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Bot Fly Larvae (*Cephenemyia jellisoni*) as a Cause of Neurologic Signs in an Elk

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ABSTRACT: In June 1993, a yearling female elk (*Cervus elaphus*) near John Day, Oregon (USA) was observed twice over a four week period with signs of neurologic disease including weakness, walking in circles with an uncoordinated gait and disorientation. The elk was shot, and the head and neck were examined grossly for parasites and lesions. Thirty-five second and third instar larvae of *Cephenemyia jellisoni* were recovered from an encapsulated space in the nasopharyngeal area dorsal to the soft palate. Larvae protruded into the caudodorsal end of the ventral nasal meatus, obliterating the opening of the left eustachian tube. Larvae were not recovered from their normal location in the retropharyngeal recesses. Thus the effects of several *Cephenemyia jellisoni* larvae in an aberrant location mimicked signs observed in meningeal worm infections.

Key words: *Cephenemyia jellisoni*, bot fly larvae, elk, *Cervus elaphus*, neurologic signs, pathology.

In June 1993, a yearling female elk (*Cervus elaphus*) near John Day, Oregon (USA; 44°13'N, 118°55'W) was observed twice over a 4-wk period and had aberrant behavior consisting of loss of fear of people, circling, bumping into trees and other objects, and incoordination. The elk was shot on 12 July 1993, and the head and neck were submitted for gross evaluation of lesions and parasites, primarily meningeal worm (*Parelaphostrongylus tenuis*) infection. For initial observation, a midsagittal cut through the head was made with a bandsaw to expose the brain, nasal turbinates, retropharyngeal recesses and associated areas. Additional transverse cuts were made later for further observation. The brain and associated tissues were examined for the presence of meningeal worms according to the methods of Samuel et al. (1992).

After sectioning the skull, we observed a roughly ovoid space left of midline, 30 mm (dorsoventral) by 18 mm (medial to lateral) by 20 mm (cranial to caudal), bounded completely by a dense, tan-gray fibrous capsule up to 10 mm thick. Thirty-five 2nd and 3rd instar larvae filled the space, and protruded into the caudodorsal end of the ventral nasal meatus (Fig. 1), obliterating the opening of the left eustachian tube. The fibrous capsule was caudal and ventral to the basioccipital bone, but did not alter the left tympanic bulla. Adjacent soft palate and pharyngeal lymph node were unaffected grossly. Larvae were identified by Dr. Paul Catts, Department of Entomology, Washington State University, Pullman, Washington (USA), based on morphological criteria (Bennet and Sabrosky, 1962). Voucher specimens were deposited in the U.S. National Parasite Collection (Beltsville, Maryland, USA; accession number 83263). No fly larvae were detected in the retropharyngeal area or the brain of the elk. Three soft ticks (nymphs of *Otobius megnini*) (Furman and Catts, 1982) were in the left external ear canal and two additional nymphs were in the right external ear canal.

From this case report, we conclude that an aberrant location for *C. jellisoni* resulted in neurologic signs that could be mistaken for those produced by meningeal worm infection in elk (Anderson et al., 1966; Samuel et al., 1992). Although meningeal worm infection has not been identified in Oregon, concern regarding the potential presence of the parasite stimulated collection of this elk. Based on our findings, we believe that *C. jellisoni* larvae had been in the capsule for at least several weeks, and the vestibular neurologic signs observed in the elk were attributed to the location of the larvae and associated fibro-

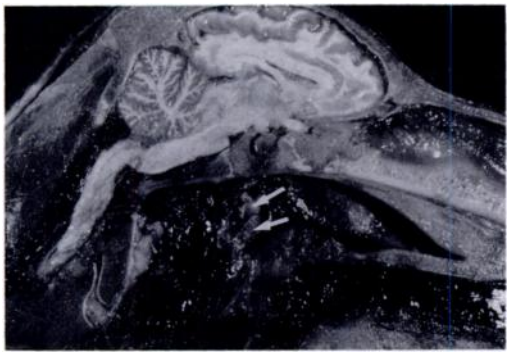

FIGURE 1. Midsagittal section of the head of the elk containing encapsulated *Cephenemyia jellisoni* larvae in the dorsal nasopharyngeal region. Arrows point to larvae in the encapsulated space. The dark material is clotted blood from the gunshot.

sis. *Cephenemyia* spp. should be included in a differential diagnosis when neurologic signs are observed in elk. The usual location for *Cephenemyia* spp. larvae in elk, deer (*Odocoileus* spp.), moose (*Alces alces*), and reindeer (*Rangifer tarandus*) is the retropharyngeal recesses where tissue damage can occur (Cogley, 1987); healthy animals rarely are harmed (McMahon and Bunch, 1989). In this elk, no larvae occurred in these recesses. Factors responsible for the large number of larvae developing in the aberrant location are unknown.

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LITERATURE CITED

ANDERSON, R. C., M. W. LANKESTER, AND R. R. STRELIVE. 1966. Further experimental studies of *Pneumostrongylus tenuis* in cervids. Canadian Journal of Zoology 44: 851–861.

BENNET, G. F., AND C. W. SABROSKY. 1962. The Nearctic species and genus *Cephenemyia* (Diptera, Oestridae). Canadian Journal of Zoology 40: 431–448.

COGLEY, T. P. 1987. Effects of *Cephenemyia* spp. (Diptera: Oestridae) on the nasopharynx of blacktailed deer (*Odocoileus hemionus columbianus*). Journal of Wildlife Diseases 23: 596–605.

FURMAN, D. C., AND E. P. CATTS. 1982. Manual of medical entomology, 4th ed. Cambridge University Press, New York, New York, 207 pp.

MCMAHON, D. C., AND T. D. BUNCH. 1989. Bot fly larvae (*Cephenemyia* spp., Oestridae) in mule deer (*Odocoileus hemionus*) from Utah. Journal of Wildlife Diseases 25: 636–638.

SAMUEL, W. M., M. J. PYBUS, D. A. WELCH, AND C. J. WILKE. 1992. Elk as a potential host for meningeal worm: Implications for translocation. The Journal of Wildlife Management 56: 629–639.

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