Research Note

Endoparasites of the Bird-voiced Treefrog, *Hyla avivoca* (Anura: Hylidae), from Arkansas

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ABSTRACT: Sixty-one juvenile and adult bird-voiced treefrogs, *Hyla avivoca* Viosca, 1928, were collected from 8 counties of central and southern Arkansas and examined for endoparasites. Thirteen (21%) of the frogs were found to be infected with 1 or more parasites, including 13 of 13 with *Tritrichomonas augusta*, 10 of 13 (77%) with *Opalina sp.*, 4 of 13 (31%) with *Nycyotherus cordiformis*, 1 of 61 (2%) with *Megalodiscus temperatus*, 3 of 61 (5%) with *Cylindrotaenia americana*, 4 of 61 (7%) with *Batracholandros bassii*, 2 of 61 (3%) with *Abbreviata sp.*, and 5 of 61 (8%) with *Oswaldocruzia (Oswaldocruzia) piapiens*. All represent new host records for the respective parasites.


The bird-voiced treefrog, *Hyla avivoca* Viosca, 1928, is a small anuran that ranges within the Mississippi River and Gulf Coast drainage systems from extreme southern Illinois to South Carolina, Georgia, and Florida westward to parts of Arkansas and Oklahoma (Smith, 1966; Conant and Collins, 1991). The species generally inhabits permanent wooded swamps comprised of tupelo-cypress, birch, and buttonbush. Although much is available on the natural history of related hylids, the biology of *H. avivoca* is not well-known (Trauth and Robinette, 1990; Jamieson et al., 1993), and only 1 report has been published on parasites of this frog. Reiber (1941) reported *Oswaldocruzia waltoni* Ingles, 1936 from *H. avivoca* from Reelfoot Lake, Tennessee, a species inquirenda according to Baker (1987). We report the identity and prevalence of endoparasites infecting *H. avivoca* from southern and central Arkansas.

During May and June 1990 and again between May and July 1991, 61 juvenile and adult *H. avivoca* (58 males, 3 females, mean ± snout–vent length [SVL] = 36.3 ± 0.5, range 31–48 mm) were collected by hand in swampy habitat from 8 counties in central (35°05'N, 92°26'W) and southern (33°19'N, 92°32'W) Arkansas. Of these, a subset of 13 frogs (all males, 36.4 ± 0.7, 33–41 mm SVL) were collected during July 1991 from Conway (N = 6) and Lafayette (N = 7) counties and examined for protozoans, and all 61 were examined for helminths. Frogs were examined within 48 hr of capture. Detailed methods for examining and processing hosts and preparing and staining parasites are identical to those provided by McAllister et al. (1989).

Voucher specimens of parasites are deposited in the U.S. National Museum Parasite Collection (USNM), USDA, Beltsville, Maryland 20705. Voucher specimens of hosts are deposited in the Arkansas State University Museum of Zoology.

REFERENCES


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All 13 H. avivoca examined for protozoans harbored at least 1 species, and 13 of 61 (21%) were infected with helminths (Table 1). None of the frogs was infected with apicomplexan or trypanosomal parasites in the blood, the intestinal contents and feces were negative for coccidia, and the gallbladder did not contain myxozoans.


Endocommensal *Opalina* sp. not identifiable to species were observed in the colon of *H. avivoca*. *Opalina hylaxena* Metcalf, 1923, has been previously reported from closely related *H. versicolor* from Michigan, Massachusetts, Indiana, and Georgia (Metcalf, 1923). In addition, an *Opalina* sp. was reported by Metcalf (1923) from Cope’s gray treefrog, *H. chrysoscelis* in Texas; however, he noted that 3 *H. chrysoscelis* from Hot Springs, Arkansas, were negative for opalinids. Other opalinids have been reported from other species of *Hyla* (see Carini, 1937; Metcalf, 1940).

The ciliate *Nyctotherus cordiformis* Ehrenberg, 1838, also infected the colon of *H. avivoca*. *Opalina* hylaxena Metcalf, 1923, has been previously reported from closely related *H. versicolor* from Michigan, Massachusetts, Indiana, and Georgia (Metcalf, 1923). In addition, an *Opalina* sp. was reported by Metcalf (1923) from Cope’s gray treefrog, *H. chrysoscelis* in Texas; however, he noted that 3 *H. chrysoscelis* from Hot Springs, Arkansas, were negative for opalinids. Other opalinids have been reported from other species of *Hyla* (see Carini, 1937; Metcalf, 1940).

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A single paramphistomid digenean, *Megalodiscus temperatus* (Stafford, 1905) Harwood, 1932, was found in the cloaca of an adult male *H. avivoca* from an unnamed slough near Blackwell, Conway County. Other hyloid hosts include *H. chrysoscelis* from Nebraska (Brooks, 1976), *H. cinerea* from Texas (Harwood, 1932), *H. eximia* from Mexico (Bravo-Hollis, 1941), and *P. crucifer* from Michigan (Najarian, 1955). Brooks (1976) provided a summary of the amphibians reported to harbor this worm.

Adult nematothoracid cestodes, *Cylindrotaenia americana* Jewell, 1916, were recovered from the small intestine of 3 *H. avivoca* from an unnamed slough near Blackwell and Cox Creek Lake in Grant County; mean intensity was 3.3 ± 1.5 (range 1–6) worms. A total of 7 hyroids, 3 of which are in the genus *Hyla*, have been reported previously as hosts of *C. americana*, including the European hyloid, *H. arborea* from Czechoslovakia, *H. arenicolor* from Utah, and *H. squirella* from Texas (see McAllister, 1991).

A single pharyngodontid nematode, *Batracholandros bassii* (Walton, 1940) Petter and Quintin, 1976, was found in the colon of 4 frogs (3 males, 1 female) collected from Calion Lake in Union County, Cox Creek Lake in Grant County, and an unnamed slough near Blackwell. The species was described originally by Walton (1940) as *Pharyngodon bassii* from Cuban treefrogs, *Ostoeopilus septentrionalis*. Since then, additional frogs have been listed as hosts, including Puerto Rican crested toads, *Peltophryne* spp., bullfrogs, *Rana catesbeiana*, and tropical frogs, *Eleutherodactylus* spp. (Barus and Moravec, 1967; Barus, 1972, 1973; Coy Otero and Ventosa, 1984).

Two third-stage *Abbreviata* sp. were found in the stomach of each of 2 frogs (male and female) collected from Calion Lake and an unnamed

<table>
<thead>
<tr>
<th>Parasite</th>
<th>USNM Helminth Collection Number</th>
<th>Prevalence*</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Mastigophora</em></td>
<td>82024-82025</td>
<td>13/13 (100%)</td>
</tr>
<tr>
<td><em>Trichrichomonas augusta</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Opalina</em> sp.</td>
<td>82024</td>
<td>10/13 (77%)</td>
</tr>
<tr>
<td><em>Ciliophora</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Nyctotherus cordiformis</em></td>
<td>82025</td>
<td>4/13 (31%)</td>
</tr>
<tr>
<td>Platyhelminthes</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Trematoda</em></td>
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<td></td>
</tr>
<tr>
<td><em>Megalodiscus temperatus</em></td>
<td>82023</td>
<td>1/61 (2%)</td>
</tr>
<tr>
<td><em>Cestoidea</em></td>
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<td></td>
</tr>
<tr>
<td><em>Cylindrotaenia americana</em></td>
<td>82021-82022</td>
<td>3/61 (5%)</td>
</tr>
<tr>
<td><em>Nematoda</em></td>
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</tr>
<tr>
<td><em>Abbreviata sp.</em></td>
<td>82066</td>
<td>2/61 (3%)</td>
</tr>
<tr>
<td><em>Batracholandros bassii</em></td>
<td>82065</td>
<td>4/61 (7%)</td>
</tr>
<tr>
<td><em>Oswaldocruzia pипens</em></td>
<td>82020</td>
<td>5/61 (8%)</td>
</tr>
</tbody>
</table>

* Number infected/number examined (%).
slough near Blackwell. Numerous authors have reported physalopterid larvae from North American frogs (see McAllister and Freed, 1992). Abbreviated (syn. Physaloptera) ranae (Walton, 1931) Morgan, 1941, thought to be a valid species from frogs, has been designated as species inquirenda by Baker (1987).

Five specimens of Oswaldoctruzia (Oswaldoctruzia) pipiens Walton, 1929, were recovered from the small intestine of 5 H. avivoca (3 males, 2 females) collected from the aforementioned locales and Lake Erling, Lafayette County. This nematode is a common parasite of amphibians and reptiles ranging from Canada to southern Texas, including P. crucifer, P. streckeri, P. triseriata, H. cinerea, and H. versicolor (Baker, 1977, 1987; McAllister, 1987).

In summary, several new host records are reported for parasites of H. avivoca from Arkansas. Unfortunately, prevalence of infection could not be compared between the sexes due to a paucity of females. However, H. avivoca is infected by a parasite fauna typical of that reported previously for other hylid frogs. This is interesting given that the diet of frogs reported herein, unlike other species of Hyla, consisted primarily of Crema斯塔ges ants (Jamieson et al., 1993). Therefore, interpretation of the ecological relationships of H. avivoca parasites and potential intermediate hosts will have to await additional study of bird-voiced treefrogs collected outside the breeding season along with sympatric congeners. Indeed, these parasites may not be typical of this treefrog population in general, as there was a conspicuous absence of ground-dwelling arthropods in their diet compared to other species of Hyla (Jamieson et al., 1993).

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Literature Cited


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Reiber, R. J. 1941. Nematodes of Amphibia and


