

# Monogeneans of Leatherjackets, *Oligoplites* spp. (Osteichthyes: Carangidae), with the Description of a New Species of *Metacamopia* (Monogenea: Allodiscocotylidae) from the Coast of the State of Rio de Janeiro, Brazil

Ricardo M Takemoto<sup>+</sup>, JFR Amato\*, José Luis Luque\*

Departamento de Biologia Animal, Universidade Federal Rural do Rio de Janeiro, Caixa Postal 74512, 23851-970 Seropédica, RJ, Brasil

*Metacamopia oligoplites* n. sp., a gill filament parasite of carangid fishes of three species of *Oligoplites* Gill, *O. palometa* (Cuvier), *O. saurus* (Bloch & Schneider), and *O. saliens* (Bloch), from the coast of the State of Rio de Janeiro, Brazil, is described and illustrated. *Metacamopia oligoplites* n. sp. differs from *M. indica* by: the shape of the body; the pre-, para-, and post-germarial testes; vaginas lacking sclerotized structures; well-developed seminal receptacles; muscular sleeves around the constriction between the vaginas and the seminal receptacles; and the haptor highly asymmetric, with a large, heel-like area; and differs from *M. chorinemi* by: the esophagus lacking diverticles; a larger number of testes (26-55) and not just, approximately 10; and the vaginas lacking sclerotized structures of any kind. This is the first record of *Metacamopia* in the South Atlantic Ocean. The generic diagnosis of *Metacamopia* is emended. *Hargicola oligoplites* is reported for the first time in the South Atlantic Ocean. *Oligoplites palometa* and *O. saliens* are new host records for *Hargicola oligoplites*.

Key words: *Oligoplites palometa* - *Oligoplites saurus* - *Oligoplites saliens* - *Hargicola oligoplites* - *Metacamopia oligoplites* n. sp. - South Atlantic Ocean

*Metacamopia*, proposed by Lebedev (1972), includes two species originally described as *Vallisia* Perugia & Parona, 1890: *M. chorinemi* (Yamaguti, 1953) Lebedev, 1984, from *Chorinemus moadetta* (Cuv. & Val.), in the Celebes, and *M. indica* (Unnithan, 1962) Lebedev, 1972, from *C. sanctipetri* Cuv., in Trivandrum, India. *Hargicola* Lebedev, 1970 includes *H. oligoplites* (Hargis, 1957) Lebedev, 1970, from *Oligoplites saurus* (Bloch & Schneider), in Florida, USA (Hargis 1957) and in Veracruz, Mexico (Bravo-Hollis 1989). Lebedev (1984) and Bravo-Hollis (1989) considered *Hargicola* to be a member of the Gotocotyloidea (Yamaguti, 1963), but changed the species to the Camopiinae Lebedev, 1984 of the Allodiscocotylidae Tripathi, 1959.

In Brazil there is a single record of a monogenean parasite from fishes of the genus *Oligoplites* Gill: *Probursata brasiliensis* Takemoto, Amato & Luque, 1993.

The present paper is a continuation of studies on ecology and taxonomy of the parasite fauna of the marine fishes of the Brazilian coast (Amato 1982a,b,c and Amato 1983a,b,c) at Florianópolis, State of Santa Catarina. The authors undertake the study of the parasite fauna of all known species of *Oligoplites* in the Brazilian coast. This is the first record of *Metacamopia* in the Atlantic Ocean. *Hargicola oligoplites* (Hargis, 1957) is recorded for the first time in the South Atlantic Ocean.

## MATERIALS AND METHODS

The specimens studied are part of the material collected from 157 necropsies of leatherjackets, which in Brazil are called "guaiviras": 84 *O. palometa*, 37 *O. saurus*, and 36 *O. saliens*, from Sepetiba Bay, State of Rio de Janeiro, Brazil (22° 51'S, 43° 56'W). The total length of the fishes were: *O. palometa* - 16.5 to 49.0 cm; *O. saurus* - 15.0 to 37.0 cm; and *O. saliens* - 20.0 to 49.0 cm; and weight: *O. palometa* - 40 to 1320 g; *O. saurus* - 40 to 630 g; and *O. saliens* - 120 to 1350 g. Collection, preparation, and mounting of the parasites as permanent slides were carried out according to Amato et al. (1991). Illustrations were prepared with a drawing tube. Measurements are in micrometers unless otherwise indicated; the ranges are followed by the mean in parentheses. The terms prevalence, intensity of infestation, and mean intensity of infestation agree with the recommenda-

Supported by CNPq

<sup>+</sup>Present address: Univ. Estadual de Maringá, NUPELIA - Bloco H-90, Av. Colombo 5790, 87020-900 Maringá, PR, Brasil. Fax: 55-44-226.1860

\*CNPq research fellows

Received 20 June 1995

Accepted 14 December 1995

tions of Margolis et al. (1982). The holotype and some paratypes of *M. oligoplites* n. sp., and some voucher specimens of *H. oligoplites*, were deposited in the Coleção Helmintológica do Instituto Oswaldo Cruz (FIOCRUZ), Rio de Janeiro, RJ, Brazil, while some paratypes of *M. oligoplites* n. sp. were deposited in the United States National Parasite Collection (USNPC), Beltsville, MD, USA. The Meguro Parasitological Museum (MPM) loaned the holotype of *Metacamopia chorinemi* (Yamaguti, 1953) Lebedev, 1984. Twenty two of the fishes studied were identified and deposited in the Seção de Peixes, Museu de Zoologia, Universidade de São Paulo (USP), while the remaining hosts were identified in our laboratory according to Menezes and Figueiredo (1980).

### DESCRIPTIONS

#### *Metacamopia oligoplites* n. sp. (Figs 1 - 7)

DESCRIPTION (based on 23 mounted specimens, seven measured): Allodiscocotylidae, Camopiinae. Body elongate, asymmetric, amphitypic, with three distinct regions (Fig. 1), 3.33 - 5.91 mm (4.96 mm) in total length; anterior region 1.73 - 2.83 mm (2.32 mm) long, 311 - 695 (462) wide; middle region 0.64 - 1.00 mm (0.88 mm) long, 0.80 - 1.46 mm (1.16 mm) wide; posterior region 1.13 - 2.48 mm (2.04 mm) long, 0.69 - 1.46 mm (0.91 mm) wide. Longitudinal musculature well developed along the concave margin of posterior region, reaching middle region. Haptor subtriangular, not differentiated from body, with prominent, heel-like projection, 622 - 951 (810) long, and four bilateral pairs of clamps, those of the left margin larger, with long peduncles, 77 - 108 (95) long; 81 - 108 (97) wide, sitting on large muscular pads; those of the right margin smaller, with short peduncles, 57 - 86 (74) long, 60 - 81 (73) wide; one pair of anchors, one pair of hook-like "crochet en fléau", one pair of tiny, sclerotized, stubby sclerites; one pair of gastrocotylid-like "crochet en fléau" located between the last clamp and the anchors extremity (sometimes one or both "crochet en fléau" are lost) (Fig. 2). Clamps with pronounced sclerotized ribs; each clamp (Figs 3, 4) with one pair of anterolateral sclerites (c), one pair of posterolateral sclerites (d), one anterior mid-sclerite (a) with perforations (not drawn) in posterior half, and a pair of accessory sclerites (e). Buccal organs hemispheric, 46 - 68 (58) long, 35 - 58 (50) wide. Mouth subventral; pharynx ovoid, 46 - 49 (49) long, 37 - 43 (39) wide; esophagus 190 - 380 (312) long; ceca long, reaching haptor, with diverticulae surrounded by vitellaria. Testes spherical, 26 to 55 in number, 44 - 51 (48) in diameter, mostly pre-germarial, two or three para-germarial, and few post-germarial; copu-

latory organ robust, intercecal, tubular, 343 - 562 (470) long, lumen with spines of different sizes (Figs 5a,b,c, 6). Germarium directed posteriad, 219 - 482 (340) long, 88 - 190 (124) wide; Mehlis' gland at base of ootype; vitellaria follicular, extending from posterior level of seminal receptacles to the area just prior to clamps; two vaginas with ventral pores, posterior to genital atrium; vaginal ducts, 204 - 452 (350) long, expanding posteriorly after a constriction to form seminal receptacles; seminal receptacles 168 - 299 (249) long, 109 wide (Fig. 6); constriction between vaginas; seminal receptacles surrounded by muscular sleeves; muscular sleeves 94 - 133 (119) long; eggs fusiform, 315 - 233 (201) long, 44 - 80 (59) wide, with filament at each pole (Fig. 7).

### Taxonomic summary

Type host: *Oligoplites palometa* (Cuvier, 1833)

Other hosts: *O. saurus* (Bloch & Schneider, 1801) and *O. saliens* (Bloch, 1793)

Site of infestation: gills

Type locality: Itacuruçá, Baía de Sepetiba, RJ, Brazil

Prevalence: 45.2% on *O. palometa*, 48.6% on *O. saurus*, and 44.4% on *O. saliens*

Intensity of infestation: 137 on 39 *O. palometa*, 47 on 18 *O. saurus*, and 22 on 16 *O. saliens*

Mean intensity of infestation: 3.51 on *O. palometa*, 2.61 on *O. saurus*, and 1.38 on *O. saliens*

Etymology: the specific name *oligoplites* is given after the generic name of the hosts

Specimen examined: MPM No. 22817 - *M. chorinemi* (Yamaguti, 1953) Lebedev 1984

Specimens deposited: CHIOC No. 33.623a - holotype, CHIOC Nos 33.623b, 33.623c, 33624, 33.625 - paratypes; USNPC Nos 85411, 85412, 85413, 85414 - paratypes

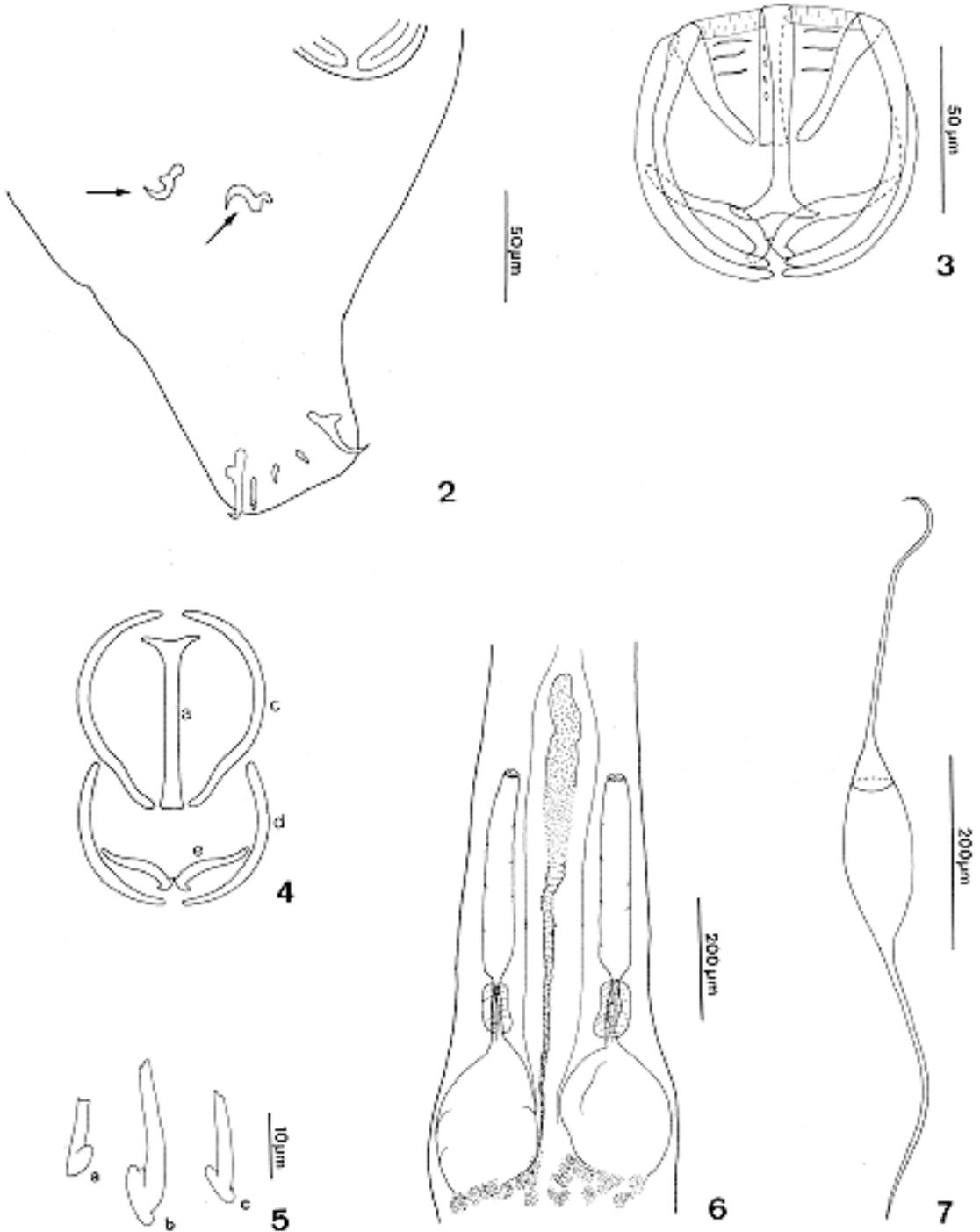
### Remarks

According to Lebedev (1986), *Metacamopia* Lebedev, 1972 has only two species: *M. indica* (Unnithan, 1962) and *M. chorinemi* (Yamaguti, 1953). *Metacamopia oligoplites* n. sp. differs from *M. indica* by: the shape of the body; the testes being pre-, para-, and post-germarial; the vaginas lacking sclerotized structures; the seminal receptacles being well developed; muscular sleeves around the constriction present between the vaginas and the seminal receptacles; and the asymmetric haptor, with a large heel-like area. It differs from *M. chorinemi* by: the esophagus being without diverticles; presence of a larger number of testes (26-55); and the vaginas lacking sclerotized structures.

*Metacamopia oligoplites* n. sp. is the only species in the genus without any kind of sclerotized



*Metacamopia oligoplites* n. sp. - Fig. 1: paratype, entire worm, ventral view.



*Metacamopia oligoplites* n. sp. - Fig. 2: posterior region of the haptor showing the extranumerary pair of “crochet en fléau” between the last clamp and the tip of the haptor (arrows). Fig. 3: clamp. Fig. 4: open clamp, diagramatic. Fig. 5: spines of the cirrus. Fig. 6: vaginal region, showing the vaginas, the muscular sleeves, the seminal receptacles, and the cirrus. Fig. 7: egg.

teeth-like structures in the various regions of the vaginas. Fig. 17 shows these sclerotized structures drawn from the holotype of *M. chorinemi* (MPM No. 22.817).

For *M. chorinemi*, Yamaguti (1953) did not mention the presence of muscular sleeves around the constriction between the vaginas and the seminal receptacles, as well as the presence of the

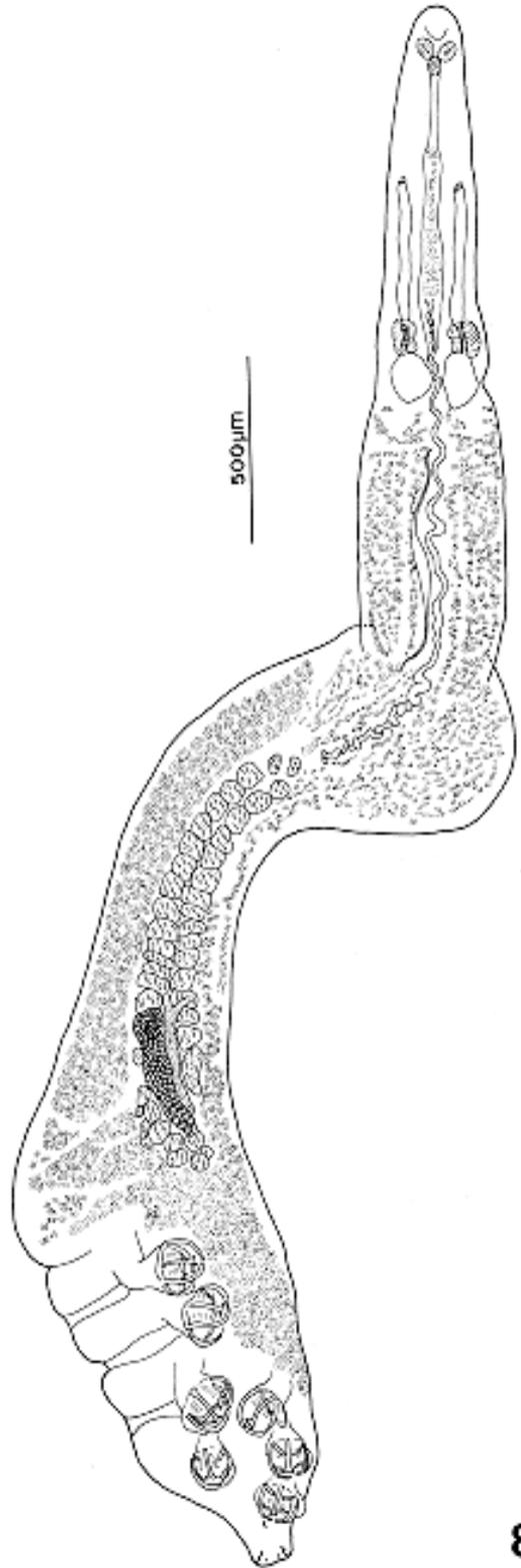
gastrocotylid-type of “crochet en fléau” located between the last clamp and the anchors. Unnithan (1962), also did not register these structures for *M. indica*. Thus it becomes necessary to emend the generic diagnosis of *Metacamopia*, given by Lebedev (1986), to include these structures.

*Metacamopia* Lebedev, 1972 emend.

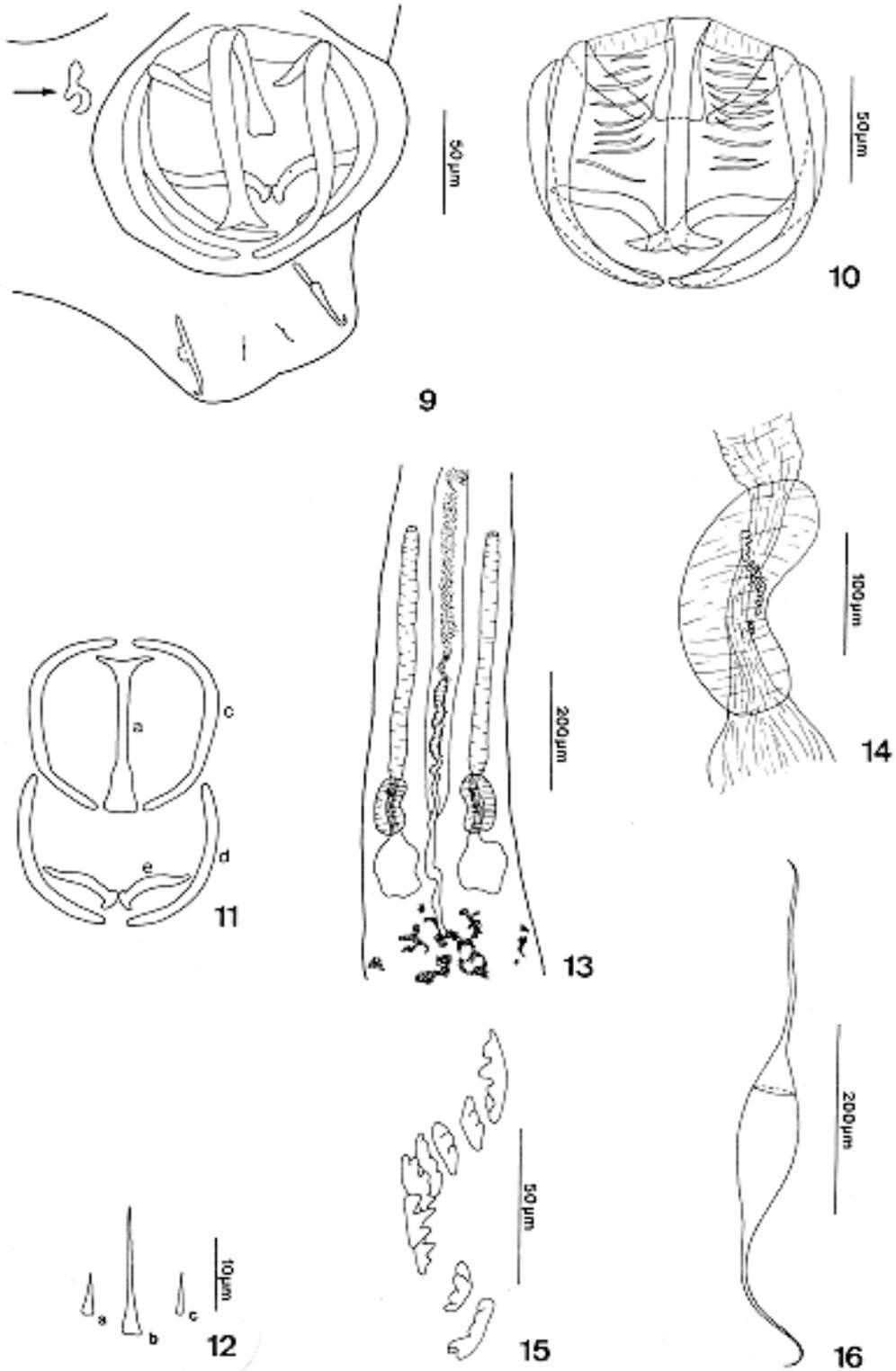
Body divided in three regions; vaginas with or without teeth-like sclerotized plates and a second group of finger-like sclerotized structures; testes pre-germarial, pre- and para-germarial, or pre-, para-, and post-germarial. Haptor with or without a heel-like area.

*Hargicola oligoplites* (Hargis, 1957)  
Lebedev, 1970  
(Figs 8 - 16)

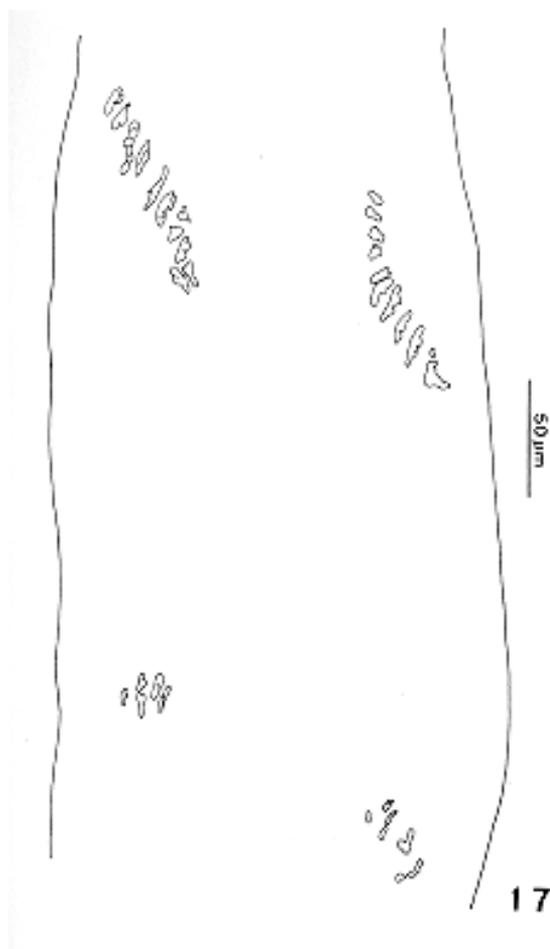
DESCRIPTION (based on 15 mounted specimens, seven measured): Allodiscocotyliidae, Camopiinae. Body elongate, amphitypic, asymmetric, with two distinct regions (Fig. 8), 375 - 597 (471) long; anterior region 145 - 296 (241) long, 36 - 53 (41) wide; posterior region with curvature not pronounced, 219 - 350 (260) long, 49 - 86 (71) wide. Haptor 82 - 123 (100) long, with seven clamps of same size, disposed along the longitudinal axis of the posterior region of the body, four in right margin; three in left margin, 11 - 14 (12) long, 12 - 15 (13) wide; one pair of anchors (Fig. 9), one pair of hook-like “crochet en fléau”, located between the anchors, and one pair of gastrocotylid-like “crochet en fléau” located between penultimate and last clamps. Clamps pedunculated, with pronounced, sclerotized ribs sitting on large muscular pads; each clamp (Figs 10, 11) with one pair of anterolateral sclerites (c), one pair of posterolateral sclerites (d), one anterior mid-sclerite (a), and one pair of accessory sclerites (e), perpendicular to the anterior mid-sclerite. Buccal organs hemispheric, 5 - 6 (5) long, 4 - 5 (4) wide. Anterior extremity rounded; mouth anterior, subventral; pharynx ovoid, 4 - 5 (5) long, 4 - 5 (4) wide; esophagus 17 - 31 (26) long; ceca long, with diverticulae, surrounded by vitellaria. Testes subovate, 33 - 42 (38) in number, 5 - 9 (7) in diameter, pre-, para-, and post-germarial; copulatory organ robust, tubular, 41 - 52 (48) long, lumen with many spines of different sizes in anterior and posterior regions (Figs 12a,b,c). Germarium 20 - 53 (37) long, intercecal; two vaginas with ventral vaginal pores, immediately posterior to genital atrium; vaginal ducts 31 - 55 (41) long, expanding in posterior region to form the seminal receptacles, after a constriction surrounded by strong muscular sleeves, muscular sleeves 45 - 82 (68.4) long (Figs 13, 14) with spiral



*Hargicola oligoplites* (Hargis 1957) Lebedev, 1970. Fig. 8: voucher specimen, entire worm, ventral view.



*Hargicola oligoplites* (Hargis 1957) Lebedev, 1970. Fig. 9: posterior region of the haptor showing the “crochet en fléau” lateral to the last clamp (arrow). Fig. 10: clamp. Fig. 11: open clamp, diagramatic. Fig. 12: spines of the cirrus. Fig. 13: vaginal region, showing the vaginas, seminal receptacles, muscular sleeves around the constriction between the vaginas and the seminal receptacles and the cirrus. Fig. 14: larger view of the, muscular sleeves around the constriction between the vaginas and the seminal receptacles, and teeth-like eslerotized plates. Fig. 15: teeth-like eslerotized plates. Fig. 16: egg.



*Metacampopia chorinemi* (Yamaguti 1953) Lebedev, 1984. Fig. 17: teeth-like sclerotized plates, in two groups; anterior groups in diagonal series and posterior groups forming two irregular bunches. Original drawing by the present authors using the holotype deposited in the Helminthological Collection of the Meguro Parasitological Museum No. 22.817.

series of teeth-like, sclerotized plates (Figs 14, 15); seminal receptacles 9 - 15 (11) long, 9 - 13 (11) wide; Mehlis' gland at base of ootype; vitellaria follicular, extending from just beyond seminal receptacles to middle haptor region; eggs fusiform, 19 long, 4 wide (measured in one specimen) with filament at each pole (Fig. 16).

#### Taxonomic summary

Synonym: *Vallisia oligoplites* Hargis, 1957

Hosts: *Oligoplites palometa* (Cuvier, 1833), *O. saurus* (Bloch & Schneider, 1801), and *O. saliens* (Bloch, 1793)

Site of infestation: gills

Locality: Itacuruçá, Baía de Sepetiba, RJ, Brazil

Prevalence: 21.4% on *O. palometa*, 29.7% on *O. saurus*, and 8.3% on *O. saliens*

Intensity of infestation: 60 on 18 *O. palometa*, 23

on 11 *O. saurus*, and 3 on 3 *O. saliens*

Mean intensity of infestation: 3.3 on *O. palometa*,

2.0 on *O. saurus*, and 1.0 on *O. saliens*

Specimens deposited: CHIOC Nos 33.626a, 33.626b, 33.626c, 33.626d - voucher specimens

#### Remarks

*Hargicola oligoplites*, described by Hargis (1957) as *Vallisia oligoplites* from *O. saurus* from Florida, USA, was also recorded on this same host at Veracruz, Mexico, by Bravo-Hollis (1989). This is the first record of *H. oligoplites* from the Brazilian coast. *Oligoplites palometa* and *O. saliens* are new host records.

Our specimens have sclerotized teeth-like plates in the muscular sleeves around the constriction between the vaginas and the seminal receptacles. Lebedev (1986) did not mention the presence of these plates, but presented as the main character for the genus the presence of seven clamps (3/4) in the haptor. Bravo-Hollis (1989) also did not comment on the presence of these sclerotized teeth-like plates, or any other sclerotized structures, in the specimens collected at Veracruz.

#### ACKNOWLEDGMENTS

To Dr José Lima de Figueiredo, Seção de Peixes, Museu de Zoologia, Universidade de São Paulo, for the identification of the fish hosts, to Dr Jun Araki, Meguro Parasitological Museum, Tokyo, Japan, for the kindness of loaning the holotype of *M. chorinemi*, and to Prof. Abner Chiquieri, Instituto de Ciências Humanas e Sociais, Universidade Federal Rural do Rio de Janeiro, for the invaluable discussions and suggestion on the specific name of the new species.

#### REFERENCES

- Amato JFR 1982a. Digenetic trematodes of percoid fishes of Florianópolis, southern Brasil - Bucephalidae. *Rev Bras Biol* 42: 667-680.
- Amato JFR 1982b. Digenetic trematodes of percoid fishes of Florianópolis, southern Brasil - Fellodistomidae, Monascidae, Diplangidae, Zoogonidae, and Waretrematidae, with description of two new species. *Rev Bras Biol* 42: 681-699.
- Amato JFR 1982c. Digenetic trematodes of percoid fishes of Florianópolis, southern Brasil - Monorchiidae, with description of two new species. *Rev Bras Biol* 42: 701-719.
- Amato JFR 1983a. Digenetic trematodes of percoid fishes of Florianópolis, southern Brasil - Acanthocolpidae. *Rev Bras Biol* 43: 65-72.
- Amato JFR 1983b. Digenetic trematodes of percoid fishes of Florianópolis, southern Brasil - Homalometridae, Lepocreadiidae, and Opecoelidae, with description of seven new species. *Rev Bras Biol* 43: 73-98.
- Amato JFR 1983c. Digenetic trematodes of percoid fishes of Florianópolis, southern Brasil -

- Pleorchiiidae, Didymozoidae, and Hemiuridae, with description of three new species. *Rev Bras Biol* 43: 99-124.
- Amato JFR, Boeger WA, Amato SB 1991. *Protocolos para Laboratório - Coleta e Processamento de Parasitos do Pescado*. Imprensa Universitária, Universidade Federal Rural do Rio de Janeiro, Seropédica, RJ, Brasil, 81 pp.
- Bravo-Hollis M 1989. Monogenea (van Beneden, 1858) Carus, 1863, de peces del Golfo de México y del Mar Caribe XII. Nuevas localidades de colecta de especies conocidas de gastrocotilidos. *An Inst Biol Univ Nac Autón México Ser Zool* 59: 1-14.
- Hargis Jr WJ 1957. Monogenetic trematodes of Gulf of Mexico fishes. Part XIII. The family Gastrocotylidae Price, 1943. (continued). *Trans Amer Microsc Soc* 76: 1-12.
- Lebedev BI 1972. The taxonomy of monogeneans of suborder Gastrocotylina. Investigation on the Fauna Systematics and Biochemistry of Helminths in the East. *Proc New Series Inst Biol and Ped far East Center Acad Sci USSR* 11: 121-145 (In Russian).
- Lebedev BI 1984. Parasites of plants and animals. In BL Mamaev, BA Dboritki, Erozenko. Academy of Sciences of the USSR, Institute of Biology and Edafology of Central Asia and Far East. Vladivostok, 108 pp. (In Russian).
- Lebedev BI 1986. *Monogenoidea of the suborder Gastrocotylina*. Leningrad: Izdatel'vo "Nauka", 200 pp. (In Russian).
- Margolis L, Esch G, Holmes JC, Kuris AM, Schad GA 1982. The use of ecological terms in Parasitology (report of an ad hoc committee of the American Society of Parasitologists). *J Parasitol* 68: 131-133.
- Menezes N, Figueiredo JL 1980. *Manual de Peixes Marinhos do Sudeste do Brasil IV. Teleostei 3*. Museu de Zoologia, Universidade de São Paulo, São Paulo, SP, 96 pp.
- Unnithan RV 1962. On the functional morphology of a new fauna of Monogenoidea on fishes from Trivandrum and environs. *Parasitology* 52: 315-351.
- Yamaguti S 1953. Parasitic worms mainly from Celebes. Part 2. Monogenetic trematodes of fishes. *Acta Med Okayama* 8: 203-256, 9 plates.