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THE EXPERIMENTAL APPROACH TO PALEOPARASITOLOGY: DESICCATION OF TRICHURIS TRICHIURA EGGS

U. E. C. Confalonieri, Instituto de Biologia, UFRRJ, Rio de Janeiro,
B. M. Ribeiro-Filho, L. F. Ferreira and A. J. G. Araújo, ENSP,
Fundação Oswaldo Cruz, Rio de Janeiro

Adamson (1976) initiated the experimental approach to paleoparasitology by desiccating, in sodium salts, tissue fragments containing Schistosoma sp. eggs, with the aim of finding out whether mummification, as practiced by the ancient Egyptians, destroyed the eggs of these helminths. Zimmerman (1977a; 1977b; 1978) introduced this approach in paleopathology, and artificially mummified normal tissues, as well as tissues with different paleopathological processes, in order to observe the effects of desiccation on their cellular organization and the implications for histological diagnosis. Using the same approach, Fry (1977) and Araujo, Confalonieri and Ferreira (1982) studied, respectively, the color of the rehydrating solution of artificially desiccated recent feces, and the effects of desiccation performed in the laboratory on the form of the feces as well as on the dimensions of helminth eggs inside the samples. Their major goal was to facilitate the identification of coprolites collected in archeological sediments.

In this study, experimental desiccation of the eggs of Trichuris trichiura was performed, in order to verify alterations in their shape and size. Part of a recent human fecal sample (5 grs), which contained T. trichiura eggs, was placed in a glass vial with a 2 cm layer of anhydrous calcium chloride at the bottom. After two weeks the sample was transferred for three more weeks to another dry vial under the same conditions. After this period, the material was rehydrated by the trisodium phosphate method used for coprolites, then submitted to the sedimentation technique for microscopic analysis. One hundred eggs without gross deformities were recovered, and their width and length, with and without polar plugs, were measured. Another part of the sample was subjected, soon after elimination, to the same sedimentation technique, and one hundred eggs were measured with the same criteria as for the first part of the sample.

Several eggs of the desiccated sample showed gross alterations such as vacuolization of the embryonic mass, discoloration, corrugation of the shell outline, and also lateral deformities resulting in loss of symmetry in the structure. The averages, the extreme values, and the standard deviation for the series of measurements of both desiccated and non-desiccated eggs are given in the table.

Trichurid eggs are the forms most commonly found in archeological sediments (Gooch 1972; Confalonieri 1983), and their good preservation, recorded in different archeological sites, has so far allowed the easy identification of the genus. However, the differential diagnosis of the species in this genus is based on quantitative taxonomic characters, Table (measurements in microns)

	Length with polar plugs		Length without polar plugs		Width	
	Non-des.	Des.	Non-des.	Des.	Non-des.	Des.
Average	55.8967	54.5586	48.0834	47.6591	25.9746	25.7956
Maximum value	60.50	60.25	53.75	54.50	34.87	31.63
Minimum value	50.00	44.75	44.87	36.88	22.62	22.75
Standard deviation	2.1402	2.6299	2.0594	2.8248	1.8084	1.3464

whose possible alterations due to dehydration had not previously been assessed. Jones (1982) asserts that it is not known whether the dimensions of the eggs change with time and with the circumstances of their preservation. He also stresses the need to obtain measurements of a large number of eggs in order to identify closely related species of helminth parasites in archeological sediments, with particular reference to the differential diagnosis of T. trichiura and T. suis.

The desiccation we performed resulted in an average reduction of 1.25 u in the length of the eggs with polar plugs. This may have been due to a retraction of these structures caused by the dehydration process, which was not reversed by the rehydration. The structures are weaker than the shell itself: that suffered less reduction, as shown by the comparison of the average length without the plugs and of the width in both parts of the sample. The difference observed does not have practical importance, as it is very small and does not hamper the specific diagnosis of the eggs of this genus. Trichuris suis is the species morphologically closest to T. trichiura, and the difference in the length of their eggs (including the plugs) has been shown to vary from 4.2 to 8.0 u (Beer 1976).

We can conclude, therefore, that the alterations resulting from desiccation of the feces do not hinder the identification of Trichuris eggs at the generic level, and, providing that gross deformities are not present, do not influence the recognition of the species based on biometric data.

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[Editorial note: There has been a sharp surge of interest recently in paleoparasitology. In this issue alone, we have one article, a proposal for a symposium, and two papers listed in the Annotated Bibliography. During the past year, the Brazilian group organised a graduate course on The Paleoepidemiology of Parasitic Infections, which consisted of 45 hours of lectures, seminars, and laboratory work; it will be repeated next year. P.S. Gooch, of the Commonwealth Institute of Parasitology, has already asked whether the lecture texts might be made available to others. Mr. Gooch has also recommended two books that he feels would be useful to members for reference. These are:

Ova and Parasites, Medical Parasitology for the Laboratory Technologist, by Robert S. Desowitz, published by Harper and Row, Hagerstown; Veterinary Clinical Parasitology (Fifth Edition), by Margaret W. Sloss and Russell L. Kemp, published by Iowa State University Press, Ames, Iowa.

No publication year was mentioned.]