Mem. Inst. Oswaldo Cruz, Rio de Janeiro, Vol. 80(2):141-143, abr./jun. 1985

THE FINDING OF *ENTEROBIUS VERMICULARIS* EGGS IN PRE-COLUMBIAN HUMAN COPROLITES

A.J.G. DE ARAÚJO,* L.F. FERREIRA,** U.E.C. CONFALONIERI,***
L. NUÑEZ**** & B.M. RIBEIRO FILHO**

Enterobius vermicularis *eggs were found in human coprolites collected in the archaeological site of Caserones, Tarapaca Valley, Chile, dating from 400 BC to 800 AD.*

The human pinworm had already been found in other pre-historic archaeological sites in America, and its introduction in this continent is discussed.

The findings of immature forms os parasites in archaeological material have contributed to a more comprehensive picture of parasitic diseases in the past. As stressed by Cockburn (1971), coprolite analysis is the most promising tool for accurate diagnosis of parasite infections in ancient populations.

Since the works of Szidat (1944) and Pizzi & Schenone (1954), the first to search for parasites in human coprolites, new techniques have been proposed. At the same time, the difficulties in recognizing as human the coprolites found free in archaeological layers increased, as animal coprolites can also be found in these strata.

Several parameters to help the diagnosis were proposed by Callen (1967), Wilke & Hall (1975) and Fry (1977) stressing morphological and chemical aspects, as well as the coprolite contents. However, several authors agree that the finding of an exclusively human parasite can elucidate the coprolite origin (Ferreira, Araújo & Confalonieri, 1980; Jones, 1982; Confalonieri, 1983).

It is reported here the finding of *Enterobius vermicularis* eggs in pre-Columbian human coprolites from Chile, dated from 400 BC to 800 AD.

MATERIAL AND METHODS

The coprolites (Fig. 1) were found free in the strata of sedimental layers in the archaeological site of Caserones, Tarapaca Valley, North of Chile. The layers were dated from 400 BC to 800 AD.

Fig. 1: human coprolites from the archaeological site of Caserones, Chile.

* Departamento de Parasitologia – UFRJ – Rio de Janeiro, RJ, Brazil.

** Escola Nacional de Saúde Pública – FIOCRUZ, Caixa Postal 926, 20000 Rio de Janeiro, RJ, Brazil.

*** Departamento de Biologia Animal – UFRuRJ – Rio de Janeiro, RJ, Brazil.

**** Universidad del Norte – Chile.

Received for publication July 7th and accepted December 14th, 1984.

Ten samples were examined for parasites, using the rehydration in 0.5 per cent trisodium phosphate solution (Callen & Cameron, 1960) and spontaneous sedimentation (Lutz, 1919) for microscopic analysis.

As an aid to the recognition of the origin of the coprolites, recent faeces of the present local population were artificially desiccated and their aspect and contents studied.

RESULTS

All the 10 samples turned the rehydration solution to a dark brown opaque colour after 72 hours and the analysis of their contents showed plant and animal food remains together with charcoal and stone fragments.

In one of the coprolite samples helminth eggs with a plano-convex double shell, measuring 60.12 x 30.06 μm were found. These were very well preserved, with a larva inside, and were identified as *Enterobius vermicularis* (Fig. 2).

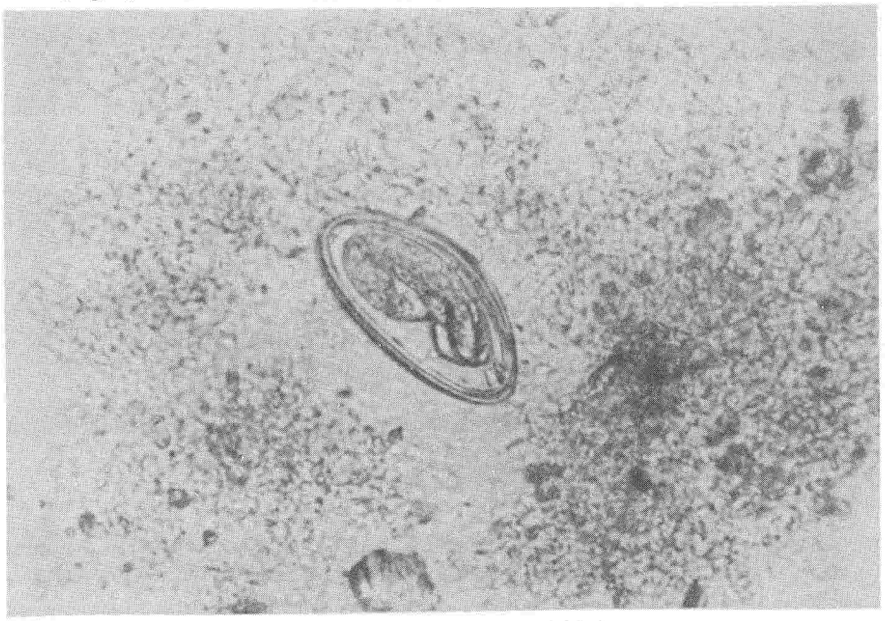

Fig. 2: *Enterobius vermicularis* eggs found in the coprolites (160 x).

The plant remains were identified as *Prosopis* sp. seeds which is a common bush still used today as food by the local population. The recent faeces artificially desiccated showed a marked morphological similarity with the coprolites.

DISCUSSION

Enterobius vermicularis is a parasite commonly infecting humans today and it seems to have been common also in the past.

It is accepted that the human pinworm was inherited by man from his ancestors as it is shared today with the orangutan, chimpanzee and gorilla (*Pongo* sp., *Pan* sp.) (Dunn, 1966).

There are no records of *Enterobius vermicularis* from archaeological material in the Old World, but the descriptions of early physicians, in Greece, China, India, Rome and Arabia, led Hoeppli (1959) to point out its existence in pre and protohistorical times.

The oldest documented association with man was reported in North America, dated from 10,000 years, by Fry & Moore (1969), followed by Fry & Hall (1957), from 1,075 BC to 1,140 AD. Eggs of *Enterobius vermicularis* were also found in South America by Zimmerman & Morilla (1983), in a pre-Columbian Argentinean mummified body, and by Patrucco, Tello & Bonavia (1983) in Peru, dated from 2,277 BC.

The presence of the worm in past populations, in spite of the low prevalence of eggs in coprolites, suggests that those tribal groups could be infected as a whole because of the direct transmission of the parasite and the living conditions of the populations.

Enterobius vermicularis does not need to pass a free stage on the soil so it could have been introduced in America by the Bering strait immigrants. That can be also inferred by the 10,000 years old finding of Fry & Moore (1969) since the oldest admitted prehistoric transpacific contacts started at about 3,000 BC (Meggers & Evans, 1966). However, the transpacific route could be also another one through which the parasite has been introduced later, together with the human hookworm and whipworm (Ferreira, Araújo & Confalonieri, 1980, 1983; Confalonieri, 1983).