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## Natural Infections of Vervet Monkeys (*Cercopithecus aethiops*) and African Red Monkeys (*Erythrocebus patas*) in Sudan with Taeniid Cysticerci

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Abdominal cysticercosis due to *Taenia hydatigena* has been recorded as an occasional finding in sub-human primates in several countries in West Africa (Stiles and Hussall, 1929, U.S. Pub. Health Serv. Hyg. Lab. Bull. 152: 409–601), Kenya and Taiwan (Kuntz and Myers, 1967, Primates 8: 83–88). In the course of collecting specimens of vervet and African red monkeys for medical research in central Sudan, animals were encountered with grossly enlarged abdomens. At necropsy these, and others not visibly affected while alive, were found to harbor large cysticerci.

Fifty-two vervet monkeys and 26 African red monkeys were live-trapped in Blue Nile province in central Sudan. The animals were taken to Khartoum and, after experimental use, they were necropsied and examined thoroughly for parasites. Specimens were measured and fixed in buffered formalin after dissection from the fibrous host capsules. Individual scolices were removed from 23 representative cysticerci and squashed and cleared in Hoyer's medium for microscopy. The numbers of hooks, and their shapes and sizes, were recorded and compared with published characteristics of taeniid metacestodes.

Ten vervet and 10 African red monkeys were infected with cysticerci with intensities of 1–30 (mean, 6.7) and 1–26 (mean, 5.1), respectively. Most infections consist-

ed of one to three cysticerci usually attached to the serosal surfaces of the liver, mesentery or other abdominal organs. In one vervet monkey parasites were present in the pleural cavity attached to the lungs and pericardial sac. Cysts contained clear fluid and varied in size from a few mm in diameter to 5 cm. Most of the larger parasites were ovoid and a single creamy-yellow inverted scolex with four muscular suckers was observed. The rostellums (diameter 275–335  $\mu\text{m}$ ) had two concentric rings in which large hooks measured 195–208  $\mu\text{m}$  (mean  $206 \pm 8.9$ , SD), and small hooks, 125–145  $\mu\text{m}$  (mean  $135 \pm 4.2$ , SD). The shape of the hooks resembled those of *T. hydatigena* (Edwards and Herbert, 1981, J. Helminthol. 55: 1–7). Specimens submitted to the U.S. National Parasite Collection (Beltsville, Maryland 20705, USA) have been assigned accession number 78759.

These observations are consistent with a provisional identification of the cysticerci as larval forms of *T. hydatigena*, though definitive assignation cannot be made on the basis of larval morphology alone. This parasite has been recorded previously in African red monkeys in French Guinea, and in both African red monkeys and vervet monkeys in Ghana, Cameroon and the Congo (Stiles and Hussall, 1929, op. cit.). Five cysticerci of *T. hydatigena* were found in three of 240 vervets from Kenya examined at Southwest Foundation, San Antonio, Texas, and two similar cysticerci were found in two

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of 57 Taiwan macaques, *Macaca cyclopis* (Kuntz and Myers, 1967, op. cit.) examined in Taiwan, Republic of China. One rhesus monkey (*Macaca rhesus*) of 100 examined from China was found to be infected with a single cysticercus (Bezubik and Furmaga, 1959, Acta Parasitol. Pol. 7: 591–598). It appears therefore that exposure to eggs of *T. hydatigena* in the environment leads to sporadic infection of sub-human primates in many parts of the world. However, the prevalence and, in several cases, the intensity of these infections in monkeys in Sudan is higher than reported elsewhere. *Taenia hydatigena* is a common parasite of small ruminants in

central Sudan and its characteristic cysticerci are seen frequently at slaughter (Sulaiman et al., unpubl. data). Infections with many large cysts are unusual, and the manner in which these come about in sub-human primates is unclear. Vervets and red monkeys around human habitations in Blue Nile province often feed on garden vegetables. Perhaps in this way they come into close contact with eggs derived from feces of the canine definitive hosts scattered around dwellings.

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### Myiasis by *Wohlfahrtia vigil* in Nestling *Microtus pennsylvanicus*

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The grey flesh fly, *Wohlfahrtia vigil* (Walker) (Diptera: Sarcophagidae) is an obligate, myiasis-producing parasite, often associated with captive mink (*Mustela vison*), fisher (*Martes pennanti*), fox (*Vulpes fulva*), and in rabbits, cats, and dogs (Kingscote, 1935, Annu. Rep. Ont. Vet. Coll. 1934, pp. 51–69; Strickland, 1949, Can. Entomol. 81: 58–60; Lopushinsky, 1970, J. Wildl. Dis. 6: 98–100). Only a few cases have been reported in wild species: nestling cottontail rabbits (*Sylvilagus floridanus*) (Beule, 1940, Trans. N. Am. Wildl. Conf. 5: 320–328; Yuill and Eschle, 1963, J. Wildl. Manage. 27: 477–480), newly hatched northern shoveler (*Anas clypeata*) and blue-winged teal (*Anas discors*) ducklings (Wobeser et

al., 1981, Can. Field Nat. 95: 471–473), and adult Townsend voles (*Microtus townsendii*) (Boonstra, 1977, Can. J. Zool. 55: 1057–1060). We report the first known occurrence of *Wohlfahrtia vigil* parasitizing nestling meadow voles, *Microtus pennsylvanicus*.

We found nests by tracking lactating females with a spool-and-line technique (Boonstra and Craine, 1986, Can. J. Zool. 64: 1034–1036) on a 2.5-ha study area near Toronto during the spring and summer of 1985. This study was part of an investigation into the population dynamics of meadow voles. Trapping methods are listed in Boonstra and Rodd (1983, J. Anim. Ecol. 52: 757–780). Females were tracked 2 days per wk from 17 April to 24 July.

On 5 June a nest containing five young (approximately 4 days old) was found in which all the young had severe cutaneous

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