MASSIVE PULMONARY ACARIASIS IN THE PIG-TAILED MACAQUE

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Source: Bulletin of the Wildlife Disease Association, 5(1) : 20-22

Published By: Wildlife Disease Association

URL: https://doi.org/10.7589/0090-3558-5.1.20

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During July, 1968 a pair of pig-tailed macaques *(Macaca nemestrina)* died three days apart at the Burnet Park Zoo, Syracuse, N.Y. They had been at the zoo for about one year after having been received in trade from the Oklahoma City Zoo. Both monkeys had a paroxysmal cough and red eyes for a time before death but were not found to be tuberculin-positive. The male died first and at autopsy he was found to have numerous lung nodules containing the mite *Pneumonyssus simicola.* However, no intensive study was done. When the female monkey died three days later with similar gross lesions it was decided to investigate the infection more fully.

Macroscopically, 283 parasitic nodules ranging from 2-14 mm were seen on the periphery of the female monkey's lungs. Areas of hemorrhage were seen about the edges of many of the larger nodules, and some of the lesions contained up to 40 adult and larval mites and a few eggs.

This appeared to be an exceptionally heavy infection. Helwig (1925, Amer. J. Path., 1:389-395) found 20 to 40 nodules per lung in several monkeys with heavy *P. simicola* infections, and Innes et al. (1954, Amer. J. Path., 30:813-835) found 50 nodules to be a large number. Baker et al. (1956, A Manual of Parasitic Mites :35-37) feel that a total of 85 to 100 *P. simicola* probably represents a heavy infection. In view of this an attempt was made to quantify the mites present after some material from the interior of several nodules was taken for bacterial cultures and six other nodules were removed for histological examination.

In order to free the mites from the tissue the lungs were teased apart, shaken in a liter of tap water, and allowed to sit for 24 hours at 4 C. The resulting fluid was filtered through a Buchner funnel (fitted with paper towels cut as filters) and the mites were collected and counted. This procedure was repeated six times until only a few mites were recovered. To get the few remaining mites the tissue was digested with artificial digestive fluid (5 gm of pepsin and 7 ml of HCl/liter of water) at 37 C for 12 hours, filtered, and the mites counted. The digestion technique distorted and partially broke down the structure of some of the mites.

A total of 3,243 mites and 408 eggs were collected. The diagnosis of *P. simicola* was made by the use of Furman's key for the genus *Pneumonyssus* (1954, J. Parasitol. 40:31-42). Typical mites can be seen in Figures 1 and 2. The ratio of females to males and to larvae was approximately 9:1:2. The histologic lesions were similar to those seen by Innes (1954) and described by Lapin and Yakovleva (1960, Comparative Pathology in Monkeys :105-117) except that the pathological changes were accompanied by extensive hemorrhage and collapse of alveoli about the parasitic lesions. Masses of refractile brown pigment, which is believed to be a mite excretory product, were seen in all sections. Figure 3 shows a section through a typical lesion. Attempted bacterial cultures on blood agar and Petragnini's medium were negative.

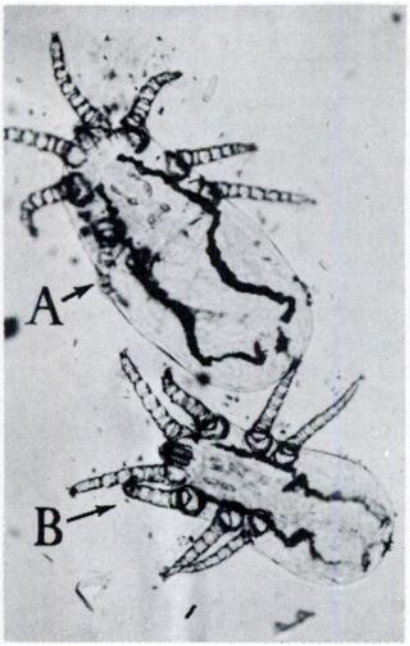

FIGURE 1. *Pneumonyssus simicola female (A), and male (B) mounted in Hoyer's medium. X 50.*

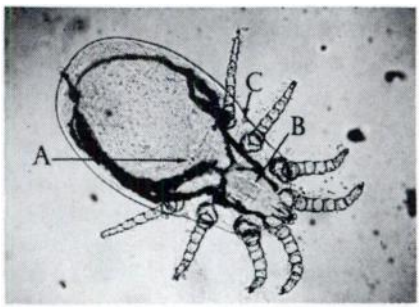

FIGURE 2. *A female* Pneumonyssus simicola *containing an egg with a well developed six-legged larva. A, Gnathosomal region of the larva. B, Characteristic marks at the site of muscle insertion on the dorsal plate. C, stigma, mounted in Hoyer's, X 90.*

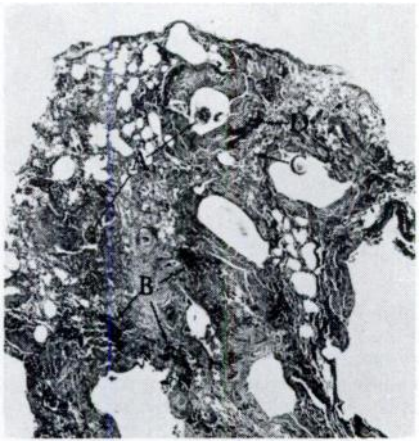

FIGURE 3. *Pulmonary acariasis. A,* Pneumonyssus simicola *in dilated bronchioles with thickened walls. B, Masses of brown pigment. C, Region of alveolar collapse and hemorrhage. D, Area of heavy lymphocytic infiltration; histologic section, hematoxylin and eosin, 8 X.*

It has been debated as to whether or not *P. simicola* may be a severe pathogen. Lapin and Yakovleva (1960), from their experience and in reviewing the work of others, decided that *P. simicola* rarely, if ever, is the direct cause of death. In this case we believe that the massive mite infection was at least highly contributory to death, if not the actual cause.

How such heavy infections as those we found in the pig-tailed macaques originated is not known. However, since eggs, larval stages, and adults can all be found in the lungs this is probably a parasite that can reproduce within its host. Perhaps the mite is usually held to low numbers by the immune mechanisms of its several host species of monkeys. This delicate mechanism might be upset by factors such as improper diet, social stress, stress of experimentation, and other infections. Infected captive monkeys may heavily contaminate their often small environments by coughing and sneezing. Thus large doses of *P. simicola* may be acquired by noninfected monkeys that may be difficult, particularly for weakened animals, to control.

Acknowledgements

The authors acknowledge the assistance of Mrs. Lorraine Stone and Dr. Daniel Dindal. We are grateful for the cooperation of Mr. Charles Clift (Director) and Mr. Edwin Wright of the Burnet Park Zoo.

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August 26, 1968

The Nineteenth Annual Southwestern Conference on Diseases in Nature Transmissible to Man will be held May 22 and 23, 1969, at the Hilton Palacio del Rio, San Antonio, Texas.

Since its inauguration in 1951 on an annual basis, this Conference has afforded an excellent opportunity for interested physicians, veterinarians, epidemiologists, public health officers, nurses, microbiologists, biologists, public health engineers, sanitarians, laboratory workers, and individuals in related fields to discuss the various aspects of diseases that may affect man in his continuous contact with his environment.

As Conference Chairman, I would appreciate it very much if you would announce the Conference meeting date in your Journal or Newsletter.

S. S. Kalter, Ph.D.
Director, Division of Microbiology
and Infectious Diseases
Conference Chairman