeat doses may be required, resulting in lower effectiveness against small lungworm compared to gastrointestinal nematodes. Reducing the population of the intermediate host may provide an alternative means to break the lifecycle and therefore decrease infections. The two species of small lungworm occurring in sheep in Australia, Muellerius capillaris and Protostongylus rufescens both require a mollusc intermediate host to complete their lifecycle.

Our hypothesis was that by reducing the prevalence of small lungworm, lambs would grow faster. Thus, the objective of this study was to assess the effect of pasture molluscicide treatment on the prevalence and severity of small lungworm infections, and the productivity of lambs grazing improved pastures in southeast South Australia.

Materials and method
The commercial farm selected for this study had a high prevalence of small lungworm infections; 100% (n = 217) and 87% (n = 191) of lambs, 2018 and 2019 respectively. The irrigated lucerne pasture used for grazing lambs following weaning was divided into a Treatment (4 x 5.5ha paddocks) and Control (4 x 5.5ha paddocks) area. The molluscicide, iron chelate (60g/kg) was applied to the Treatment area on three occasions, at a rate of 16kg/ha. A subgroup of 260 lambs were alternately allocated to the Control (n = 130) and Treatment (n= 130) groups. Control lambs rotationally grazed the untreated paddocks, whilst Treatment lambs grazed the molluscicide treated paddocks for 16 weeks from October 2019 to February 2020.

Lamb measurements were made on four occasions at the farm; day 0 when lambs commenced grazing the trial paddocks, day 48, day 94 and day 112, prior to consignment to the abattoir. The presence of lungworm infection was determined from faecal samples using the Baermann test from a subsample of 30 lambs from the Treatment and Control groups, respectively, at each measurement. Additionally, a visual assessment of lungworm nodules at slaughter was made from all lambs to assess the severity of infection. Lungs were scored on a scale of 0-3, with 0 indicating no nodules and 3 being the most severely affected, with extensive nodules throughout the lungs. Live weight, growth rate and carcass weights were compared between the Treatment and Control lambs. During the trial the snail population on pasture, and the lucerne quantity and quality was also measured.

Results
Prevalence was low (0-13%) during the trial in Control and Treatment lambs, except at day 94 when 48% (n = 28) of Control lambs were positive compared to 0% (n = 27, P <0.001) of
Treatment lambs. At slaughter, a similar proportion of lambs with small lungworm nodules were detected in the Control (n = 121, 67.8%) and Treatment groups (n = 118, 67.8%). Over the 112-day trial period, Control lambs grew slightly faster than Treatment lambs, with an average daily gain (ADG) of 202 g/head/day for Control and 190 for Treatment animals (P= 0.01). There was a decrease in the rate of ADG in both groups between day 48 and 94 but Control also grew faster than Treatment lambs during this time. Similarly, the carcass weight was slightly heavier for Control lambs, with an average carcass weight of 26.5kg (n= 122) for Control and 26.2kg (n = 122; P = 0.3) for Treatment animals. The carcass weight for non-infected lambs (n = 73) was not statistically different (26.6kg) to infected lambs (n= 156, 26.3kg, P= 0.4) regardless of whether lambs were in the Treatment or Control group.

Discussion
The results indicate that the molluscicide did not decrease the prevalence of small lungworm in grazing lambs, suggesting the mollusc population was not sufficiently reduced in the Treatment paddocks. The difference between the prevalence in Control and Treatment lambs at day 94 may have been the result of the Baermann test sensitivity or larval inhibition.2,7 Molluscicide treatment did not appear to affect lamb productivity, with lambs growing at a similar rate in Control and Treatment groups. When ADG decreased, this was more likely to have resulted from differences in lucerne quality, rather than infection with small lungworm. The Control group, which had a higher prevalence at day 94, also grew faster between days 48 and 94, suggesting infection did not decrease lamb ADG. Additionally, lambs spent longer grazing each paddock during this time, increasing the time spent grazing lower quality lucerne. This demonstrates the need for a systems approach for investigations into parasite management and flock productivity.

Regardless of treatment group, small lungworm infection did not appear to reduce the productivity of lambs with a similar carcass weight for infected and non-infected lambs. Therefore, prevention of small lungworm infection in lambs may not provide significant production or health gains. Consequently, it may not be cost effective, nor easy to prevent small lungworm infections. Alternative means of control, assessing the effects of small lungworm on older sheep and limitations of current diagnostic methods should be considered for any further research.

References