J. Protozool. Res. 19, 12-15 (2009)

Intestinal parasites identified in caged Orangutans (*Pongo* spp.) at the Avilon Zoo, Montalban Zoological Park, Rizal, Philippines

Velasco Ng, J.[1] and Claveria, F. G.[2*]

[1]Department of Biology, College of Arts and Sciences, University of the Philippines, Padre Faura, Ermita, Manila, [2]Biology Department, College of Science, De La Salle University-Manila, Taft Avenue, Philippines

*Corresponding author: Claveria, F.G., Email: Florencia.claveria@dlsu.edu.ph

ABSTRACT

Fecal samples collected from 8 groups of caged orangutans (*Pongo* spp.) kept at Avilon Zoo in Montalban, Rizal were examined using formalin ether concentration and Danish bilharziasis sieving techniques. Hookworm and *Ascari*s sp. eggs, and numerous mature cysts of *Entamoeba coli* were identified in orangutans housed in two separate cages and in single female kept in another cage, respectively.

Key words: *Pongo* spp. intestinal parasites

INTRODUCTION

One of the great ape species to inhabit Southeast Asia is the orangutan. The *Pongo pygmaeus pygmaeus*, Bornean orangutan and the *Pongo pygmaeus abelii*, Sumatran orangutan are categorized as highly endangered and critically endangered species, respectively; some threats to their survival include hunting, habitat loss and trade (IUCN, 2004). Orangutans in the zoo have become more important because of their decreasing numbers in the wild. The Avilon Zoo, one of the newest and largest zoos in the Philippines has approximately 30 orangutans kept in captivity (Vince Remonde, Avilon Zoo Veterinarian, personal communication).

Several studies have shown susceptibility of non-human primates to many agents causing human diseases. The pathogen exchange is believed to become potentially high, as a consequence of the close phylogenetic relationship between humans and non-human primates. Orangutans, chimpanzees, gorillas and monkeys are carriers and effective transmitters of parasitic infections (Chitwood, 1970; Orihel, 1970; Ott-Joslin, 1993 cited by Mul *et al*., 2007). In Sumatra, Indonesia, captive orangutans are infected with tapeworms and roundworms (Mul *et al*., 2007). Awareness of the potential zoonotic pathogen transmission is essential, since direct or indirect contact between human and non-human primates and of their excreta is inevitable. The maintenance of the high standard of any zoological parks compels management to provide the necessary care and wellbeing of animals, particularly caged animals. In this paper, we document the parasites detected in the excreta of orangutans kept in the animal zoo at Avilon Montalban Zoological Park, Rizal, Philippines.

MATERIALS AND METHODS

Study Area

Avilon Montalban Zoological Park, Barrio San Isidro, Rizal which was opened to the public in 2003, is the largest zoological park in the Philippines to date. It covers a 7.5-hectare total land area and houses more than 3000 specimens of exotic and endemic animals (http://avilonzoo.com.ph/, updated 2007).

Fecal Collection and Identification

Samples of excreta were collected from 10 females and 14 males orangutans kept in 8 different cages aged 1-6 years old (Table 1). Fecal samples were obtained from the bottom of each cage. Since we were constrained to rely on the veterinarian doctor to collect the excreta, it was difficult to establish the source of excreta per individual orangutan. The excreta collection were then labeled according to cage, and kept in separate bottles containing 10% formalin, and processed using the formalin ether concentration technique (FECT). Those that were positive using FECT were subsequently processed using the filtration and sedimentation Danish bilharziasis laboratory (DBL) technique (Carabin *et al*., 2005). With DBL, per fixed sample was mixed thoroughly and passed through a series of 400, 100 and 45 µm sieves and the filtrate collected was washed. One half of the filtrate was set aside, while the other half was subjected to centrifugation to allow further sedimentation, and the sediment was re-suspended in saline. Both types of processed fecal samples were stained with iodine and then examined and quantified for parasite ova and cysts/oocysts (Medical Parasitology and Vector Biology and Control, Laboratory Handbook, 1998).

Table 1. Summary of the orangutan (*Pongo* spp.*)* examined at Avilon Zoo, 2007, with their gender, age and general health state.

Cage #	Number-Gender		Approximate age (Yrs)	Health Status
	Female	Male		
1	4	4	3-5	Healthy
2	1	2	3	Healthy
3	2	2	1-2	Healthy
4	0	1	3	Sick (skin disease)
5	1	1	6	Healthy
6	0	3	6	Healthy
7	1	0	4	Healthy
8	1	1	6	Healthy
TOTAL	10	14	1- 6	23 healthy; 1 sick

RESULTS and DISCUSSION

Of the 24 orangutans examined, one had clinical manifestations of skin disease. Of the 8 cages, endoparasites were noted only in animals housed in cages 1, 2 and 8. Orangutans in cage 1 had hookworm eggs, while those in cage 2 had hookworm and *Ascaris* infection (Fig. 1). Parasitemia was rare to moderate. In view of our indirect access to the orangutans and our dependence on the zoo personnel in the collection of fecal samples, it was operationally impossible to identify which one of the 8 orangutans or how many of the individuals were infected with hookworm and/or *Ascaris* sp. Fecal sample collected from the single orangutan in cage 8 manifested numerous mature cysts of *Entamoeba coli* (Fig. 2).

Pongo sp., being one of the great apes is highly susceptible to many human diseases (Chitwood, 1970; Orihel, 1970; Ott-Joslin, 1993 as cited by Mul, *et al*., 2007). Hookworm, *Ascaris* and *Entamoeba coli* are parasites commonly reported in humans. According to Mul *et al*. (2007), in the wild, orangutans are arboreal and their diet includes mostly fruits, leaves, bark, buds, and flowers, making them less predisposed to soil-transmitted helminthic infections like hookworms and *Ascaris*, and in captivity, the presence of *Strongyloides* parasites suggests their susceptibility to waterborne, foodborne and soilborne infections due to ground dwelling, crowding and poor hygiene. *Entamoeba coli* was detected in one female animal. According to Collet *et al*. (1986), Cummings *et al*. (1973) and Patten (1939), cited by Mul *et al.* (2007), non-

pathogenic *E. coli* may contribute to infirmity or even death of animals with a much weakened immunity caused by to stress, pregnancy, bad condition and/or old age and disease.

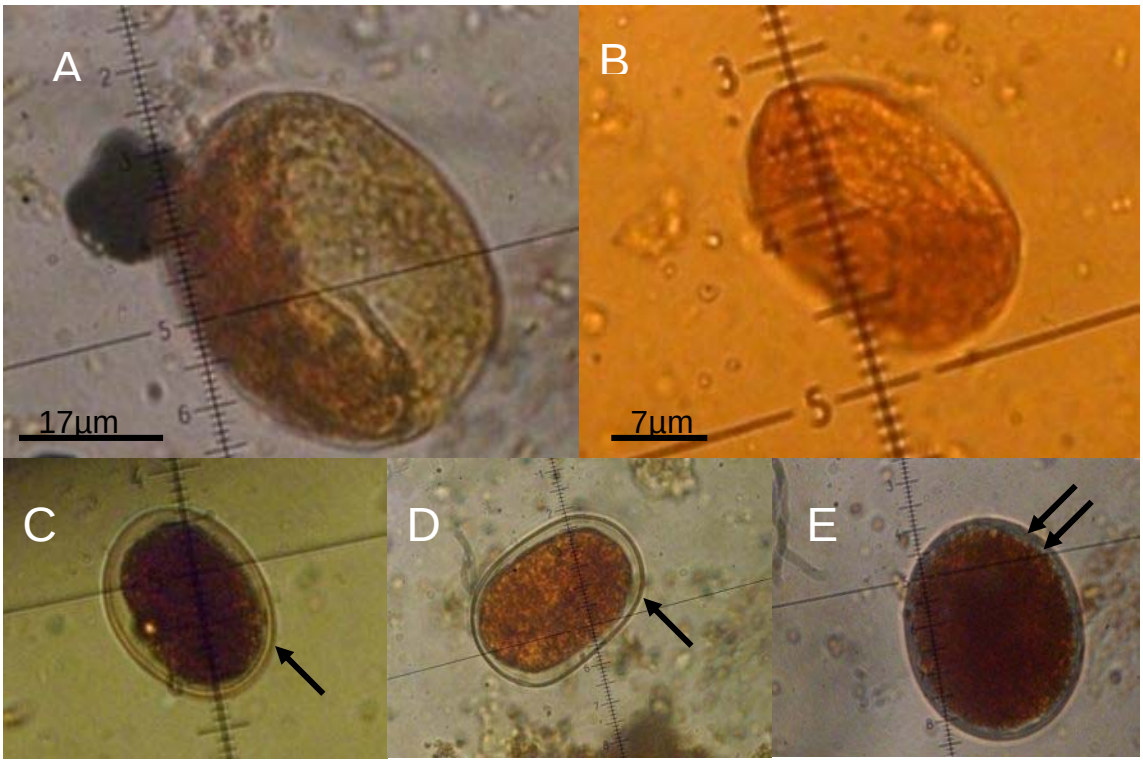

Figure 1. Hookworms and *Ascaris* sp. eggs. Hookworm eggs recovered from cage 1 animals (A: FECT; B: DBL technique). Hookworm (C, D) and ascarid (E) eggs in animals in cage 2 (C & E: FECT; D: DBL technique). Note very distinct and thick hookworm (single arrows) and striated *Ascaris* sp. egg membrane (double arrows).

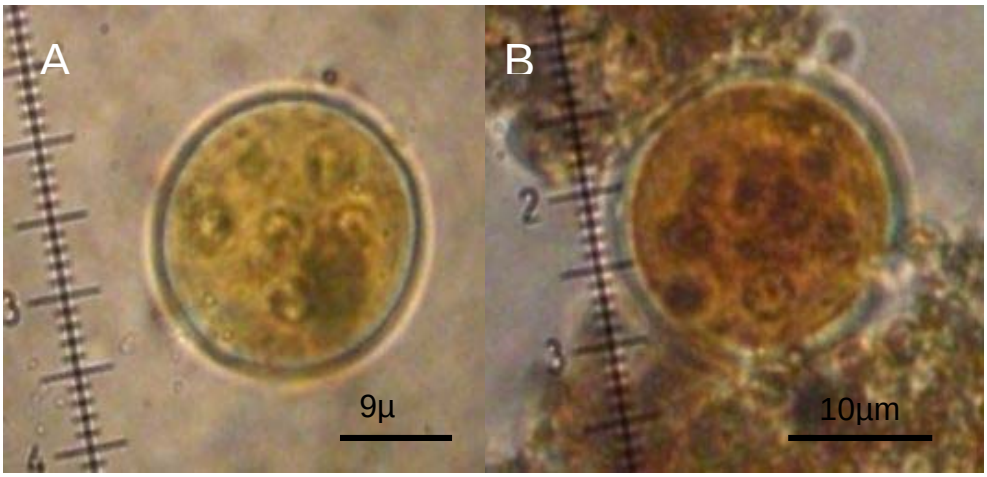

Figure 2. *Entamoeba coli* cysts detected in excreta of orangutan housed in cage number 8. Note presence of thick and tough cysts wall (long arrow) and several nuclei (short arrows).

Present parasitological findings of low density of hookworm and ascarid eggs and cysts of *E. coli* only in orangutan housed in 3 of the 8 cages is indicative of the effectiveness of a regimen of regular deworming, as part of the management practice, and to safeguard the wellbeing of animals in zoological parks and reduce the risk of the transmission of zoonotic infection(s) between animals and humans.

ACKNOWLEDGEMENTS

We would like to thank Jake Gaw, owner of the Avilon Zoological Park, for allowing us to conduct this study. To Romel Ramos and Vince Remonde, and Kimberly Beltran for their kind assistance in the sample collection and personal assistance, respectively.

REFERENCES

Carabin, H., Balolong, E., Joseph, L., McGarvey, S.T., Johansen, M.V., Fernandez, T., Willingham, A.L., and Olveda, R. 2005. Estimating sensitivity and specificity of a faecal examination method for *Schistosoma japonicum* infection in cats, dogs, water, buffaloes, pigs, and rats in Western Samar and Sorsogon Provinces, The Philippines. Int. J. Parasitol. 35:1517-1524.

Chitwood, M. 1970. Comparative relationships of some parasites of man and old and new world subhuman primates. Laboratory Animal Care. 20:389-394.

Collet, J., Galdikas, B. M. F., Sugarjito and J., Jojosudharmo, S. 1986. A coprological study of parasitism in orangutans (*Pongo pygmaeus*) in Indonesia. *J. Med. Primatol.*15:121–129.

Cummings, L. B., Keeling, M. E. and McClure, H. M. 1973. Preventive medicine in anthropoids: Parasite control. Laboratory Animal Science. 23:819–822.

IUCN. 2004. IUCN Red list of Threatened Species. Available URL: http://www.redlist.org (9 November 2007).

Medical Parasitology and Vector Biology and Control Laboratory Handbook. 1998. Liverpool School Tropical Medicine. p.13.

Mul, I.F., Paembonan, W., Singleton, I., Wich, S.A. and vanBolhuis, H.G. 2007. Intestinal parasites of free-ranging, semicaptive, and captive *Pongo abelii* in Sumatra, Indonesia. Int. J. Primatol. 28:407-420.

Orihel, T.C. 1970. The helminth parasites of nonhuman primates and man. Laboratory Animal Care, 20: 395-401.