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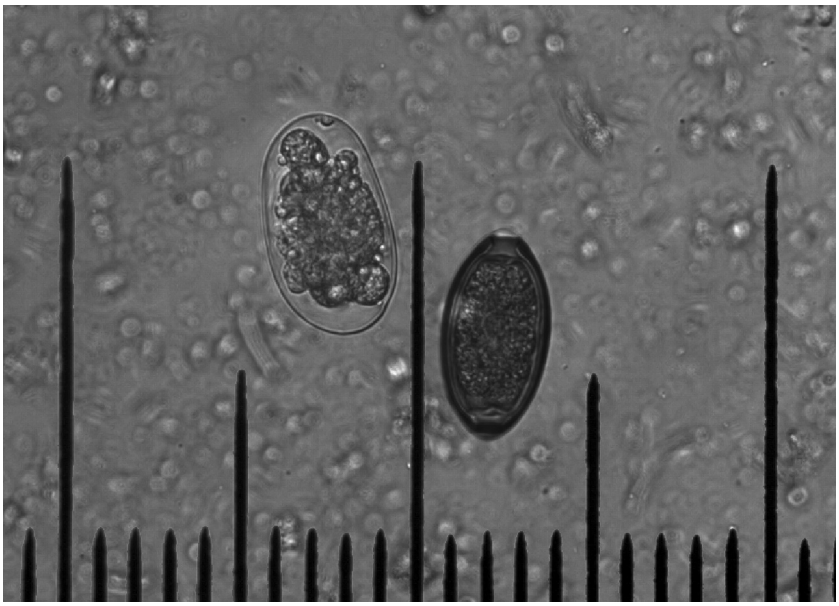
25 *Useful diagnostic references and images of protozoans, helminths, and nematodes commonly found in wild primates*

HIDEO HASEGAWA, COLIN A. CHAPMAN, AND MICHAEL A. HUFFMAN



Primate Parasite Ecology. The Dynamics and Study of Host-Parasite Relationships, ed. Michael A. Huffman and Colin A. Chapman. Published by Cambridge University Press.

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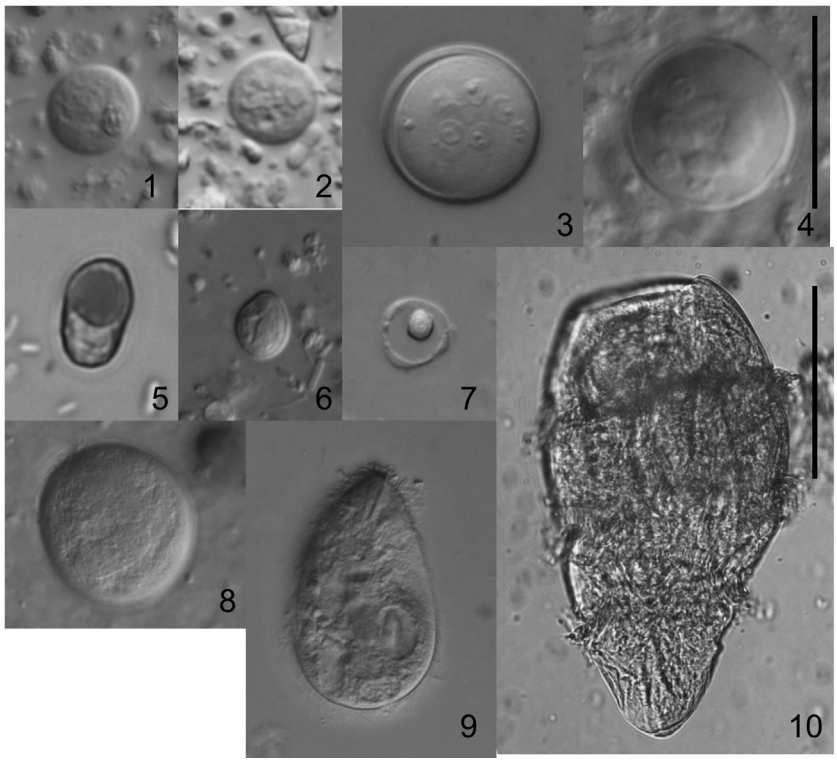

Figure 25.1. Protozoans that have appeared in the feces of primates. 1–2. *Entamoeba* sp. cyst (host: *Macaca fuscata*). 3. *Entamoeba coli* cyst (host: *M. fuscata*). 4. *Entamoeba dispar* cyst (host: *M. fuscata*). 5. *Iodamoeba buetschlii* (host: *Pan troglodytes*). 6. *Chilomastix mesnili* cyst (host: *Pan troglodytes*, captive). 7. *Blastocyctis hominis* cyst (host: *P. troglodytes*, captive). 8. *Balantidium coli* cyst (host: *M. fuscata*). 9. *B. coli* trophozoite (host: *P. troglodytes*, captive). 10. *Troglodytella abrassarti* trophozoite (host: *P. troglodytes*, captive). (Scale 25 μm × 2 for 1–7, 50 μ m×2 for 8–10). Photos/material: T. Dagg and A. D. Hernandez (4, 8), K. J. Petrzelkova (3, 6, 7, 9, 10).

This chapter provides a collection of useful references and diagnostic images of protozoans, helminths, and nematodes, commonly found in primates from the wild and captivity. The host species noted after the taxa name in the plates denote the host species from which each particular image was taken, but does not necessarily present the full range of host species in which these parasites are found. We refer the reader to the Global Mammal Parasite Database at http://www.mammalparasites.org/ for a more comprehensive list of host–parasite associations of these and other parasites.

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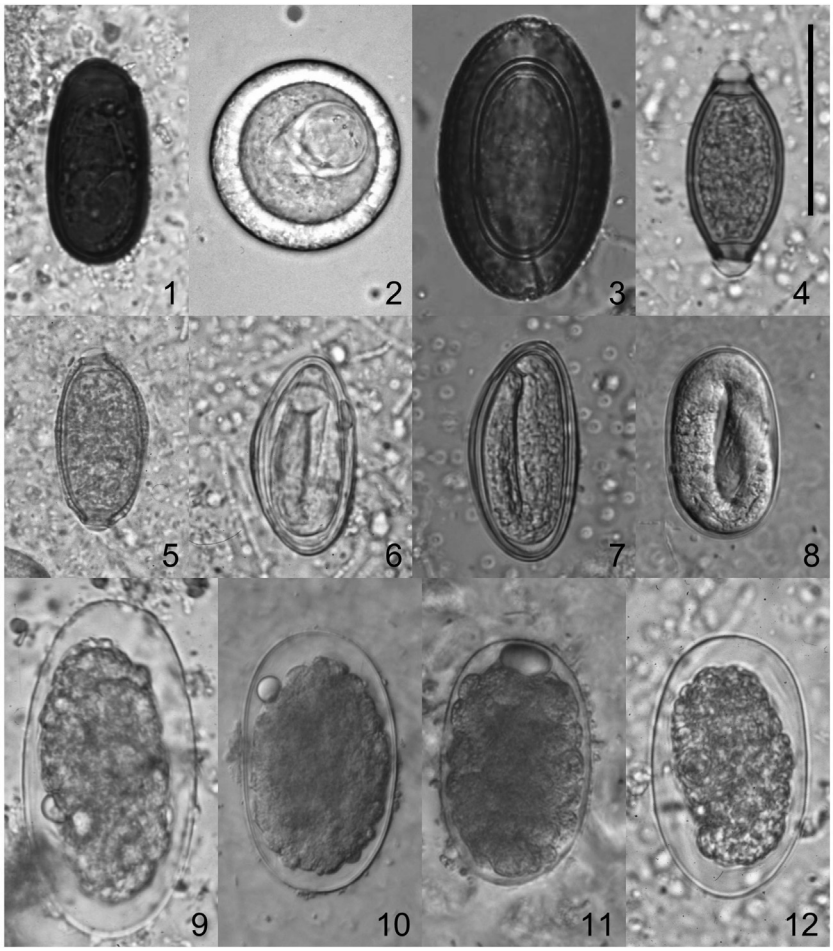

Figure 25.2. Eggs of some common helminths parasitic in primates (I).
1. Dicrocoeliidae sp. (host: *Pan paniscus*). 2. *Bertiella sturdi* (host: *Macaca fuscata*). 3. *Prosthenorchis elegans* (host: *Saimiri sciureus*). 4. *Trichuris* cf. *trichiura* (host: *P. paniscus*). 5. *Capillaria brochieri* (host: *P. paniscus*). 6. *Enterobius anthropopitheci* (host: *P. paniscus*). 7. *Enterobius vermiculalris* (host: *Pan troglodytes*, captive). 8. *Strongyloides fuelleborni* (host: *M. fuscata*). 9. *Oesophagostomum* cf. *stephanostomum* (host: *P. paniscus*). 10, 11. *Oesophagostomum aculeatum* (host: *M. fuscata*). 12. Strongylyda sp. (hookworm) (host: *P. paniscus*). (Scale: 50 μm). Photos courtesy of K. Ando (2) and H. Sato (3).

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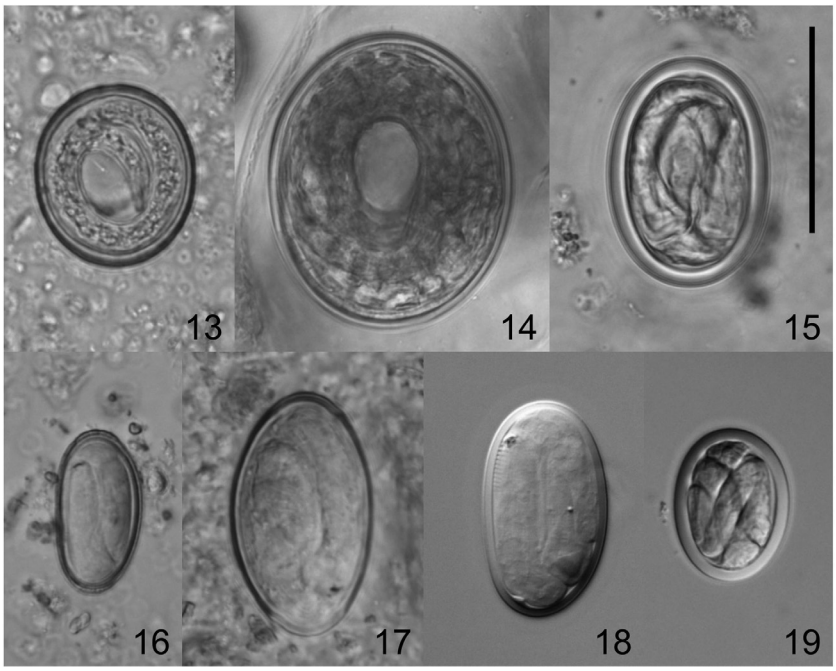

Figure 25.3. Eggs of some common helminths parasitic in primates (II). 13. *Subulura* sp. (host: *Pan troglodytes*, Courtesy of IJP). 14. *Subulura* sp. (host: *Cercopithechus mitis kolbi*). 15. *Protospirura muricola* (host: *Pan troglodytes*). 16. *Streptopharagus pigmentatus* (host: *Macaca fuscata*), 17. *Gongylonema pulchrum* (host: *M. fuscata*). 18. *Spirura guianensis* (host: *Saimiri sciureus*, captive). 19. *Pterygodermatites nycticebi* (host: *Nycticebus coucang*, captive). (Scale: 50μm). Photos/material courtesy of United States National Parasite collection (14), A. D. Hernandez and T. Dagg (17), H. Sato (18).

These images are meant to be a preliminary guide to identification. Care must be taken, as some eggs and larvae look similar to others, and definitive species identification by adult worms is always preferable (Greiner & McIntosh, Chapter 1, this volume; Hasegawa, Chapter 2, this volume). For the non-specialist, close collaboration with a parasitologist experienced in primates is highly recommended.

The bibliography contains recommended resources for identification of the parasite images provided and for parasites in general. An important source of verification is via the comparison of one's specimens with voucher specimens and/or photo material that can often be borrowed on inter-institutional loan from leading depositories of parasite material such as the USNPC (http://www.ars.usda.gov/is/np/systematics/animalpar.htm). Another option is to contact an experienced parasitologist willing to verify or make positive IDs

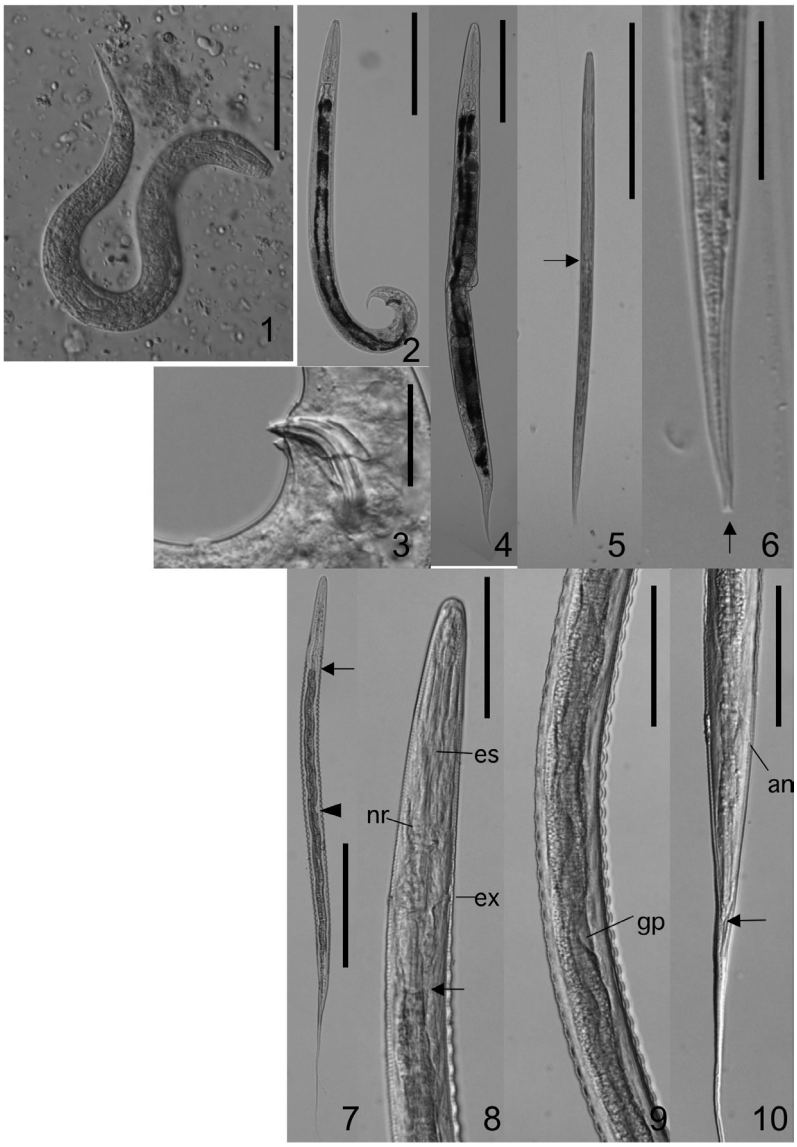

Figure 25.4. Common nematodes appearing in feces and fecal cultures of primates. 1. Rhabditoid larva of *Strongyloides stercoralis* (host: *Pan troglodytes*, captive). 2–6. *Strongyloides fuelleborni* (Host: *Macaca fuscata*): 2. Free-living male, 3. Spicule and gugernaculum of free-living male, 4. free-living female, 5. Filariform larva (arrow indicates esophago-intestinal junction), 6. posterior end of filariform larva. 7–10. Infective larva of *Oesophagostomum aculeatum* (Host: *Macaca fuscata*): 7. Entire worm (arrow and arrowheads indicate esophago-intestinal junction and gonadal primordium, respectively), 8. Anterior portion (arrow indicates esophago-intestinal junction), 9. Middle intestine region showing zigzagged lumen, 10. Posterior portion showing level of tail tip (arrow). Abbreviations: es. esophagus, ex. excretory pore, gp. gonadal primordium, nr. nerve ring. (Scale: 200 μm for 2, 4, 7, 50 μm for 1, 5, 8–10; 25 μm for 3, 6 0). Material : K. Petrzelkova (1).

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for you. For this, it is often necessary to send worm specimens preserved in formaldehyde or alcohol for morphological and genetic identification (Gasser *et al*., Chapter 3, this volume).

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