

The rate of spread of sheep scab within small groups of Merino and Dorper sheep

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ABSTRACT

A single Merino sheep, artificially infested with the sheep scab mite, *Psoroptes ovis*, and a similarly infested Dorper sheep were placed with 9 uninfested Merino or 9 uninfested Dorper sheep respectively during winter and the rate of spread of infestation on the uninfested sheep observed. The same procedure was repeated in summer. It took 14 and 8 weeks respectively in winter before all sheep in the 2 groups displayed lesions of sheep scab, whereas in summer it took 10 and 12 weeks before all sheep had lesions.

Key words: Dorper sheep, Merino sheep, *Psoroptes ovis*, rate of spread, sheep scab.

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Sheep scab, caused by the astigmatid mite *Psoroptes ovis*, is a highly contagious disease of sheep. Several factors influence the rate at which scab will spread within a flock. These include flock size, contact frequency between uninfested and infested sheep, age of flock members, sheep breed, season and husbandry methods². In addition the extent of infestation on the initial carrier sheep can affect the rate at which the disease spreads.

Autumn/winter group

Ten healthy, year-old Merino and 10 year-old Dorper sheep were used in the study. During April 1997 (autumn/winter) 1 sheep of each breed was taken from its group and these 2 sheep were placed in separate quarantine camps approximately 1 ha in size. Mites were collected from a Merino donor sheep and the 2 sheep were each infested with 25 ovigerous female and 5 adult male *P. ovis* by parting their wool and placing the mites on their skin. The mites were held in position by twisting an elastic band around the wool tufts immediately above the site of infestation. The 9 remaining Merino and 9 Dorper sheep were pastured in separate quarantine camps, each approximately 1 ha in size, in which natural grazing was available. Alfalfa hay and maintenance pellets were supplied twice a week as supplementary feed.

Both artificially infested sheep were found to have scab lesions 3 weeks after infestation and were returned to their original groups in the quarantine camps. All the sheep in the 2 camps were individually carefully examined fortnightly for the presence of live mites or active lesion development and the results recorded. The presence of a live mite, or active scab lesion was considered a positive infestation. After examination of each sheep the investigators changed their aprons and washed their hands to prevent mechanical transfer of mites.

Spring/summer group

Early in October 1997 10 Merino and 10

Dorper sheep were exposed in the same manner as the previous groups.

Two weeks after the artificially infested Merino sheep of the autumn/winter group was returned to its group it had scab lesions covering an area 158 cm². None of the other Merino sheep showed any signs of irritation, nor were any sheep scab lesions visible. Four weeks after the introduction of the infested sheep the first signs of scratching and biting in the control sheep were apparent, although no lesions could be found. In the 6th week the artificially infested sheep's lesions covered almost half its body, and it had a very shaggy appearance, at the same time scab lesions were apparent on 3 of the control sheep. At 8 weeks, 6 of the Merino sheep were infested, and the lesions on the artificially infested sheep had increased to 2100 cm², with large parts of its body denuded of wool. Two weeks later a further 2 sheep were infested, and lesions on those sheep that were already infested had rapidly increased in size. Twelve weeks after introduction of the infested sheep all sheep displayed visible lesions (Fig. 1).

Two weeks after placing the artificially infested Dorper sheep with its group, no signs of irritation were observed in any of the control sheep and no lesions could be

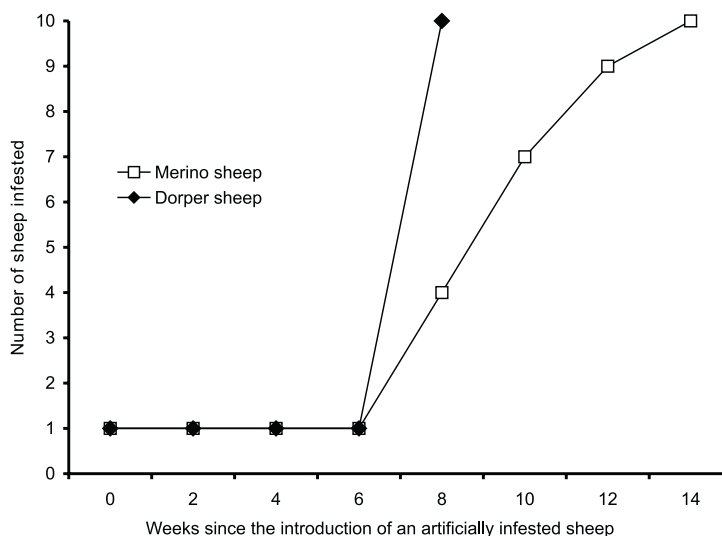


Fig. 1: Autumn/winter group. The rate at which sheep scab spread within groups of 9 Merino and 9 Dorper sheep after placing a single artificially infested sheep in each group during winter.

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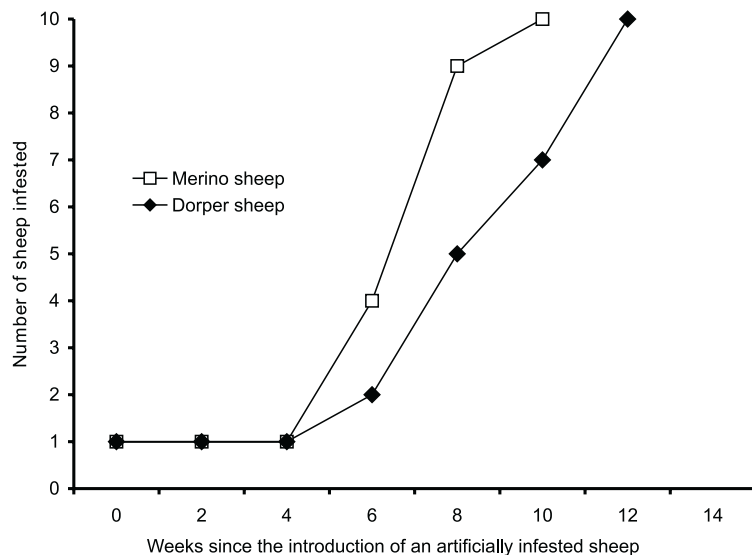


Fig. 2: Spring/summer group. The rate at which sheep scab spread within groups of 9 Merino and 9 Dorper sheep after placing a single artificially infested sheep in each group during summer.

found. At 4 weeks some of the Dorper sheep had wool in their teeth, and scratched and rubbed against trees, but no lesions or live mites could be detected. Eight weeks after introduction all the Dorper sheep were infested (Fig. 1), and all had substantial lesions, with an average size of 40.14 cm². During the study period, 1 of the Dorper sheep died, but its death was unrelated to scab infestation.

Two weeks after placing the artificially infested Merino sheep with the spring/summer group its lesion had developed to 30 cm² in size. The other sheep showed no signs of irritation. The first infested Merino sheep were detected 6 weeks after introduction of the infested sheep. At 8 weeks 9 sheep including the original carrier sheep were infested and at 10 weeks all the Merino sheep were infested and had actively expanding lesions (Fig. 2).

Lesion development on the artificially infested Dorper sheep was more rapid than that on its Merino partner. It had a

lesion 70 cm² in size 2 weeks after placement with its group and at 10 weeks the surface area of its lesions had increased to 1700 cm². Two weeks after introduction of the artificially infested sheep no signs of irritation were evident on any of the control sheep. A lesion was found on a single sheep 6 weeks after introduction of the artificially infested sheep. Although 4 sheep, including the original carrier sheep, had lesions after 8 weeks, no signs of irritation were noted. Seven sheep were infested at 10 weeks and all at 12 weeks (Fig. 2). Ten weeks after introduction of the artificially infested sheep the Dorper sheep showed the first signs of uneasiness and wool appeared in their teeth. At 14 weeks all the Dorper sheep were biting, scratching and rubbing against the fences.

All sheep in both the winter and summer experiments were treated with an endectocide at 14 weeks to terminate infestation.

Sheep scab lesions usually grow more quickly on Merino sheep than on Dorper sheep during both winter and summer^{3,5}. Consequently it could have been expected that the rate of spread of infestation amongst Merino sheep would be more rapid during both seasons than on Dorper sheep. However, this was not the case and breed had no major effect on the rate of mite transfer. The gregarious nature of sheep ensures ample opportunity for direct contact between individuals, and consequently the rate of contact between sheep and the size of the lesions should influence the time required for transfer of infestation. During the present study lesions were found on control sheep only when the size of the lesion on the artificially infested sheep had reached a considerable size.

In view of these factors, it is not possible to predict the rate at which scab will spread within a specific flock. Although early detection of sheep scab in a flock will not reduce the costs of acaricide treatment, it could increase treatment success as well as considerably decreasing production losses^{1,4}.

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