

## ACANTHOCEFALAN EGGS IN ANIMAL COPROLITES FROM ARCHAEOLOGICAL SITES FROM BRAZIL

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*An important point in paleoparasitology is the correct diagnosis of the origin of coprolites found in archaeological sites. The identification of human and animal coprolites, through the study of the shape, size, characteristics after rehydration, alimentary contents, and the presence of parasites, has proved to be accurate for human coprolites. For non-human ones we compared coprolites with recent faeces of animals collected near the archaeological sites, following the methodology above mentioned.*

*In this paper anteaters coprolites (Tamandua tetradactyla; Myrmecophaga tridactyla) with eggs of Gigantorhynchus echinodiscus (Archiancanthocephala; Gigantorynchidae) were identified.*

Key words: Paleoparasitology – animal coprolites – acanthocephalan eggs in coprolites

Paleoparasitology developed through findings of parasites in human coprolites collected from archaeological sites. However, among human coprolites, material of animal origin have also been found, and it is necessary to separate and classify them according to its zoological origin. For that it was developed a methodology comparing the coprolites with animal faeces presently existing in the region of archaeological sites, assuming that no modifications on the composition of hosts and parasitic fauna occurred during this relatively short period of time. It consists in their morphological and morphometric study as well as that of the alimentary contents and parasitic fauna (Araújo et al., 1982).

This report refers to the diagnosis of acanthocephalan eggs in animal coprolites from two geographical regions of Brazil, corresponding to the caatinga and cerrado biomes.

### MATERIALS AND METHODS

The coprolites were collected from the following archaeological sites, occupied by prehistoric population:

*Archaeological Site of Baixão da Vaca – São Raimundo Nonato, Piauí State – This site*

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is still under study by the staff of the “Museu do Homem Americano”, headed by Dr Niède Guidon. There are not yet data about radiocarbon dates, however the material examined was related to hearth remains and pigments used in rock paints (Dr Niède Guidon, personal communication).

We received from this site 1 sample with 3 cylindrical and brownish fragments (about 10 x 2.5 cm), covered by a thin layer of clay that, when removed, showed fragments of insects on the surface of the coprolites.

*Archaeological Site of Boqueirão Soberbo – Varzelândia, Minas Gerais State – Excavations on this site were performed by the staff of the “Instituto de Arqueologia Brasileira”, headed by Prof. Ondemar Dias. The cave and a rock shelter are situated 45 km from the city of Varzelândia, on a calcareous wall, where rock paints were found. The study about the stages of human occupation are still under way.*

Fifty five samples were recovered from layers dated by radiocarbon from 2955 BC (Si – Smithsonian Institute-2789) to 625 AD (SI-4486) (Prof. Ondemar Dias, personal communication).

The coprolites were rehydrated on a 0.5% aqueous solution of trissodium phosphate ( $\text{Na}_3\text{PO}_4$ ) for 72 hours (Callen & Cameron, 1960) followed by spontaneous sedimentation on conical glass jars (Lutz, 1919).

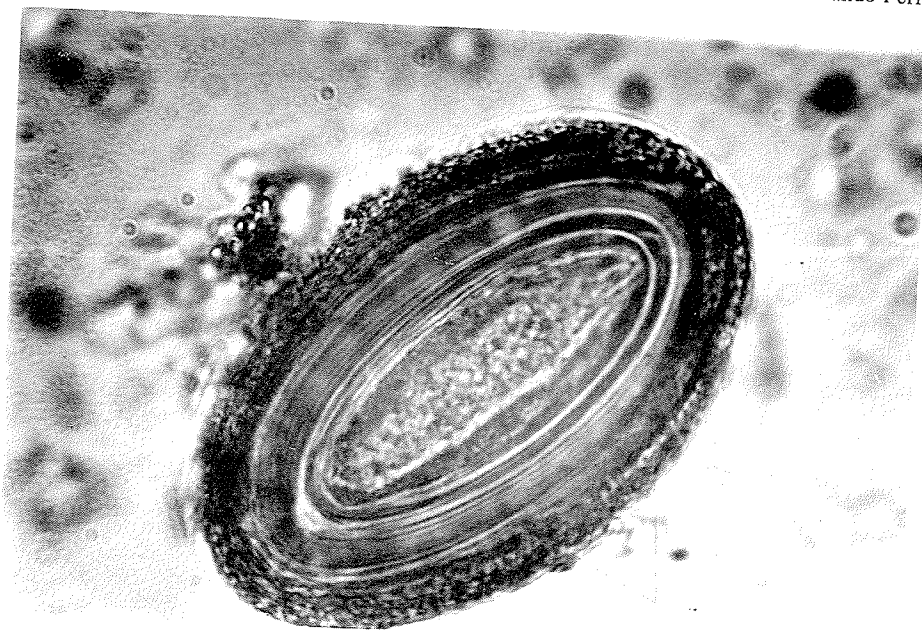


Fig. 1: Acanthocephala egg in coprolites (400x).

#### RESULTS

*Baixão da Vaca* – In the single sample of this site eggs of brown colour, thick double shell with the embryo inside, identified as acanthocephalan eggs were found. The average length and width of 10 eggs was  $61.62 \times 33.40 \mu\text{m}$  (Fig. 1).

*Boqueirão Soberbo* – Eggs with the same morphological characteristics of the above ones were found in two coprolites of this site. The average length and width were  $68.80 \times 39.41 \mu\text{m}$  ( $\bar{X}_{10}$ ) and  $64.79 \times 38.65 \mu\text{m}$  ( $\bar{X}_{10}$ ), respectively.

The colour of the solution in the three samples turned to brown opaque after 72 hours of immersion of the specimens.

#### DISCUSSION AND CONCLUSIONS

There is only one report of the finding of acanthocephalan eggs in archaeological material. Moore et al. (1969) found *Moniliformis clarki* (Ward, 1917) Van Cleave, 1924 eggs in coprolites described as human, dated from 6400 to 4865 BC, in the United States. The presence of this parasite in human hosts was related to insect remnants that could indicate alimentary habits with ingestion of these invertebrate host, or to the ingestion of rodents

infected with the adult worm, that is, a false parasitism (Fry, 1977).

The morphology of the three coprolites examined in our laboratory showed that the animal was of medium to great size, with a diet composed mostly by insects. Among the animals of the regions that could be involved by eating arthropods, the armadillos (*Dasypus novemcinctus* L., *Euphractus sexcinctus* (L.), *Tolipeutes tricinctus* (L.)) were discarded for their faeces were not morphologically compatible with the coprolites.

Two species of anteaters remained: *Tamandua tetradactyla* L. and *Myrmecophaga tridactyla* L. Yamaguti (1963) refers to two acanthocephalan species that parasitize these animals: *Moniliformis monechinus* (Linstow, 1902), Petrotchenko, 1958 with an average for the measurements of the eggs of  $104 \times 57 \mu\text{m}$ , is described only for *M. tridactyla* (= *M. jubata* L.), and was discarded by its egg size. *Gigantorhynchus echinodiscus* (Diesing, 1851) Hamann, 1892 parasitizes both hosts and the eggs have an average of  $62 \times 42 \mu\text{m}$  (Travassos, 1917).

It was not possible to collect faeces of *M. tridactyla*, a vanishing species in the region, but in relation to *T. tetradactyla* (= *Myrmecophaga bivittata*, (Geoffroy) Desmarest) it was noted

their similarity with the coprolites, including the remnants of termites (Isoptera). In the faeces of this animal trapped in the region of São Raimundo Nonato, Piauí State, eggs of acanthocephala with measurements ranging from 51.61-69.93 x 39.96-49.95  $\mu\text{m}$  ( $X_{20} = 65.99 \times 40.20 \mu\text{m}$ ) were found, with the same morphology of the coprolite eggs.

It was concluded that the parasite found in the coprolites is the species *G. echinodiscus*, based on the morphometry of the eggs, and that the host could be one of the two species of anteaters.

It has to be stressed the similarity of the external morphology of anteaters' faeces with the human ones, including the characteristics of the rehydration solution, after 72 hours, that turned to a brown opaque colour, a feature commonly regarded as peculiar to human coprolites (Callen & Cameron, 1960). This can be a cause of mistake in the interpretation of the diagnosis. However this can be easily clarified after the examination of the alimentary residues.

#### RESUMO

**Ovos de acantocéfalo em coprólitos de animais em sítios arqueológicos do Brasil** – Uma questão central em paleoparasitologia é o diagnóstico correto da origem dos coprólitos encontrados em sítios arqueológicos. A separação entre coprólitos humanos e animais, através do estudo do tamanho, forma, características após a reidratação, conteúdo alimentar e a presença de parasitos, tem sido usada principalmente nos casos de material de origem humana. Em relação aos coprólitos de animais, um mé-

do que provou ser eficiente é a comparação de coprólitos com fezes recentes de animais da região dos sítios arqueológicos, seguindo-se os parâmetros mencionados anteriormente.

Este trabalho refere-se ao diagnóstico de coprólitos de tamanduá (*Tamandua tetradactyla*; *Myrmecophaga tridactyla*) com a presença de ovos de *Gigantorynchus echinodiscus* (Archiancanthocephala; Gigantorynchidae).

Palavras-chave: paleoparasitologia – coprólitos de animais – ovos de acantocéfalo em coprólitos

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#### REFERENCES

- ARAÚJO, A.; CONFALONIERI, U. & FERREIRA, L. F., 1982. Oxyurid (Nematoda) egg from coprolites from Brazil. *J. Parasitol.*, 68: 511-512.
- CALLEN, E. O. & CAMERON, T. W. M., 1960. A prehistoric diet revealed by coprolites. *New Scientist*, 8: 35-40.
- FRY, G. F., 1977. Analysis of prehistoric coprolites of Utah. 45 p. In: J. D. Jennings. *Anthropological Papers*. Salt Lake City, University of Utah Press, nº 97.
- LUTZ, A., 1919. O Schistosomum mansoni e a schistosomatose segundo observações feitas no Brasil. *Mem. Inst. Oswaldo Cruz*, 11: 121-155.
- MOORE, J. G.; FRY, G. F. & ENGLERT Jr. E., 1969. Thorny-headed worm infection in North American prehistoric man. *Science*, 1963: 1324-1325.
- TRAVASSOS, L., 1917. Contribuição para o conhecimento da fauna helmintológica brasileira. *Mem. Inst. Oswaldo Cruz*, 9: 1-60.
- YAMAGUTI, S., 1963. *Systema Helminthum*. Acanthocephala V: 423 p. Interscience Publ. Inc. ed. New York.