

RESEARCH COMMUNICATION

RESISTANCE OF SHEEP TO POISONING BY THE PLANT, *MARTICARIA NIGELLIFOLIA* DC.

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ABSTRACT

NEWSHOLME, S. J. & KELLERMAN, T. S., 1984. Resistance of sheep to poisoning by the plant. *Matricaria nigellifolia* DC. *Onderstepoort Journal of Veterinary Research*, 51, 277-278 (1984).

The plant, *Matricaria nigellifolia*, was dosed to 2 sheep to reinvestigate whether or not sheep are susceptible to pushing disease ("stootsiekte"). Each sheep received a total dose of 370 g/kg of the milled, dried plant from a batch that had caused pushing disease in cattle when given at doses as low as 10 g/kg.

Neither of the sheep developed clinical disease over the trial period of 60 days, and necropsies revealed no macro- or microscopical lesions.

Sheep are apparently resistant to pushing disease, which supports previous findings.

INTRODUCTION

Ingestion of the plant, *Matricaria nigellifolia*, is the cause of pushing disease (PD) (Afrikaans—stootsiekte), a distinctive nervous disorder that affects cattle in certain parts of southern Africa (Andrews, 1923). Typically affected cattle become docile and clumsy, and they push against objects. There is a latent period of several weeks from the time of ingestion of the plant until clinical signs first appear. Encephalitis has been described as a consistent light microscopical finding in PD (Newsholme, Kellerman & Welman, 1984). The toxic principle of the plant has not been identified, and the pathogenesis of the cerebral lesion is not clear.

PD appears to be restricted to cattle. There is no field evidence that other grazing animals are susceptible, and when *M. nigellifolia* was fed to sheep, horses, pigs, rabbits and guinea-pigs it failed to cause clinical disease (Andrews, 1923).

Since sheep are cheaper and more convenient than are cattle as animals for toxicological research, a pilot dosing trial was conducted to reinvestigate whether or not sheep are susceptible to PD. Herein we report the results of the trial.

MATERIALS AND METHODS

Plants: *M. nigellifolia* plants from a batch which had been shown to cause PD in cattle (Newsholme *et al.*, 1984) were used. The plants were stored at -5 °C.

Dosing trial: Two 5-month-old Merino wethers (Sheep 1 & 2) were kept in pens and fed dried lucerne. *M. nigellifolia* was chopped, dried and dosed to each sheep through a ruminal fistula (Table 1). Each received a total dose of 370 g/kg.

TABLE 1 Dosing regimen for dried, milled *M. nigellifolia* administered to Sheep 1 and 2

Days dosed	Doses (g/kg × n)
0-5	5 × 6
13-17	10 × 5
13-17	10 × 5
20-24	10 × 5
27-31	10 × 5
34-38	10 × 5
41-45	10 × 5
48-51	10 × 4

g/kg × n = dose × number of daily administrations

The initial body masses of Sheep 1 & 2 were 33 kg and 32,5 kg, respectively. The sheep were released into a paddock each day for observation. On Day 59 of the trial the sheep were killed by intravenous injection of pentobarbitone sodium.

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Pathology: Necropsies were performed on both sheep immediately after death. The brains, spinal cords and specimens from livers and kidneys were collected and fixed in buffered 10 % formalin. Paraffin sections of these tissues were prepared and stained with haematoxylin and eosin according to standard procedures for light microscopy.

RESULTS

No clinical signs were seen in either sheep. The body mass of Sheep 1 increased by 7,5 kg and that of Sheep 2 increased by 6,5 kg over the trial period. No macroscopical or microscopical lesions were found in the central nervous systems or in the other tissues.

DISCUSSION

The results support the finding of Andrews (1923) that sheep are resistant to PD. *M. nigellifolia* failed to cause clinical disease or lesions in either of the sheep at a total dose of 370 g/kg, whereas plants from the same batch had caused PD consistently in cattle when given at a total dose as low as 10 g/kg (Newsholme *et al.*, 1984). It is possible that the plant had lost its toxicity during storage, but this is unlikely since it had already been stored in the same way for several months before it was fed to the cattle. The toxicity of *M. nigellifolia*, furthermore, appears to be remarkably stable. Plants heated in an autoclave at 115 °C for 15 minutes retained their toxicity to cattle (Andrews, 1923).

The reason for this difference in susceptibility between 2 ruminant species is not clear, but examples of other such differences exist. Sheep are more resistant than are adult cattle to nitrite poisoning (Blood, Radostits & Henderson, 1983). Sheep and goats are apparently resistant to a nervous disorder of cattle caused by the plant, *Solanum kwebense* (Pienaar, Kellerman, Basson, Jenkins & Vahrmeijer, 1976).

Larger numbers of sheep would be required to demonstrate conclusively that they are completely resistant to PD. Different breeds of sheep should also be included, since it has been found, for example, that sheep of Welsh genotype are more susceptible than sheep of Cheviot genotype to acute copper poisoning (Wiener & Macleod, 1970). The results of this pilot trial, however, indicate that sheep are not suitable for the study of PD.

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