

Communication

***Strongyloides papillosus* : prenatal and transmammary infection in ewes**

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L'absence de larves chez des agneaux de 6 brebis infestées et surveillées, tués immédiatement après la naissance sans avoir tété, semble indiquer l'absence d'infestation prénatale. Les brebis avaient des larves dans leur lait bien avant la mise bas et quelques heures après. La persistance de l'infestation malgré un traitement au thiabendazole à la dose de 50 mg/kg semble être liée à la présence dans les intestins de larves inhibées. Tous les agneaux ayant tété ont été atteints dans les 4 à 5 jours. L'infestation par *Strongyloides papillosus* des agneaux ayant tété démontre le passage transmammaire de ce nématode. **Mots clés** : Brebis - Agneau - *Strongyloides papillosus* - Lait - Infection transmammaire - Nigeria.

Introduction

TURNER *et al.* (12), NWAORGU and CONNAN (8) have reported the routes of infection for *Strongyloides papillosus*, the most prominent being the percutaneous penetration. Also if larvae are taken in orally they will penetrate the lining of the mouth and throat but those passing directly to the stomach fail to establish an infection. Following the percutaneous route of infection the time required for patency has been shown to be between 9 and 11 days (11, 12, 13). However, from field reports the occurrence of patent infections of *S. papillosus* in lambs (9) and calves (2) less than a week old have been regularly observed. The existence of another route of infection was presumed by these workers.

The objectives of this experimental study was to investigate this route of infection for *S. papillosus* in suckling lambs and also to establish the period of patency in these animals.

Materials and methods

Animals

Six pregnant ewes (E1 to E6) positive for *Strongyloides papillosus* infections and with synchronised pregnancy dates were given thiabendazole orally at 50 mg/kg body weight to eliminate the possible adult infections in the small intestine. They were thoroughly scrubbed and housed in individual pens with concrete walls and floor cleaned daily throughout the experiment. They were fed on forage and concentrates. Salt licks and water were available *ad libitum*.

Infection by *Strongyloides papillosus* was originally obtained from a naturally infected sheep with larvae from faecal cultures injected subcutaneously into three helminth-free young lambs. Subsequently, infective larvae required

for experiments were obtained from faeces of these lambs, cultured at 28-30 °C and harvested with the Baerman's apparatus.

Milk examination for larvae

Ewes were hand-milked and all the available milk was removed. Larvae were recovered by sedimentation in urine flasks after dilution of the milk with saline. After sedimentation (0.3 h) larvae were removed with a pipette from the bottom of the flask. The milk was discarded through a 400 mm sieve from which any remaining larvae were recovered. The total number of larvae obtained from a known volume of milk was corrected for number per ml (6).

Experimental procedure

Twenty-eight days before expected parturition, two ewes (E3 and E4) received 100 000 L3 each subcutaneously. Two ewes more (E1 and E2) were given the same inoculum 14 days before expected parturition. E5 and E6 were kept uninfected as controls.

Ewes E1 and E2 lambed at 19 and 24 days, respectively, and ewes E3 and E4, at 37 and 38 days, respectively, post infection, while the controlled ewes (E5, E6) lambed at 22 and 26 days, respectively. Twins were born to each of the ewes. One was removed from each ewe and killed immediately without suckling. Tissue and viscera were examined by a previously described technique (8). The remaining 6 lambs were left to suckle normally.

Milk obtained from ewes immediately prior to lambing and for 15 h afterwards was examined for larvae. Faecal samples from the suckling lambs were examined daily until patency.

Results and discussion

Of the two ewes (E1, E2) infected nearest to parturition one died (E2) the day after giving birth to twins. At necropsy, larvae were recovered from the mammary gland and from the heart muscle. The presence of larvae in the myocardium might be one of the factors responsible for the death of the host during strongyloidosis. A similar finding has been reported by SPINDER and HILL (10) in pigs infected with *S. ransomi*.

All lambs killed immediately at birth were negative for larvae. This is in agreement with the results of LYONS *et al.* (3) obtained in similar studies. There is probably no prenatal infection in sheep.

Milk obtained immediately prior to lambing and for several hours after was found to contain larvae. The number present varied among individuals with 17 larvae per ml of milk being the largest number. This was obtained from E1 which was infected nearest to parturition.

Two larvae per ml of milk which was the lowest number recorded was obtained from E6, one of the controls. The peak of larval concentration seems to be at the time of parturition with a sharp drop for the next 10 h. The persistence of infection in the controls may be due to the pool of inhibited larvae (7) which were removed by the treatment.

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Communication

In all suckling lambs a patent infection developed within four to five days confirming the field observations of ONYALI and AJAYI (9) and IKEME (2).

The result of this experiment showed that transmammary infection of *S. papillosus* represents a special means for supporting previous studies (3, 5). There may be two routes of infection :

Firstly, there is evidence for inhibited development of *S. papillosus* (4) and NWAORGU (7) believed that such inhibited larvae located in the adipose tissues of the ventral body wall constituted the pool of transmammary infection. Secondly since it is believed that lactation influences larval migratory behaviour and subsequent development (14), transmammary infection may also be derived from infective larvae in post-natal infections of nursing ewes.

Conclusion

Under intensive sheep management, strongyloidosis is above all a disease of young lambs and it appears especially in bad or poor sanitary conditions (9). Breeding stock should therefore be confined in a well drained sunny area to reduce the exposure to free-living stages of this parasite during gestation. Where *S. papillosus* constitutes a problem it is wise to give pre-weaning treatment particularly within one week after birth to kill worms that may be acquired from the ewe's milk during the first few days of life before the worms add to the contamination of the surroundings and this is in addition to post-weaning treatments (1).

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The absence of larvae in lambs of six infected and controlled ewes immediately killed at birth without suckling may indicate the absence of prenatal infection. The ewes had larvae in their milk immediately prior to lambing and several hours afterwards. The persistence of infection, even after intestinal infection was removed with thiabendazole at 50 mg/kg body weight, may be due to the pool of inhibited larvae. All the suckling lambs had patent infections within 4 to 5 days. Infection of suckling lambs with *Strongyloides papillosus* via milk from their ewes demonstrates the transmammary route of infection of this nematode. *Key words* : Ewe - Lamb - *Strongyloides papillosus* - Milk - Transmammary infection - Nigeria.

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