Mem. Inst. Oswaldo Cruz, Rio de Janeiro, Vol. *88* (4): 577-579, oct./dec. 1993

CLIMATIC CHANGE IN NORTHEASTERN BRAZIL – PALEOPARASITOLOGICAL DATA

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Trichuris *eggs were observed in* Kerodon rupestris *coprolites dated 9,000 years before present, collected in archeological sites of São Raimundo Nonato, northeastern Brazil. However, present day local rodents seem not to be infected by the parasite, suggesting its disappearence due to climatic changes.*

Key words: *Trichuris* – paleoparasitology – coprolites – paleobiology – parasite ecology

Parasitological examination of coprolites has broadened the scope of ancient feces analysis, providing information to the understanding of past environments and evolution of parasitic diseases (Herrmann, 1985; Reinhard et al., 1987; Araújo et al., 1988; Kliks, 1990; Confalonieri et al., 1991).

In a previous paper it was discussed the finding of *Trichuris* Roederer, 1761 eggs in coprolites of *Kerodon rupestris* (Wied, 1820) (Rodentia, Caviidae), dated 32,000 years B. P. (before present) collected in the archeological site of Pedra Furada, São Raimundo Nonato, Piauí State, Brazil, (Ferreira et al., 1991).

Detailed here are new findings of *Trichuris* eggs in *K. rupestris* coprolites collected in the site of Sítio do Meio, which also belongs to the São Raimundo Nonato archeological region. *K. rupestris* (Rocky cavy) is a medium size rodent that is endemic in the semi-arid environment of northeastern Brazil.

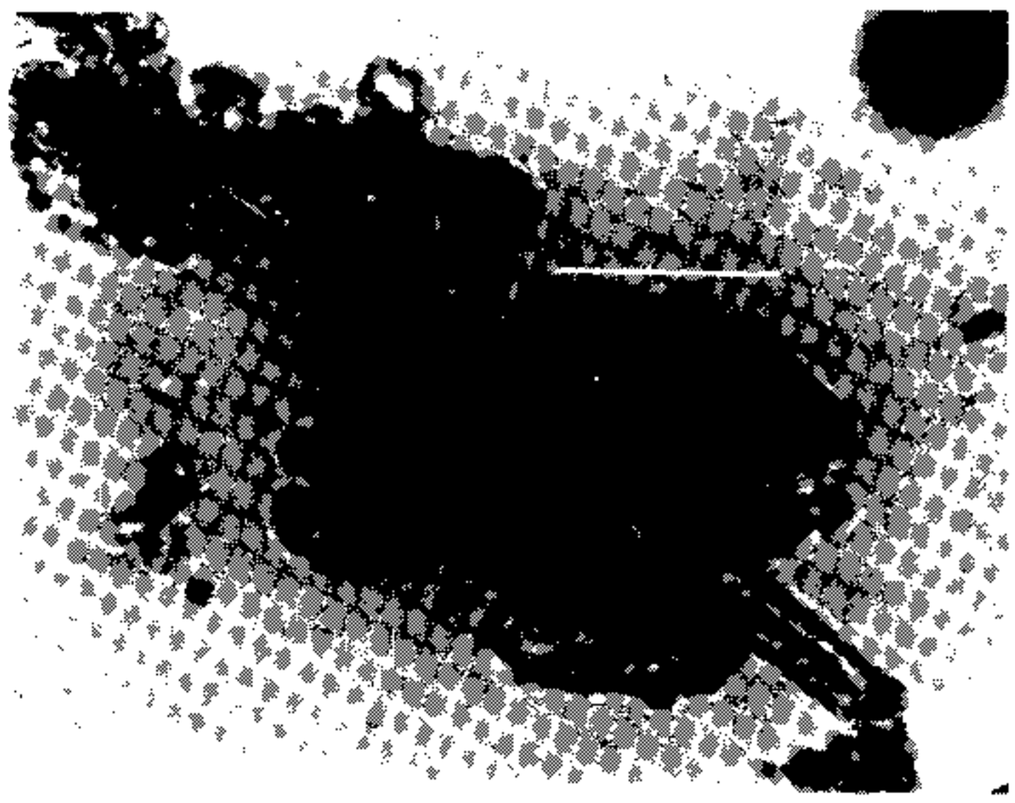
MATERIALS AND METHODS

Excavations were carried out by the staff of the Fundação Museu do Homem Americano, in the archeological site of Sítio do Meio, Piauí state, Brazilian northeast (8° 51'S, 42° 33'W).

Ninety-three animal coprolites collected in this site were sent to our laboratory for paleoparasitological analysis. Coprolites were dated 9,000 years B. P. by the radiocarbon method (Guidon, 1991). Out of those, six were identified as *K. rupestris* coprolites by comparison with fresh feces of this rodent (Chame et al., 1989; 1991; Ferreira et al., 1991). They consisted of numerous kidney-shaped small dark-brown units, measuring 1.0-1.7 x 0.3-0.5 cm, with a conspicuous groove on the concave face.

RESULTS

After rehydration (Callen & Cameron, 1960) and microscopic analysis (Reinhard et al., 1988) *Trichuris* eggs measuring 59 – 66 x 33 μm (n = 20), were found in one sample (Fig.).



Trichuris egg in *Kerodon rupestris* coprolites (bar = 50 μm).

DISCUSSION

Paleoclimatic studies have shown that arid conditions have prevailed in the Brazilian northeast since, at least, 20,000 to 15,000 years ago (Ab'Sáber, 1974). It is likely that there were regional variations in climatic changes.

This work received financial support from CNPq.

Received 23 March 1993.
Accepted 12 July 1993.

Studies carried out in the archeological region of São Raimundo Nonato, have revealed prehistorical rock paintings, dated 8,000 years ago, which depict present day animals (e.g. coatis and capybaras) known to depend upon more humid conditions than those currently observed in the Brazilian northeast (Guidon, 1991). Indeed, these animals are no longer present in the region.

Eremotherium laurillardi (Lund), *Hippidium principale* (Lund) and *Equus (Amerhippus) neogaeus* (Lund) fossils were collected in the archeological region of São Raimundo Nonato (Guérin et al., 1990). These mammals were grazing herbivorous, what leads to the postulation of a different ecosystem as late as 10,000-8,000 years B. P., when they disappeared. The environment before that time would have had more humid conditions than the present day caating domain.

Similarly to this argument, Ferreira et al. (1991) reported the finding of *Trichuris* in *K. rupestris* coprolites, which were collected from different archeological layers, dated 30,000-8,000 years B. P., in São Raimundo Nonato.

There are evidences which suggest that the ecology of *Trichuris* may have been affected by the climatic changes which took place in northeastern Brazil. First, this parasite was not found in 1,000 parasitological examination of recent feces of present day *K. rupestris,* while this study provides evidence that a species of *Trichuris* infected this species of rodent in the past. Second, the increasing dryness may have affected the helminth in a negative way, as humid conditions are known to be more appropriate for the development of *Trichuris* species (Beer, 1973). Third, contemporaneous human population have not been found to be infected by *Trichuris trichiura* (Linn, 1771) Stiles, 1901 (data not published), despite the poor sanitary conditions, and lack of regular antihelminthic treatments in the São Raimundo Nonato region.

Therefore, both the study by Ferreira et al. (1991) and this one provide indirect evidences for modifications in the ecology of *Trichuris* in the northeast Brazil associated with environmental changes. While its rodent host became adapted to the increasing drier environment, *Trichuris* was not able to maintain its transmission, becoming extinct in the region.

It is interesting to note that not all host-parasite relationship, and those including geohelminths in particular, were equally affected by the climatic changes. For instance, *Strongyloides ferreirai,* Rodrigues, Vicente & Gomes, 1985 another parasite of *K. rupestris,* still found in northeast Brazil, has also been observed in this rodent coprolites dated 8,000-2,000 years B. P. (Araújo et al., 1989). Transmission and life-cycle characteristics of this parasite, such as prenatal infection (Levine, 1968), or the persistence of infection by coprophagy, as observed in some herbivorous rodents (Alho, 1986), are two possibilities for its stability, despite climatic changes.

In the check lists of parasite fauna of South American wild mammals there is no record of *Trichuris* species in *K. rupestris.* The paleoparasitological data in an endemic host of the semiarid region (Mares et al., 1985), suggest a parasite species in a host which disappeared with climate changes at 10,000 years ago, although these changes seem not to have affected the Caviomorpha host. There is no evidences of *Trichuris* infection in other rodents of the region (Chame, 1992).

ACKNOWLEDGEMENTS

To Dr Ricardo Santos (ENSP-FIOCRUZ), who made helpful suggestions to this paper, and Dr Niéde Guidon (Fundação Museu do Homem Americano, Piauí, Brasil).

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