

Some Digeneans of the Neotropical Turtle Genus *Rhinoclemmys* in Mexico and South America

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ABSTRACT: Four species of digeneans detected in freshwater turtles of Mexico and South America represent new host and/or locality records. *Rhinoclemmys areolata* of Mexico and *Rhinoclemmys punctularia* of French Guiana were infected with *Nematophila grandis*. *Rhinoclemmys nasuta* of Ecuador was infected with *Octangioides tlacotalpensis*, *Pseudocleptodiscus margaritae*, *Pseudallassostoma heteroxenus*, and *N. grandis*. *Rhinoclemmys pulcherrima pulcherrima* of Mexico, *Rhinoclemmys annulata*, *Rhinoclemmys melanosterna*, and *Kinosternon leucostomum* of Ecuador, and *Rhinoclemmys diademata* of Venezuela were negative for digeneans.

KEY WORDS: Digenea, *Octangioides tlacotalpensis*, *Nematophila grandis*, *Pseudocleptodiscus margaritae*, *Pseudallassostoma heteroxenus*, freshwater turtles, *Rhinoclemmys areolata*, *Rhinoclemmys nasuta*, *Rhinoclemmys punctularia*, new host records, new locality records, Mexico, Ecuador, French Guiana.

Few references are available on angiodictyid and paramphistomid digeneans of freshwater turtles in Mexico and South America and especially so on those of Ecuador, Venezuela, and French Guiana. In conjunction with fieldwork by one of us (J.L.C.) on the ecologically diverse genus *Rhinoclemmys* (Emydidae) in Ecuador and Mexico during July–August 1986 and 1988, respectively, an opportunity became available to study the helminths of some of these turtles. Over the same time period, colleagues donated freshly collected *Rhinoclemmys* spp. from Venezuela and French Guiana. Included in this report are new host and/or geographic locality records for 4 species of digeneans found in *Rhinoclemmys areolata* (Dumeril and Bibron, 1851), *Rhinoclemmys nasuta* (Boulenger, 1902), and *Rhinoclemmys punctularia* (Daudin, 1801).

Materials and Methods

Helminths were recovered in situ by necropsy from the turtles shortly after death. Some turtles were transported to our laboratory in Carbondale, Illinois, and kept isolated from other specimens prior to necropsy. Helminths from *R. nasuta* were recovered from organs preserved in 10% formalin in the field. Only digestive tracts and lungs were examined for helminths. All other digeneans were fixed in cold AFA. Specimens were stained in Harris' hematoxylin, dehydrated, and cleared in beechwood creosote. Small and medium size digeneans were mounted in Canada balsam and large specimens were examined and stored in beechwood creosote. Trematode specimens are deposited in the United States National Museum Helminthological Collection (USNM Helm. Coll.). Representative specimens of the host species, *R. nasuta*, have been deposited in the United States National Museum Reptile Collection, Nos. 281887–281891. Specimens of *R. areolata* will be deposited in the USNM collection, and *R. punctularia*

specimens are destined for the Texas Cooperative Wildlife Collection at Texas A&M University.

Results and Discussion

Of 37 freshwater, semiterrestrial, and terrestrial turtles examined from Mexico, western Ecuador, Venezuela, and French Guiana, 4 species of digeneans including 1 from Mexico, 1 from French Guiana, and 4 from Ecuador were recovered from digestive tracts. Lungs were negative for helminths. Nematodes recovered from digestive tracts are in the process of being studied and will be reported elsewhere.

Angiodictyidae Looss, 1902

Octangioidinae Yamaguti, 1958

Octangioides tlacotalpensis Caballero, 1942

Of 17 *R. nasuta* examined from various localities in Esmeraldas Province, Ecuador, 8 were infected with approximately 50–365 specimens per host of *Octangioides* in the large intestine. These included 2 of 7 turtles from Sarria, Río Bogotá (0.1°0.6'N, 78°48'W), and 6 of 8 from Estero El Ceibo (0.1°05'N, 78°48'W). Two turtles from Playa Grande (00°54'N, 78°58'W) were negative for *Octangioides*. Observation based on numerous specimens from each host with respect to the morphology of the excretory vesicle and canals, length of the intestinal ceca and their proximity to the excretory vesicles, body size, and organ configuration revealed that they fit the description of *Octangioides tlacotalpensis* as presented by Caballero (1942). Egg size was not given in the original description but was later reported by Thatcher (1963) as 90–100 μ m long

by 50–65 μm wide. In the present study, eggs measured 93–110 μm long by 50–70 μm wide.

Two species of *Octangioides* have been described from turtles, namely *Octangioides skrjabini* Price, 1937, and *O. tlacotalpensis* Caballero, 1942. Both have been described from the same host, *Dermatemys mawii* Gray, and the same locality, Mexico. To our knowledge each species has subsequently been reported only once. Caballero Rodriguez (1960) redescribed and figured *O. skrjabini* from *D. mawii* of Tabasco, and Thatcher (1963) reported *O. tlacotalpensis* from 2 *D. mawii* of Veracruz and Tabasco, Mexico.

The finding of *O. tlacotalpensis* in *R. nasuta* from Ecuador establishes a new host record and extends the geographic distribution from Mexico to South America.

Voucher specimens of *O. tlacotalpensis* have been deposited in the USNM Helm. Coll. Nos. 80612–80613.

Paramphistomidae Fiscoeder, 1901

Nematophilinae Skrjabin, 1949

***Nematophila grandis* (Diesing, 1839)**

Travassos, 1934

Six of 17 *R. nasuta* examined from various localities in Ecuador were infected with 2–6 *Nematophila grandis* (Diesing, 1839), Travassos, 1934 (= *Paramphistomum argentinum* Cordero and Vogelsang, 1940), in both the small and large intestines. These included 4 of 8 turtles from Estero El Ceibo and 2 of 7 from Sarria, Río Bogotá. In addition, 3 of 4 *R. punctularia* captured 1.6 km W and 1.8 km S of Iracoubo, French Guiana (0.5°28'N, 53°12'W), were each infected with a single *N. grandis*. Two of 7 *R. areolata*, one captured 24 km NE of Catazajá, Chiapas (17°52'N, 91°50'W) and the other in the vicinity of Emiliano Zapata, Tabasco, Mexico (17°45'N, 91°46'W), were also infected with 3 and 1 specimens of *N. grandis*, respectively.

Digeneans of the genus *Nematophila* have thus far been reported from freshwater turtles of Central and South America. *Nematophila grandis* occurs in several freshwater turtles of Panama including *Rhinoclemmys melanosterna* (Caballero et al., 1958), and Argentina. Alho (1964) reported *N. grandis* from the large intestines of *Kinosternon scorpioides scorpioides* (Linnaeus) and *Geoemyda punctularia punctularia* (Daudin) (= *Rhinoclemmys p. punctularia*) in Brazil. *Nematophila venezuelensis* (Cordero and Vogelsang, 1940) Yamaguti, 1958 (= *Allassostoma venezue-*

lensis Cordero and Vogelsang, 1940), and *Nematophila ovalis* Cordero and Vogelsang, 1940, have both been reported from *Podocnemis* sp. from Venezuela.

Rhinoclemmys areolata and *R. nasuta* are new host records for *N. grandis*. The finding of *N. grandis* in *R. nasuta* from Ecuador, *R. punctularia* from French Guiana, and *R. areolata* from Mexico constitute new locality records.

Voucher specimens of *N. grandis* have been deposited in the USNM Helm. Coll. Nos. 80614–80617.

Dadaytrematinae Yamaguti, 1958

***Pseudocleptodiscus margaritae* Caballero, 1961**

Seven of 17 *R. nasuta* from Ecuador were infected with *Pseudocleptodiscus margaritae* in either the terminus of the small intestine or the upper part of the large intestine; the range of infection being 1–20 specimens per host. These included 5 of 8 turtles from Sarria, Río Bogotá, and 2 of 7 from Estero El Ceibo. Two turtles from Playa Grande were negative for *P. margaritae*.

Except for those species of *Pseudocleptodiscus* that occur in turtles, dadaytrematinid digeneans are parasites of fish. The types species, *P. margaritae*, was described by Caballero (1961) from the large intestine of a freshwater turtle, *D. mawii*, from tributaries of the Río Grijalva near Villahermosa, Estado de Tabasco, Mexico. Later, *Pseudocleptodiscus sphaerorchidum* (Thatcher, 1963) Yamaguti, 1971 (= *Dadaytrema sphaerorchidum* Thatcher, 1963), was described from the same host species captured 15 mi south of Villahermosa, Estado de Tabasco. On examination of the holotype (USNM Helm. Coll. No. 60309), Yamaguti (1971) concluded that it appears conspecific with *P. margaritae*.

The finding of *P. margaritae* in *R. nasuta* of Ecuador constitutes a new host record and a southern extension of the geographic range of this parasite.

Specimens of *P. margaritae* have been deposited in the USNM Helm. Coll. No. 80618.

Schizamphistominae Looss, 1912

Pseudallassostoma heteroxenus

(Cordero and Vogelsang, 1940)

Yamaguti, 1958

One of 8 *R. nasuta* from Estero El Ceibo, Ecuador was found infected with 50 *Pseudallassostoma heteroxenus* (= *Cladorchis heteroxenus*

Cordero and Vogelsang, 1940). This species was originally described from the stomach of *Podocnemis* sp. from Estado de Guarica, Venezuela. The finding of *P. heteroxenus* in *R. nasuta* from Ecuador constitutes a new host record and extends the geographic distribution from Venezuela to Ecuador.

Specimens of *P. heteroxenus* have been deposited in the USNM Helm. Coll. No. 80619.

Specimens of *Kinosternon leucostomum* (Dumeril and Bibron, 1851), *Rhinoclemmys annulata* (Gray, 1860), *R. melanosterna* (Gray, 1861) of Ecuador, *Rhinoclemmys diademata* (Mertens, 1954) of Venezuela, and *Rhinoclemmys pulcherrima pulcherrima* (Gray, 1855) of Mexico were negative for digeneans.

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