SCIENTIFIC COMMUNICATION

Didymozoidae (Digenea) parasites of Scombridae (Actinopterygii) from Rio de Janeiro coast, Brazil

Márcia Cristina Nascimento Justo[1] and Anna Kohn[2]

ABSTRACT: *Didymoproblema fusiforme* Ishii, 1935 and *Neodiplotrema pelamydis* (Yamaguti, 1938) from the gills and *Coeliodidymocystis kamegaii Yamaguti,1970* from pyloric caeca of *Katsuwonus pelamis* (Linnaus, 1758) and *Didymocystis orbitalis* Yamaguti, 1970, from periorbital connective and adipose tissues of *Thunnus obesus* (Lowe, 1839) *are studied. D. fusiforme, N. pelamydis and D. orbitalis* are reported for the first time in South America and *C. kamegaii* in Brazil; these four species already described from Pacific are now referred in Atlantic Ocean. Brief description with original measurements are presented.

Key Words: *Didymoproblema fusiforme, Neodiplotrema pelamydis, Coeliodidymocystis kamegaii, Didymocystis orbitalis, Didymozoidae*, Brazil.

Parasite fauna from scombrid fishes of economic interest from the coast of the State of Rio de Janeiro, Brazil, has been recently studied (FERNANDES, *et al.,* 2002; KOHN, *et al.,* 2001; KOHN, *et al.,* 2003; KOHN, *et al.,* 2004; MORAVEC, *et al.,* 1999). Digeneans of the family *Didymozoidae* are represented in South America by six species: *Brasicystis bennetti* Thatcher, 1979 *and Nematobothrium scombri* (Taschenberg 1879) in Brazil and Peru, *Didymocystis wedli* Ariola, 1902 and *Unitubulotestis sardae* (Maccallum & Maccallum , 1916) only in Brazil, *Paralichthytrema patagonicum* Szidat, 1960 in Ar-

[1] *Laboratório de Helmintos Parasitos de Peixes, Departamento de Helmintologia, Instituto Oswaldo Cruz, FIOCRUZ, Av. Brasil, 4365, 21045-900, Rio de Janeiro, RJ, Brazil.marciajusto@ioc.fiocruz.br*

[2]*Laboratório de Helmintos Parasitos de Peixes, Departamento de Helmintologia, Instituto Oswaldo Cruz, FIOCRUZ, Av. Brasil, 4365, 21045-900, Rio de Janeiro, RJ, Brazil; Research felow from Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq.annakohn@ioc.fiocruz.br*

gentina and *Coeliodidymocystis kamegaii* Yamaguti, 1970 in Chile. In this paper, *Neodiplotrema pelamydis* (Yamaguti, 1938), *Didymoproblema fusiforme* Ishii,1935 *and Didymocystis orbitalis* Yamaguti, 1970 are reported for the first time in South America and *Coeliodidymocystis kamegaii* Yamaguti, 1970 in Brazil. These four species already described from Pacific are now referred in Atlantic Ocean.

Specimens of *Katsuwonus pelamis* (Linnaeus, 1758) and *Thunnus obesus* (Lowe,1839) were obtained from industrial tuna fisheries and carried in large containers to the laboratory to be examined. The parasites released from dissected cysts were fixed in AFA (alcohol, formalin, acetic acid) under slight coverslip pressure, stained in alcoholic-acid carmine, dehydrated in alcohol series and mounted in Canada balsam. Measurements are in millimeters unless otherwise indicated. Material studied is deposited in the Helminthological Collection of the Instituto Oswaldo Cruz (CHIOC) in Rio de Janeiro, Brazil, with the following numbers: *D. fusiforme*: 36589-f, 36584 and 36585; *N. pelamydis*: 36586a-b; *C. kamegaii*; 36587a-b and *D. orbitalis*: 36588a-e.

Didymoproblema fusiforme Ishii, 1935

We found 34 specimens encysted in gills of three *K. pelamis* out of eight examined (prevalence 37.5%) with 2, 7 and 8 cysts respectively. The fusiform cysts containing paired worms were found attached longitudinally along the gill filament, as described by YAMAGUTI (1970). Considering that the morphology of this species was well described by ISHII (1935) and by YAMAGUTI (1970), we present only a brief description with the main measurements of slightly compressed adult worms.

Description and measurements based on 10 specimens: The elongated forebody projects from the middle part of the fusiform hindbody and measure 1.25-4.60 (2.10) long by 0.05-0.10 (0.078) wide. Oral sucker oval 45-57 µm (52µm) long by 30-42 µm (32 µm) wide; pharynx 32-37 µm (36 µm) long by 32-42 µm (37 µm) wide. Hindbody fusiform 3.10-5.40 (4.30) long by 0.40-0.70 (0.60) wide, with a slender caudal process 0.60-1.10 (0.70) long. Testes two, elongate, cylindrical, 30-40 µm in width; ovary elongate, winding, 32-55 µm (43 µm) in width; vitellarian tubules variable in number, 37-75 µm (53 µm) wide; eggs bean shaped 12-17 µm

(15 µm) long by 7-12 mm (9 µm) wide.

D. fusiforme was originally described by ISHII (1935) from *Thynnus orientalis* and *K. pelamis* from the Pacific coast of Japan. YAMAGUTI (1970) described it from *K. pelamis* from Hawaii. In a list of trematodes from Peru, the genus *Didymoproblema* was referred without morphological data (TANTALEÁN, *et al.,* 1992). The structure of our specimens conformed to the descriptions of *D. fusiforme* from the Pacific and the measurements are closer related to those given by YAMAGUTI (1970). This is the first report of *D. fusiforme* in South America and from the Atlantic Ocean.

Neodiplotrema pelamydis (Yamaguti, 1938) Yamaguti, 1938

Synonym: *Diplotrema pelamydis* Yamaguti, 1938.

One cyst with two parasites were attached to the gills of one out of 8 fishes examined. The two hermaphroditic individuals are of the same shape and size, fused at the posterior third of the hindbody. Considering that the species was very well described by YAMAGUTI (1938) and the morphology of our specimens corresponds to it, we present herein only the main data.

The filiform forebody 4.1- 5.8 in length by 0.12 to 0.20 wide is attached to the flat side of the hindbody just anterior to the middle of the latter. Hindbody 16 to 17 long by 1.4 to 1.5 wide in anterior part and 2.0 to 3.0 wide in posterior fused part. Mouth terminal leading to oral sucker by short cylindrical vestibule; oral sucker oval 50 µm to 62 µm long by 37 µm to 47 µm wide; pharynx globular 65 µm to 80 µm long by 37 µm to 70 µm wide. Esophagus sinuous, bifurcating into narrow caeca. Reproductive organs located in hindbody. Two elongated testes, sinuous, in anterior part of hindbody. Vas deferens opens near the oral sucker. Ovary tubular divided into several winding branches. Vitellaria tubular, branched, strongly convoluted. Uterus winding, extends back and forth through the length of the hindbody leaving the posterior extremity free; metraterm opens along with the vas deferens near the oral sucker slightly to the left of the median line; eggs small, 15 to 22 µm long by 10 to 15 µm wide.

YAMAGUTI (1938) proposed the new genus and species *Diplotrema pelamydis* from *K. pelamis* from the Pacific coast of Japan, characterized by two hermaphrodites individuals enclosed in a cyst being fused at the posterior part of the hindbody

as well as by the excretory vesicles being paired and united at the two ends. In the same year, YAMAGUTI changed the preoccupied *Diplotrema* Spencer, 1900 to *Neodiplotrema*. In 1970 YAMAGUTI described one more specimen from *K. pelamis* from Hawaii. This is the first report of this genus and species in South America and in the Atlantic Ocean.

Coeliodidymocystis kamegaii Yamaguti, 1970

On serosa of pyloric caeca of one specimen of *K. pelamis* out of 8 examined we found one thin-walled cyst with two similar worms, which agree with YAMAGUTI's description (1970) of C. *kamegaii* from Hawaii.

Body divided into a slender forebody and a large rounded hindbody flattened on the side on which the two worms are pressed against each other. Forebody cylindrical 4.1-4.2 long by 0.38-0.46 wide, with anterior extremity blunt-conical, attached to ventral surface of hindbody. Hindbody rounded, concave, 20-21 long by 12-15 in diameter. Oral sucker globular, small, 35 μm in diameter; esophagus very short, caeca parallel in forebody and divergent as they enter the hindbody running to posterior end. Pharynx absent. Two tubular testes irregularly winding located along the anterior edge of hindbody. Vas deferens running in median field of forebody alongside metraterm. Genital pore opens ventral to oral sucker. Ovarian tubules branched, confined to anterodorsal region of hindbody. Seminal receptacle present. Vitellarian tubules irregularly branched, extending along almost entire convex side of hindbody, not occupied by ovary. Uterine coils fill all available space of hindbody and form a conspicuous uterine reservoir; last portion differentiated into muscular metraterm. Eggs 12-20 μm (17 μm) long by 10-15 μm (12 μm) wide.

The genus *Coeliodidymocystis* is characterized by the habitat, body shape and distribution of the male and female reproductive organs and contains two species*: C. kamegaii* (type-species) parasite of the pyloric caeca of K. *pelamis* and *C. abdominalis* (Yamaguti, 1938) parasite of the body cavity of *K. pelamis*.

From the same host, *C. kamegaii* was also described from India, by MADHAVI (1982) and reported from Chile, by OLIVA (1984). In this opportunity, this species is referred for the first time in Brazil and in the Atlantic Ocean.

Didymocystis orbitalis Yamaguti, 1970

Three cysts with two identical parasites in each one, were found in periorbital connective and adipose tissues of one *T. obesus* out of 13 examined.

Description and measurements (with means in parentheses) based on 5 specimens

The subcylindrical forebody 1.0-1.4 (1.2) in length by 0.30-0.40 (0.36) wide is attached to ventral furrow of hindbody in anterior end. Hindbody 6.2-7.8 (6.8) long by 3.0-4.8 (4.0) wide, two-lobed in front and curved posteriorly with longitudinal ventral furrow . Oral sucker pyriform 32.5 - 50 µm (31µm) long by 25 - 40µm (31.5µm) wide followed by globular pharynx 40 - 70µm (50.5µm) long by 32.5 - 47.5µm (38µm) wide. Esophagus straight and narrow, 0.30 – 0.52 (0.40) long, bifurcating in two caeca straight in forebody and sinuous and sometimes inflated in hindbody, reaching to near posterior region. Reproductive organs located in hindbody. Testes tubular, extending along dorsolateral margins of hindbody, measuring 2.5 - 4.0 (3.1) long by 0.07 - 0.25 (0.10) wide. Vas deferens running alongside metraterm. Common genital pore ventral at level of oral sucker or pharynx. Ovary with 3 to 4 main branches which extend, in ventro-lateral fields, as far back as posterior extremity. Seminal receptacle 0.22 long by 0.16 wide in one specimen. Melih's gland present. Vitellaria with 10-12 terminal branches. Uterus coiled occupying all available space of hindbody, leading into elongate median egg reservoir. Metraterm muscular, swollen and winding as it enters the forebody, in which it is moderately muscular as far forward as the intestinal bifurcation; anterior to this point the metraterm present delicate walls. Eggs bean-shaped measuring 15 - 17.5 µm (16µm) long by 7.5 – 12.5 µm (10µm) wide.

This species was characterized by the peculiar location in host and rather irregular branching of the ovary and vitelline gland. In 1989, POZDNYAKOV redescribed it from *Pterolamiops longimanus*, a pelagic shark from the Pacific. In 1993, the same author erected the genus *Didymosulcus* to all *Didymocystis* species with a median groove on the posterior section on the body, including *D. orbitalis*. MURUGESH & MADHAVI (1995) did not consider the presence of the median groove as a valid generic character and considered *Didymosulcus* synonym of

Didymocystis, which opinion we accept. The structure of our specimens agrees with previous descriptions (YAMAGUTI, 1970; POZDNYAKOV, 1989) differing only in the larger hindbody (6.2 - 7.8 x 3.0 – 4.8) comparing with the original description (2.9 – 5.9 x 1.7 – 3.2) but similar to Pozdnyakov's material (4.9 –7.4 x 3.0 – 4.5). *Didymocystis orbitalis* is now referred for the first time in the Atlantic Ocean and in South America.

BIBLIOGRAPHIC REFERENCES

FERNANDES, B. M. M., KOHN A. & SANTOS A. L. 2002 Some Digenea parasites of tunny from the coast of Rio de Janeiro State, Brazil. **Braz Jour of Biol** 62(3): 453-457.

ISHII, N. 1935. Studies on the Family *Didymozoidae* (Monticelli, 1888). **Japan Jour of Zool** 6:279-335.

KOHN, A.; BAPTISTA-FARIAS M.F.; SANTOS A.L. & GIBSON D.I. 2004. A new species of *Nasicola* Yamaguti, 1968 (Monogenea:Capsalidae) from the nasal cavities of *Thunnus obesus* and a redescription of *N. klawei* (Stunkard, 1962) from *T. albacares* off Brazil. **Syst Parasitol** 57, 51-58.

KOHN A.; SANTOS A. L & BAPTISTA-FARIAS M. F. 2001. Report of *Didymocystis wedli* Ariola, 1902 (Digenea; Didymozoidae) from *Thunnus albacares* in Brazil. **Mem Inst Oswaldo Cruz** 96, 951-954.

KOHN A.; SANTOS A. L & COHEN S. C. 2003. Report of two parasites from Brazilian tunas. **Arq de Ciências do Mar** 36, 19-22.

MADHAVI R. 1982. Didymozoid trematodes from marine fishes of the Waltair coast, Bay of Bengal. **Syst Parasitol** 4(2):99-124.

MORAVEC F.; KOHN A & SANTOS A. L 1999. New data on *Oncophora melanocephala* (Nematoda: Camallanidae), a little-known parasite on scombrid fishes. **Parasite** 6(1):79-84.

MURUGESH, M. & MADHAVI, R. 1995. Some new and known species of the genus *Didymocystis* Ariola, 1902 (Trematoda: Didymozoidae) from Scombrid fishes of the Visakhapatnam coast, Bay of Bengal. **Syst Parasitol**. 31(1):11-24.

OLIVA, M. 1984. Nuevos registros de trematodos digeneos en peces marinos de la zona de Antofagasta. **Cienc Tecnol del Mar** 8: 9-15.

POZDNYAKOV, S.E. 1989. Occurrence of didymozoids in pelagic sharks in the Pacific Ocean. **Parazitologiya** 23(2): 529-532.

POZDNYAKOV, S.E. 1993. Classification of trematodes of suborder Didymozoata. ***Parazitologiya*** 27(6)415-425.

TANTALÉAN M. V.; SARMIENTO,L. B & HUIZA, A. F. 1992. Digeneos (Trematoda) del Perú. **Bol de Lima** 80:47-84.

YAMAGUTI S. 1938. **Studies on the helminthes fauna of Japan, Part 21. Trematodes of fishes, *IV***. Kyoto: S, Yamaguti +139 p.

YAMAGUTI S. 1970. **The digenetic trematodes from Hawaiian fishes**. Tokyo, Keigaku. Publishing Company + 434 p.

Recebido: 17/01/05
Aceito: 13/07/05