

# Incidence of helminth infections in water buffaloes in Eastern Amazon, Brazil

H.D. Láu <sup>1</sup>

## Key words

Cattle - Water buffalo - Calf - Helminthosis - *Strongyloides papillosus* - *Toxocara vitulorum* - Epidemiology - Brazil.

## Summary

Gastrointestinal nematode infections were studied in three groups of water buffalo calves (A, B, C) by mean faecal egg counts (EPG), post-mortem examinations and determination of infective larvae (L<sub>3</sub>) in pasture. Each group was made of twelve suckling calves (1 to 6 months old) and their mothers and twelve weaned animals (7 to 12 months old). Groups A, B, C grazed on cultivated pasture (Belém), native pasture (Marajó Island) and floodable native pasture (Low Amazon region), respectively. *Strongyloides papillosus* and *Toxocara vitulorum* were the most prevalent nematodes in suckling buffaloes in all groups. The incidence of these helminths does not depend on environmental conditions. The mean monthly EPG of animals in group A were relatively lower in the period of intensive rainfall and higher in the period of lesser rainfall. The EPG of animals in group B increased sharply during the wet period and decreased during the dry period. Low EPG were found in the animals of group C. The number of L<sub>3</sub> from cultivated pasture was lower in the intensive rainfall period and higher in the lesser rainfall period. Larval counts of native pasture increased sharply in the wet period and decreased during the dry period. A small number of L<sub>3</sub> was observed on floodable native pasture. *Cooperia punctata* and *Haemonchus contortus* were the most prevalent nematodes found upon necropsy of weaned animals in all groups.

## ■ INTRODUCTION

The role of parasitism in the overall production of water buffaloes has been documented in the fast-growing scientific literature on this host species during the last two decades. It is evident that buffaloes and cattle share many identical parasitic infections but buffaloes differ in many aspects and, therefore, need to be dealt with separately (3).

The incidence and severity of parasitic infections depend on several factors, such as climatic conditions, species of parasites present, levels of pasture contamination and ages of the animals. Although it is not possible to quantify exactly the economic losses caused by helminths, it is known that they are one of the main reasons for poor buffalo performance. Several authors (1, 4, 5, 9, 13) have identified the most important nematodes and their prevalence in different regions of Brazil. In the present paper the incidence of helminth infections in water buffaloes in Eastern Amazon was investigated.

## ■ MATERIALS AND METHODS

The trials were conducted in the Experimental Farms of the Agroforestry Research Centre for the Eastern Amazon (CPATU) of the Brazilian Corporation for Agricultural Research (EMBRAPA), located in Belém (latitude: 1°28' S; longitude: 48°30' W), Marajó Island (latitude: 00°45' S; longitude: 48°30' W) and Low Amazon region (latitude: 02°00' S; longitude: 54°04' W) in the State of Pará, Brazil. According to Bastos *et al.* (2), the climate of Belém region (Af type of Köppen classification) does not present a well-defined dry season. The annual rainfall is well distributed during the year, with short periods of low total rainfall. In Marajó Island and Low Amazon region, the climate (Am type of Köppen classification) presents well-defined dry (June-November) and rainy (December-May) seasons. In all regions the mean temperature throughout the year is 26°C (minimum 21°C and maximum 33°C). The period of study was 1993 (Belém region), 1994 (Marajó Island) and 1995 (Low Amazon region).

For each trial location a group (group A, in Belém; group B, in Marajó Island; group C, in Low Amazon) made of twelve suckling

1. EMBRAPA/Centro de Pesquisa Agroflorestal da Amazônia Oriental, Trav. Dr. Enéas Pinheiro, S/N CEP 66.070000, Belém, PA, Brazil

calves (1-6 months old) and their mothers and twelve weaned animals (7-12 months old) buffaloes were used. Group A grazed in a 30-hectare single paddock with cultivated pasture (*Brachiaria humidicola*). Groups B and C grazed extensively in about 100 hectares of native pasture and floodable native pasture, respectively. None of the animals were treated with anthelmintics.

At monthly intervals, rectal fecal samples were collected from all animals for eggs per gram of faeces counts (EPG) using the Gordon and Whitlock technique (7). Pasture samples were collected from all areas for third-stage trichostrongylid larval counts ( $L_3/kg$  dry grass) according to the Donald technique (6). At the end of the dry and rainy period, necropsies were performed in one weaned animal of each group for parasite counts using the method recommended by Lima *et al.* (10).

■ RESULTS AND DISCUSSION

*Strongyloides papillosus* and *Toxocara vitulorum* eggs were predominant in suckling buffaloes in all groups (A, B, C). In group A, eggs of *S. papillosus* and *T. vitulorum* were present in the faeces of calves aged 15 days. The average worm egg counts of both species gradually increased up to a peak in animals aged 30 days (31,000 EPG for *S. papillosus* and 23,000 EPG for *T. vitulorum*) and then decreased to zero when the calves were about 150 and 210 days old for *T. vitulorum* and *S. papillosus*, respectively (figure 1). Similar results were found in groups B and C. The transmammary infection of *S. papillosus* (15) and *T. vitulorum* (14) infective larvae may be responsible for the early presence of these parasites in suckling buffalo calves. Penetration through the unbroken skin was another route of *S. papillosus* larvae (15).

In group A, the mean monthly strongyle EPG counts of the weaned buffaloes (figure 2) were relatively lower in the period of intensive rainfall (January-June) and higher in the period of relatively lesser rainfall (July-December). In group B, the EPG increased sharply during the wet period and decreased during the dry period (figure 3). A low EPG count (15-30 EPG) was found in the animals of group C.

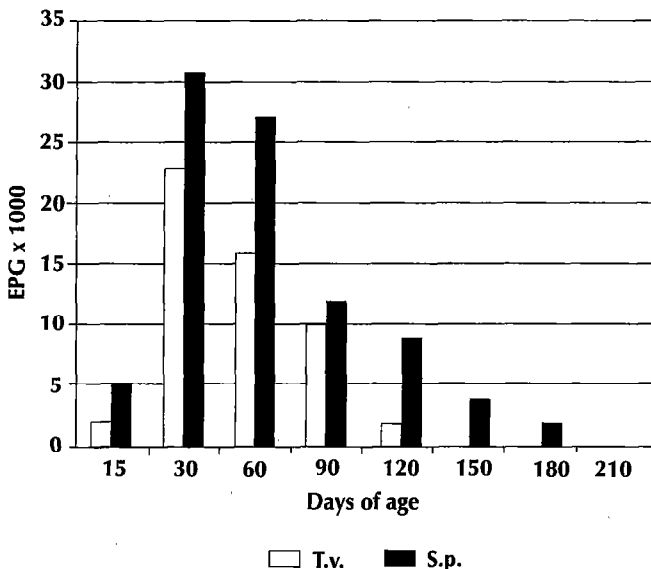


Figure 1: average of *Strongyloides papillosus* (S.p.) and *Toxocara vitulorum* (T.v.) eggs per gram of faeces in suckling buffaloes (Belém).

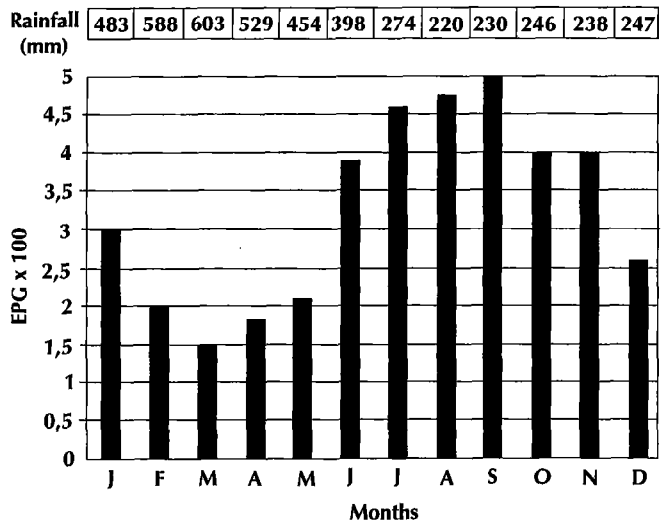


Figure 2: strongyle faecal egg counts of weaned water buffalo calves grazing in cultivated pasture (Belém).

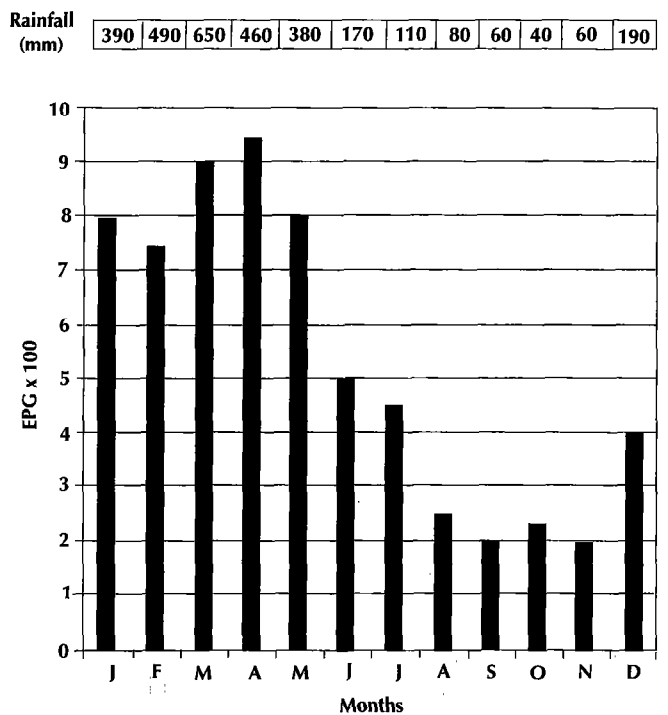


Figure 3: strongyle faecal egg counts of weaned water buffalo calves grazing in native pasture (Marajó Island).

In the first case (group A) the intensive rainfall had a high impact on the infectivity of pastures and, therefore, was an important factor with respect to the parasite population. The number of  $L_3$  from the cultivated pasture was lower in the intensive rainfall period and higher in the lesser rainfall period (figure 4). In the second case (group B), the rainfall probably had little effect on the parasite population because the larval counts of the native pasture increased sharply in the wet period and decreased during the dry period (figure 5). Pasture infectivity was reduced in the dry period probably as a consequence of the high temperature and the low humidity of the season. This finding was similar to those of Guimarães (8), Maciel (11), Parra and Uribe (12) in bovines in a

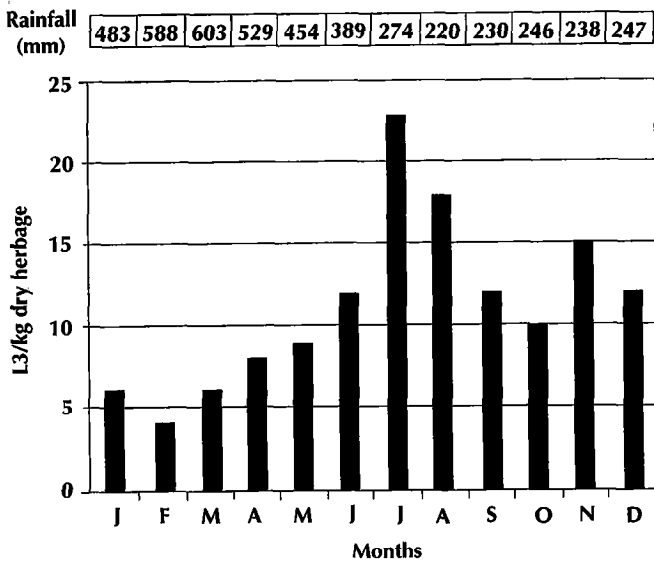


Figure 4: pasture larval counts in cultivated pasture (Belém).

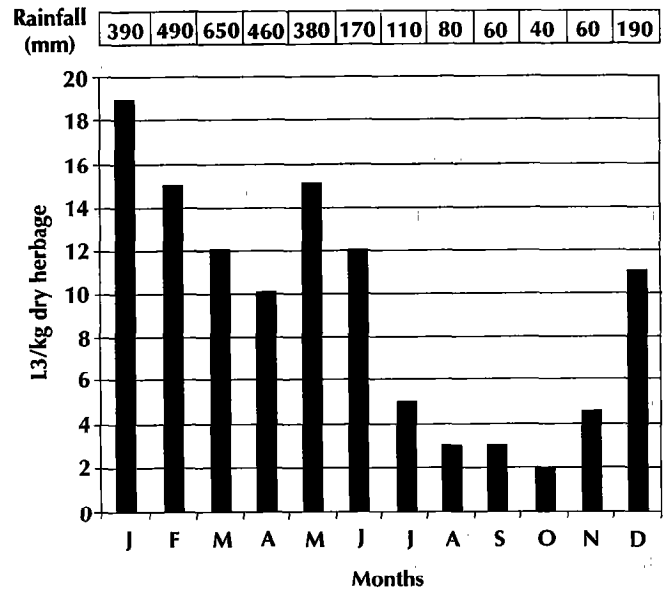


Figure 5: pasture larval counts in native pasture (Marajó Island).

comparable climatic pattern. The low and inconsistent number of EPG in group C was probably caused by the lower pasture infectivity of the experimental area. Only a small number of  $L_3$  (30 at 60  $L_3$ /kg dry grass) was observed on the floodable native pasture probably due to the impossibility for nematode eggs to develop under water and for lack of oxygen. *Cooperia* were the genera most frequently recuperated from all pasture types.

Six nematode genera were usually found upon necropsy of weaned calves in all groups: *Cooperia*, *Haemonchus*, *Oesophagostomum*, *Bunostomum*, *Trichostrongylus* and *Trichuris*. *Cooperia* spp. were found to be the most prevalent parasites (65%). Two species of *Cooperia*, *C. punctata* (85%) and *C. pectinata* (15%), were noted. *Haemonchus* sp. was the second most prevalent specie (15%). Other species seen in the study included *Trichostrongylus axei* (9%), *Oesophagostomum radiatum* (6%), *Bunostomum plebotomum* (4%) and *Trichuris discolor* (1%).

## CONCLUSION

*Strongyloides papillosus* and *Toxocara vitulorum* were the most prevalent nematodes in suckling water buffaloes. The incidence of *S. papillosus* and *T. vitulorum* parasitic infections does not depend on environmental conditions. The strongyle egg counts of the animals grazing in the cultivated pasture (Belém) were relatively lower in the period of intensive rainfall and higher in the period of less rainfall. In the animals grazing in the native pasture (Marajó Island) the EPG increased sharply during the wet period and decreased during the dry period. In the animals grazing on the floodable native pasture (Low Amazon region) the EPG was low and inconsistent. The number of  $L_3$  from the cultivated pasture was lower in the intensive rainfall period and higher in the lesser rainfall period. Larval counts of the native pasture increased sharply in the wet period and decreased during the dry period. A small number of  $L_3$  was observed on the floodable native pasture. *Cooperia* and *Haemonchus* were the most prevalent nematode genera in weaned animals.

## REFERENCES

- BARBOSA M.A., OLIVEIRA M.R., CORRÊA F.M.A., 1991. Parasitismo natural de bufalinos em Botucatu, SP Brasil: II. Observações sobre helmintos do gênero *Strongyloides*. *Arq. Bras. Med. vet. zoot.*, **43** (6): 517-523.
- BASTOS T.X., ROCHA E.J.P. da, ROLIM P.A.M., DINIZ T.D. de A.S., SANTOS E.C.R.dos, NOBRE R.A.A., CUTRIM E.M.C., MENDONÇA R.L.D. de., 1986. O estado atual dos conhecimentos de clima da Amazônia brasileira com finalidade agrícola. In: Anais do I Simpósio do Trópico Úmido, Belém, Brasil, 12-17 de novembro 1984, p. 19-36.
- BHATIA B.B., 1992. Parasites of river buffaloes. In: Tulloh N.M., Holmes J.H.G. eds., Buffalo production. Victoria, Australia, School of Agriculture and Forestry, University of Melbourne, p. 305-327.
- BRITO P. de V., VIEGAS J. P., TIMÓTEO A., CARVALHAL J. de R.M., ARAÚJO J.X. de, PEREIRA I.H. de O., 1984. Levantamento parasitológico em bubalinos na região da Baixada Maranhense. São Luís, Brasil, DFA-MA, 27 p.
- BUSETTI E.T., PASKE A., RUIS M.C.E., TOMAZ V., GOLINELLI A., 1983. Helmitos parasitas de *Bubalus bubalis* no Estado do Paraná. *Arq. Bras. Med. vet. zoot.*, **35** (3): 399-404.
- DONALD A.D., 1970. A technique for the recovery of strongyloid infective larvae from small sample units of pasture. *J. Helminthol.*, **61**: 1-10.
- GORDON H.M., WITLOCK H.V., 1939. A new technique for counting nematode eggs in sheep faeces. *J. Counc. sci. Ind. Res.*, **12**: 50-52.
- GUIMARÃES M.P., 1972. Variação estacional de larvas infestantes de nematóides parasitos de bovinos em pastagem de cerrado de Sete Lagoas, MG. *Arq. vet. UFMG*, **2**: 97-113.
- LAU H.D., 1993. Helmitoses gastrintestinais do bubalinos no Estado do Pará: epidemiologia e controle. Belém, Brasil, EMBRAPA-CPATU, 38 p. (Documentos, n° 72)
- LIMA J.D., LIMA W dos S., GUIMARÃES A.M., LOSS A.C.S., MALACCO M.A., 1990. Epidemiology of bovine nematode parasites in southeastern Brazil. In: Guerrero J., Leaning W.H.D. eds., Proceedings of the Symposium sponsored by MSD-AGVET in XVI World buiatrics congress, Salvador, Bahia, Brazil, August 14, 1990, p. 49-63.
- MACIEL F.C., 1979. Epidemiologia de helmintos gastrintestinais em bovinos de corte na região de Porto Velho. Porto Velho, Brasil, EMBRAPA-UEPAT/Porto Velho, 23 p. (Comunicado técnico, n° 6)

12. PARRA D., URIBE L.F., 1990. Epidemiology of bovine nematode parasites in the eastern plains of Colombia. In: Guerrero J., Leaning W.H.D. eds., Proceedings of the Symposium sponsored by MSD-AGVET in XVI World buiatrics congress, Salvador, Bahia, Brazil, August 14, 1990, p. 33-40.

13. PEREIRA I.H.O., SILVA E.P. da., 1992. Ocorrência de nematódeos em bubalinos (*Bubalus bubalis*) na Zona da Mata do Estado de Pernambuco, Brasil. Caderno Omega. Sér. vet., 6: 7-12.

14. ROBERTS J.A., FERNANDO S.T., SIVANATHAN S., 1990. *Toxocara vitulorum* in the milk of buffalo (*Bubalus bubalis*) cows. Res. vet. Sci., 49: 289-291.

15. SUKHAPESNA V., 1992. Parasites of swamp buffaloes. In: Tulloh N.M., Holmes J.H.G. eds., Buffalo production. Victoria, Australia, School of Agriculture and Forestry, University of Melbourne, p. 329-354.

Reçu le 24.12.96, accepté le 5.8.97

## Résumé

**Láu H.D.** Incidence d'helminthoses chez le buffle d'eau en Amazonie orientale, Brésil

L'incidence des nématodes gastro-intestinaux a été étudiée sur trois groupes de veaux buffles d'eau (A, B, C) par le comptage des œufs par gramme de fèces (OPG), par l'examen post-mortem et par l'identification des larves infestantes (L<sub>3</sub>) dans le pâturage. Chaque groupe était composé de douze veaux non sevrés (de 1 à 6 mois) et de leur mère et de douze veaux sevrés (de 7 à 12 mois). Les groupes A, B, et C pâturaient respectivement sur un pâturage cultivé près de Belém, sur un parcours naturel de savane dans l'île de Marajó, et sur un parcours naturel de savane inondable de la Basse-Amazone. *Strongyloides papillosus* et *Toxocara vitulorum* étaient les nématodes le plus fréquemment rencontrés chez les veaux buffles non sevrés dans les trois groupes. L'incidence de ces helminthes était indépendante du milieu. Les OPG mensuels moyens des animaux du groupe A étaient relativement faibles en saison de fortes pluies et importants en saison de faibles pluies. Dans le groupe B les OPG ont augmenté fortement lors de la saison des pluies et ont diminué pendant la saison sèche. Les OPG étaient faibles chez les animaux du groupe C. Le nombre de L<sub>3</sub> sur pâturage cultivé était plus faible pendant la période de fortes pluies et plus élevé pendant la période de faibles pluies. Il augmentait nettement dans le parcours naturel de savane pendant la saison des pluies et diminuait pendant la saison sèche. Un petit nombre de L<sub>3</sub> a été observé sur le parcours naturel de savane inondable. Lors de la nécropsie, les nématodes rencontrés le plus fréquemment sur les veaux sevrés dans les trois groupes étaient *Cooperia punctata* and *Haemonchus contortus*.

**Mots-clés** : Bovin - Buffle d'eau - Veau - Helminthose - *Strongyloides papillosus* - *Toxocara vitulorum* - Epidémiologie - Brésil.

## Resumen

**Láu H.D.** Incidencia de infecciones por helmintos en los búfalos de agua en el este del Amazonas, Brasil

Se estudiaron las infecciones por nemátodos gastrointestinales en tres grupos de terneros de búfalos de agua (A, B, C), mediante conteos de huevos en heces (EPG), exámenes post-mortem y determinación de larvas infecciosas en pastos. Cada grupo se compuso de doce terneros lactantes (de 1 a 6 meses de edad) y sus madres y de doce terneros destetados (de 7 a 12 meses de edad). A, B y C pastorearon, respectivamente, en pastos cultivados (Belém), pastos nativos (Isla Marajó) y pastos nativos inundables (región del Bajo Amazonas). Los nemátodos de mayor prevalencia en todos los grupos de terneros lactantes fueron *Strongyloides papillosus* y *Toxocara vitulorum*. La incidencia de estos helmintos no depende de las condiciones ambientales. El promedio de los conteos mensuales de huevos de los animales en el grupo A fue relativamente menor en el período de lluvias intensas y elevado en el período de menor intensidad pluviosa. El EPG de los animales en el grupo B aumentó dramáticamente durante la estación húmeda y disminuyó durante el período seco. Los EPG del grupo C fueron bajos. El conteo de larvas de tricostrongilos de tercer estadio (L<sub>3</sub>) en pastizales cultivados fue menor durante la estación de lluvias intensas y mayor durante el período de menor intensidad pluviosa. Los conteos de larvas en los pastizales nativos aumentaron dramáticamente durante el período húmedo y disminuyeron durante la estación seca. Se observó una pequeña cantidad de L<sub>3</sub> en los pastizales nativos inundables. En todos los grupos, *Cooperia punctata* y *Haemonchus contortus* fueron los nemátodos de mayor prevalencia en las necropsias de animales destetados.

**Palabras clave**: Ganado bovino - Búfalo de agua - Ternero - Helminthosis - *Strongyloides papillosus* - *Toxocara vitulorum* - Epidemiología - Brasil.