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A Parasitological Survey on the Feces of Pygmy Chimpanzees, *Pan paniscus*, at Wamba, Zaïre

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ABSTRACT. A parasitological examination was carried out on the feces of pygmy chimpanzees, *Pan paniscus*, in Zaïre, Africa. Of a total of 390 feces, 99.0% contained *Troglodytella* sp. trophozoites, 45.1% dicrocoeliid trematode eggs, 21.0% *Capillaria* sp. eggs, 3.3% *Trichuris* sp. eggs, 52.9% *Strongyloides* sp. eggs, 17.9% *Oesophagostomum* sp. eggs, 21.0% hookworm-like nematode eggs and 6.2% oxyurid eggs. No zoonotic protozoan was found. This is the first survey on the parasites of the pygmy chimpanzees in their natural habitat.

INTRODUCTION

The intestinal parasites of the common chimpanzee, *Pan troglodytes*, have been extensively reviewed (YAMASHITA, 1963; VAN RIPER et al., 1966; KUNTZ & MYERS, 1969; REARDON & RININGER, 1968; MYERS & KUNTZ, 1972; HEALY & MYERS, 1973; MYERS, KUNTZ & KAMARA, 1973; CUMMINS, KEELING & MCCLURE, 1973). However, to our knowledge, there have been only a few reports on the intestinal parasites of the pygmy chimpanzee even in the captive condition (STAM, 1960; VUYLSTEKE, 1964). This paper covers the parasitological condition of pygmy chimpanzees in their natural habitat.

MATERIALS AND METHODS

The research area was located at Wamba, République du Zaïre, Africa; and the period was from October 26 to December 27, 1981. Four unit groups of pygmy chimpanzees, namely, Groups E, P, B and K which were estimated to be composed of 65, 50–60, 80–100 and 90–120 members, respectively (KANO, 1982), were chosen for the survey. From an ecological survey, it was observed that the group ranges overlapped with one another and transfer of adolescent females between unit groups often occurred.

The samples were collected from feces on the ground of the previous night's sleeping places in the mornings mainly, at less than 5 hr after defecation in most cases. About 2 ml of feces was taken from each fecal mass, dissolved in 10 ml of 10% formalin, preserved in a plastic container (Type K feces sampling tube, Toyo Kizai Co., Ltd., Tokyo, Japan), and transported to the Department of Parasitology, School of Medicine, University of the Ryukyus, Naha, Japan. These samples were examined by using the MGL technique (RITCHIE, 1948). The sediments of each sample were observed twice under an 18 × 18 mm or 18 × 24 mm cover glass.

RESULTS

Eight species of parasites, comprising one protozoan (trophozoites), one trematode (eggs) and six nematodes (eggs), were found in the feces (Table 1). Cestodes and acanthocephalans were not detected. In total, 19.0% of the samples were contaminated with one parasite species, 29.0% with two, 25.4% with three, 20.3% with four, 5.1% with five and 1.0% with six; only 0.3% were without parasites. The intensity of helminth eggs in the sample was usually very low; only a few eggs were observed under the cover glass.

Troglodytella sp. (Fig. 1) was the most prevalent species in every chimpanzee group. Almost all of the chimps were infected.

Dicrocoeliid eggs (Fig. 2) were demonstrated in about one-third to half of the fecal samples of all groups. The eggs were elliptical, dark brown, thick-shelled, operculated and measured 38–50 × 21–26 μm in size.

The *Capillaria* sp. eggs found (Fig. 3) were long barrel-shaped, somewhat asymmetrical, slightly yellow in color, with plugs on both ends and 43–50 × 21–23 μm in size. The surface of the shell was rough. The prevalence of this egg species in the feces was highly variable, ranging from 0 to 88.9% according to the sampling occasion and was remarkably higher in Group P.

The *Trichuris* sp. eggs found (Fig. 4) were barrel-shaped, yellowish brown, almost symmetrical, with plugs on both ends and 54–57 × 23–26 μm in size. The shell surface was smooth. They contained one- to two-cell-stage embryos. The incidence of this egg species was generally low, at less than 10%, but exceeded 50% on one occasion in Group B.

The *Strongyloides* sp. eggs found (Fig. 5) were oval, thin-shelled, colorless, containing larvae, and 42–58 × 31–36 μm in size. This species was the most prevalent nematode in the present survey.

The *Oesophagostomum* sp. eggs (Fig. 7) were elliptical, almost symmetrical, containing morula-stage embryos, and 75–80 × 43–48 μm in size. The incidence was higher in Group B.

The strongylid eggs (Fig. 6) resembled the hookworm eggs and were found in about one-fifth of the samples. They were oval, thin-shelled, colorless, containing morula-stage embryos, and 63–73 × 35–38 μm in size. One end of some eggs was slightly pointed.

Table 1. Prevalence of parasites in the feces of pygmy chimpanzees at Wamba, Zaïre.

	Name of group				
	E	P	B	K	Total
No. of sampling occasions	11	4	9	1	
No. of samples collected on each occasion: mean (range)	16.7 (2–43)	20.0 (10–36)	11.9 (1–30)	19	
Total No. of samples collected	184	80	107	19	390
Incidence (%)					
Protozoa					
Troglodytella sp.	99.5	100.0	97.2	100.0	99.0
Trematoda (eggs)					
Dicrocoeliidae gen. sp.	55.4	40.0	33.6	31.6	45.1
Nematoda (eggs)					
Capillaria sp.	17.9	46.3	11.2	0.0	21.0
Trichuris sp.	1.1	0.0	10.3	0.0	3.3
Strongyloides sp.	57.1	58.8	42.1	47.4	52.9
Oesophagostomum sp.	13.6	17.5	28.0	5.3	17.9
Strongylida fam. gen. sp.	22.8	20.0	22.4	0.0	21.0
Oxyuridae gen. sp.	5.4	11.3	4.7	0.0	6.2

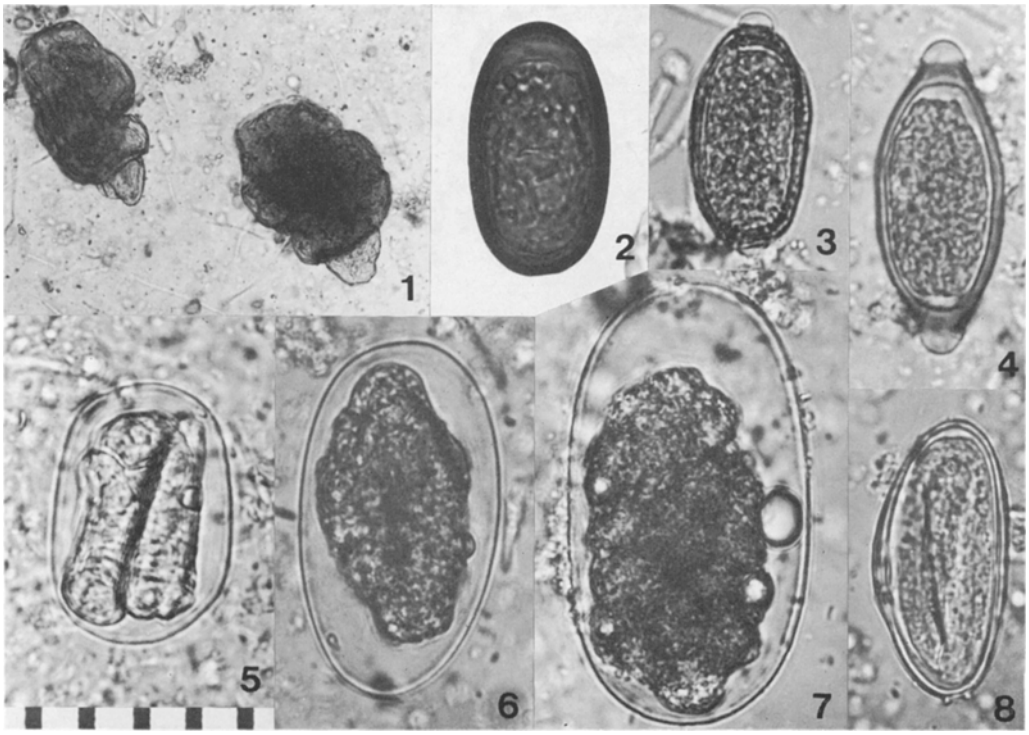

PLATE 1. Protozoan and helminth eggs found in the feces of pygmy chimpanzees at Wamba, Zaïre. (Scale: 25 μm for Fig. 1; 10 μm for Figs. 2–8) **Fig. 1.** *Troglodytella* sp. **Fig. 2.** Dicrocoeliidae gen. sp. **Fig. 3.** *Capillaria* sp. **Fig. 4.** *Trichuris* sp. **Fig. 5.** *Strongyloides* sp. **Fig. 6.** Strongylida fam. gen. sp. **Fig. 7.** *Oesophagostomum* sp. **Fig. 8.** Oxyuridae gen. sp.

The oxyurid eggs (Fig. 8) were oval, asymmetrical (one side flattened and the other side with a thickened shell), colorless, containing larvae, and 49–53 × 23–25 μm in size. The incidence of this egg species was generally low, at less than 10% on most sampling occasions.

DISCUSSION

The *Troglodytella* sp. observed in this survey may be *T. abrassarti*, a well-known parasite of the common chimpanzee (e.g., MYERS, KUNTZ & KAMARA, 1973; FILE, MCGREW & TUTIN, 1976). The abundance of this species in the feces suggests a possible symbiotic relation between the protozoan and chimpanzee.

Important zoonotic protozoans such as *Entamoeba histolytica*, *Giardia lambria* and *Balantidium coli*, have commonly been demonstrated in the feces of captive chimpanzees (e.g., MYERS & KUNTZ, 1972; CUMMINS, KEELING & MCCLURE, 1973; MYERS, KUNTZ & KAMARA, 1973; KAGEI & ASANO, 1980). However, we were unable to find any of them in the present survey. It is of interest that similar results have been obtained from feral chimpanzees (FILE, MCGREW & TUTIN, 1976). We speculate that the zoonotic protozoans are less prevalent in chimpanzees in the wild condition than is generally believed. The chimpanzees in the present study were living near human residences and might have a chance to be infected with human parasites. On the other hand, the men of the village might have some contact with the chimps.

The parasitological condition of the inhabitants of the village is thus an interesting problem but we were unfortunately unable to carry out any survey on this subject.

From the common chimpanzee, *Dicrocoelium dendriticum* and *Concinnum brumpti* have been found as dicrocoeliids (RAILLIET, HENRY & JOYEUX, 1912; VAN DER BERGHE & DENECKE, 1938; KUNTZ & MYERS, 1969). The eggs of dicrocoeliids are closely similar among the species, and identification on the basis of only the eggs is usually difficult. Dicrocoeliid trematodes are thought to utilize insects as second intermediate hosts. Ants are known to be second intermediate hosts of *D. dendriticum* (KRULL & MAPES, 1952–1953 cited in YAMAGUTI, 1975). Although ecological observations on the pygmy chimpanzees have revealed the absence of an insect-eating habit, except for certain lepidopteran larvae and hymenopteran adults which are not considered to be intermediate hosts of dicrocoeliids, it seems probable that small insects such as ants contaminating the food are actually ingested by chimps.

Capillaria hepatica is the only-known species of this genus obtained from chimpanzees (TROISIER et al., 1928a, b), but its eggs do not usually appear in the feces. The present eggs were smaller than those of *C. hepatica* (51–56 × 30–35 μm). The present *Capillaria* species probably parasitizes the alimentary canal wall, and may represent a new *Capillaria* species from chimpanzees.

The *Trichuris* sp. eggs observed in the present study closely resembled those of *T. trichiura*, the human whipworm, but were slightly larger (50–54 × 22–23 μm in *T. trichiura*). CHITWOOD and MYERS (cited in HEALY & MYERS, 1973) found certain morphological differences between the *Trichuris* from primates and *T. trichiura* from man.

The *Strongyloides* sp. found in this survey may be *S. fülleborni*, a common parasite of a wide variety of primates (e.g., YAMASHITA, 1963; HEALY & MYERS, 1973), since the egg size was almost the same as that of *S. fülleborni*.

Seven species of *Oesophagostomum* have been recorded from common chimpanzees (MYERS & KUNTZ, 1972). The measurements of the present eggs were almost identical to those of *O. stephanostomum* eggs (60–80 × 40–45 μm). *O. stephanostomum* was once recorded from the cecum of the pygmy chimpanzee in Congo (VUYLSTEKE, 1964). However, as HEALY and MYERS (1973) stated, it is not possible to distinguish the species on the basis of egg size.

Several species of hookworms have been recorded from common chimpanzees (MYERS & KUNTZ, 1972), and *Necator americanus* was reported from the pygmy chimpanzee (STAM, 1960). However, it is difficult to distinguish them on the basis of the eggs only.

The oxyurid eggs observed in this study resembled those of *Enterobius*. From the common chimpanzee, several *Enterobius* species are known. Among them, *E. anthropopitheci* is the closest to the present species in its egg dimensions (56 × 24 μm; SANDOSHAM, 1950). From the common chimpanzee also, immature adults of *Buckleyenterobius* sp. and *Trypanoxyuris* sp. have been recorded (KUNTZ & MYERS, 1969), but the eggs as well as mature forms have not yet been described.

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