RESEARCH COMMUNICATION

Bile enhances the infectivity of third stage larvae of *Dictyocaulus filaria*

G.A.P. TITOY and E.V. SCHWAN

Helminthology Division, Onderstepoort Veterinary Institute
Private Bag X5, Onderstepoort, 0110 South Africa

ABSTRACT

TITOY, G.A.P. & SCHWAN, E.V. 1994. Bile enhances the infectivity of third stage larvae of *Dictyocaulus filaria*. *Onderstepoort Journal of Veterinary Research*, 61:395–396

Incubating metacyclic larvae of *Dictyocaulus filaria* in ovine bile solution prior to *per os* infection significantly enhanced their infectivity to sheep.

INTRODUCTION

Although there are several reports on the effect of bile on the motility of third stage larvae of *Dictyocaulus viviparus* (Jørgensen 1973, 1975, 1981), no information seems to be available concerning its effect on the subsequent infectivity of *Dictyocaulus* larvae.

The faeces of a sheep with patent experimental infection of *D. filaria* were collected and first stage larvae recovered by the Baermann technique (Boch & Supperer 1983). These larvae were cultured to infective third stage larvae at 21 °C for 7 d for use in the experiment. Bile was collected from freshly slaughtered sheep and stored at −20 °C after its dry matter content (9,1 %) had been determined (Smyth & Haslewood 1963).

Eight 5-month-old Dorper sheep, which had been raised under conditions that precluded unintentional nematode infection—and which were kept thus for the duration of the experiment—were allocated to two groups by use of random tables, and infected (day 0). Animals in group 1 (n = 4) were each infected *per os* with 1 500 untreated third stage larvae of *D. filaria*, whereas sheep in group 2 (n = 4) each received 1 500 larvae, pre-incubated for 60 min at a concentration of 1 000 larvae/mℓ in 4 % (w/v) bile solution at room temperature (Jørgensen 1973).

Sheep 8 of group 2, which died on day 21 after infection as a consequence of severe parasitic bronchopneumonia, yielded 140 *D. filaria* adults of mixed sex at necropsy. The larval infectivity rate in this sheep was 9,3 %. After the expected prepatent period of 28 d, faecal samples from the other sheep were examined daily. The three remaining sheep of group 2 became positive on day 29, whereas only one sheep of group 1 developed a patent infection. From day 41 onwards, one sheep after another stopped passing first stage larvae of *D. filaria*, until day 49 when the last animal of group 2 became negative. The difference between group 1 and group 2 was highly significant ($0{,}01 > P > 0{,}001$).

Accepted for publication 20 September 1994—Editor

TABLE 1 Mean faecal larval counts of sheep, each infected either with 1500 untreated (group 1) or 1 500 bile-incubated (group 2) metacyclic larvae of *D. filaria*. Larval counts were determined from the beginning of patency until the day before the faeces became negative

Sheep	Mean faecal larval counts (L1s/5 g of faeces)
Group 1	
1	0
2	0
3	7
4	0
Group 2	
5	21
6	19
7	28
8	Died on day 21

The infectivity of metacyclic larvae of *D. filaria* is poor when they are cultured conventionally, thus making it difficult to obtain patent infections experimentally in sheep. To the best of our knowledge, this study has demonstrated for the first time that incubating metacyclic larvae of *D. filaria* in bile solution prior to infection *per os*, enhances their infectivity. It would be of interest in further studies, to determine which bile components are responsible for stimulation of infectivity.

REFERENCES

BOCH, J. & SUPPERER, R. 1983. *Veterinärmedizinische Parasitologie*, 3rd ed. Berlin und Hamburg: Verlag Paul Parey.

JØRGENSEN, R.J. 1973. *In vitro* effect of bile on the motility of *Dictyocaulus viviparus* third stage larvae. *Acta Veterinaria Scandinavica*, 14:341–343.

JØRGENSEN, R.J. 1975. *In vitro* migration of *Dictyocaulus viviparus* larvae: migration of the infective stage in agar gel. *International Journal for Parasitology*, 5:199–202.

JØRGENSEN, R.J. 1981. Studies on the lungworm *Dictyocaulus viviparus* (Bloch 1782) and its epidemiology in young cattle with a description of an attempt to prevent parasitic bronchitis. *Acta Veterinaria Scandinavica Supplementum*, 76:1–77.

SMYTH, J.D. & HASLEWOOD, G.A.D. 1963. The biochemistry of bile as a factor in determining host specificity in intestinal parasites, with particular reference to *Echinococcus granulosus*. *Annals of the New York Academy of Sciences*, 113:234–260.