# TREMATODES FROM THE BARRED OWL, *STRIX VARIA*, IN TEXAS: *BRACHYLAIMA MCINTOSHI* HARKEMA, 1939, AND *NEODIPLOSTOMUM REFLEXUM* CHANDLER AND RAUSCH, 1947

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*Brachylaima mcintoshi* Harkema, 1939 (Family Brachylaimidae) and *Neodiplostomum reflexum* Chandler and Rausch, 1947 (Family Diplostomidae) are reported for the first time in Texas. They were found in the intestine of the barred owl, *Strix varia*. Descriptions of these species are amended and the trematodes from North American owls are discussed; the known species are listed.

The barred owl, *Strix varia*, has a nearly continuous distribution in the eastern two-thirds of North America. Only at a few points in this great range has it been examined for parasites. Harkema (1) described the new species *Brachylaemus mcintoshi* from 62 specimens found in one North Carolina barred owl. Chandler and Rausch (2) reported *Neodiplostomum cochleare* from the one New York barred owl examined, and described the new species *Neodiplostomum delicatum* from one of two Wisconsin barred owls. (The three Ohio barred owls examined by Chandler and Rausch contained no trematodes.) In the same paper Chandler and Rausch (2) described the new species *Neodiplostomum reflexum* from one of three great horned owls, *Bubo virginianus*, from Michigan. Specimens of *Neodiplostomum* species from Ontario, including some from *Strix varia*, were later studied by Pearson (3) and by Dubois (4). Dubois, an authority on the strigeoid trematodes, declared *N. delicatum* a synonym of *N. reflexum* (which had page priority). In Texas, owls have been examined for external parasites (5), but the only one examined for trematodes was the great horned owl in the Houston zoo from which Denton and Byrd (6) obtained the type specimens of their new species *Brachylecithum moorei*.

## MATERIALS AND METHODS

Two barred owls, *Strix varia*, found freshly killed on the highway (State 6-U.S. 290) near Hempstead in Waller County, Texas, were examined for internal and external parasites. The intestine of one contained nine specimens of a strigeoid trematode and the intestine of the other, five specimens of a brachylaimid. The worms were fixed with Bouin's solution while under the pressure of a cover slip, and were later stained with alum cochineal and mounted in balsam. All observations and measurements were made on these whole mounts.

## RESULTS

The strigeoids were found to be *Neodiplostomum reflexum* Chandler and Rausch (2). Six of the nine specimens were gravid, containing one to six eggs 104-117 microns long and 55-65 wide; these measurements agree with those of the larger type of egg in the Chandler and Rausch specimens (2). A camera lucida drawing of one of the gravid specimens is shown as Figure 1. This flattened specimen was 1.37 mm long and 0.70 mm wide. Other specimens ranged from 1.10 to 1.70 mm in length and were 0.50 to 0.63 mm wide at the widest point (posterior part of forebody). Six specimens (on four sides) have been deposited in the U.S. National Museum Helminth Collection (USNM Helm. Coll. No. 73848).

The brachylaimids were easily identified as *Brachylaima mcintoshi* Harkema, (1). They differed from Harkema's description and figure only in being much larger in all dimensions. Harkema's 62 specimens evidently fell far short of showing the true size range possible in this species. The measurements that follow show, for each part, length range of the Texas specimens

[1] Prepared by Hopkins, with additions, from a manuscript and specimens left by Little, who died 3 August 1970.

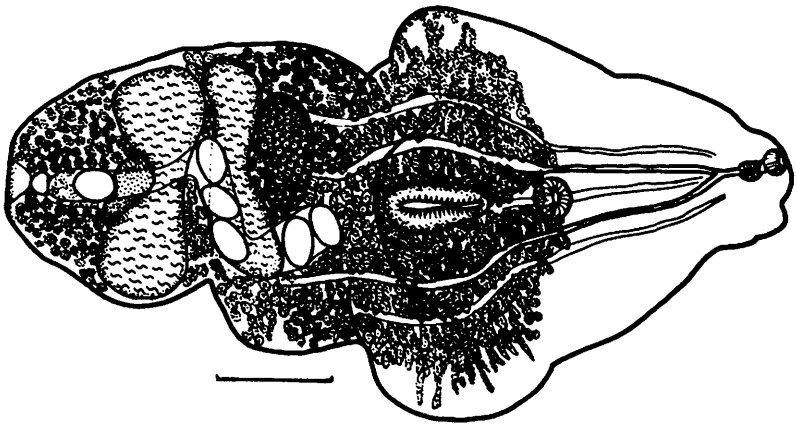

FIGURE 1. *Neodiplostomum reflexum* from barred owl; whole mount of contracted, flattened specimen with 6 eggs, ventral view, drawn with the aid of camera lucida. Scale line = 0.2 mm.

followed by range in width; Harkema's average measurements follow in parentheses; all measurements are in microns.

Body 4000-6000 x 366-555 (2600 x 290). Oral sucker 222-288 x 200-244 (210 x 163). Ventral sucker 169-244 x 143-222 (130 x 121). Pharynx 78-122 x 91-111 (77 x 95). Anterior testis 260-333 x 223-286 (164 x 153). Posterior testis 286-333 x 266-289 (164 x 144). Ovary 130-144 x 208-244 (120 x 124). Eggs 26-31 x 18-21 (30 x 19).

Two brachylaimids also have been deposited (as slides) in the U.S. National Museum Helminth Collection (No. 73849).

## DISCUSSION

The literature on the species of *Neodiplostomum* and the number of names given them, as summarized by Yamaguti (7), would tend to make one suspect that there are more names than true species. In 1962 Dubois (4) examined many specimens of *Neodiplostomum* spp. from Ontario owls, sent to him by Pearson, and also reexamined older material including the type specimens of Chandler and Rausch (2). Dubois determined that Chandler and Rausch's species *N. delicatum* and *N. reflexum* were one species, which he called *N. reflexum* because the description of this species preceded that of *N. delicatum* in the 1947 publication. At the same time, he corrected errors in the description of *N. reflexum;* he found that the vitellaria extended to the posterior extremity of the body (not just to the ovary), as in other specimens that he assigned to *N. reflexum*, including those that Pearson (3) had used in his life cycle study under the name *N. buteonis*. The life cycle described by Pearson (3) for *Neodiplostomum buteonis* is therefore actually the life cycle of *N. reflexum*.

Dubois (4) also determined that the specimens from owls in Ontario and elsewhere in North America that had been called *Neodiplostomum cochleare* or *N. cochleare americanum* did not belong to the Old World species *N. cochleare* but to a distinct species that he called *N. americanum* Chandler and Rausch, 1947.

Only one species of *Brachylaima, B. mcintoshi* Harkema, has been reported from *Strix varia* or from any North American owl. We follow Yamaguti (7) in using this spelling rather than *Brachylaema, Brachylaemum* or *Brachylaimus* because Dujardin (8) in his original designation of the genus spelled it *Brachylaima,* according to Stiles and Hassall (9). Dr. Reinard Harkema kindly examined our specimens of *B. mcintoshi* and confirmed our identification.

The known trematodes of North American owls are: Brachylaimidae: *Brachylaima mcintosbi* in *Strix varia,* North Carolina, and now Texas. Dicrocoeliidae: *Brachylecithum moorei* Denton and Byrd, 1951, in *Bubo virginianus* in zoo, Houston, Texas. Cyathocotylidae: *Neogogatea bubonis* Chandler and Rausch, 1947, in *Bubo virginianus,* Wisconsin. Diplostomidae: *Diplostomum baeri eucaliae* Hoffman and Hundley, 1958, in *Otus asio* (screech owl, experimental host). *Neodiplostomum americanum* in several owls, New York, Wisconsin, Ontario. *Neodiplostomum reflexum* in several owls, Michigan, Wisconsin, Ontario, and now Texas. Strigeidae: *Strigea elegans* Chandler and Rausch, 1947, from *Bubo virginianus* in Wisconsin and Ontario.

## ADDENDUM

Three specimens of bird lice (Mallophaga) collected from the two Waller County barred owls were examined by Professor Manning Price of the Department of Entomology, Texas A&M University. One was an adult female of the family Philopteridae and probably of the genus *Strigiphilus.* The others were an adult female and a nymph of the family Menoponidae, genus *Kurodaia,* probably *K. magna.* More definitive identifications could not be made in the absence of adult males.

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