BioOne COMPLETE

Grey Flesh Fly (Wohlfahrtia vigil) Parasitism of a Preble's Meadow Jumping Mouse (Zapus hudsonius preblei)

Authors: Schorr, Robert A., and Davies, Robert

Source: Journal of Wildlife Diseases, 38(3) : 604-606

Published By: Wildlife Disease Association

URL: https://doi.org/10.7589/0090-3558-38.3.604

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Downloaded From: https://bioone.org/journals/Journal-of-Wildlife-Diseases on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

Journal of Wildlife Diseases, 38(3), 2002, pp. 604–606
© Wildlife Disease Association 2002

Grey Flesh Fly (*Wohlfahrtia vigil*) Parasitism of a Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*)

Robert A. Schorr[1,3] **and Robert Davies**[2] [1]Colorado Natural Heritage Program, 254 General Services Building, Colorado State University, Fort Collins, Colorado 80523, USA; [2]Colorado Division of Wildlife, 2126 North Weber, Colorado Springs, Colorado 80907, USA; [3]Corresponding author (email: rschorr@lamar.colostate.edu)

ABSTRACT: A Preble's meadow jumping mouse (*Zapus hudsonius preblei*) parasitized by five grey flesh fly (*Wohlfahrtia vigil*) larvae was discovered at the United States Air Force Academy in Colorado Springs, Colorado (USA), in June 1998. This is the first documented case of grey flesh fly parasitism of jumping mice (Family Dipodidae). The lesion was approximately 6 mm wide and was partially hidden under a mat of wet fur. Myiasis was found in one (0.7%) of 146 jumping mice captured at the Academy in 1998. The Preble's meadow jumping mouse is considered a threatened subspecies by the United States Fish and Wildlife Service. Although grey flesh fly myiasis can be fatal, it is unknown whether it is affecting populations of Preble's meadow jumping mouse. This is the first report of grey flesh fly myiasis in free-ranging wildlife in Colorado.

Key words: Grey flesh fly, myiasis, Preble's meadow jumping mouse, *Wohlfahrtia vigil*, *Zapus hudsonius preblei*.

Preble's meadow jumping mouse (Preble's mouse; *Zapus hudsonius preblei*), the subspecies known from southeastern Wyoming (USA) and along the western portion of the Colorado Piedmont (Colorado, USA), is listed as threatened by the United States Fish and Wildlife Service (1998). Because of its legal status, considerable research and conservation effort have focused on this subspecies. As part of a study of Preble's mouse movement patterns at the United States Air Force Academy (Academy), El Paso County, Colorado (39°00′58″N, 104°50′29″W), 15 mice were fitted with a 1.0-g radiocollar (Model MD-2C from Holohil Systems Ltd., Carp, Ontario, Canada). To attach the collars, mice were captured using 8×8×24 cm Sherman live traps (H. B. Sherman Traps, Inc., Tallahassee, Florida, USA) baited with whole oats, then anesthetized using methoxyflurane (Schering-Plough Corporation, Kenilworth, New Jersey, USA). The mice were provided food and water and allowed to recover from anesthesia. Mice were not released until they were able to move unhindered by the anesthesia or the collar.

On June 4, 1998, one radio-collared adult male mouse was found infected with five grey flesh fly (*Wohlfahrtia vigil*) larvae. The larvae were partially visible through an open wound and were within the peritoneal cavity. The entrance wound was approximately 6 mm in diameter and was located approximately 3 mm anterior to the tail on the back. The 18.5 g mouse showed no signs of injury when it was initially captured or when it was located with telemetry equipment and observed on eight previous occasions. The day the myiasis was discovered, the mouse shifted its habitat use from a willow (*Salix exigua*)-dominated riparian corridor to grasslands and oak shrublands.

Upon discovery of the infection, the animal was placed in a temporary housing facility within the Natural Resources Office of the Academy and given whole oats and water. After 50 min the animal lost use of its hindlimbs and was euthanized using prolonged exposure to methoxyflurane. The five flesh fly larvae were extracted through the entrance wound and measured (mean length=9.2±SEM 0.6 mm). The larvae were identified (RD; James and Gassner, 1947) and deposited in the C. P. Gillette Museum of Arthropod Diversity, Colorado State University (Fort Collins, Colorado; accession numbers SO1–SO5). Of 146 jumping mice captured at the Academy in 1998 only one (0.7%) was infected by grey flesh fly larvae.

The grey flesh fly is found in Europe and throughout northern and western North America. The subspecies *W. vigil*

Downloaded From: https://bioone.org/journals/Journal-of-Wildlife-Diseases on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

vigil is found in the eastern states from Maine to New York and west to North Dakota (James, 1947; Staub et al., 1964). The subspecies *W. vigil opaca* is found in western states and Canadian provinces from California to British Columbia and east to North Dakota, Nebraska, Colorado, and New Mexico (Knowles, 1925; Gassner and James, 1948; Stone et al., 1965; Dong, 1977; Eads, 1979; Smith et al., 1981).

Larviparous grey flesh flies are attracted to the odor and temperature of animal litters (Ford, 1936; Capelle, 1971) and deposit small larvae on the exposed skin of living hosts. Larvae penetrate the skin of young individuals and of species with particularly thin skin, but they also may enter the body through open wounds (Kingscote, 1935). Animals infected with grey flesh fly larvae may die of toxemia or septicemia (Davies, 1981) with exhaustion usually preceding death (Capelle, 1971).

This is the first documentation of flesh fly parasitism of meadow jumping mice (Whitaker, 1972). Grey flesh fly myiasis has been identified in humans (James, 1947), in domesticated species such as cats and dogs, and in captive wildlife such as cottontail rabbits (*Sylvilagus floridanus*), mink (*Mustela vison*), ferrets (*Mustela* sp.), and foxes (*Vulpes vulpes*) (Kingscote, 1935; Lopushinsky, 1970; Baumgartner, 1988). The only records of grey flesh fly parasitism of free-ranging mammals are restricted to cottontail rabbits (Buele, 1940), wood rats (*Neotoma* sp.; James, 1953) and two species of voles (*Microtus* spp.; Boonstra, 1977; Craine and Boonstra, 1986). Cottontail rabbits may be the natural host of the grey flesh fly in the wild (Yuill and Eschle, 1963).

In British Columbia, the frequencies of Townsend's voles (*Microtus townsendii*) parasitized by grey flesh flies were proportional to the frequencies of the age classes of voles captured (Boonstra, 1977). Boonstra hypothesized that myiasis in adult Townsend's voles may have been facilitated by other parasites such as the bot fly (*Cuterebra* spp.). The frequency of bot fly parasitism of Townsend's voles and the frequency of *W. vigil* parasitism of Townsend's voles were closely associated (Boonstra, 1977). Bot flies commonly parasitize rodents in Colorado (Davies, 1981) and are regular parasites of meadow jumping mice (Whitaker, 1963). The flesh fly larvae in the meadow jumping mouse from Colorado may have gained access through a wound created by botflies or other parasites.

This is the first report of grey flesh fly myiasis in free-ranging wildlife in Colorado. Since adult flies may preferentially deposit larvae on young (Gassner and James, 1946) and young mice are infrequently observed in the field, grey flesh fly myiasis in wild mouse populations may be more prevalent than records show (Yuill and Eschle, 1963). If grey flesh flies are more abundant than suspected, myiasis in young Preble's mice could hinder conservation efforts. This is particularly important because Yuill and Eschle (1963) provide circumstantial evidence that cottontail rabbit populations fluctuate with the prevalence of grey flesh fly myiasis in mink farms. Because of their limited range and limited abundance, populations of Preble's mice may become more difficult to manage if grey flesh fly myiasis increases in Colorado. Although it is unlikely that myiasis alone is regulating Preble's populations (Holmes, 1995), it is important to document the prevalence of parasitism in all age classes.

We would like to thank B. Mihlbachler of the Environmental Flight of the Academy for his continued support of this work. J. Gionfriddo, A. Black, J. Sovell, E. Williams, and an anonymous reviewer provided helpful comments on the manuscript. This research was supported through Department of Defense Environmental Compliance Grant F05611-00-P-0437-P00007.

LITERATURE CITED

BAUMGARTNER, D. L. 1988. Review of myiasis (Insecta: Diptera: Calliphoridae, Sarcophagidae) of Nearctic wildlife. Wildlife Rehabilitation 7: 3–46.

Downloaded From: https://bioone.org/journals/Journal-of-Wildlife-Diseases on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use

BOONSTRA, R. 1977. Effect of the parasite *Wohlfahrtia vigil* on *Microtus townsendii* populations. Canadian Journal of Zoology 55: 1057–1060.

BUELE, J. D. 1940. Cottontail nesting-study in Pennsylvania. Transactions of the North American Wildlife Conference 5: 320–328.

CAPELLE, K. J. 1971. Myiasis. *In* Parasitic diseases of wild mammals, J. W. Davis and R. C. Anderson (eds.). Iowa State Press, Ames, Iowa, pp. 279–305.

CRAINE, I. T. M., AND R. BOONSTRA. 1986. Myiasis by *Wohlfahrtia vigil* in nestling *Microtus pennsylvanicus.* Journal of Wildlife Diseases 22: 587–589.

DAVIES, R. B. 1981. Myiasis. *In* Manual of common wildlife diseases in Colorado, W. J. Adrian (ed.). Colorado Division of Wildlife, Denver, Colorado, pp. 113–118.

DONG, L. 1977. First report of human myiasis due to *Wohlfahrtia vigil opaca* in California and a review of the distribution of the subspecies in the state. California Vector Views 24: 13–17.

EADS, R. B. 1979. Notes on muscoid Diptera of public health interest. Mosquito News 39: 674–675.

FORD, N. 1936. Further observations on the behaviour of *Wohlfahrtia vigil* (Walk.) with notes on the collecting and rearing of the flies. Journal of Parasitology 22: 309–328.

GASSNER, F. X., AND M. J. JAMES. 1948. The biology and control of the fox maggot, *Wohlfahrtia opaca* (Coq.). Journal of Parasitology 34: 44–50.

HOLMES, J. C. 1995. Population regulation: A dynamic complex of interactions. Wildlife Research 22: 11–19.

JAMES, M. T. 1947. The flies that can cause myiasis in man. United States Department of Agriculture, Miscellaneous Publication No. 631, Washington, D.C., 175 pp.

———. 1953. *Wohlfahrtia* parasitism of foxes and mink and its control. National Fur News 26: 14–15, 26–27, 30.

———, AND F. X. GASSNER. 1947. Immature stages of the fox maggot, *Wohlfahrtia opaca* (Coq.). Journal of Parasitology 33: 241–244.

KINGSCOTE, A. A. 1935. Myiasis in man and animals due to infection with the larvae of *Wohlfahrtia vigil* (Walker). Report of the Ontario Veterinary College 29: 51–69.

KNOWLES, T. R. 1925. Cutaneous myiasis. Colorado Medicine 22: 309.

LOPUSHINSKY, T. 1970. Myiasis of nestling cottontail rabbits. Journal of Wildlife Diseases 6: 98–100.

SMITH, F. D., K. L. SHAFFER, P. A. GASSELING, AND H. W. MCFADDEN. 1981. Furuncular myiasis caused by *Wohlfahrtia vigil* (Walker): First case in Nebraska. Archives of Dermatology 117: 119–120.

STAUB, H. P., G. C. KIMMEL, E. B. BERGLUND, AND L. J. SHOLLER. 1964. Cutaneous myiasis due to *Wohlfahrtia vigil.* Pediatrics 34: 880–884.

STONE, A., C. W. SABROSKY, W. W. WIRTH, R. H. FOOTE, AND J. R. COULSON. 1965. A catalog of Diptera of America north of Mexico. United States Department of Agriculture Handbook Number 276: 1–1696.

UNITED STATES FISH AND WILDLIFE SERVICE. 1998. Federal Register, May 13, 1998: Final rule to list the Preble's meadow jumping mouse as a threatened species. 63: 26517–26530.

WHITAKER, J. O., JR. 1963. A study of meadow jumping mice, *Zapus hudsonius* (Zimmerman), in central New York. Ecological Monographs 33: 215–254.

———. 1972. *Zapus hudsonius.* Mammalian Species 11: 1–7.

YUILL, T. M., AND J. L. ESCHLE. 1963. Myiasis of penned cottontails. Journal of Wildlife Management 27: 477–480.

Received for publication 25 January 2001.

Downloaded From: https://bioone.org/journals/Journal-of-Wildlife-Diseases on 28 Mar 2024
Terms of Use: https://bioone.org/terms-of-use