J. Helminthol. Soc. Wash.
61(1), 1994, pp. 133–138

Research Note

Some New Records of Marine and Freshwater Leeches from Caribbean, Southeastern U.S.A., Eastern Pacific, and Okinawan Animals

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ABSTRACT: Thirteen specimens of *Trachelobdella lubrica* were found attached near the eyes of 6 closely associated *Pomacentrus partitus* on a coral reef in Puerto Rico. *Myzobdella lugubris* is recorded for the first time in the West Indies and may have been introduced into eastern Puerto Rico. Varied sizes of *Ozobranchus branchiatus* found in a large tank with tilapia may demonstrate the first record of off-turtle development of this leech and of its occurrence in the insular Caribbean. *Branchellion torpedinis,* previously reported only in temperate regions, is reported in the tropics.

New host records (number in parentheses) are noted for *B. torpedinis* (1), *Myzobdella lugubris* (3), *Stibarobdella macrothela* (2), and *Trachelobdella lubrica* (12) from the West Indies; *Actinobdella inequiannulata* (1), *Myzobdella lugubris* (6), and *Piscicolaria reducta* (2) from the southeastern U.S.A.; *Trachelobdella* sp. (1) from the Pacific coast of Panama; and *Trachelobdella* sp. (1) from the southern islands of Japan.

KEY WORDS: Annelida, Hirudinea, leeches, fishes, crabs, new hosts.

Sawyer and Kinard (1980) listed freshwater and marine leeches from Puerto Rico and some Caribbean areas. New host and locality records have been noted for leeches from Alabama (E. H. Williams, 1979) and the Caribbean (E. H. Williams, 1982). A series of routine collections from West Indian and Japanese marine vertebrates and invertebrates (L. B. Williams and Williams, 1986) and from southeastern U.S. freshwater and brackish water fishes included 27 new host records, 3 new leech records for the Caribbean, and 2 unusual field observations (Table 1).

The positions of external leeches observed with SCUBA were drawn on dive slates prior to collection. Hosts were collected with SCUBA with elastic-band spearguns and multiprong–microbarb spears, underwater lights and dipnets, rotenone, and quineldine; fish traps; monofilament gillnets; boat and backpack shockers; 15- and 25-m seines; hook and line; and trawls and from fish kills and mass mortalities and from strandings. The majority of the collections in the Caribbean were made in Puerto Rico, Mona Island, the U.S. Virgin Islands, the Dominican Republic, and Panama; in the southeastern U.S.A. in Alabama, Georgia, and Florida; and in Japan in Okinawa. Geographic locations for leeches are reported in Table 1.

Leeches were relaxed by refrigeration and preserved in 10% formalin. The specimen of *Actinobdella inequiannulata* was flattened between microscope slides when preserved in formalin, stained in carmine, and mounted in Permount. All specimens were deposited in the U.S. National Museum, Division of Worms (USNM).

Trachelobdella lubrica (Grube, 1840)

A closely spaced group of 6 bicolor damselfishes, *Pomacentrus partitus* Poey (Pomacentridae), each infested with *T. lubrica,* was observed at Buoy #1 off Mayaguez Bay at a depth of 25 m (Table 1). Thirteen leeches were collected from the skin of 6 fishes. No other bicolor damselfishes, or other fishes observed during the dive, were infested externally with leeches. Sixty-nine percent were attached around the eyes of these hosts, and this is similar to early attachment positions that we found in extensive field studies of juvenile parasitic isopods (L. B. Williams, 1984). This may indicate a similar mechanism among externally attaching fish associates in locating and attaching to fish hosts.

After more than 3,500 hr of closely observing fishes underwater for externally visible parasites and tumors, we are certain that leeches do not commonly attach externally on Caribbean reef fishes. Specimens of *T. lubrica* usually attach on the gills. These external attachment sites may indicate that they first attach externally and then move to the preferred site on the gills and that our observation found them in this process. Monogeneans and isopods have been found to

Table 1. Caribbean, southeastern U.S.A., eastern Pacific, and Okinawan marine and freshwater leeches.

Host	N/H*	Site	I/E†	Host sizes (cm)	Locality	Date	USNM no.
Family Ozobranchidae							
***Ozobranchus branchiatus* (Menzies, 1791)‡**							
No host	1–40	–	–	–	Magueyes, Parguera, Puerto Rico	18 Apr 1990	132423
Family Glossiphoniidae							
***Actinobdella inequiannulata* Moore, 1901**							
Class Osteichthyes—bony fishes/order Cypriniformes/family Catostomidae—suckers							
Minytrema melanops§	1	body	1/1	–	Lee County, Alabama, U.S.A.	3 May 1969	144227
Family Piscicolidae							
***Branchellion torpedinis* Savigny, 1822‖**							
Class Chondrichthyes—cartilaginous fishes/order Rajiformes/family Myliobatidae—eagle rays							
Aetobatis narinari§	5	nare	1/1	285	off Parguera, Puerto Rico	10 Aug 1989	132445
***Trachelobdella lubrica* (Grube, 1840)**							
Class Osteichthyes—bony fishes/order Elopiformes/family Elopidae—tarpons							
Elops saurus§	1	gills	1/3	36.5	Cayo Santiago, Puerto Rico	10 Dec 1991	155354
Order Myctophiformes/family Synodontidae—lizardfishes							
Synodus intermedius§	1	skin	1/10	20.0	Turrumote, Parguera, Puerto Rico	5 Apr 1989	132437
Order Perciformes/family Centropomidae—snooks							
Centropomus undecimalis§	1	mouth	1/2	48.0	Urban Pond, Carolina, Puerto Rico	30 Apr 1991	144225
Family Serranidae—sea basses							
Epinephelus cruentatus§	1	body	1/5	–	Freeport, Grand Bahama, Bahamas	12 Jun 1991	144224
Epinephelus guttatus	1	gills	2/10	22.0	Magueyes, Parguera, Puerto Rico	1 Feb 1985	132438
Liopropoma rubre§	1	gills	1/1	6.4	Salinas, Puerto Rico	8 May 1978	132439
Family Lutjanidae—snappers							
Lutjanus apodus§	1	gills	1/3	38.0	north of Sardinero, Mona Island	15 Apr 1975	132440
Lutjanus synagris§	1	gills	1/2	24.5	Punta Santiago, Humacao, Puerto Rico	5 Feb 1992	155352
Family Gerreidae—mojarras							
Gerres cinereus§	2	gills	1/1	16.5	Punta Santiago, Humacao, Puerto Rico	30 Apr 1991	144226
	1	gills	1/1	27.9	Cayo Santiago, Humacao, Puerto Rico	10 Dec 1991	155353
	2	gills	2/2	25–29	Cayo Santiago, Humacao, Puerto Rico	5 Feb 1992	155351
Family Haemulidae—grunts							
Haemulon flavolineatum	1	gills	1/10	16.7	shelf edge, Parguera, Puerto Rico	22 Jan 1977	132446
Haemulon plumieri§	1–2	gills	2/12	20–22	shelf edge, Parguera, Puerto Rico	10 Sep 1992	164035

Table 1. Continued.

Host	N/H*	Site	I/E†	Host sizes (cm)	Locality	Date	USNM no.
Haemulon sciurus	2	gills	2/5	10.2–15	Ensenada, Puerto Rico	10 Oct 1977	132441
	2	mouth	1/1	19.0	Parguera, Puerto Rico	11 Nov 1977	
Family Pomacentridae—damselfishes							
Abudefduf saxatilis§	1	gills	1/10	11.0	shelf edge, Parguera, Puerto Rico	11 Feb 1981	132442
Pomacentrus partitus§	1–7	skin	6/6	2.5–9	off Mayaguez Bay, Puerto Rico	20 Oct 1988	132443
Family Scaridae—parrotfishes							
Sparisoma aurofrenatum§	1	gills	1/2	—	Salinas, Puerto Rico	20 May 1978	132436
Family Acanthuridae—surgeonfishes							
Acanthurus bahianus	2	gills	1/4	15.0	shelf edge, Parguera, Puerto Rico	14 Oct 1977	132444
***Trachelobdella* sp. A**							
Class Osteichthyes—bony fishes/order Perciformes/family Sciaenidae—drums							
Sciaenops ocellatus§	1	body	1/1	—	Agromarina, El Dorado, Panama	4 Feb 1988	132448
***Trachelobdella* sp. B**							
Class Osteichthyes—bony fishes/order Perciformes/family Oplegnathidae—knifejaws							
Oplegnathus punctatus§	1	tongue	1/1	39.0	Amitori Bay, Iriomote Island, Japan	25 Nov 1985	144437
***Stibarobdella macrothela* (Schmarda, 1861)**							
Class Chondrichthyes—cartilaginous fishes/order Squaliformes/family Carcharhinidae—requiem sharks							
Carcharhinus perezi§	1	fin	1/1	—	Saba, Netherland Antilles	4 Nov 1986	132433
Ginglymostoma cirratum	5	mouth	1/1	—	Parguera, Puerto Rico	29 Apr 1969	132450
	2	mouth	1/1	—	Parguera, Puerto Rico	22 Jun 1971	132449
	1	mouth	1/1	220	Parguera, Puerto Rico	30 Aug 1974	132451
	3	mouth	1/1	—	Parguera, Puerto Rico	—	132455
Galeocerdo cuvier	1	mouth	1/1	300	Parguera, Puerto Rico	21 Jan 1982	
Negaprion brevirostris	3	mouth	1/1	226	Laurel Reef, Parguera, Puerto Rico	6 Jul 1978	132452
"Shark"	1	—	1/1	—	Parguera, Puerto Rico	14 Dec 1962	132454
"Shark"	1	—	1/1	—	Parguera, Puerto Rico	1977	132453
Order Rajiformes/family Myliobatidae—eagle rays							
Aetobatis narinari§	5	skin	1/1	310	Salt River Canyon, St. Croix, USVI	16 Mar 1984	132434
	1–15	skin	2/2	158	Margarita, Parguera, Puerto Rico	2 Aug 1989	132435
Not on a host	1	—	—	—	Guayacan, Lajas, Puerto Rico	5 May 1955	3517¶
***Myzobdella lugubris* Leidy, 1851‖**							
Class Crustacea—crustaceans/order Decapoda/family Portunidae—swimming crabs							
Callinectes bocourti§	4–10	body	17/17	7–7.5	Santa Teresa Lagoon, Puerto Rico	29 May 1992	155347
Callinectes sapidus	6	body	1/1	7.9	Santa Teresa Lagoon, Puerto Rico	29 May 1992	

Table 1. Continued.

Host	N/H*	Site	I/E†	Host sizes (cm)	Locality	Date	USNM no.
				Class Osteichthyes—bony fishes/order Elopiformes/family Elopidae—tarpons			
Megalops atlanticus§	1	fin	1/12	48.8	Santa Teresa Lagoon, Puerto Rico	29 May 1992	155349
				Order Cypriniformes/family Cyprinidae—carps and minnows			
Notropis callistius§	1	skin	1/32	7.6	Loblockee Creek, Lee County, Alabama, U.S.A.	15 Feb 1972	132424
				Family Catostomidae—suckers			
Hypentelium etowanum§	1	skin	1/15	25.0	Loblockee Creek, Lee County, Alabama, U.S.A.	15 Feb 1972	132425
				Order Siluriformes/family Ictaluridae—bullhead catfish			
Ameiurus catus§	3	fins	2/21	27.0	Euphapy Creek, Alabama, U.S.A.	27 Mar 1972	132426
Ameiurus natalis§	1	skin	1/8	15.2	Loblockee Creek, Lee County, Alabama, U.S.A.	15 Feb 1972	132427
				Order Atheriniformes/family Cyprinodontidae—killifishes			
Fundulus jenkinsi§	1	skin	1/1	4.1	Bon Secour River mouth, Alabama, U.S.A.	22 Jan 1971	132429
				Order Perciformes/family Centrarchidae—sunfishes			
Lepomis gulosus	1	skin	1/43	12.7	Loblockee Creek, Lee County, Alabama, U.S.A.	15 Feb 1972	132430
Micropterus coosae§	1	skin	1/5	13.0	Loblockee Creek, Lee County, Alabama, U.S.A.	15 Feb 1972	132431
				Family Cichlidae—cichlids			
Tilapia rendalli§	1	gills	1/12	18.0	Santa Teresa Lagoon, Puerto Rico	29 May 1992	155350
				Family Mugilidae—mullets			
Mugil curema	1	fin	1/1	49.0	Santa Teresa Lagoon, Puerto Rico	29 May 1992	155348
				***Piscicolaria reducta* Meyer, 1940**			
				Class Osteichthyes—bony fishes/order Cypriniformes/family Ictaluridae—bullhead catfish			
Noturus leptacanthus§	2	skin	1/4	6.2	Loblockee Creek, Lee County, Alabama, U.S.A.	15 Feb 1972	132428
				Family Percidae—perches			
Percina palmaris§	1	skin	1/1	6.0	Loblockee Creek, Lee County, Alabama, U.S.A.	15 Feb 1972	132432

* Number of leeches per host.
† Number of hosts infected/number of hosts examined.
‡ New locality record for the insular Caribbean (Sawyer et al. [1975] reported this leech from the Caribbean coast of Costa Rica).
‖ New locality record for the Caribbean.
§ New host record.
¶ Department of Marine Sciences, University of Puerto Rico, Invertebrate Collection, Acct. No.

attach initially in various locations on the body of their fish host and move to preferred sites (Kearn, 1976; Cone and Burt, 1981; L. B. Williams, 1984). More than half of the leeches attached to the largest host.

E. H. Williams (1982) did not publish the USNM numbers for his specimens of this leech on *Acanthurus bahianus* (USNM 73880), *Archosargus rhomboidalis* (73883), *Cantherhines macrocerus* (73887), *Epinephelus guttatus* (73892), *Epinephelus striatus* (73886), *Haemulon album* (73888), *Haemulon flavolineatum* (73885), *Haemulon sciurus* (73889), *Lachnolaimus maximus* (73891), and *Scorpaena plumieri* (73884) from the Caribbean.

Myzobdella lugubris Leidy, 1851

A month-long fish kill occurred in the Santa Teresa Lagoon during May 1992. The Lagoon is brackish water and is located near Humacao, Puerto Rico. Losses were largely confined to Mozambique tilapia, *Tilapia mossambica* (Peters), but a few other brackish and freshwater fishes died. Water temperatures in the Lagoon were 30–32°C, which is unusually high for that time of year. The tilapia were infected with a variety of protozoan parasites, high intensities of nematodes encysted in the skin, fins, and internal organs, and systemically infected with *Vibrio vulnificus* (identification via API 20E® System, API Products Limited, Quebec, Canada).

During the last week of the kill, blue crabs (*Callinectes bocourti* Milne-Edwards and *Callinectes sapidus* Rathbun) began to die in the Lagoon. The crabs were reported to be infested with very high numbers of leeches identified as *M. lugubris*. Those we collected (Table 1) had only 4–10 leeches per crab, which are not unusual levels (Sawyer et al., 1975). The mortalities were probably caused by poor water quality conditions.

Myzobdella lugubris is found on freshwater fishes in the continental U.S.A. (Table 1). We have not seen this leech during the examination of thousands of freshwater fishes from a variety of locations and habitats in Puerto Rico or during extensive examinations of brackish water fishes and crustaceans from other parts of Puerto Rico. Its absence in the past suggests that the leech may have been introduced recently into Puerto Rico. Mariculture projects in eastern Puerto Rico have brought in exotic organisms for culture including species from the U.S.A. This record is a range extension of at least 1,700 km for *M. lugubris*. The previously known southern range for this leech was Florida, U.S.A. (Sawyer et al., 1975). Leeches are not known to infest freshwater fishes in Puerto Rico. *Myzobdella lugubris* may eventually invade all freshwater habitats in Puerto Rico.

Ozobranchus branchiatus (Menzies, 1791)

A circular plastic pool, 3.5 m in diameter and 0.9 m deep, was filled with seawater from the seawater system of Magueyes Island, La Parguera, Puerto Rico. Twenty to 30 small blue tilapia, *Tilapia aurea* (Steindacher) (Cichlidae), which had been acclimated to seawater, were added to this tank. Graduate students soon began complaining of leeches attaching to their arms while in this tank. One student standing in the pool was covered immediately with 30–40 leeches of varied sizes (5–11 mm). Samples from this student were removed with forceps, preserved in 10% formalin, and identified as *O. branchiatus* (Table 1).

The establishment of leeches in the plastic pool is difficult to explain, as is the range of sizes of leeches present in the tank. Sawyer et al. (1975) suggested that *O. branchiatus* completed its life cycle on turtle hosts. This case would suggest that the leech sometimes occurs free living off the host. No leeches or wounds were found on the blue tilapia specimens, and no evidence of leech reproduction was found when the tank was drained and disinfected.

Branchellion torpedinis Savigny, 1822

The specimens collected from the spotted eagle ray, *Aetobatis narinari* (Euphrasen) (Table 1), had 33 pairs of branchiae, typical of *B. torpedinis*. According to Sawyer et al. (1975), *B. torpedinis* is a temperate species that has not been reported south of North Carolina in the western Atlantic or south of Senegal in the eastern Atlantic. The southern, warm-water counterpart of *B. torpedinis, Branchellion ravenelii,* known from Florida, Alabama, and Mississippi, would be expected in Puerto Rico; however, *B. ravenelii* has only 31 pairs of branchiae. On the basis of the number of branchiae and other external characters, we consider the leeches from the spotted eagle ray to be *B. torpedinis.*

Trachelobdella sp. A

Red drum ("red fish"), *Sciaenops ocellatus* (Linnaeus), have been introduced for culture in a number of Caribbean and eastern Pacific lo-

cations. A leech on this fish taken from a culture pond on the Pacific coast of Panama (Table 1) may be *Trachelobdella lubrica,* the common gill leech of marine tropical fishes; however, the specimen was curled and contracted, making observation difficult. Large pulsatile vesicles typical of *T. lubrica* were not obvious, and the trachelosome was much shorter than typical specimens of *T. lubrica.* However, both these features may have been the result of the state of contraction of the specimen. In addition, 1 pair of punctiform eyespots was present on the oral sucker. Eyespots have not been reported on *T. lubrica* from the Atlantic, and they were not observed on specimens identified as *T. lubrica* during this study. However, eyespots may be present on *T. lubrica* from Hawaii (Epshtein, 1973), and since the leech from the red drum was collected from the Pacific, the presence of eyespots may not be a reason for ruling out *T. lubrica.* The red drum were brought into Panama as fry from hatcheries in Texas and were unlikely to have been infested with leeches. The presence of *Nerocila californica* Schiodte and Meinert, 1881 (Isopoda: Cymothoidae), also indicates that these fishes were exposed to Pacific parasites. These leeches were not a problem in the culture of red drum in Panama. They were only recorded twice from cage-cultured fishes.

Trachelobdella sp. B

The specimen from the knifejaw, *Oplegnathus punctatus* (Temminck and Schlegel), was too contracted to be identified to species (Table 1). We examined 289 fish specimens, representing 186 species in 61 families, for leeches from May 1985 through March 1986 from 9 islands in the Ryukyu Islands of Japan (Williams and Williams, 1986). This was the only leech recovered.

Stibarobdella macrothela (Schmanda, 1861)

Williams (1982) did not publish the USNM numbers for his specimens of this leech on *Ginglymostoma cirratum* (73880), *Galeocerdo cuvieri* (73882), *Negaprion brevirostris* (73881), and *Sphyrna mokarran* (73879) from the Caribbean.

We thank Humberto A. Garces, Hiroyoshi Kohno, Patrick L. Colin, Ileana E. Clavijo, Tom van't Hof, Rosa M. Steele, Ronald P. Phelps, and Joseph R. Sullivan for collecting leeches or hosts; Donald Klemm for identifying the specimen of *Actinobdella inequiannulata*; and Hiroyuki Yokochi and Hiroyoshi Kohno for use of facilities. Support was provided by the Department of Fisheries and Allied Aquacultures, Auburn University, in part by Dingle Johnson Funds; the Department of Natural Resources, Commonwealth of Puerto Rico, and Wallop Breaux Funds, Project F-28; and the Ministry of Education, Science and Culture of the Japanese Government. This manuscript is a contribution of the Sesoko Marine Sciences Center.

Literature Cited

Cone, D. K., and M. D. B. Burt. 1981. The invasion route of the gill parasite *Urocleidus adspectus* Mueller, 1936 (Monogenea: Ancyrocephalinae). Canadian Journal of Zoology 59:2166–2171.

Epshtein, V. M. 1973. New information on the structure, geographic distribution and hosts of the marine tropical leech *Trachelobdella lubrica* (Piscicolidae). Parazitologiya 7:427–435. (In Russian, translated by P. G. Rossbacher, Oregon State University, Corvallis.)

Kearn, G. C. 1976. Body surfaces of fishes. Pp. 185–208 *in* C. R. Kennedy, ed. Ecological Aspects of Parasitology. North-Holland Publishing Company, Amsterdam.

Sawyer, R. T., and W. F. Kinard. 1980. A checklist and key to the marine and freshwater leeches (Annelida: Hirudinea) of Puerto Rico and other Caribbean islands. Caribbean Journal of Science 15: 83–85.

———, **A. R. Lawler, and R. M. Overstreet.** 1975. Marine leeches of the eastern United States and the Gulf of Mexico with a key to the species. Journal of Natural History 9:633–677.

Williams, E. H., Jr. 1979. Leeches of some fishes of the Mobile Bay region. Northeast Gulf Science 3:47–49.

———. 1982. Leeches of some marine fishes from Puerto Rico and adjacent regions. Proceedings of the Helminthological Society of Washington 49: 323–325.

Williams, L. B. 1984. Geographic distribution and early life history of *Anilocra* (Isopoda: Cymothoidae) parasites of Caribbean coral reef fishes. Ph.D. Dissertation, Auburn University, Auburn, Alabama. 141 pp.

———, **and E. H. Williams, Jr.** 1986. Ichthyological notes about fishes collected for parasite examination around Sesoko Island, Okinawa. Galaxea 5:217–221.