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Cover Page Footnote

We thank M. J. Yabsley for identification of a sample of the parasites. For their support in collection of otter carcasses, we thank the Arkansas Trapper's Association, the Southwest Arkansas Furtaker's Association, the North American Fur Auction, and especially L. Black, D. Cost, E. Elliot, M. Fisher, D. Funderburk, K. Jackson, S. Kirshman, A. Lewis, H. McLaughlin, and T. Rainey.

Distribution of *Dracunculus* sp. Infection in River Otters (*Lontra canadensis*) in Arkansas

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Running Title: *Dracunculus* sp. in River Otters of Arkansas

Mature females of the Guinea worm (*Dracunculus* sp.) are large and most commonly observed in the subcutaneous layers beneath the skin of extremities of certain mammals. *Dracunculus insignis* has been reported primarily from raccoon (*Procyon lotor*), but is known also from mink (*Neovison vison*), opossum (*Didelphis virginiana*), muskrat (*Ondatra zibethicus*), domestic dogs, and a variety of mustelids (Crites 1963; Ewing and Hibbs 1966; Crichton and Beverley-Burton 1974; Tumlison *et al.* 1984; Richardson *et al.* 1992). Historically, *Dracunculus insignis* was the only species of *Dracunculus* known in North America, so it was identified by default until Crichton and Beverley-Burton (1973) described *D. lutrae* from the river otter (*Lontra canadensis*) in Canada. Earlier reports of infection by *Dracunculus* sp. in otter occurred under the designation *D. insignis*, but Crichton and Beverley-Burton (1973) argued that *Dracunculus* in river otters throughout North America likely were *D. lutrae*, although definitive diagnosis requires examination of male specimens. In the absence of males, diagnosis was based on host.

Tumlison *et al.* (1984) first reported *Dracunculus* sp. in Arkansas from 3 species of mammals (raccoon, mink, and river otter). Because no males were located, the authors used host identity and personal communication with V. Crichton to suggest *D. lutrae* to be the species found in their river otter samples. More recently, use of DNA barcoding of the mitochondrial cytochrome c oxidase I (*cox1*) gene resulted in identification of both species of *Dracunculus* from river otters (Elsasser *et al.* 2009). Currently, species designation cannot be based on an assumption of host specificity, and identification lacking either males or use of DNA techniques is valid only to the genus level.

Although the fur trade generates a large number of carcasses in many states of the U.S. and provinces of Canada, few studies have attempted to examine the occurrence and geographic distribution of infection by *Dracunculus* sp. in furbearing mammals. Cheatum and Cook (1948) reported them in New York, Toll (1961) in Massachusetts, Crichton and Beverley-Burton (1974) in

Ontario, Lauhachinda (1978) in Alabama, Tumlison *et al.* (1984) in Arkansas, and Barding and Lacki (2014) in Kentucky.

We contacted fur trappers and fur buyers in Arkansas through social media and personal communication, to secure carcasses of river otters for examination. We obtained and examined 184 skinned carcasses of river otters harvested during the December-January harvest seasons of 2013-2014, of which 29 (15.8%) were found to be infected by *Dracunculus* sp. In an earlier Arkansas study conducted in 1981-1982, Tumlison *et al.* (1984) found 17 of 105 otters (16.2%) were infected.

Tumlison *et al.* (1984) documented specimens of *Dracunculus* from 12 Arkansas counties (Ashley, Bradley, Conway, Craighead, Greene, Hot Spring, Jackson, Prairie, Pulaski, Randolph, White, and Woodruff). From the 30 Arkansas counties represented in the current sample, we report new records of *Dracunculus* sp. from the counties of Arkansas, Crawford, Franklin, Grant, Miller, Montgomery, Polk, Sebastian, and Sevier (Fig. 1). We found this nematode again in river otters from Bradley, Prairie, Pulaski, and White counties, previously reported by Tumlison *et al.* (1984). No males were found during our survey, but a sample of our specimens has been examined by use of *cox1* sequence analysis (Prosser *et al.* 2013), and all were *D. insignis* (M. J. Yabsley, College of Veterinary Medicine, University of Georgia, *pers. comm.*). It seems, then, that the report of *D. lutrae* in Arkansas (Tumlison *et al.* 1984) more likely represented *D. insignis*.

Besides documenting new county records of this parasite in Arkansas, examination of Fig. 1 reveals presence of the parasites in western portions of the state. It is likely that this parasite occurs in every county of Arkansas in which river otters also occur. The present report extends the known range of occurrence westward in the Arkansas and Ouachita River drainages, and for the first time documents occurrence in the Red River drainage.

The previous Arkansas study (Tumilson *et al.* 1984) reported finding usually 1 to 7 guinea worms per river otter, found mostly in the fascia of the legs. More intense infections including up to 32 immature female worms (50-100 mm length range) were discovered distributed on the head, neck, legs, back, abdomen, inguinal area, axilla, and under the latissimus dorsi of two river otters from Ashley County. A river otter from Conway County harbored 41 mature female dracunculids, located primarily in the legs. In the current study, we detected infection by 41 female *Dracunculus* sp. (140-300 mm length range) in a river otter from White County, and 7 other river otters harbored > 10 dracunculids. Generally, observations of infections were similar between the earlier and current studies.

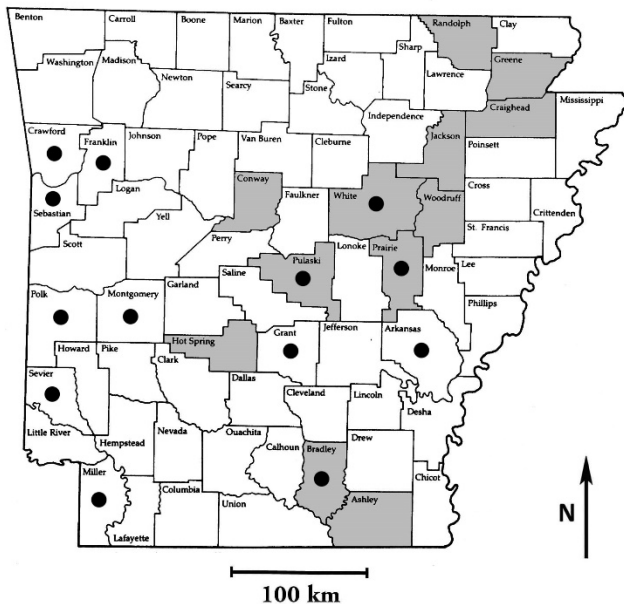


Figure 1. Geographic distribution of *Dracunculus* infections in river otters (*Lontra canadensis*) in Arkansas. Shaded counties represent historic records (Tumilson *et al.* 1984), and black dots represent records obtained during this study.

An interesting new observation during our study was the occurrence of oval cysts up to 30 x 60 mm in width and length, filled with up to 19 individuals of maturing female *Dracunculus* sp. Parasites in these cysts, located in the wrists and ankles of infected otters, ranged in length from 125-300 mm (Tumilson and Surf 2018). Once in the extremities, the parasites create ulcerations through which they deposit larvae into the water when available (Kimber and Kollias 2000).

Other authors have noted such structures to develop at the sites where female *Dracunculus* sp. create a lesion in the extremities of their hosts, allowing them to

deposit larvae into the water (Crichton and Beverley-Burton 1977; Langlais 2003; Beyer *et al.* 1999), but none had reported large numbers of parasites within the lesions.

Of 105 otters examined in 1982, 17 (16.2%) contained specimens of *Dracunculus* sp., including 6 of 40 (15.0%) from the Ouachita Mountain physiographic region, 6 of 38 (15.8%) from the Mississippi Alluvial Plain, and 5 of 27 (18.5%) from the West Gulf Coastal Plain (Tumilson *et al.* 1984). In the present study, 12 of 87 (13.8%) otters from the Ouachita Mountains, 13 of 67 (19.4%) from the Mississippi Alluvial Plain, and 5 of 21 (23.8%) from the West Gulf Coastal Plain were infected. Infection rate for females (12 of 80, 15.0%) was only slightly lower than that for males (18 of 98, 18.4%).

Infection rates found in the previous and current studies indicate reasonably consistent infection rates over time. Examination of pelts of harvested river otters, and reports from trappers, reveal efforts by river otters to relieve skin irritation at the site of lesions in their extremities. Hair often has been rubbed off by either scraping or biting at the point of irritation. Based on harvest trends, the river otter population in Arkansas is believed to be stable, so infection by *Dracunculus* sp. does not appear to be a major health issue affecting the population.

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We thank M. J. Yabsley for identification of a sample of the parasites. For their support in collection of otter carcasses, we thank the Arkansas Trapper's Association, the Southwest Arkansas Furtaker's Association, the North American Fur Auction, and especially L. Black, D. Cost, E. Elliot, M. Fisher, D. Funderburk, K. Jackson, S. Kirshman, A. Lewis, H. McLaughlin, and T. Rainey.

Literature Cited

- Barding EE and MJ Lacki.** 2014. Occurrence of nematodes (*Dracunculus* spp.) in reintroduced River Otters in Kentucky. *Journal of the Kentucky Academy of Science* 75:94-96.
- Beyer TA, RD Pinckney, and AJ Cooley.** 1999. Massive *Dracunculus insignis* infection in a dog. *Journal of the American Veterinary Medical Association* 214:366-368.

- Cheatum EL** and **AH Cook**. 1948. On the occurrence of the North American guinea worm in mink, otter, raccoon, and skunk in New York State. *Cornell Veterinarian* 38:421-423.
- Crichton VFJ** and **M Beverley-Burton**. 1973. *Dracunculus lutrae* n. sp. (Nematoda: Dracunculoidea) from the otter *Lutra canadensis*, in Ontario, Canada. *Canadian Journal of Zoology* 51:521-529.
- Crichton VFJ** and **M Beverley-Burton**. 1974. Distribution and prevalence of *Dracunculus* spp. (Nematoda: Dracunculoidea) in mammals in Ontario. *Canadian Journal of Zoology* 52:163-167.
- Crichton VFJ** and **M Beverley-Burton**. 1977. Observations on the seasonal prevalence, pathology and transmission of *Dracunculus insignis* (Nematoda: Dracunculoidea) in the raccoon (*Procyon lotor* (L.) in Ontario. *Journal of Wildlife Diseases* 13:273-280.
- Crites JL**. 1963. Dracontiasis in Ohio carnivores and reptiles with a discussion of the dracunculid taxonomic problem (Nematoda: Dracunculidae). *Ohio Journal of Science* 63:1-6.
- Elsasser SC, R Floyd, PDN Hebert, and AI Schulte-Hostedde**. 2009. Species identification of North American guinea worms (Nematoda: *Dracunculus*) with DNA barcoding. *Molecular Ecology Resources* 9:707-712.
- Ewing SA** and **CM Hibbs**. 1966. *Dracunculus insignis* (Leidy, 1858) in dogs and wild carnivores in the Great Plains. *American Midland Naturalist* 76:515-519.
- Kimber KR** and **GV Kollias II**. 2000. Infectious and parasitic diseases and contaminant-related problems of North American river otters (*Lontra canadensis*): A review. *Journal of Zoo and Wildlife Medicine* 31:452-472.
- Langlais L**. 2003. Dracunculosis in a German shepherd dog. *Canadian Veterinary Journal* 44:682.
- Lauhachinda V**. 1978. Life history of the river otter in Alabama with emphasis on food habits. Ph.D. Dissertation. Auburn University, Auburn, Alabama. 169 pp.
- Prosser SWJ, MG Velarde-Aguilar, V León-Règagnon, and PDN Hebert**. 2013. Advancing nematode barcoding: A primer cocktail for the cytochrome *c* oxidase subunit I gene from vertebrate parasitic nematodes. *Molecular Ecology Resources* 13:1108-1115.
- Richardson DJ, WB Owen and DE Snyder**. 1992. Helminth parasites of the raccoon (*Procyon lotor*) from north-central Arkansas. *Journal of Parasitology* 78:163-166.
- Toll WG**. 1961. The ecology of the river otter (*Lutra canadensis*) in the Quabbin Reservoir of central Massachusetts. M.S. Thesis. University of Massachusetts, Amherst, Massachusetts. 45 pp.
- Tumlison R** and **A Surf**. 2018. Prevalence, structure, and distribution of novel parasite cysts containing *Dracunculus* species in river otters (*Lontra canadensis*) from Arkansas. *Journal of Parasitology* 104:319-321.
- Tumlison R, R Smith, J Hudspeth, PJ Polechla, and AW King**. 1984. Dracunculiasis in some Arkansas carnivores. *Journal of Parasitology* 70:440.