

New Host and Locality Record for *Trypanosoma peromysci*

Richard D. McKown, Steve J. Upton*, Robert D. Klemm†, and Robert K. Ridley, Department of Laboratory Medicine, College of Veterinary Medicine; *Division of Biology; and †Department of Anatomy and Physiology, College of Veterinary Medicine, Kansas State University, Manhattan, Kansas 66506

ABSTRACT: *Trypanosoma peromysci* Watson, 1912 (Sarcostigophora: Kinetoplastida), is described from a new host and locality. One of 20 (5.0%) *Peromyscus leucopus* collected from Pottawatomie and Riley counties in Kansas was found to harbor the parasite. Morphometric and statistical analysis confirmed the trypanosome to be indistinguishable from *T. peromysci*, the only difference being a greater mean flagellar length than reported previously. This is the first reported occurrence of *T. peromysci* in the white-footed mouse (*Peromyscus leucopus noveboracensis* Fischer, 1829) and also the first record of its occurrence in Kansas.

Two species of trypanosome, *Trypanosoma cruzi* and *Trypanosoma peromysci*, have been reported to occur in *Peromyscus* spp. (Wood, 1934, 1942, 1952a, 1952b, 1975a, 1975b; Davis, 1952; Esquivel et al., 1967; Burkholder et al., 1980). *Trypanosoma peromysci* was first described by Watson in Watson and Hadwen (1912) in *Peromyscus maniculatus*, *Peromyscus nebracensis* (now *P. maniculatus nebracensis*), and other species collected from Lethbridge, Alberta, Canada. Since that time, additional hosts and localities for the parasite have been reported, including *P. maniculatus* from New Mexico, Arizona, and California (Wood, 1942, 1952a, 1975a; Davis, 1952); *Peromyscus truei* from Arizona and California (Davis, 1952; Wood, 1952a, 1975a, 1975b); *Peromyscus californicus* from California (Wood, 1942, 1952a); *Peromyscus boylii* from California (Wood, 1942, 1952a; Davis, 1952); and *Peromyscus nudipes* from Costa Rica (Esquivel et al., 1967). The parasite has not been recorded previously from *Peromyscus leucopus*.

During an ongoing survey of protozoa of small mammals in Kansas, 20 *P. leucopus* were collected from 2 locations; 17 mice were collected between 1 May and 30 June 1988 from Pottawatomie County (39°13'N, 96°30'W), and 3 mice

were collected between 1 March and 30 April 1989 from Riley County (39°08'N, 96°29'W). All mice were caught using Sherman Live Traps (H. B. Sherman Traps, Tallahassee, Florida) baited with a mixture of peanut butter and oatmeal. The rodents were transported to Kansas State University where blood samples were obtained by tail bleeding into heparinized microhematocrit capillary tubes (American Scientific Products, McGaw Park, Illinois). Thick and thin blood smears were air dried and stained with either Giemsa stain or a modified Wright's stain (Leuko Stat Stain Kit, Fisher Scientific, St. Louis, Missouri). Of 20 mice, 1 (5.0%), collected from Riley County, was found to be infected. All specimens were elongate trypomastigotes with the nucleus located slightly anterior to the midpoint of the body and both the anterior and posterior ends tapering to a point (Figs. 1, 2). After morphological and statistical analysis it was concluded that the trypanosome species found was *T. peromysci*.

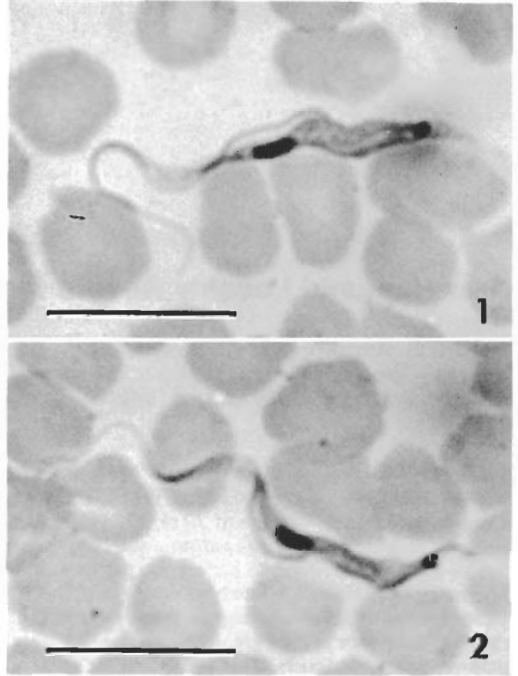
Davis (1952) presented a table listing measurements of 5 parameters from the specimens she examined, and Esquivel et al. (1967) listed measurements for 3 additional parameters. Because a complete description of *T. peromysci* is lacking, a description of the parasite from a new host, *P. leucopus*, is provided.

Twenty-five trypomastigotes were viewed with a Zeiss Standard RA microscope using a 100× oil immersion objective. Actual measurements and morphometric analyses were performed using the Microcom PM Interactive Image Analysis for Planar Morphometry (Southern Micro Instruments, Atlanta, Georgia) in conjunction with a Zenith ZW248-12 computer. All statistical analyses were made using the Number

Cruncher Statistical System, Version 5.01 (Dr. Jerry L. Hintze, Kaysville, Utah). Measurements are in micrometers and are given as the mean \pm standard error, followed by the range in parentheses. Total length, 30.82 ± 0.28 (26.3–32.9); body width, 1.39 ± 0.03 (1.03–1.69); free flagellar length, 9.68 ± 0.33 (6.2–13.4); anterior end to mid-nucleus, 9.81 ± 0.294 (5.63–13.6); nucleus length (NL), 2.09 ± 0.043 (1.7–2.64); nucleus width (NW), 0.842 ± 0.021 (0.63–1.06); mid-nucleus to mid-kinetoplast, 8.25 ± 0.112 (6.91–9.20); kinetoplast length (KL), 0.73 ± 0.026 (0.52–0.98); kinetoplast width (KW), 0.544 ± 0.016 (0.43–0.68); posterior end to mid-kinetoplast, 3.47 ± 0.132 (2.35–5.00); body length excluding flagellum, 21.75 ± 0.258 (20.0–24.5); posterior end to mid-nucleus, 11.86 ± 0.152 (9.95–13.5); body length to flagellar length, 2.32 ± 0.107 (1.49–3.95); nuclear index (=NL/NW), 2.53 ± 0.084 (1.85–3.50); kinetoplast index (=KL/KW), 1.35 ± 0.054 (1.00–1.91); total length to flagellar length, 3.26 ± 0.111 (2.37–4.93); body length to posterior end to mid-kinetoplast, 6.48 ± 0.259 (4.47–9.53); body length to posterior end to mid-nucleus, 1.83 ± 0.029 (1.51–2.27); and posterior end to mid-nucleus to anterior end to mid-nucleus, 1.24 ± 0.045 (0.86–1.95).

Watson and Hadwen (1912) reported an average length of 28 for trypanosomes from *P. maniculatus*, etc., but provided no additional data. Davis (1952) gave measurements from 500 trypanosomes from 4 species of *Peromyscus* collected by herself and S. F. Wood. The only difference between her measurements and ours is that of mean free flagellar length (9.68 in our study versus 4.93–7.18 in hers). We do not think this is a true species variation, but it is attributed to the planimetry device we used that is capable of more precisely measuring distances along a curvature. Thus, we believe the trypanosome reported and described herein to be *T. peromysci* and to represent a new host and geographic record for the species. However, when our data and those of Davis (1952) are compared to the data presented by Esquivel et al. (1967), a significant difference is noted between measurements for a number of parameters. It seems likely that the trypanosome described from Costa Rica is a species separate from *T. peromysci*.

Specimens were submitted to the U.S. National Parasite Collection, Beltsville, Maryland 20705; accession number 80897. This study was supported in part by a grant from Bioserve Space



FIGURES 1, 2. Bright field photomicrographs of *Trypanosoma peromysci* from blood of *Peromyscus leucopus*. Modified Wright's stain. Scale bar = 10 μ m.

Technologies (NASA NAGW-1197). This manuscript is Kansas Agricultural Experiment Station Contribution No. 90-126-J.

LITERATURE CITED

- BURKHOLDER, J. E., T. C. ALLISON, AND V. P. KELLY. 1980. *Trypanosoma cruzi* (Chagas) (Protozoa: Kinetoplastida) in vertebrate, reservoir, and human hosts of the lower Rio Grande valley of Texas. *Journal of Parasitology* 66: 305–311.
- DAVIS, B. S. 1952. Studies on the trypanosomes of some California mammals. University of California Publications in Zoology 57: 145–250.
- ESQUIVEL, R., J. A. ZUNIGA, M. ALFARO, AND E. KOTCHER. 1967. Trypanosomes of Costa Rican feral mammals. *Journal of Parasitology* 53: 951–955.
- WATSON, E. A., AND S. HADWEN. 1912. Trypanosomes found in Canadian mammals. *Parasitology* 5: 21–26.
- WOOD, F. D. 1934. Natural and experimental infection of *Triatoma protracta* Uhler and mammals in California with American human trypanosomiasis. *American Journal of Tropical Medicine* 14: 497–517.
- WOOD, S. F. 1942. Observations on Chagas' disease in the United States. I. California. *Bulletin of the Southern California Academy of Science* 41: 61–69.
- . 1952a. Mammal blood parasite records from

- Southwestern United States and Mexico. *Journal of Parasitology* **38**: 85-86.
- . 1952b. *Trypanosoma cruzi* in California mice by xenodiagnosis. *The Pan-Pacific Entomologist* **28**: 147-153.
- . 1975a. New localities for mammal blood parasites from southwestern United States. *Journal of Parasitology* **61**: 969-970.
- . 1975b. *Trypanosoma cruzi*: New foci of enzootic Chagas' disease in California. *Experimental Parasitology* **38**: 153-160.