

## RESEARCH COMMUNICATION

# Amphistome infection of goats farmed under resource-poor conditions in South Africa

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### ABSTRACT

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From December 1998 to April 2000, a longitudinal study was conducted of the pooled trematode faecal egg counts of samples collected from goats of resource-poor farmers at Rust de Winter, Gauteng Province, Impendle, KwaZulu-Natal Province, and Kraaipan, North-West Province, South Africa. The amphistome faecal egg counts followed a seasonal pattern, with an increase in the counts during the warmer months of the year (October to March). This is the first work concerning the seasonal cycling of amphistomes in ruminants in South Africa.

**Keywords:** Amphistome, faecal egg counts, *Fasciola* spp., goats, trematode

### INTRODUCTION

A longitudinal study of the trematode faecal egg counts (FECs) was conducted as part of a larger study to examine the nematode FECs, haematocrits, conjunctival mucous membrane colour scores and body condition scores of goats owned by resource-poor farmers. Faecal samples were examined for trematode eggs from December 1998 to April 2000 for three study sites within the summer rainfall area of South Africa at fortnightly (Rust de Winter, Gauteng Province) or monthly (sites 1 and 2, Impendle, KwaZulu-Natal Province and Kraaipan, North-West Province) intervals. The results of the nematode FECs, haematocrits, body

condition scores and conjunctival colour scores for the goats are recorded in Vatta (2001) and Vatta, Krecek, Letty, Van der Linde, Grimbeek, De Villiers, Motswatswe, Molebiemang, Boshoff & Hansen (2002), while further details of the trial are recorded in Vatta, Letty, Van der Linde, Van Wijk, Hansen & Krecek (2001).

While the farmers at Impendle and Kraaipan grazed their animals on communal lands, the goats at Rust de Winter were grazed on a private farm. As such, it may be argued that the farmer was not resource-poor. Nevertheless, he was part of a government farmer resettlement programme, which was making land available on loan to disadvantaged people.

Rainfall from December 1998 to April 2000 totalled 1 100 mm for Rust de Winter, 1 963 mm for Impendle and 760 mm for Kraaipan. Eighty per cent or more of this rain fell during the months of November to March.

No investigation was made into the presence of snail intermediate hosts. The farm at Rust de Win-

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ter is percolated by a stream, which is probably filled with some running water throughout the year. The communal grazing areas at Impendle are also traversed by small streams which might carry some water throughout the year. At Kraaipan, the goats had access to at least one non-permanent pan.

**MATERIALS AND METHODS**

Faecal samples were screened for trematode eggs by means of the sedimentation method (Van Wyk, Schröder, Van Schalkwyk & Horak 1987) which was modified for pooled samples as follows: 0.5 g of faeces was weighed from each of ten faecal samples randomly selected from those collected at each visit to a site. The faeces were pooled and softened and/or homogenised with an electric mixer in water. The faeces were then sieved through a 150 µm sieve on to a 38 µm sieve using water sprayed from a nozzle at high pressure. The remaining sediment was washed into a 2 l or 3 l glass jar, which was filled with water and allowed to stand for at least 15 min. The supernatant was then decanted and the sediment washed by filling up the jar again. This process was repeated approximately three times until the

resulting supernatant was clear. Thereafter the sediment was poured into a measuring cylinder, made up to 200 ml with water and mixed well by blowing air through the suspension with a pipette. Twenty millilitres of this suspension were examined in a perspex counting chamber under a stereoscopic microscope. The number of eggs per gram of faeces (epg) was calculated as follows after a formula given by Reinecke (1983):

$$\begin{aligned} \text{FEC (in epg)} &= \frac{\text{Total number of eggs present (in 200 ml sample)}}{\text{Mass of faeces}} \\ &= \frac{\text{Number of eggs counted (in 20 ml aliquot)} \times 10}{0.5 \text{ g/sample} \times 10 \text{ samples}} \\ &= \text{Number of eggs counted (in 20 ml aliquot)} \times 2 \end{aligned}$$

**RESULTS**

The results for the three study sites are illustrated in Fig. 1. The pooled amphistome FECs followed a seasonal pattern, with an increase in the counts during the warmer months of the year (October to March), especially in the goats at Rust de Winter, where counts rose up to 264 epg. In contrast, the amphistome FECs for the goats at Impendle did not

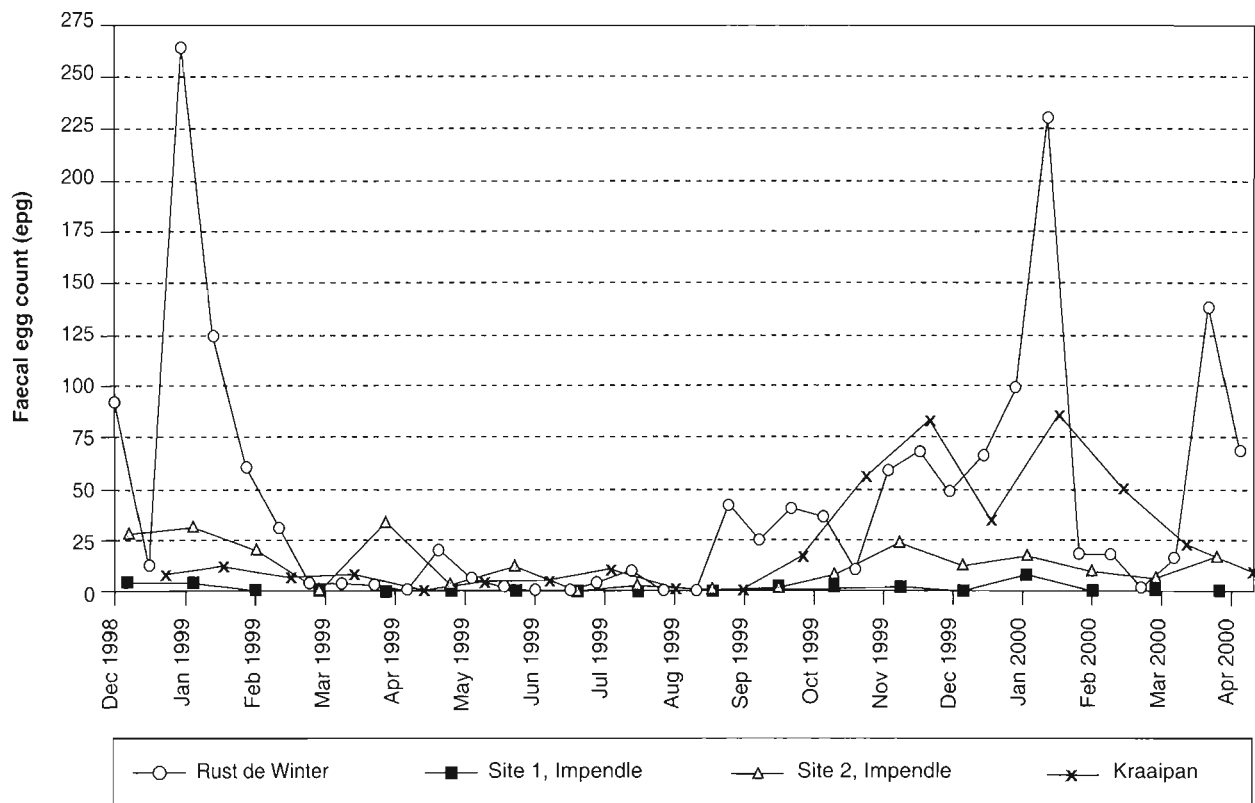


FIG. 1 Pooled amphistome faecal egg counts (FECs) for goats at Rust de Winter, sites 1 and 2, Impendle and Kraaipan

rise higher than 8 epg for site 1 and 34 epg for site 2. The infection levels at Kraaipan were also low during the first summer of the study but were higher from October 1999 to February 2000.

*Fasciola* eggs were recorded at levels of 2 and 4 epg in the goats at Rust de Winter and site 2, Impendle, in August and January 1999, respectively. All other samples examined were negative for *Fasciola* eggs.

## DISCUSSION

Horak (1971) remarked that "no natural outbreak has as yet been followed from its inception until its termination". While an outbreak was not followed in the present work, it is the first work concerning the seasonal cycling of amphistomes in ruminants in South Africa. Reinecke (1983) reports that cattle and sheep on commercial farms shed amphistome eggs on the pastures they graze during the summer-rainfall period. During this time, conditions in the water sources are suitable for the reproduction of the intermediate snail hosts and they become heavily infected with *Calicophoron* miracidia.

Prior to the winter, the water sources start to dry up, the snails retreat with the receding water and the snails become much more concentrated in the water sources. High concentrations of metacercariae accumulate on the herbage in the water. The herbage of the pastures becomes dormant and the animals seek out the better grazing surrounding the wetlands. In autumn and winter, therefore, conditions are favourable for heavy infection of susceptible animals, and outbreaks of clinical amphistomosis may occur.

Horak (1971) found that adult flukes start to pass eggs 69 days after goats have been infected with metacercariae. However, he found massive migration of the immature flukes to take place mainly between 34 and 48 days after infection in these animals. It seems reasonable to conclude therefore that peak egg excretion after infection will occur only about 80 days after infection. The animals in the present study were therefore probably exposed to highest concentrations of infective metacercariae during September to January (spring to summer).

Since it is the immature stages that are pathogenic (Horak & Clark 1963), outbreaks of clinical amphistomosis may occur two to four weeks after infection (Horak 1971), which in the present study would then have occurred during spring and summer. However, no signs of a copious, watery, foetid diarrhoea characteristic of amphistomosis (Horak & Clark 1963) were noted in any of the study animals.

The low counts and incidence indicate that *Fasciola* spp. were not important parasites in the animals in this study.

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