

## Some Ascaridid, Spirurid, and Rhabditid Nematodes of the Neotropical Turtle Genus *Rhinoclemmys* in Mexico and South America

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**ABSTRACT:** Several species of nematodes collected from turtles of Mexico and South America represent new host and/or locality records. From Mexico, *Rhinoclemmys areolata* was infected with *Atractis caballeroi*, *Atractis impura*, *Cruzia mexicana*, *Falcaustra* sp., and *Serpinema parvus*, and *Rhinoclemmys pulcherrima* infected with *A. impura*, *C. mexicana*, and *Longibucca* sp. From Ecuador, *Rhinoclemmys nasuta* was infected with *Falcaustra tikasinghi* and *Hedruris* sp., *Rhinoclemmys annulata* with *A. caballeroi*, *Rhinoclemmys melanosterna* with *F. tikasinghi*, and *Kinosternon leucostomum* with *A. caballeroi*. From Venezuela, *Rhinoclemmys diademata* was infected with *A. impura*.

Few records exist on the ascaridid, spirurid, and rhabditid nematodes of turtles in Mexico and South America and especially so on those of Ecuador and Venezuela. 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 July 1988, respectively, an opportunity became available to study the helminths of some of these turtles. Additional specimens were obtained from colleagues.

Six of the 9 species of *Rhinoclemmys* were available for study, including the terrestrial species *Rhinoclemmys annulata* (Gray, 1860), *Rhinoclemmys areolata* (Duméril and Bibron, 1851), and *Rhinoclemmys pulcherrima pulcherrima* (Gray, 1855), the semiterrestrial species *Rhinoclemmys diademata* (Mertens, 1954) and

*Rhinoclemmys melanosterna* (Gray, 1861), and the aquatic species *Rhinoclemmys nasuta* (Boulenger, 1902). This report includes new host and/or geographic locality records for 5 genera of nematodes found in the 6 *Rhinoclemmys* species and in the mud turtle *Kinosternon leucostomum* (Duméril and Bibron, 1851).

Helminths were recovered in situ by necropsy from the turtles shortly after death. Some turtles were transported to the laboratory in Carbondale, Illinois, and kept isolated from other specimens prior to necropsy. Helminths from *R. nasuta* and 1 specimen each of *R. annulata* and *R. melanosterna* were collected from organs preserved in 10% formalin in the field. Only digestive tracts and lungs were examined for helminths. All other nematodes were fixed in hot glycerin alcohol (9 parts 70% ethyl alcohol, 1 part glycerin) and cleared for study in glycerin. Nematode specimens are deposited in the United States National Museum Helminthological Collection (USNM-HC). Representative specimens of the host species have been deposited in the United States National Museum (USNM) Reptile Collection: *R. annulata*, USNM 281878, 281892; *R. melanosterna*, USNM 281880 and 281881, 281883–281886; *R. nasuta*, USNM 281887–281891; and *K. leucostomum*, USNM 281876 and 281877. Specimens of *R. areolata*, *R. diademata*, and *R. p. pulcherrima* will be deposited in the USNM collection.

TABLE I. Nematodes of the neotropical turtle genus *Rhinoclemmys*.

Parasite	Host	Locality	No. turtles examined/no. infected/mean intensity	USNM-HC no.		
<b>Ascaridida</b>						
<i>Falcaustra tikasinghi</i>	<i>Rhinoclemmys nasuta</i> *	Sarria, Río Bogotá, Ecuador	01°06'N, 78°48'W	7/4/120	80801	
		Estero El Ceibo, Ecuador	01°05'N, 78°48'W	8/5/80	80799	
		Playa Grande, Ecuador	00°54'N, 78°58'W	2/2/300	80800	
<i>Rhinoclemmys melanosterna</i> *	<i>Rhinoclemmys melanosterna</i> *	Río Bogotá at Concepcion, Ecuador	01°02'N, 78°50'W	5/1/28	80802	
		<i>Rhinoclemmys annulata</i> *	San Jose de Tagua, Ecuador	01°01'N, 78°50'W	1/1/250	80803
<i>Falcaustra</i> sp.	<i>Rhinoclemmys areolata</i>	Playa Grande	00°54'N, 78°58'W	1/1/7		
		1.1 km N of Coba Road, on Hwy. 307, Quintana Roo, Mexico	20°13'N, 87°26'W	1/1/1	80804	
<i>Atractis caballeroi</i>	<i>Rhinoclemmys areolata</i> *	Emiliano Zapata, Tabasco, Mexico	17°45'N, 91°46'W	3/3/260	80805	
		24 km NE of Catazajá, Chiapas, Mexico	17°52'N, 91°50'W	2/2/350		
		<i>Kinosternon leucostomum</i> *	Río Bogotá at Concepcion		3/1/7	
<i>Atractis impura</i>	<i>Rhinoclemmys areolata</i> †	Playa Grande		1/1/35		
		1.1 km N of Coba Road, on Hwy. 307, Quintana Roo		1/1/16	80806	
<i>Cruzia mexicana</i>	<i>Rhinoclemmys areolata</i> †	1.6 km S of Hwy. 307 on the Coba Road, southeasterly extension	20°12'N, 87°27'W	1/1/49		
		<i>Rhinoclemmys p. pulcherrima</i> †	Acapulco, Guerrero, Mexico	16°51'N, 99°55'W	1/1/40	
		<i>Rhinoclemmys diademata</i> *	Lake Maracaib basin, Venezuela		2/1/80	
<i>Cruzia mexicana</i>	<i>Rhinoclemmys areolata</i> †	1.1 km N of Coba Road, on Hwy. 307, Quintana Roo		1/1/2	80809	
		<i>Rhinoclemmys p. pulcherrima</i>	Acapulco	1/1/1		
<b>Spirurida</b>						
<i>Hedruris</i> sp.	<i>Rhinoclemmys nasuta</i>	Estero El Ceibo		8/1/1	80807	
<i>Serpinema parvus</i>	<i>Rhinoclemmys areolata</i> †	Emiliano Zapata, Tabasco		3/1/2		
<b>Rhabditida</b>						
<i>Longibucca</i> sp.	<i>Rhinoclemmys p. pulcherrima</i>	Acapulco		1/1/14	80808	

\* New host and locality records.

† New host record.

Of the 37 freshwater, semiterrestrial, and terrestrial turtles examined from Mexico, western Ecuador, and Venezuela, 8 species of nematodes including 5 from Mexico, 2 from Ecuador, and 1 from Venezuela were collected from digestive tracts. The prevalence, mean intensity, and geographical distribution of each species are presented in Table I. Lungs were negative for helminths. Digeneans collected from digestive tracts are reported elsewhere (Dyer and Carr, 1990).

Three species of *Rhinoclemmys* were infected with *Falcaustra tikasinghi*. Our specimens are slightly smaller than previously recorded (Schonecker et al., 1977; Baker and Bain, 1981). Measurements of 7 males and 6 females from Ecuador are as follows. Male: total length 11.9 mm; pharynx 118  $\mu$ m, esophagus 2.2 mm, spicules

607  $\mu$ m, and gubernaculum 320  $\mu$ m long. Female: total length 14.2 mm; esophagus 2.1 mm, tail 560  $\mu$ m, vulva 5.4 mm from tip of tail; eggs in utero 119–126  $\mu$ m long, 90–112  $\mu$ m wide.

The only other congeneric species that have been reported from South America are *Falcaustra guatamalana* (Caballero, 1953) Chabaud and Golvan, 1957, and *Falcaustra mascula* (Rudolphi, 1819) Freitas and Lent, 1941. To our knowledge, only *F. tikasinghi* has been reported from turtles. It differs from other species in the Americas by a cephalic inflation of the body cuticle as well as the shape and size of the spicules and gubernaculum. The male is without a pseudosucker.

One turtle from Mexico was infected with a single female specimen of *Falcaustra* that could

not be identified to the species level. Four species of *Falcaustra* have been reported from amphibians and reptiles of Mexico, namely, *Falcaustra affinis* (Leidy, 1856) Harwood, 1932, *Falcaustra intermedia* (Caballero, 1939) Freitas and Lent, 1941, *Falcaustra caballeroi* Chabaud and Golvan, 1957, and *Falcaustra mexicana* Chabaud and Golvan, 1957. The former 2 species have been reported from turtles.

*Atractis caballeroi* Brenes and Bravo-Hollis, 1960, was found in turtles from Mexico and Ecuador. This species was originally described from the large intestine of *Kinosternon cruentatum* (Duméril and Bibron, 1851) (= *Kinosternon scorpoides cruentatum*) from Santa Ana, San José-Province, Costa Rica, by Brenes and Bravo-Hollis (1960).

Several species of *Rhinoclemmys* were infected with *Atractis impura* Caballero, 1944. This species was originally described by Caballero (1944) from the large intestine of *Gopherus polyphemus* (Daudin, 1801) from Atzacapotzalco, Mexico. As noted in the original description, this host is confined to the southeastern United States and may have been imported. Another possibility is that it was a specimen of the then undescribed *Gopherus flavomarginatus* Legler, 1959, a species from north-central Mexico with affinities to *G. polyphemus* and with a history of being confused with that species (Smith and Smith, 1980). This species was reported subsequently in *Gopherus agassizii* from Sonora, Mexico, by Petter and Douglas (1976), thus substantiating *Gopherus* as a natural host and Mexico as part of the natural range.

Two turtles from Mexico were infected with *Cruzia mexicana* Khalil, 1927. Only 3 species of *Cruzia* have been reported from amphibians and reptiles of Mexico, namely, *C. mexicana* from an unidentified lizard, *Cruzia morleyi* (Pearse, 1936) Chabaud, 1978, from *Bufo horribilis*, and *Cruzia tropidodipsi* Ubelaker and Young, 1965, from *Tropidodipsas fasciata*.

A single female specimen of *Hedruris* Nitzsch, 1821, found in the stomach of an Ecuadorian turtle, could not be identified to the species level. Four *Hedruris* species have been reported from amphibians and reptiles of South America, namely, *Hedruris juninensis* Bendezú, 1976 (Peru), *Hedruris moniezi* Ibaney and Eleazar Cordova, 1976 (Peru), *Hedruris mucronifer* Schuurmans Stekhoven, 1952 (Argentina), and *Hedruris scabra* Freitas and Lent, 1941 (Uruguay

and Brazil). Of these only *H. scabra* has been reported from turtles.

We were unable to deposit specimens of *Serpinema parvus* (Caballero, 1939) Baker, 1979, taken from the small intestine of a Mexican turtle as they were inadvertently lost after they were identified.

Several specimens of *Longibucca* Chitwood, 1933, were found in the stomach of a single Mexican turtle. *Longibucca* is mainly a soil-dwelling nematode. Chitwood (1933) described *Longibucca vivipara* from the stomach of *Pseudoboa cloelia* at the National Zoological Park, Washington, D.C. The snake was originally from British Guiana. Chitwood reported that these worms exerted a distinct pathological effect upon the host. Pathology was not evident on examination of the stomach of our host.

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