

Observations on dry season strongyle infestations of permanent swamps grazed by cattle in Vom area, Plateau State, Nigeria

I. O. Onyali ¹

ONYALI (I. O.). Observations sur les infestations par les strongles, durant la saison sèche, des pâturages à bovins inondés en permanence dans la région de Vom, État du Plateau, Nigeria. *Revue Élev. Méd. vét. Pays trop.*, 1989, 42 (3) : 431-434.

Des échantillons d'herbes ont été récoltés dans les environs de 4 mares permanentes (2 très pâturées et 2 peu pâturées), situées dans la région de Vom. Les collectes ont eu lieu tous les 15 jours de novembre 1985 à avril 1986 et de novembre 1986 à avril 1987. Les larves ont été extraites par lavage et sédimentation et les décomptes effectués ont été exprimés en nombre de larves par kg de matière sèche. Parmi les larves de vers présentes dans les coprocultures, on distinguait *Haemonchus*, *Cooperia* et *Oesophagostomum* qui étaient les plus importants. *Trichostrongylus*, *Bunostomum* et *Strongyloides* étaient présents aussi, mais en très petit nombre. Les alentours des mares permanentes très peu pâturées étaient faiblement infestés, alors que ceux très pâturés se révélaient contaminés par de fortes infestations. Les pâturages fortement contaminés deviennent un milieu à risque de la moitié jusqu'à la fin de la saison sèche. Les traitements de routine durant la saison sèche sur les bovins qui ont accès aux pâturages, en particulier dans les zones fortement contaminées, sont dès lors nécessaires. *Mots clés* : Bovin - Saison sèche - Pâturages - Strongle - Nigeria.

INTRODUCTION

During the peak of the dry season in Vom, in the savanna zone of Northern Nigeria, rainfall is virtually nil and relative humidity is very low. The ground become extremely hard and the grass withers into straw. Availability of infective larvae on pasture during this period is virtually precluded and infection of stock is nil (15). Nutrition at this time is similarly poor and pasturing is usually concentrated at certain swamps called in Hausa « fadamas » which remain moist throughout the dry season.

The surroundings of these large ponds are permanently damp and only temporarily flooded during the rainy seasons from June to September.

These « fadamas » are never dry throughout the year and hence they are conducive for grasses to flourish during the dry season. Pasturing is therefore concentrated at these areas only during the dry seasons.

1. Parasitology Department, National Veterinary Research Institute, Vom, Plateau State, Nigeria.

Current address : Department of Parasitology and Applied Entomology, Anambra State University of Technology, P.M.B. 5025 Awka Campus, Anambra State, Nigeria.

Reçu le 10.08.88, accepté le 22.12.88.

The prevalent grasses are *Andropogon* sp. and *Hyparrhenia* sp. and such trees as *Isoberlina* sp. are occasionally present.

The forage is grazed at about 5 cm to 8 cm above ground level. Studies on the ecology of the preparasitic stages of the strongylate nematodes responsible for bovine gastroenteritis in the savanna areas of Northern Nigeria (11, 15) and in the derived savanna zone of Eastern Nigeria (3, 4) have shown that rainfall which is highly seasonal in these parts of the country is the most important single factor controlling the availability of L3 on pasture. Consequently large numbers of L3 are present on herbage only during the rains. The same is also true of the trichostrongylids of small ruminants both in the Northern savanna zone and in parts of the rainforest zone of Western Nigeria (13).

Since temperature is not a limiting factor in the development and survival of the preparasitic stages of the strongylate nematodes in the Plateau area (14), it is possible that cattle grazing at permanent swamps during the dry season may be at risk from strongyle infestations. This study was therefore carried out to assess the extent of preparasitic development and its contribution to the herbage infestations of the dry season at Vom area, Northern Nigeria.

MATERIALS AND METHODS

The faecal deposits are dropped on the damp ground surroundings of these ponds. The faeces are not dropped directly into water.

Herbage larval counts

The samples of herbage were collected fortnightly using the technique described by TAYLOR (16). Samples were collected from heavily grazed surroundings of 2 permanent swamps and from lightly grazed surroundings of 2 permanent swamps in Vom area starting from November 5, 1985 to April 30 of 1986 and November 11, 1986 to April 28, 1987. The herbage was soaked in water and the larvae recovered by conti-

nuous centrifugation followed by salt flotation. The counts were expressed as third stage larvae per kilogram (L3/kg) of dry matter of herbage.

Faecal cultures

Freshly deposited faeces were cultured monthly for larval recovery and identification to determine the percentage species composition of the strongyle eggs found. The cultures were prepared using sterile cattle faeces and the cultures were left for 7 days at room temperature (25-30 °C). The harvested larvae were identified using the morphological characteristics described by KEITH (10).

Temperature conditions at Vom

Monthly temperature and humidity data during the study period were obtained from the meteorological station of the National Root Crops Research Institute, Vom.

RESULTS

Figure 1(A) shows the mean pasture larval counts for the two heavily contaminated permanent swamps and the two lightly contaminated permanent swamps. Pasture infestation is on the increase from mid dry season (January to February) to late dry season (March to April). Humidity was low and ranged from 18 to 52 per cent as indicated in figure 1(B). Temperature was fairly constant and as shown in figure 1(C), the mean maximum temperature did not exceed 31.4 °C and the mean minimum is 18.3 °C.

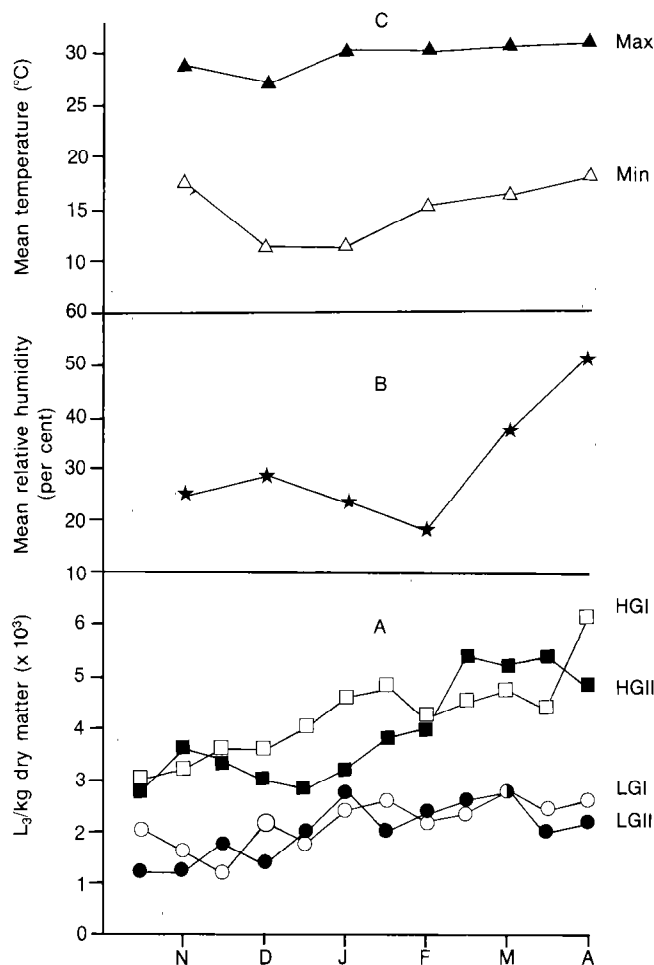


Fig. 1 : Dry season mean herbage larval counts in two heavily grazed permanent swamps (HG I, II) and two lightly grazed permanent swamps (LG I, II) in Vom area, including humidity and temperature data.

Table I shows that about 90 per cent of the worm eggs were those of *Haemonchus*, *Cooperia* and *Oesophagostomum* species, with relatively small numbers of *Trichostrongylus*, *Bunostomum* and *Strongyloides* species.

TABLE I Mean percentage larval recovery from faecal cultures.

Nematode species	Per cent recovery by month					
	November	December	January	February	March	April
<i>Haemonchus</i> species	60.0	60.5	56.0	60.0	55.8	64.0
<i>Cooperia</i> species	24.0	20.4	23.0	27.0	22.6	20.5
<i>Oesophagostomum</i> species	10.8	8.6	10.0	7.5	10.6	9.0
* Others	5.2	10.5	11.0	5.5	11.0	6.5

* *Trichostrongylus*, *Bunostomum* and *Strongyloides* species.

DISCUSSION

The contaminated permanent swamps during the dry season show that temperature is not a limiting factor in the development and survival of the preparasitic stages of the strongyles of cattle on the Plateau since a fairly constant temperature conducive for larval survival is maintained during this period. At no time did the maximum temperature exceed 31.4 °C while the minimum was 18.3 °C. This situation contrasts with that obtained in the USA (2), Australia (5) and Iraq (1), where related studies has shown that not only the lack of rainfall, but also the high temperatures of the summer months are very unsuitable for the development and survival of the preparasitic stages. Moisture therefore which is continually available in these swamps throughout the dry season seems to have the most important effect on the preparasitic stages of the cattle strongyles. This is in agreement with the studies reported in the Plateau area of Northern Nigeria (15) in parts of Western Nigeria (13) and in the derived savanna zone of Eastern Nigeria (3, 4).

Two sources of carry over of infection through the dry season appear to be operating on the Plateau. These include the permanent swamps « fadamas » created by the numerous abandoned tin mines which serve as pasturing areas during this period and through the carrier animal. However in Nigeria the carrier animal is the most important means of carry over of infection from one rainy season to another (11). This infection is present in the animals either as arrested larvae which generally resume their development towards the end of the dry season or as adults or both depending on the trichostrongylid species concerned (6, 7, 8, 12).

The high incidence of *Haemonchus* and *Cooperia* species recorded in this area have been reported by previous workers (7). The significant occurrence of

ONYALI (I. O.). Observations on dry season strongyle infestations of permanent swamps grazed by cattle in Vom area. Plateau State, Nigeria. *Revue Elev. Méd. vét. Pays trop.*, 1989, 42 (3) : 431-434.

Herbage samples were taken from 4 permanent swamps (2 heavily and 2 lightly pastured) located in Vom area every fortnight from November 1985-April 1986 and November 1986-April 1987. Larvae were extracted by washing and sedimentation and counts expressed as number of larvae per kg dry herbage. Worm larvae seen in faecal cultures were differentiated as *Haemonchus*, *Cooperia* and *Oesophagostomum* and these formed the bulk. *Trichostrongylus*, *Bunostomum* and *Strongyloides* were also seen but these were generally few. Lightly pastured permanent swamps were lightly infested and heavily pastured were contaminated with corresponding high infectivity. Heavily contaminated pastures are with risk from mid dry to late dry season. Dry season routine treatment is therefore necessary for cattle with access to swamps during the dry season especially heavily contaminated ones. *Key words* : Cattle - Dry season - Permanent swamps - Strongyle - Preparasitic stages - Nigeria.

Oesophagostomum species is hereby reported too. Strongyles associated with gastroenteritis of cattle in the Plateau include *Haemonchus contortus*, *H. placei*, *Cooperia punctata*, *C. pectinata*, *Trichostrongylus axei*, *T. colubriformis*, *Oesophagostomum radiatum* and *Bunostomum phlebotomum* (11) and in young calves are *Strongyloides papillosus* and *Neoscaris vitulorum* (9).

Finally the results of this study have some implications for the control of bovine parasitic gastroenteritis in this part of Nigeria. It is clear that contaminated pastures are with risk from mid dry to late dry season. Dry season routine treatment is therefore necessary for cattle with access to swamps during the dry season especially heavily contaminated ones. First anthelmintic medication is probably best given by the third week of November, about a month after the onset of the dry season. This will reduce the build up of herbage infestations within the pasturing swamps and also prevent possible outbreaks of bovine parasitic gastroenteritis in the dry season such as have been reported here in the Plateau by FABIYI *et al.* (7). A second treatment by the first week of March will not only drastically reduce the amount of infection carried over to the next rainy season but it will also minimise the urgency of the first wet season treatment.

ACKNOWLEDGEMENTS

I am grateful to the Director, National Veterinary Research Institute, Vom, for permission to publish this paper. The technical assistance of the laboratory staff is appreciated. My appreciation is also extended to Mr. Samuel Oc. OCHAI for typing the manuscript.

ONYALI (I. O.). Observaciones sobre las infestaciones por estróngilos durante la estación seca de pantanos permanentes pastoreados por bovinos en la región de Vom, Estado del Plateau, Nigeria. *Revue Elev. Méd. vét. Pays trop.*, 1989, 42 (3) : 431-434.

Cada 15 días, de noviembre de 1985 a abril de 1986, se recogieron muestras de hierbas en 4 pantanos permanentes (2 muy pastoreados y 2 poco pastoreados) situados en la región de Vom. Se extrajeron las larvas por lavado y sedimentación y se notaron las cuentas efectuadas por número de larvas por kg de materia seca. Entre las larvas de helmintos presentes en los coprocultivos, *Haemonchus*, *Cooperia* y *Oesophagostomum* eran los más importantes. *Trichostrongylus*, *Bunostomum* y *Strongyloides* se encontraban también pero en muy pequeño número. Los pantanos poco pastoreados eran poco infestados y los pantanos muy pastoreados eran muy infestados. Estos últimos presentan riesgos desde la mitad hasta el fin de la estación seca. Por consiguiente, se necesitan tratamientos regulares durante la estación seca sobre los bovinos pastoreando, en particular en las zonas muy infestadas. *Palabras claves* : Bovino - Estación seca - Pastos - Estróngilo - Nigeria.

REFERENCES

1. ALTAIF (K. I.), YAKOUB (A. Y.). Development and survival of *Haemonchus contortus* larvae on pasture in Iraq. *Trop. Anim. Hlth Prod.*, 1987, **19** : 88-92.
2. ANDERSON (F. L.), WANG (G. T.), LEVINE (N. D.). Effect of temperature on survival of the free-living stages of *Trichostrongylus colubriformis*. *J. Parasit.*, 1966, **52** : 713-721.
3. CHIEJINA (S. N.), EMEHELU (C. O.). Seasonal changes in pasture populations of infective larvae of gastrointestinal nematodes of cattle in Eastern Nigeria. *Res. vet. Sci.*, 1984, **37** : 144-147.
4. CHIEJINA (S. N.), FAKAE (B. B.). Development and survival of infective larvae of gastrointestinal nematode parasites of cattle on pasture in Eastern Nigeria. *Res. vet. Sci.*, 1984, **37** : 148-153.
5. DONALD (A. D.). Ecology of the free-living stages of nematode parasites of sheep. *Aust. vet. J.*, 1968, **44** : 139-144.
6. EYSKER (M.), OGUNSUSI (R. A.). Observations on epidemiological and clinical aspects of gastrointestinal helminthiasis of sheep in Northern Nigeria during the rainy season. *Res. vet. Sci.*, 1980, **28** : 58-62.
7. FABIYI (J. P.), OLUYEDE (D. A.), NEGEDU (J. O.). Late dry season outbreak of clinical haemonchosis and cooperiasis in cattle of Northern Nigeria. *Vet. Rec.*, 1979, **105** : 399-400.
8. HART (J. A.). Observations on the dry season strongyle infestations of Zebu cattle in Northern Nigeria. *Br. vet. J.*, 1964, **120** : 87-95.
9. IKEME (M. M.). *Strongyloides papillosus* and *Neoascaris vitulorum* naturally acquired mixed infestations of calves in the Plateau area of Northern Nigeria and the treatment given. *Bull. epizoot. Dis. Afr.*, 1970, **18** : 339-345.
10. KEITH (R. K.). The differentiation of the infective larvae of some nematode parasites of cattle. *Aust. J. Zool.*, 1953, **1** : 223-235.
11. LEE (R. P.), ARMOUR (J.), ROSS (J. G.). The seasonal variations of strongyle infestations in Nigerian Zebu cattle. *Br. vet. J.*, 1960, **116** : 34-46.
12. OGUNSUSI (R. A.), EYSKER (M.). Inhibited development of trichostrongylids of sheep in Northern Nigeria. *Res. vet. Sci.*, 1979, **26** : 108-110.
13. OKON (E. D.), ENYENIHI (U. K.). Development and survival of *Haemonchus contortus* larvae on pastures in Ibadan. *Trop. Anim. Hlth Prod.*, 1977, **9** : 7-10.
14. ONYALI (I. O.), ONWULIRI (C. O. E.), AJAYI (J. A.). Development and survival of *Haemonchus contortus* larvae on pastures in Vom, Plateau State, Nigeria. *Trop. Anim. Hlth Prod.*, in press.
15. SPRENT (J. F. A.). Some observations on the bionomics of *Bunostomum phlebotomum*, a hookworm of cattle. *Parasitology*, 1946, **37** : 202-210.
16. TAYLOR (E. L.). Technique for the estimation of pasture infestation by strongyloid larvae. *Parasitology*, 1939, **31** : 473-478.