

Communication

Prevalence of *Sarcocystis* species in sheep and goats in Northern Nigeria

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Des prélèvements tissulaires provenant de l'oesophage et du diaphragme ont été collectés sur 400 moutons et 400 chèvres provenant des abattoirs de la région d'étude. Parmi eux, 36 présentaient des kystes sarcocystiques chez les moutons et 56 chez les chèvres. Ceux des moutons mesuraient 35,7 à 500 µm dans leur longueur. L'épaisseur de la paroi était de 2,4 µm. *Sarcocystis tenella* a été identifiée. Chez la chèvre, les kystes mesuraient de 98 à 700 µm avec une paroi de 2,7 µm. *Sarcocystis capricanis* a été identifiée. Pour les deux espèces, la fréquence des localisations était plus élevée dans l'oesophage que dans le diaphragme. *Mots clés* : Ovin - Caprin - Oesophage - Diaphragme - Sarcocystes - Étude morphométrique - Paroi kystique - Nigeria.

Introduction

Infection of sheep and goats by *Sarcocystis* species is a cause of concern to the meat industry because it leads to carcass condemnation in many developed countries (4) especially where visible microscopic cysts are encountered (9, 12). Infection by macroscopic cysts in sheep has been shown experimentally to be transmitted by cats (11).

In addition, sheep and goats may also be infected with other species of the parasite which only form microscopic cysts in the musculature. Infection by such cysts has been shown to be transmitted by dogs (3, 5). Recent studies have shown that these microscopic cyst-forming species may cause acute and even fatal clinical diseases in sheep

and goats, abortion in pregnant ewes and does, and significant reduction in weight gain and wool growth in young lambs and kids (3). The prevalence of infections by these microscopic cysts has been examined in several countries using a variety of techniques (2, 10). In contrast, no report on the prevalence of infection by microscopic cysts has been made in sheep and goats in Nigeria. The only documented report in Nigeria is the prevalence in dogs (1).

The present investigation was therefore carried out to determine the prevalence and abundance of the different types of *Sarcocystis* species occurring in sheep and goats in 3 States of Northern Nigeria : Bauchi, Plateau and Kaduna States.

Materials and Methods

Samples of diaphragm muscle (about 30 mg) and oesophagus (about 15 cm) were collected from 400 sheep and 400 goats slaughtered in abattoirs located in the 3 State capitals (Bauchi, Jos and Kaduna). These abattoirs receive animals from the neighbouring towns and villages in and around the States. The samples were each packed in a labelled polythene bag and transported to the laboratory in a cooler. They were stored at 4 °C until use.

Tissue samples were first briefly examined in the abattoir for the presence of macroscopic cysts. At the laboratory, they were further examined under the dissecting microscope. Later, the tissues were subjected to digestion using artificial gastric juice (1 % HCL-Pepsin solution (6)). The digests were centrifuged at 200 g for 5 min and sediments checked for microscopic sarcocysts or bradyzoites. The sarcocysts seen and the cyst-wall thickness were measured with an ocular micrometer.

Results

Of the 400 sheep tissue samples (oesophagus and diaphragm), none had macroscopic cysts, while 36 were found to have microscopic sarcocysts (table I). Out of the 36, all had cysts in the oesophagus while 22 had also cysts in the diaphragm (table III). The average measurement of sarcocysts ranged from 35.7 to 500 µm in length and the average cyst-wall measure was 2.4 µm (table II).

TABLE I Prevalence of *Sarcocystis* species in sheep and goats.

Animal species	Total number sampled	Number positive	Percentage positive
Sheep	400	36	9
Goats	400	56	14

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TABLE II Nature and species of sarcocysts from oesophagus and diaphragm of sheep and goats.

Animal species	Total number sampled	Number positive	Average cyst size (length) (µm)	Average cyst-wall size (µm)	Nature of cyst	Species of <i>Sarcocystis</i>
Sheep	400	36	35.7-500	2.4	Microscopic	<i>S. tenella</i>
Goats	400	56	98-700	2.7	Microscopic	<i>S. capracanis</i>

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TABLE III Prevalence of sarcocysts based on type of tissue.

Animal species	Type of tissue	Total number sampled	Number positive
Sheep	Oesophagus	400	36
	Diaphragm	400	22
Goats	Oesophagus	400	56
	Diaphragm	400	30

In goats, 56 were positive for *Sarcocystis* cysts and all had cysts in the oesophagus, while only 30 of the 56 had cysts in the diaphragm (table III). The sarcocysts measured 98-700 μm in length and the average cyst wall measure was 2.7 μm (table II).

Discussion

The morphometric studies, using type of sarcocysts and size of cyst-wall, resulted in the detection of only one species of *Sarcocystis* in sheep and goat tissues examined. The oesophagus was found to contain more cysts than the diaphragm and the reason for this cannot be explained.

Microscopic cysts from sheep musculature was described by MOULE (8). The transmission studies performed later demonstrated that microscopic cysts from sheep and goats were infective to dogs (5, 7), whereas repeated attempts to infect cats were unsuccessful. Therefore, the microscopic species found in sheep were *Sarcocystis tenella* and those of goats *Sarcocystis capracanis*. This assessment is based on transmission to dogs, nature of cysts and size of cyst-wall.

The prevalence of infection by microscopic cysts was found to be 9 % in sheep and 14 % in goats. Higher levels of infection of 50-100 % have been reported in sheep and goats in other countries (3, 10). Infection by *S. tenella* and *S. capracanis* appears to be world-wide in areas with a high production of sheep and goats and differs markedly in geographical location, climate and animal management. This may explain the low prevalence in this study compared to the results obtained in other countries.

The economic impact of these infections on sheep and goat products is difficult to assess. Microscopic cysts are not classified as carcass lesions, therefore they do not contribute to carcass rejection or condemnations. However, recent experimental studies have shown that

S. tenella and *S. capracanis* can cause severe and even fatal diseases in sheep and goats during the period of parasite merogonous proliferation prior to muscle cyst formation. This may result in high abortion and mortality rates (3). Since this is the first study in Nigeria, further investigations should be done to confirm the parasite species present using electron microscopes and also to determine the effect on small ruminant production. This is because adequate supply of meat to Nigerian population depends to a large extent on the considerable attention given to small ruminant production and therefore any factors that have a negative influence on this production should be brought under strict control.

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Tissue samples comprising the oesophagus and diaphragm were collected from 400 sheep and 400 goats slaughtered at the abattoirs in the study area. Out of this number, 36 were positive for *Sarcocystis* cysts (sarcocysts) in sheep and 56 in goats. The sarcocysts in sheep measured 35.7 to 500 μm lengthwise and the cyst-wall 2.4 μm . They were identified to be *Sarcocystis tenella*. The cysts in goats measured 98 to 700 μm and the cyst-wall 2.7 μm . They were identified to be *Sarcocystis capracanis*. In both animals species, the sarcocysts were more frequent in the oesophagus than in the diaphragm. All sarcocysts seen were microscopic. **Key words** : Sheep - Goat - Oesophagus - Diaphragm - Sarcocysts - Morphometric study - Cyst-wall - Nigeria.

References

- AGANGA (A.O.), AGANGA (A.A.), UMOH (J.U.), KUDI (A.C.). Isolation of *Sarcocystis oivicanis* of dogs in Zaria area : its significance to small ruminant production. *Bull. Anim. Hlth Prod. Afr.*, 1988, **36** : 138-140.
- DUBEY (J.P.), LEEK (R.G.), FAYER (R.). Prevalence, transmission and pathogenicity of *Sarcocystis gigantea* of sheep. *J. Am. vet. med. Ass.*, 1986, **188** : 151-154.
- DUBEY (J.P.), SPEER (C.A.), FAYER (R.). *Sarcocystosis of animals and man*. Boca Raton (Florida), CRC Press, 1988.
- FAYER (R.). Economic losses to *Sarcocystis*. *Nat. Wool Grower*, 1976, **66** (22) : 23-28.
- FORD (G.E.). Prey-predator transmission in the epizootiology of ovine sarcosporidiosis. *Aust. vet. J.*, 1974, **50** : 38-39.
- JACOBS (L.), REMINGTON (J.S.), MELTON (M.L.). A survey of meat samples from swine, cattle, and sheep for the presence of encysted *Toxoplasma*. *J. Parasit.*, 1960, **46** : 23-28.
- KUDI (A.C.). Prevalence of *Sarcocystis* species in Kaduna, Plateau and Bauchi States of Nigeria. M. Sci. Thesis, Ahmadu Bello University, Zaria, 1989.
- MOULE (L.T.). Des Sarcosporides et de leur fréquence, principalement chez les animaux de boucherie. *Mém. Soc. Arts Vitry-le-François*, 1988, **14** : 3-42.
- MUNDAY (B.L.). The prevalence of sarcosporidiosis in Australia meat animals. *Aust. vet. J.*, 1975, **51** (10) : 478-480.
- O'DNOGHUE (P.J.), FORD (G.E.). The prevalence and intensity of *Sarcocystis* spp. infections in sheep. *Aust. vet. J.*, 1986, **63** : 273-278.
- ROMMEL (M.), HEYDORN (A.O.), GRUBER (F.). Beiträge zum Lebenszyklus der Sarkosporidien. I. Die Sporozyste von *S. tenella* in den Fäzes der Katze. *Berl. Münch. tierärztl. Wschr.*, 1972, **85** : 101-105.
- SENEVIRATNA (P.), EDWARD (A.G.), DEGIUSTI (D.L.). Frequency of *Sarcocystis* spp. in Detroit, Metropolitan Area, Michigan. *Am. J. vet. Res.*, 1975, **36** : 337-339.