Microfilariae of Tetrapetalonema llewellyni in Raccoons of Cades Cove, Great Smoky Mountains National Park, Tennessee, USA

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were not residing free within the host cell cytoplasm, indicated that the organisms probably were *Toxoplasma gondii* (Dubey et al., 1982, Am. J. Vet. Res. 43: 2147–2164; Sheffield and Melton, 1968, J. Parasitol. 54: 209–226) and not one of the other "cyst-forming" coccidia. The inconclusive direct fluorescent antibody test and negative mouse inoculation studies probably were the result of detrimental effects of freezing and thawing of the tissues or organisms prior to performing these tests.

Although the prevalence of *T. gondii* in wild turkeys has not been studied, there is evidence that other species of wild birds frequently are infected (Sanger, 1971, *In* Infectious and Parasitic Diseases of Wild Birds, Iowa State Univ. Press, Ames, Iowa, pp. 313–316). However, *T. gondii* rarely causes clinical disease in wild birds, and toxoplasmosis apparently is not a significant cause of death in wild turkeys.

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Microfilariae of *Tetrapetalonema llewellyni* in Raccoons of Cades Cove, Great Smoky Mountains National Park, Tennessee, USA

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Five species of filarial worms are known from the raccoon, *Procyon lotor*, in the United States; *Dirofilaria immitis, D. tenuis, Dipetalonema* (*Acanthocheilonema*) *procyonis* and *Tetrapetalonema llewellyni* were reported by Herman and Price (1965, J. Wildl. Manage. 29: 695–699) and *Brugia beaveri* by Ash and Little (1964, J. Parasitol. 50: 119–123). The objectives of this study were to determine the species of microfilariae present in the blood of free-ranging raccoons in Cades Cove, an area of the Great Smoky Mountains National Park, Tennessee, and to evaluate the role of raccoons as a reservoir of filarial nematode infection for other animals in the park. Cades Cove is a protected, unmanaged area which is relatively isolated by mountains on three sides. There are tourist facilities and a campground on the extremities of the cove, thus the raccoons maintain some contact with humans and domestic pets. Also 50–100 cattle are permitted to graze within the cove. The area also has a wildlife community.

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Raccoons were captured from September 1979 through September 1980 and

anesthetized with 0.2 ml ketamine hydrochloride/kg body weight (Parke-Davis and Co., Morris Plains, New Jersey 07950, USA). One ml of blood was collected in EDTA and within 96 hr was examined for microfilariae by the modified Knott's test (Sloss and Kemp, 1978, Veterinary Clinical Parasitology, 5th Ed., Iowa St. Univ. Press, Ames, Iowa, 174 pp.). All measurements are in micrometers (μm). One vial of typical microfilariae is lodged in the U.S. National Parasite Collection, Beltsville, Maryland (Accession No. 76388).

The sex and age of all raccoons were determined; they were marked with numbered ear tags (Rototag, NASCO, Ft. Atkinson, Wisconsin 53538, USA) and released. Estimations of age were based primarily on tooth wear with five wear classes corresponding to age groups 0–14, 15–38, 39–57, 58–86 and >86 mo, respectively (Grau et al., 1970, J. Wildl. Manage. 34: 364–372). A total of 145 raccoons were bled and during the study no adult filarial worms were recovered because killing of animals was prohibited by the park service. A Chi-square 2 × 2 test (Sokal and Rohlf, 1969, Biometry, W. H. Freeman and Co., San Francisco, California, 776 pp.) was used to determine relationships between prevalence and host sex and host age. The overall homogeneity of the prevalence of infection in different groups of raccoons was tested with the log-likelihood (G) statistic (Sokal and Rohlf, 1969, op. cit.). The a posteriori simultaneous test procedure using the G-statistic (Sokal and Rohlf, 1969, op. cit.) was used to identify subgroups of raccoons which contained homogeneous prevalences of infection.

Microfilariae were found in 108 (75%) of the samples. All positive samples contained microfilariae of *Tetrapetalonema llewellyni*. One sample contained one microfilaria of *Dipetalonema procyonis* as well as microfilariae of *T. llewellyni*. Microfilariae of *T. llewellyni* were 270.2 μm in length (n = 333; range 210–310, S_m = 0.71) and 2.5 μm in width (no variation). This species was distinguished from the other four species of microfilariae found in raccoons on the basis of measurements of length and width; *Dirofilaria immitis*, 307–322 μm × 6–7 μm (Herman and Price, 1965, op. cit.), *D. tenuis*, 370–390 μm × 7 μm (Orihel and Beaver, 1965, Am. Trop. Med. Hyg. 14: 1030–1043), *Dipetalonema procyonis*, 135–156 μm × 4–5 μm (Smith, 1980, J. Parasitol. 66: 333–336), *B. beaveri*, 330 μm × 6 μm (Ash and Little, 1964, op. cit.). Prominent morphological characteristics were blunt, bulbous head, no sheath, and a curved buttonhook tail. The single microfilaria of *D. procyonis* was 130 μm by 5 μm and had a distinct cephalic hook.

Prevalence of infection was similar (P = 0.05) in males (70%) and females (79%). In animals 14 mo of age, prevalence of infection was lower than in other age classes (P = 0.05). This may reflect a long prepatent period or a greater probability of exposure to infected intermediate hosts with age. No significant differences in prevalence of infection occurred in other age classes. Prevalence of infection was greater in autumn than in summer (P = 0.05); no significant differences occurred in other seasons.