

## RESERVOIR HOSTS OF CUTANEOUS LEISHMANIASIS AMONG PANAMANIAN FOREST MAMMALS

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**Abstract.** Principal results obtained during a 7-year period (1965-1972) of investigations on natural cutaneous leishmaniasis among Panamanian forest mammals are reported. A total of 2,947 feral mammals, belonging to 6 different orders and 42 genera, were studied. Leishmanial infections were demonstrated in 192 (6.5%) of these animals. Infected animals belong to 5 of the 6 orders investigated. Cutaneous leishmaniasis among Panamanian forest mammals was found to be produced by three different species of *Leishmania*: *L. braziliensis*, *L. mexicana* and *L. hertigi*. Most of the animals in which the infection was demonstrated are considered incidental hosts. Principal hosts are: the two-toed sloth, *Choloepus hoffmanni*, for *L. braziliensis*; the rice rat, *Oryzomys capito*, for *L. mexicana*; and the tropical porcupine, *Coendou rothschildi*, for *L. hertigi*. The infection rate of the two-toed sloth varies considerably in different localities studied, the high incidence of infection among the porcupine was relatively stable, and the rice rat has been found infected in a single locality in eastern Panama.

To our knowledge, the spiny rat, *Proechimys semispinosus*, was the first forest mammal found naturally infected in the New World with a species of *Leishmania* similar to those which produce cutaneous infections in humans. This important finding was reported by workers at the Gorgas Memorial Laboratory in Panama.<sup>1</sup> The parasite, isolated from the heartblood, proved to be infective to a volunteer and to the golden hamster, *Mesocricetus auratus*. This discovery had a profound effect on the investigative approaches concerned with the reservoir hosts of cutaneous leishmaniasis in tropical forested areas of the New World. Starting at this time emphasis shifted from domestic animals to forest mammals as potential reservoir hosts, in contrast to the previous half century of investigations.

Since the demonstration of natural leishmaniasis in the spiny rat, a considerable number of forest animals from several mammalian orders have been found infected in different neotropical areas.<sup>2-11</sup> Both *L. braziliensis* and *L. mexicana*, species that infect humans in the New World, have been found in these animals. In addition, a host-specific species, *Leishmania hertigi*, was found in the tropical porcupine, *Coendou rothschildi*.<sup>12</sup>

The present paper reports results of studies on cutaneous leishmaniasis in Panamanian forest mammals from April 1965 through March 1972.

Previous publications have partially reported information contained in this paper.

### MATERIALS AND METHODS

#### *Processing of the Animals Studied*

Most of the animals studied were trapped or caught alive, but some specimens were shot. About 90% of the animals were obtained by our own personnel, and the rest were bought from local animal dealers or received as gifts.

All animals were carefully observed for gross skin alterations which might suggest a leishmanial infection. Skin smears were made in those cases with suspicious skin alterations, and were examined after being fixed in methyl alcohol and stained with Giemsa stain. As soon as possible after the animals were brought to the laboratory, cultures were made from different bare areas of the skin, mainly ears, nose and feet. After November 1967 blood was also routinely cultured. The technique used in culturing skin samples has been described previously.<sup>13</sup> Animals which gave positive promastigote cultures were kept alive as long as possible at the laboratory to observe the course of the infection. Skin cultures were made periodically from these animals. Visceral cultures, mainly from liver and spleen, were made at autopsy of animals that died or were killed. Smears from viscera, as well as cultures from blood clots, were made regularly only from the two-toed sloth, *Choloepus hoffmanni*. A slightly

