

*Theletrum lamothei* sp. nov. (Digenea), parasite of *Echidna nocturna*  
from Cuajiniquil, Guanacaste, and other digenes of  
marine fishes from Costa Rica

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**Abstract:** A new species of *Theletrum* is described from the intestine of two palenose morays, *Echidna nocturna*, collected in Cuajiniquil, Guanacaste Province, Costa Rica. The new species differs from the type species, *T. fustiforme* Linton, 1910 by having a subspherical *pars prostatica*, a subspherical seminal vesicle extending anteriorly to the anterior border of the acetabulum, by the presence of a poorly developed hermaphroditic sac, and by having a larger body size. We also report eight additional species of digeneans parasitizing marine fishes in several localities along the Atlantic and Pacific coast of Costa Rica: *Bianium simonei*, *Didymozoinae* (metacercariae), *Ectenurus virgulus*, *Hypocreadium myohelicatum*, *Lecithochirium microstomum*, *Pseudolecithaster* sp., *Stephanostomum casum*, and *Tergestia laticollis*. In addition, we present an updated list of helminth parasites of marine fish from Costa Rica and discuss the importance of including parasites as an integral part of biodiversity inventories.

**Key words:** *Theletrum lamothei* sp. nov., helminths, digenean, marine fish, Costa Rica.

Surveys of helminth parasites of wildlife in Costa Rica are relatively few; previous to this study, 60 helminth species have been collected from Costa Rican vertebrate and invertebrate hosts. Of these, 25 are parasites of marine and freshwater fishes, including five monogeneans, 11 digeneans and eight cestodes (Brooks & McCorquodale 1995, Marques *et al.* 1995, 1996; Lamothe *et al.* 1997), as well as one acanthocephalan (Van Cleave 1940, Monks *et al.* 1997). This information is difficult to obtain because it is dispersed throughout various sources, and was published

over a period of 45 years. In consideration of the initiative developed by Costa Rica to establish an inventory of the biological diversity within its territory, and to facilitate their efforts to preserve biodiversity, the objectives of this paper are to compile and update information related to the knowledge of platyhelminth parasites of marine and freshwater fishes from Costa Rica. In addition, we describe a new species of digenean belonging to *Theletrum* Linton 1910, collected from a marine fish in the locality of Playa Cuajiniquil, Guanacaste Province.

## MATERIAL AND METHODS

Information about previous records of platyhelminth parasites of fishes from Costa Rica was obtained from the data base of the Colección Nacional de Helminthos (CNHE), Instituto de Biología, U.N.A.M., Mexico City, as well as a bibliographical search for recent publications. The new records we present herein, along with the new species, are from the capture of several fish species we made in February, 1996, at Playa Cuajiniquil, Guanacaste Province (10°, 57' N, 85°, 38' W), Playa Ocotol, Guanacaste Province (10°, 32' N, 85°, 44' W), Playa Hermosa, Guanacaste Province (10°, 38' N, 85°, 38' W) and Playa Nacascolo, Bahía Prieta, Limón Province (10°, 38' N, 85°, 38' W). Helminths were relaxed with hot tap water and fixed in AFA or Bouin's fluid. Worms were stained with Ehrlich's hematoxylin, Mayer's paracarmine or Gomori's trichrome and mounted as permanent slides with Canada balsam. Measurements are in mm unless otherwise indicated, and include the average and range in parentheses. Drawings were made with the aid of a camera lucida and all specimens were deposited at the CNHE, Mexico City, and in the United States National Parasite Collection (USNPC), Beltsville, Maryland; HWML refers to the University of Nebraska State Museum, Harold W. Manter Laboratory, Division of Parasitology, Lincoln, Nebraska.

## RESULTS

In this study, we collected nine species of digenean parasites in six species of marine fishes from several localities of the Atlantic and Pacific coasts of Costa Rica (Table 1). In addition, 18 fish species examined were negative for digeneans (Table 2). We describe a new species of *Theletrum* Linton 1910, and present additional information in relation to other digeneans that represent new host and locality records. These species are not described nor illustrated; we only note morphological features and data relating to geographical distribution.

**Digenea Van Beneden, 1858**

Familia Hemuiridae Looss 1907

***Theletrum lamothei* sp. nov.**

(Figs. 1A, 1B)

Description (based on nine specimens): Body elongate, smooth, 3.85 (2.61-5.40) long to 0.57 (0.42-0.65) wide at the level of acetabulum. Complete circular postacetabular ridge present. Tegument not serrated and tail appendage absent. Oral sucker subterminal, 0.22 (0.17-0.27) long by 0.24 (0.19-0.28) wide. Preoral lobe present. Acetabulum 0.39 (0.31-0.45) long and 0.39 (0.27-0.47) wide, and located in anterior one-third of body. Ratio of length of oral sucker to length of acetabulum 1: 1.77 (1.43-1.99). Pharynx

TABLE 1

*Helminths (Monogenea, Digenea, Eucestoda, Acanthocephala, Nematoda) parasites of marine and freshwater fishes from Costa Rica*

Helminth	Host	Locality	Reference
MONOGENEA			
<i>Ahpua piscicola</i> Bravo 1973	<i>Caranx caballus</i>	Golfo de Nicoya	Lamothe <i>et al.</i> 1997
	<i>Oligoplites altus</i>	"	"
<i>Choricotyle louisianensis</i> Hargis 1955.	<i>Menticirrhus</i> sp.	Puntarenas	Bravo & Arroyo 1962b
<i>Pseudomazocraes monsvaesa</i>			
Caballero y Bravo 1955	<i>Vomer declivifrons</i>	Puntarenas	Lamothe <i>et al.</i> 1997
<i>Polymicrocrocotyle manteri</i> Lamothe 1967	<i>Lutjanus colorado</i>	Golfo de Nicoya	Lamothe <i>et al.</i> 1997
<i>Tagia ecuadori</i> (Meserve 1938)			
Sproston 1946	<i>Sphaeroides</i> sp.	Puntarenas	Bravo & Arroyo 1962b

TABLE 1 CONTINUE...

*Helminths (Monogenea, Digenea, Eucestoda, Acanthocephala, Nematoda) parasites of marine and freshwater fishes from Costa Rica*

Helminth	Host	Locality	Reference
<b>DIGENEA</b>			
<i>Acanthostomum gnerii</i> Szidat 1954	<i>Rhamdia rogersi</i>	San José	Caballero & Brenes 1957
<i>Bianium plicatum</i> (Linton 1928) Stunkard 1930	<i>Sphaeroides</i> sp.	Puntarenas	Caballero & Brenes 1957
<i>B. simonei</i> (Travassos, Freitas and Buhrheim) Yamaguti, 1971	<i>Arothron hispidus</i>	Bahía Prieta	<b>This work</b>
<i>Bucephalus introversus</i> Manter, 1940	<i>Caranx hippos</i>	Bahía Culebra	Manter 1940
<i>Crassicutis cichlasomae</i> Manter 1936	<i>Cichlasoma</i> sp.	Liberia, Guanacaste	Bravo & Arroyo, 1962a
<i>Crassicutis opisthoseminis</i> Bravo y Arroyo 1962	<i>Cichlasoma</i> sp.	Liberia, Guanacaste	Bravo & Arroyo 1962a
Didymozoinae Poche 1907 (Metacercarias)	<i>Haemulon maculicauda</i>	Bahía Culebra	<b>This work</b>
<i>Ectenurus virgulus</i> Linton 1910	<i>Fistularia commersoni</i>	Playa Ocotol	<b>This work</b>
<i>Helicometrina sinuata</i> (Rudolphi, 1819)	"Moray"	Bahía Culebra	Manter 1940
<i>Hypocreadium myohelicatum</i>	<i>Epinephelus itajara</i>	Playa Cuajiniquíl	<b>This work</b>
<i>Lecithochirium monticellii</i> (Linton 1998) Crowcroft 1946	<i>Synodus</i> sp.	Puntarenas	Bravo & Arroyo 1962b
<i>Lecithochirium microstomum</i> Chandler 1935	<i>Fistularia commersoni</i>	Playa Ocotol	<b>This work</b>
<i>Manteria brachydera</i> (Manter 1940) Caballero 1950	<i>Oligoplites altus</i> <i>O. refulgens</i> " <i>Caranx caballus</i>	Golfo de Nicoya " "	Ponciano 1986 " "
<i>Mecoderus oligoplitis</i> Manter 1940	<i>Oligoplites</i> sp. <i>O. altus</i> , <i>O. refulgens</i> "Medialuna"	Puntarenas Golfo de Nicoya Bahía Culebra	Bravo & Arroyo 1962b Ponciano 1986 Manter 1940
<i>Proctotrema costaricae</i> Manter 1940	<i>Echidna nocturna</i>	Playa Cuajiniquíl	<b>This work</b>
<i>Pseudolecithaster</i> Campbell and Munroe 1972			
<i>Stephanostomum casum</i> (Linton 1910) McFarlane 1934	<i>Epinephelus itajara</i>	Playa Cuajiniquíl	<b>This work</b>
<i>Tergestia laticollis</i> (Rudolphi 1819) Stossich 1899	<i>Caranx caballus</i> <i>Caranx caballus</i>	Playa Ocotol Bahía Culebra	<b>This work</b> Manter 1940
<i>Theletrum lamothei</i> sp. nov.	<i>Echidna nocturna</i>	Playa Cuajiniquíl	<b>This work</b>
<b>EUCESTODA</b>			
<i>Acanthobothrium nicoyaense</i> Brooks y McCorquodale 1995	<i>Aetobatus narinari</i>	Golfo de Nicoya	Brooks & McCorquodale 1995
<i>A. costarricense</i> Marques, Brooks y Monks 1995.	<i>Dasyatis longus</i>	Golfo de Nicoya	Marques <i>et al.</i> 1995
<i>A. cimari</i> Marques, Brooks y Monks 1995.	<i>D. longus</i>	Golfo de Nicoya	Marques <i>et al.</i> 1995
<i>A. puntarenense</i> Marques, Brooks y Monks 1995.	<i>D. longus</i>	Golfo de Nicoya	Marques <i>et al.</i> 1995
<i>A. vargasi</i> Marques, Brooks y Monks 1995.	<i>D. longus</i>	Golfo de Nicoya	Marques <i>et al.</i> 1995
<i>A. campbelli</i> Marques, Brooks y Monks 1995.	<i>Urotrygon chilensis</i>	Golfo de Nicoya	Marques <i>et al.</i> 1995
<i>Acanthobothroides pacificus</i> Marques, Brooks y Molina 1996	<i>Himantura pacifica</i>	Bahía Culebra	Marques <i>et al.</i> 1996
<i>Rhinebothrium geminum</i> Marques, Brooks y Molina 1996.	<i>Himantura pacifica</i>	Bahía Culebra	Marques <i>et al.</i> 1996
<b>ACANTHOCEPHALA</b>			
<i>Koronacantha pectinaria</i> (Van Cleave 1940) Monks, Marques, León-Règagnon and Pérez-Ponce de León 1996	<i>Microlepidotus brevipinnis</i> "Medialuna"	Playa Cuajiniquíl Bahía Culebra	Monks <i>et al.</i> 1997 Van Cleave 1940
<b>NEMATODA</b>			
<i>Echinocephalus janzeni</i> Hoberg, Brooks, Molina y Erbe 1997	<i>Himantura pacifica</i>	Playa Cuajiniquíl	Hoberg <i>et al.</i> en prensa

TABLE 2

List of fishes examined that were negative for platyhelminths

No. of Fishes	Fish Species	No. of Fishes	Fish Species
1	<i>Alphestes immaculatus</i> Breder, 1936	1	<i>Lutjanus colorado</i> Jordan and Gilbert, 1882
1	<i>Anisotremus interruptus</i> (Gill, 1862)	1	<i>Lutjanus synagris</i> (Linnaeus, 1758)
2	<i>Anisotremus scapularis</i> (Tschudi, 1845)	1	<i>Muraena lentiginosa</i> Jenyns, 1842
5	<i>Calamus brachysomus</i> (Lockington, 1880)	1	<i>Mycteroperca xenarcha</i> Jordan, 1888
1	<i>C. taurinus</i> (Jenyns, 1842)	1	<i>Orthopristis forbesi</i> (Jordan and Starks, 1897)
3	<i>Centropomus viridus</i> Lockinham, 1877	1	<i>Pomadasys elongatus</i> (Steindachner, 1879)
1	<i>Cirrhitus rivulatus</i> Valenciennes, 1855	1	<i>Pseudupeneus grandisquamis</i> (Gill, 1863)
3	<i>Diodon holocanthus</i> Linnaeus, 1758	2	<i>Selene brevioortii</i> (Gill, 1863)
1	<i>Eucinostomus currani</i> Yanez-Arancibia, 1978	1	<i>Stegastes acapulcoensis</i> (Fowler, 1944)

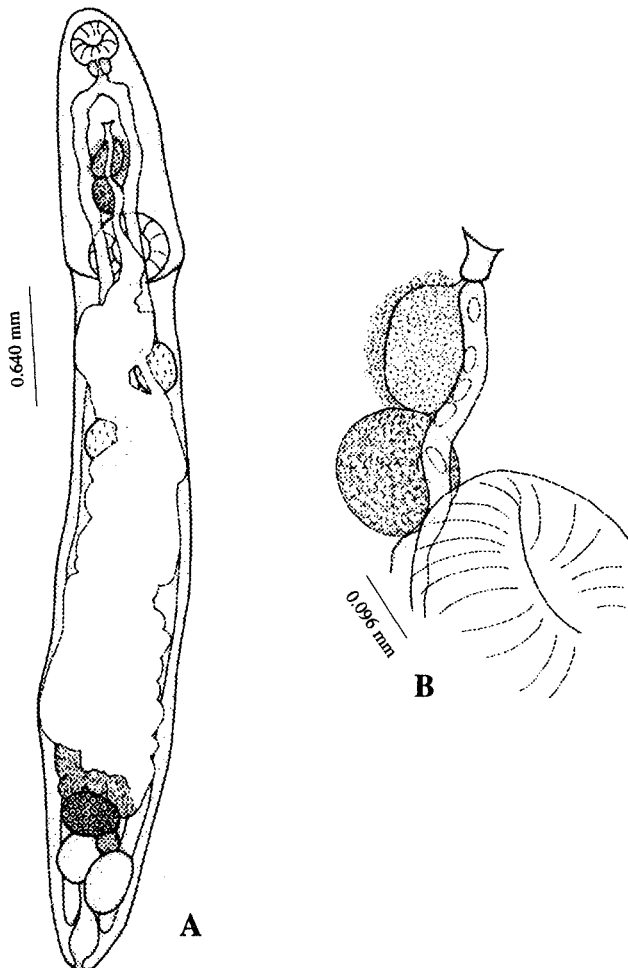


Fig. 1. *Theletrum lamothei* sp. nov. from *Echidna nocturna*. A. Holotype, dorsal view. B. Terminal genitalia with the seminal vesicle, pars prostatica, and the base of the hermaphroditic sac.

subspherical, 0.10 (0.08-0.14) long by 0.12 (0.11-0.14) wide. Esophagus very short. Intestinal caecae extending almost to posterior end of body.

Testes subspherical, oblique, and postacetabular. Anterior testis 0.24 (0.12-0.34) long by 0.23 (0.17-0.29) wide; posterior testis 0.28 (0.22-0.34) long by 0.28 (0.22-0.32) wide. Seminal vesicle saccate, overlapping anterior border of acetabulum; vesicle 0.21 (0.13-0.32) long by 0.15 (0.11-0.19) wide. *Pars prostatica* vesicular, 0.23 (0.16-0.35) long by 0.16 (0.11-0.22) wide, surrounded by numerous glandular cells. Hermaphroditic sac membranous, indistinct, and cylindrical; 0.05 (0.04-0.05) long by 0.04 (0.03-0.07) wide. Copulatory organ absent. Genital pore postbifurcal.

Ovary subspherical, located near posterior end of body; ovary 0.23 (0.15-0.29) long by 0.29 (0.26-0.35) wide. Vitelline glands forming two compact, oblique, postovarian masses; borders generally smooth, slightly lobate in some specimens. Vitellaria on left side 0.32 (0.23-0.36) long by 0.22 (0.18-0.27) wide; on right side 0.31 (0.22-0.56) long by 0.23 (0.17-0.29) wide. Juel's organ situated between vitelline glands and ovary. Uterine seminal receptacle present. Uterus entirely preovarian, opening at base of hermaphroditic sac. Eggs 32.15 $\mu$ m (32-35 $\mu$ m) long and 15.67 $\mu$ m (13-19 $\mu$ m) wide. Excretory vesicle "Y" shaped, excretory stem bulbous; excretory pore wide, terminal.

**Type-Host:** *Echidna nocturna* (Cope, 1872) (Muraenidae)

**Site of infection:** Intestine

**Type- Locality:** Playa Cuajiniquil, Golfo Santa Elena, Guanacaste Province (10°, 57' N, 85°, 38' W)

**Specimens deposited:** Holotype: CNHE No. 3179. Paratypes: CNHE No. 3180; USNPC No. 87581.

**Etymology:** This species is named in honor of Dr. Rafael Lamothe Argumedo, who, as a collaborator with costarican parasitologists,

has contributed much to the knowledge of helminth diversity of Costa Rica.

**Remarks:** The genus *Theletrum* was originally established to include *T. fustiforme* (Linton 1910). Three additional species, *T. frontilatus* Manter 1969, a parasite of *Siganus rivulatus* Forskal in Moreton Bay, Queensland, Australia (subsequently allocated by Yamaguti (1971) to *Hysteroleciithoides* Yamaguti, 1934), *T. gravida* Manter 1940 in *Abudefduf saxatilis* Linnaeus from the Pacific coast of Mexico, and *T. magnasaccus* Sogandares-Bernal and Sogandares 1961, a parasite of *A. saxatilis* in the Atlantic coast of Panama (both later transferred by Yamaguti (1971) to genus *Genolinea* Manter 1925), were added later. Gibson & Bray (1979) erected *Neotheletrum* for the latter 3 species, making *Theletrum* monotypic. Both *T. lamothei*, and the type species, have a preoral lobe and a postacetabular ridge in the tegument, as well as possessing a uterine seminal receptacle and a Juel's organ. In Linton's (1910) original description of *T. fustiforme*, a seminal receptacle is mentioned, however, after examination of the original type specimens and vouchers (USNPC 8500, 39392; HWML 473, 124642), we agree with Gibson & Bray (1979) that this structure is absent. The new species differs from *T. fustiforme* in the shape of the *pars prostatica* because, in the new species, it forms a subspherical vesicle, while in *T. fustiforme*, it is elongate. Furthermore, the two species differ in the shape of the seminal vesicle; in *T. lamothei* sp. nov. the vesicle is subspherical and only extends to the anterior border of the acetabulum, but in *T. fustiforme* it is elongate, sinuous, and extends posteriorly beyond the anterior border of the acetabulum, and the hermaphroditic sac is less developed in the new species than in *T. fustiforme*. Additionally, the new species differs from *T. fustiforme* by having a larger body size (2.6-5.4 x 0.42-0.65 vs. 1.47-1.82 x 0.35, respectively), as well as in the dimensions of suckers, testes, and ovary. The current study represents the first report of a member of this

genus from the Pacific coast of Central America; *T. fustiforme* is only known from the Gulf of Mexico and the Caribbean Sea.

**Larval Didymozoid (Didymozoinae Poche 1907) not identified**  
(Metacercariae)

Seven metacercariae were collected with morphometric characteristics consistent with those described in marine fishes from Australia as "species 5" by Kjøie & Lester (1985). León-Règagnon *et al.* (1997) recorded this didymozoinid metacercariae in 14 fish species from Chamela Bay, Mexico. They found a higher prevalence and abundance in fishes from the Haemulidae. Our results are in accordance with their findings in that we collected these specimens from *Haemulon maculicauda* Gill 1963. Taxonomic identification at the species level was not possible because specimens were collected as larval stages; adult didymozoinids are parasites in gills of larger size fishes (Yamaguti 1971). **Host:** *Haemulon maculicauda* Gill 1963 (Haemulidae)  
**Site:** gills  
**Locality:** Playa Hermosa, Bahía Culebra (10°, 38' N, 85°, 38' W)  
**Specimens deposited:** CNHE: 3182 (9 specimens)

***Ectenurus virgulus* Linton 1910**

We found a single specimen of *E. virgulus*. This species differs from the only other member of the genus in the Americas, *E. americanus* (Manter 1947) Manter & Pritchard 1960, by having the suckers located further apart and by having a smaller acetabulum than the other species. *Ectenurus virgulus* is not highly host specific, having been reported as a parasite of 12 genera of fishes, representing 6 different families. This species has been reported from the Gulf of Mexico, Caribbean Sea, and the Pacific coast of Mexico (Yamaguti 1971, Lamothe *et al.* 1997, León-Règagnon *et al.* 1997). The current study is the second report

of this digenean from Pacific Ocean, and represents a new host and locality record.

**Host:** *Fistularia commersonii* Ruppell 1835 (Fistularidae)  
**Site:** Intestine.  
**Locality:** Playa Ocotol, Guanacaste Province (10°, 32' N, 85°, 44' W)  
**Specimens deposited:** CNHE: 3183 (1 specimen)

***Lecithochirium microstomum* Chandler 1935**

One specimen from the intestine of *Fistularia commersonii* was identified as *L. microstomum*. This species is widely spread in tropical and subtropical Atlantic and Pacific oceans around the world, and exhibits a low host specificity because it has been found in many host species from different families. The record of *L. microstomum* in a fistularid from Costa Rica confirms this low host specificity. **Host:** *Fistularia commersonii* (Fistularidae)  
**Site:** Intestine  
**Locality:** Playa Ocotol, Guanacaste Province (10°, 32' N, 85°, 44' W).  
**Specimens deposited:** CNHE: 3175 (1 specimen)

***Pseudolecithaster* sp.**

This genus includes 2 species. The type species, *P. antimorae*, was described from the Western North Atlantic by Campbell and Munroe (1977). *Pseudolecithaster alocytii* (Tkachuk 1979) Aleshkina & Gaevskaja 1985 has been recorded from the Indian Ocean, Australia, New Zealand and the Atlantic coast of Africa (Tkachuk 1979, Korotaeva 1983, Aleshkina & Gaevskaya 1985). The single specimen we collected differs from both species in the shape of the ovary, which is multilobed in those species and spherical with smooth borders in our specimen. The vitelline lobes are also different in the specimen from Costa Rica, being almost spherical, in contrast with the other species, in which they are elongate. The terminal genitalia, which is of

great taxonomic value, cannot be observed with detail in our specimen.

This differences and the geographical distribution make us believe that we are dealing with an undescribed species, but the lack of additional material does not permit a description in this study.

**Host:** *Echidna nocturna* (Cope, 1872) (Muraenidae)

**Site:** Intestine

**Locality:** Playa Cuajiniquil, Golfo Santa Elena, Guanacaste Province (10°, 57' N, 85°, 38' W)

**Specimens deposited:** CNHE: 3176 (1 specimen)

Family Lepocreadiidae (Odhner 1905) Nicoll 1935

***Bianium simonei* (Travassos, Freitas and Buhrnheim, 1965) Yamaguti, 1971**

Eight digeneans were identified as *B. simonei*, a species previously described as parasite of *Sphaeroides testudineus* Linnaeus from Brazil (Yamaguti 1971). This species was originally allocated to genus *Amarocotyle* Travassos, Freitas and Buhrnheim, 1965 but transferred to *Bianium* by Yamaguti (1971) based on the examination of the type material. The present constitutes a new host and locality record.

**Host:** *Arothron hispidus* (Linnaeus, 1758) (Tetraodontidae)

**Site:** Intestine

**Locality:** Playa Nacascolo, Bahía Prieta, Limón Province (10°, 38' N, 85°, 38' W)

**Specimens deposited:** CNHE: 3181 (8 specimens).

***Hypocreadium myohelicatum* Bravo and Manter 1957**

Twenty specimens were collected from the intestine of *Epinephelus itajara* Lichtenstein 1822 and identified as *Hypocreadium myohelicatum*. Taxonomy of this group of digeneans has been controversial;

Manter (1940) and Nahhas & Cable (1964) considered genus *Hypocreadium* Ozaki 1936 a synonym of *Pseudocreadium* Layman 1930. Yamaguti (1971) consider them as independent genera and, in this work, we follow Yamaguti's criteria. This species was originally described from the Pacific coast of Mexico, in Puerto Vallarta, Jalisco, as parasite of *Balistes capistratus* (= *B. polylepis* Steindachner 1876) by Bravo & Manter (1957); later, Ponciano (1986) reported *H. myohelicatum* from *Trachinotus rhodopus* Gill in Puerto Angel, Oaxaca. In this work, we present a new host and locality record for *H. myohelicatum*.

**Host:** *Epinephelus itajara* Lichtenstein 1822 (Serranidae)

**Site:** Intestine.

**Locality:** Playa Cuajiniquil, Golfo Santa Elena, Guanacaste Province (10°, 57' N, 85°, 38' W)

**Specimens deposited:** CNHE: 3174 (18 specimens)

Family Acanthocolpidae Lühe 1909  
***Stephanostomum casum* (Linton 1910) McFarlane 1934**

One specimen of *S. casum* was identified based on body form, sucker ratio, anterior extent of the vitellaria, extent of the cirrus sac, and the presence of 36 oral spines. However, we could not observe the uroproct, which is characteristic of this species. This species was originally described by Linton (1910) from the intestine of *Lutjanus griseus* Linnaeus 1758 from Tortugas, Florida. In the Pacific coasts, it was recorded by Manter (1940) in *L. viridis* Valenciennes 1845 from Galapagos Islands, Ecuador, and in *L. jordani* Gilbert 1897 from Secas Islands, Panama, and finally, from *L. novemfasciatus* Gill 1862 from Oaxaca, Mexico. The present constitutes a new host and locality record.

**Host:** *Caranx caballus* Günther 1869 (Carangidae)

**Site:** Intestine

**Locality:** Playa Ocotol, Guanacaste Province (10°, 32' N, 85°, 44' W)

**Specimens deposited:** CNHE: 3177 (1 specimen)

Family Fellodistomidae Nicoll 1913  
*Tergestia laticollis* (Rudolphi, 1819)  
 Stossich, 1899

Two specimens were identified as *T. laticollis* based on the shape and dimensions of the body, the number of cervical folds and by the presence of a semicircle of lanceolate muscular lobes around the oral sucker. This digenean was previously recorded from the Pacific coast of Costa Rica by Manter (1940) as a parasite of *Caranx caballus* Günther 1864. However, this species exhibits a wide geographical distribution and low host specificity at the species level because it has been reported from 14 different fish species, mainly from Carangidae and Scombridae (Yamaguti 1971). Additional records of *T. laticollis* in the Pacific coast include those made by Ponciano (1986) and Castillo *et al.* (1997) from *Caranx hippos* Linnaeus 1758 from Puerto Angel, Oaxaca, and from *Euthynnus lineatus* Kishinouye from Chamela Bay, Jalisco, México, respectively.

**Host:** *Caranx caballus* Günther 1869 (Carangidae)

**Site:** Intestine

**Locality:** Playa Ocotol, Guanacaste Province (10° 32' N, 85° 44' W)

**Specimens deposited:** CNHE: 3178 (2 specimens)

## DISCUSSION

In this study, we report 9 species of digenean parasites of marine fishes of Costa Rica from 6 species of hosts, to increase the total number of species reported to 34. By comparison, we have recorded 148 species of helminth parasites from 98 species of fish from the Pacific coast of México; these data were collected as a result of isolated studies that began in the 1940's and continue to this date

(Lamothe *et al.* 1997). Clearly, we are still in the beginning stages of a complete understanding of the biodiversity of helminth parasites of the fishes of Costa Rica.

It is interesting to compare the results of the current study with those from fishes collected from Chamela Bay, Jalisco, México. This locality represents the northernmost extent of the dominant marine currents found in Costa Rican waters. The warm Costanera current begins near the equator, and near Chamela Bay, mixes with the cold California current (Wyrtyk 1965 in Pacheco 1991). The sharing of numerous species of parasites of fishes from Costa Rica with fishes from the Pacific Coast of México may be, in part, a result of these north-flowing currents from Costa Rica. Among others, the presence of the digeneans *Tergestia laticollis* (Castillo *et al.* 1997), and *Lecithochirium microstomum* (León-Règagnon *et al.* 1997), the acanthocephalan *Koronacantha pectinaria* (Monks *et al.* 1997), and the nematode *Echinocephalus janzeni* (Hoberg *et al.* 1998) may be either the result of migration patterns of the definitive hosts or the result of passive transport of intermediate hosts by marine currents.

Despite the scarcity of surveys of helminths from marine fishes of Costa Rica, the proportions of each group in our study is relatively consistent with surveys of marine fishes from other localities. In our study, digeneans are the most common group (54.3%), and of these, 31.6% represent the order Hemiuriformes. This is consistent with studies of the digenean fauna of marine fishes from various other localities (Manter 1940, Nahhas & Cable 1964, Overstreet 1969, León-Règagnon *et al.* 1997).

Marine fishes constitute an important resource group, both as a feature of ecotourism and as a food source, so they should be considered an essential feature of initiatives for preservation and sustainable use of biodiversity. Just as with any other type of



wildlife, fishes are susceptible to damage caused by parasites, and information about host-parasite relationships is essential to wise management. Thus, knowledge of the parasite fauna should be an integral part of any biodiversity inventory. Fishes are an important source of animal protein for human consumption, and the impact of parasites on fish populations, especially those maintained for aquacultural purposes, is well documented (Williams & Jones 1994, Rohde 1993). In addition, the potential risk of transmission of zoonotic diseases, such as anisakiasis (Sakanari 1990) through the consumption of parasitized fish, could cause public health problems (Williams & Jones 1994). In conclusion, we would like to highlight the importance of making a biodiversity inventory that includes not only animals and plants that are attractive and charismatic, but also those organisms that live in close association with them, and which, at some critical moment, may alter survival rates, and in this way, break the delicate balance of the ecosystem.

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#### RESUMEN

Se describe una especie nueva de digéneo del género *Theletrum*, parásito del intestino de una "morena pecosa", *Echidna nocturna*, recolectada en Playa Cuajiniquil, Provincia de Guanacaste, Costa Rica. La nueva especie es diferente de *T. fustiforme* Linton, 1910, la especie tipo, por presentar una *pars prostatica* subesférica, una vesícula seminal subesférica que se extiende hasta el borde anterior del acetábulo, por la presencia de un saco hermafrodita y por una mayor longitud del cuerpo. También se registran ocho especies adicionales de digéneos parásitos de peces marinos en varias localidades de las costas del Atlántico y del Pacífico de Costa Rica. Por último, presentamos una lista actualizada de los helmintos parásitos de peces marinos y dulceacuícolas de Costa Rica y discutimos la importancia de incluir a los parásitos como una parte integral de las investigaciones sobre biodiversidad.

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