***Monostephanostomum nolani* sp. n. and *M. krusei* Reimer, 1983 (Digenea: Acanthocolpidae) from carangid fishes from coral reef waters off Australia**

Rodney A. Bray¹ and Thomas H. Cribb²

¹Department of Zoology, Natural History Museum, Cromwell Road, London SW7 5BD, UK;

²Centre for Marine Studies and Department of Microbiology and Parasitology, The University of Queensland, Brisbane, Queensland 4072, Australia

Key words: Digenea, Acanthocolpidae, *Monostephanostomum nolani*, *Monostephanostomum krusei*, *Carangoides plagiotaenia*, *Pseudocaranx dentex*, Great Barrier Reef, Lizard Island, Ningaloo Reef, Western Australia

Abstract. *Monostephanostomum nolani* sp. n. is described from *Carangoides plagiotaenia* Bleeker, off Lizard Island, Great Barrier Reef, Queensland, Australia. It differs from all other species in the genus except *M. manteri* Kruse, 1979 in that the vitellarium reaches into the forebody. It differs from *M. manteri* in the ventral hiatus in the circum-oral spine row, the extent of the vitellarium in the forebody, where it is not confluent, its elongate pharynx and its smaller eggs. *Monostephanostomum krusei* Reimer, 1983 is redescribed from *Pseudocaranx dentex* (Bloch et Schneider) from Ningaloo Reef off Western Australia. It is considered similar to *M. nolani*, differing in the vitellarium being restricted to the hindbody, but sharing with *M. nolani* an unusual arrangement of small body-spines on the antero-ventral surface. It is also morphologically very similar to *Monostephanostomum roytmani* (Parukhin, 1974), which apparently lacks the diminutive antero-ventral body-spines. A key to eight recognized species in the genus is presented.

Monostephanostomum Kruse, 1979 was reviewed by Bray and Cribb (2002) who recognized four valid species, *M. manteri* Kruse, 1979, *M. georgianum* Bray et Cribb, 2002, *M. gazzae* (Shen, 1990) and *M. mesospinosum* (Madhavi, 1976). Saoud et al. (2002) recognized six species, *M. manteri*, *M. krusei* Reimer, 1983, *M. yamagutii* Ramadan, 1984, *M. roytmani* (Parukhin, 1974), *M. mesospinosum* and *M. loossi* (Pandey et Tewari, 1983). In this contribution we describe a new species and redescribe a species originally described in *Monostephanostomum*, but which Bray and Cribb (2002) considered a doubtful member of the genus.

MATERIALS AND METHODS

Digeneans collected from freshly killed fish were fixed by being pipetted into nearly boiling saline and immediately preserved in 10% buffered formalin or 70% ethanol. Whole-mounts were stained with Mayer's paracarmine, cleared in beechwood creosote and mounted in Canada balsam. Measurements were made through a drawing tube on an Olympus BH-2 microscope, using a Digicad Plus digitising tablet and Carl Zeiss KS100 software adapted by Imaging Associates, and are quoted in micrometres, with the range and the mean in parentheses (Table 1). Circum-oral spines counts were made with the counting function of the digitiser.

The following abbreviations are used: BMNH, the British Museum (Natural History) Collection at the Natural History Museum, London, UK; QM, Queensland Museum Collection, Brisbane, Australia.

RESULTS

Family Acanthocolpidae Lühe, 1910

Genus *Monostephanostomum* Kruse, 1979

Monostephanostomum nolani sp. n. Figs. 1–3, 7–9

Description (based on 20 whole-mount preparations). Measurements and ratios of 13 specimens in Table 1. Body elongate, narrow, widest in region of testes (Fig. 1). Tegument spinous; unarmed patch immediately posterior to oral sucker; individual worms may have blunt (Fig. 7) or sharp (Figs. 8–9) spines, but not both; spines vary in size; spines long in dorsal and lateral fields, on antero-ventral surface spines much smaller or difficult to distinguish, may be in distinct transverse rows of about 4 or 5 spines (Fig. 7), gradually increase in size posteriorly until at about mid-forebody ventral spines are of similar size to lateral spines, sharp spines reach about 90 µm long, blunt ones reach about 35 µm, small ventral spines may be as small as 12 µm long; spines smaller and becoming sparse in hindbody, reach to level of gonads or to posterior extremity. Eye-spot pigment granules scattered at level of mid-prepharynx. Oral sucker terminal, aperture anteriorly directed, distinctly wider than long. Circum-oral spines sharp or blunt, in single ring, with distinct ventral hiatus; spines decrease in size markedly towards ventral median line (Fig. 2). Ventral sucker oval, virtually equatorial.

Figs. 1–3. *Monostephanostomum nolani* sp. n. **Fig. 1.** Ventral view of holotype. **Fig. 2.** Anterior extremity. **Fig. 3.** Cirrus-sac, ventral sucker in outline. Scale bars: Fig. 1 = 1 mm; Figs. 2, 3 = 200 μ m.

Prepharynx very long. Pharynx elongate-oval. Oesophagus distinct. Intestinal bifurcation in posterior forebody. Caeca long, narrow, form uoproct.

Testes 2, oval, entire, tandem, contiguous. Post-testicular region short. Cirrus-sac elongate, coiled (Fig. 3), reaches well into hindbody, sometimes to ovary; anterior extremity dorsal to ventral sucker. Seminal vesicle saccular, oval, undivided, may be recurved anteriorly. Junction between pars prostatica and ejaculatory duct indistinct. In some specimens ejaculatory duct can be distinguished by weakly defined circles on wall of duct and in these cases pars prostatica can be taken as that part of male duct between this region and seminal receptacle. Ejaculatory duct with short, naked region distally. Genital atrium short, never reaching into hindbody. Genital pore median, slit-like, immediately anterior to ventral sucker.

Ovary oval, entire, antero-lateral to and contiguous with anterior testis. Mehlis' gland antero-dorsal to ovary. Laurer's canal not detected. Uterine seminal receptacle in proximal uterus. Uterus pre-ovarian, narrow, thick-walled throughout, with no clear transition to metraterm; small circles may be seen on wall of uterus/metraterm from midway between ovary and ventral sucker. Eggs large, thin-walled, tanned, operculate. Vitellarium follicular; fields reach slightly into forebody or occasionally to level of anterior part of ventral sucker; fields ventral and dorsal to caeca, confluent dorsally to posterior part of uterus, encroach slightly over dorsal surface of gonads, confluent dorsally and ventrally in post-testicular region.

Excretory pore terminal. Vesicle I-shaped, reaches to posterior edge of posterior testis.

Table 1. Measurements in μm , counts or ratios of *Monostephanostomum* spp.

Measurement, count or ratio descriptor	Measurement, count or ratio	
	Species Host n	Measurement, count or ratio <i>Monostephanostomum nolani</i> sp. n. <i>Carangoides plagiotaenia</i> 13 <i>Monostephanostomum krusei</i> <i>Pseudocaranx dentex</i> 3
Overall dimensions		2,072–2,963 $\times$ 293–437 (2,602 $\times$ 343) 2,504–2,708 $\times$ 273–295 (2,596 $\times$ 287)
Width as % of length		10.3–17.0 (13.3) 10.6–11.5 (11.1)
Body-spines length: anterior mid-ventral		12–13 14–17
Body-spines length: longest		35–90 39–41
Oral sucker		43–102 $\times$ 81–134 (76 $\times$ 109) 51–64 $\times$ 115–126 (58 $\times$ 120)
Oral sucker length as % of body-length		2.00–4.6 (3.0) 2.0–2.5 (2.2)
Circum-oral spine counts		17–20 (17.9) 17
Circum-oral spines: ventral		20–50 (31) 27–31 (28)
Circum-oral spines: dorsal		30–70 (44) 46–56 (52)
Ventral sucker (VS)		121–215 $\times$ 126–187 (160 $\times$ 159) 115–138 $\times$ 120–132 (124 $\times$ 127)
VS length as % of body-length		5.0–8.4 (6.2) 4.4–5.5 (4.8)
Sucker-length ratio		1:1.6–3.1 (2.2) 1:1.8–2.7 (2.2)
Sucker-width ratio		1:1.2–1.9 (1.5) 1:1.0–1.2 (1.1)
Forebody length		724–1,302 (1,075) 898–1,199 (1,048)
Forebody as % of body-length		32.4–48.6 (41.3) 35.9–44.3 (40.3)
Hindbody length		935–1,605 (1,366) 1,389–1,468 (1,423)
Hindbody as % of body-length		45.1–60.5 (52.5) 51.3–58.6 (54.9)
Prepharynx length		389–921 (701) 549–808 (668)
Prepharynx length as % of body-length		17.4–35.2 (26.9) 21.9–29.8 (25.6)
Pharynx		101–253 $\times$ 55–79 (179 $\times$ 68) 152–168 $\times$ 74–87 (161 $\times$ 80)
Pharynx length as % of body-length		4.7–9.9 (6.9) 6.1–6.3 (6.2)
Oesophagus length		21–103 (72) 65–93 (78)
Intestinal bifurcation to ventral sucker		0–101 (53) 59–93 (75)
Anterior testis		203–310 $\times$ 153–236 (266 $\times$ 207) 190–212 $\times$ 164–168 (200 $\times$ 167)
Anterior testis as % of body-length		9.2–12.5 (10.3) 7.0–8.5 (7.7)
Posterior testis		271–386 $\times$ 169–242 (330 $\times$ 208) 229–237 $\times$ 171–191 (234 $\times$ 178)
Posterior testis as % of body-length		11.1–15.0 (12.8) 8.8–9.4 (9.0)
Distance between testes (DBT)		0 in 12 worms, 13 in 1 worm 0
DBT as % of body-length		0 in 12 worms, 0.5 in 1 worm 0
Post-testicular region (PTR)		150–307 (221) 247–299 (269)
PTR as % of body-length		6.7–11.1 (8.5) 9.7–11.6 (10.4)
Cirrus-sac (CS)		660–1,006 $\times$ 64–105 (857 $\times$ 87) 726–945 $\times$ 70–75 (857 $\times$ 73)
Cirrus-sac length as % of body-length		26.2–34.9 (31.6) 28.2–37.7 (33.0)
Distance from anterior end of CS to VS		Anterior end of CS always dorsal to VS Anterior end of CS always dorsal to VS
Distance from posterior end of CS to VS		252–472 (392) 394–472 (442)
Above dimension as % of VS to Ovary		83.3–100.1 (93.9) 67.1–79.4 (74.2)
Internal male duct length		867–1,265 (992) 1,211–1,263 (1,237)
Seminal vesicle length (SV)		299–487 (378) 289–332 (311)
SV as % of internal male duct		32.2–44.6 (38.0) 23.8–26.3 (25.1)
Pars prostatica length (PP)		118–481 (223) 247–360 (303)
PP as % of internal male duct		13.6–51.2 (22.5) 19.5–29.7 (24.6)
Ejaculatory duct length (EJ)		142–507 (391) 562–684 (623)
EJ as % of internal male duct		15.1–52.9 (39.5) 46.4–54.1 (50.3)
Genital atrium length		20–29 (23) 22–28 (25)
Ovary		85–142 $\times$ 93–141 (123 $\times$ 111) 92–104 $\times$ 97–116 (98 $\times$ 106)
Ovary length as % of body length		4.1–5.4 (4.7) 3.6–4.0 (3.8)
Ovary to ventral sucker (Ov-VS)		273–566 (419) 587–603 (595)
Ov-VS as % of body-length		12.0–19.2 (16.1) 22.3–23.8 (23.0)
Eggs		52–62 $\times$ 30–40 (56 $\times$ 34) 62–64 $\times$ 39–44 (63 v 41)
Anterior limit of vitellarium to VS		0–95 (35) anterior 94–161 (130) posterior

Type host: *Carangoides plagiotaenia* Bleeker, Carangidae; barcheck trevally.

Site: Intestine.

Type locality: Lizard Island, Queensland, Australia (14°40'S, 145°28'E) (May, 2004 and June, 2005).

Prevalence: 3 of 3 (100%).

Intensity: 2–3.

Deposition of specimens: holotype QM G223043, paratypes QM G223044–223054, BMNH 2006.11.2.1–8.

Etymology: This species is named for our colleague, Dr. Matt Nolan, in recognition of his expertise in collecting the hosts and his work on marine fish sanguinicolids.

Monostephanostomum krusei Reimer, 1983

Figs. 4–6, 10

Description (based on 3 whole-mount preparations). Measurements and ratios in Table 1. Body elongate, narrow, widest in region of testes (Fig. 4). Tegument spinous; unarmed patch immediately posterior to oral sucker; spines blunt, long in dorsal and lateral fields, on anterior ventral surface spines much smaller in distinct transverse rows of about 4 spines (Fig. 10), gradually increase in size posteriorly until at about mid-forebody ventral spines are of similar size to lateral spines; spines smaller in hindbody, becoming sparse, reach posterior extremity. Eye-spot pigment granules scattered at level of mid-prepharynx. Oral sucker terminal, distinctly wider than long. Circum-oral spines blunt, in single ring, with distinct ventral hiatus; spines decrease in size markedly towards ventral median line (Fig. 5). Ventral sucker oval, just pre-equatorial. Prepharynx very long. Pharynx elongate-oval. Oesophagus distinct. Intestinal bifurcation in posterior forebody. Caeca long, narrow, form uroproct.

Testes 2, oval, entire, tandem, contiguous, in one case slightly separated. Post-testicular region short. Cirrus-sac elongate, coiled (Fig. 6), reaches well into hindbody, but not to ovary; anterior extremity dorsal to ventral sucker or just anterior. Seminal vesicle saccular, oval, undivided. Pars prostatica relatively short, deeply convoluted. Ejaculatory duct long, complexly coiled, with 'cupolas' seen as distinct circles on wall of duct; short naked region distally. Genital atrium small. Genital pore median, slit-like, immediately anterior to ventral sucker.

Ovary oval, entire, antero-lateral to and contiguous with anterior testis. Mehlis' gland antero-dorsal to ovary. Laurer's canal opens dorsally to ovary. Uterine seminal receptacle in proximal uterus. Uterus pre-ovarian. Eggs large, thin-walled, tanned, operculate. Vitellarium follicular; fields reach to about mid-level of cirrus-sac in hindbody, ventral and dorsal to caeca, confluent dorsally to posterior part of uterus, encroach over dorsal surface of gonads, confluent dorsally and ventrally in post-testicular region.

Excretory pore terminal. Vesicle I-shaped, reaches to posterior edge of posterior testis; no evidence of vesicle further anteriorly.

Host: *Pseudocaranx dentex* (Bloch et Schneider), Carangidae; white trevally.

Site: Intestine.

Locality: Ningaloo, Western Australia (22°42'S, 113°40'E) (April, 2000).

Prevalence: 1/1.

Intensity: 3.

Deposition of specimens: QM G223055–223056, BMNH 2006.11.2.9.

Remarks

These two species are similar but are readily distinguishable by the anterior extent of the vitellarium.

On worms mounted dorso-ventrally it is inevitable that some lateral oral spines lie on top of each other and are difficult to distinguish. This may be more of a problem with *Monostephanostomum*, where there is a single row of spines, than with *Stephanostomum* Looss, 1899, where the two rows are staggered.

Monostephanostomum nolani

Utilizing the key in Bray and Cribb (2002) this worm, with the vitellarium reaching into the forebody, would be identified as *Monostephanostomum manteri* Kruse, 1979, known from species of the arripid perciform genus *Arripis* in the waters of southern and southwestern Australia (Kruse 1979, Bray and Cribb 2002). This key only included four species and it appears that there may well be more to be taken into consideration. Bray and Cribb (2002) suggested that *M. krusei* Reimer, 1983, from the carangid the bludger *Carangoides gymnotethus* (Cuvier) [syn. *Caranx gymnotethoides* (Bleeker)] from off Mozambique (Reimer 1983), is a lepecreadiid as it was apparently illustrated with an external seminal vesicle. In view of the similarity of this worm with *M. nolani* and our observations discussed below, we have reconsidered this view and think that it was originally correctly designated as a species of *Monostephanostomum*. Reimer (1983) compared his species with *Stephanostomum roymani* Parukhin, 1974 from the carangid, the bigeye trevally *Caranx sexfasciatus* Quoy et Gaimard in the Gulf of Mannar, Indian Ocean (Parukhin 1974, 1976), which he considered likely to be a species of *Monostephanostomum*, although he did not form a new combination. These two parasites are very similar and should be compared with *M. nolani*. Saoud et al. (2002) discussed the distinction of the genera *Monostephanostomum* and *Stephanostomum* Looss, 1899, coming to similar conclusions as Bray and Cribb (2002), but added a further species to the genus in the form of *M. loossi* (Pandey et Tewari, 1984) from the scombrid *Euthynnus* sp. off Bombay, India (Pandey and Tewari 1984). They also formed the

Figs. 4–6. *Monostephanostomum krusei* Reimer, 1983. **Fig. 4.** Ventral view of holotype. **Fig. 5.** Anterior extremity. **Fig. 6.** Cirrus-sac, ventral sucker in outline. Scale bars: Fig. 4 = 1 mm; Figs. 5, 6 = 200 μ m.

combination *M. roytmani*. They recognized the validity of *M. yamagutii* Ramadan, 1984, in contrast to Bray and Cribb (2002), who thought it was probably a species of *Stephanostomum*. We have not changed our opinion on this species.

Monostephanostomum nolani can be distinguished from all species of the genus, apart from *M. manteri* by its vitelline extension into the forebody. It is distinguished from that species by the ventral hiatus in the

circum-oral spine row, by its vitellarium, which only just reaches into the forebody, where it is not confluent, by the elongate pharynx and by its smaller eggs.

Monostephanostomum krusei and *M. roytmani* are similar in many features, including the ventral hiatus in the circum-oral spine row, the elongate pharynx, the long forebody and the carangid hosts, but in both of these species the vitellarium is restricted to the hind-body, reaching to about the mid-level of the cirrus-sac,

and the cirrus-sac appears rather smaller. The unusual arrangement and size of the antero-ventral body spines has been described only in *M. nolani*. It is clear, however, that there is a group of similar forms from Indo-Pacific carangids.

The original illustration of *Monostephanostomum loossi* (see Pandey and Tewari 1984) shows that it is generally similar to *M. krusei* and *M. roytmani*, but it is said to have 32 circum-oral spines. It also differs from *M. nolani* in its vitelline distribution.

Monostephanostomum mesospinosum was described from the carangid the Malabar trevally *Carangoides malabaricus* (Bloch et Schneider) in the Bay of Bengal (Madhavi 1976). Although reported from the same genus of hosts as *M. nolani* it is easily distinguishable, being elongate, with the vitellarium restricted to the hindbody and interrupted at the level of the gonads.

As far as we are aware this is the first report of a digenean from *Carangoides plagiotaenia*.

Monostephanostomum krusei

We are identifying this form from *Pseudocaranx dentex* with the species described by Reimer (1983) as *M. krusei* from *Carangoides gymnostethus*, off Mozambique (see above). This species was originally described, from one adult and one juvenile, as having 18 circum-oral spines. The particular and striking arrangement of body-spines on the anterior mid-ventral region was not described by Reimer (1983), but the illustration shows the large body spines overlapping onto, but not reaching across, the ventral surface, as they do in our specimens. It is worthy of note that Reimer only illustrates the lateral spines in the other acanthocolpids described in this paper.

Our specimens should also be compared with *M. roytmani* (Parukhin, 1974) (Parukhin 1974). Reimer (1983) distinguished this species from *M. krusei* based on the circum-oral spine number (20) and the apparent lack of a uroproct in the illustration. At present, we agree that the species may be retained as distinct, as Parukhin (1974) illustrated large body spines across the antero-ventral surface of the worm and he stated that a typical feature of the worm is the presence of densely packed very large spines on the anterior part of the body. He described the caeca as reaching to the posterior end of the body, but does not mention a uroproct. These two characters, especially the body-spines, are used here to sustain the distinctness of *M. krusei* and *M. roytmani*. Due to the inconsistency of circum-oral spine counts, we do not think that the spine number is a sufficient distinguishing feature for these species.

Having added a further species to the genus and recognising two further likely species, we feel it is appropriate to update the key to the species.

Key to species of *Monostephanostomum*

- 1 Vitellarium reaches into forebody, occasionally to anterior margin of ventral sucker 2
 - Vitellarium restricted to hindbody 3
- 2 Vitellarium confluent in forebody; pharynx oval, circum-oral spine row continuous; eggs 63–91 μ m long *M. manteri* Kruse, 1979
 - Vitellarium not confluent in forebody; pharynx elongate; circum-oral spine row with ventral hiatus; eggs 52–58 μ m long *M. nolani* sp. n.
- 3 Body elongate; gonads distinctly separated; vitelline fields interrupted at level of gonads 4
 - Body claviform; gonads contiguous or nearly so; vitelline fields continuous 6
- 4 Circum-oral spines in single uninterrupted row 5
 - Circum-oral spines with short second row of spines dorsally *M. georgianum* Bray et Cribb, 2002
- 5 Circum-oral spines 23; sucker ratio 1:2.0–2.5 *M. gazzae* (Shen, 1990)
 - Circum-oral spines 18; sucker ratio 1:1.2–1.4. *M. mesospinosum* (Madhavi, 1976)
- 6 Circum-oral spines 32 *M. loossi* (Pandey et Tewari, 1984)
 - Circum-oral spines 17–20 7
- 7 Body-spines on antero-ventral surface small, in distinct transverse rows; uroproct present *M. krusei* Reimer, 1983
 - Body spines on anterior part of body very large; uroproct not reported *M. roytmani* (Parukhin, 1974)

Conclusions

Monostephanostomum is characterized by a single row of circum-oral spines, a condition which contrasts with the two rows of *Stephanostomum* Looss, 1899 and *Manteria* Caballero, 1950 and the three to five rows of *Stephanostomoides* Mamaev et Oshmarin, 1966 (Bray 2005). Reimer (1983) also suggested that the relatively small number of spines, a distinct, narrow neck devoid of spines just posterior to the oral sucker, the uroproct and the ventral sucker in about the middle of the body constitute characters of the genus. All but the last remain valid after more recent studies by Bray and Cribb (2002) and Saoud et al. (2002) added the species *M. mesospinosum*, *M. gazzae* and *M. georgianum*. In all these species the forebody is relatively short. Most of the species of *Monostephanostomum* have 14–23 circum-oral spines; the exception is *M. loossi* with 32. In view of this we have examined the list of *Stephanostomum* species in the appendix to Bray and Cribb (2003) to see whether there are any other likely candidates for a move to *Monostephanostomum*, but found that all the species within this range had already been

Figs. 7–9. *Monostephanostomum nolani* sp. n. **Fig. 7.** Anterior extremity, ventral view, showing usual arrangement of circum-oral and body spines. **Fig. 8.** Anterior extremity, ventral view, showing unusual arrangement of large sharp spines. **Fig. 9.** Anterior extremity, dorsal view, showing unusual arrangement of large sharp spines. **Fig. 10.** *Monostephanostomum krusei* Reimer, 1983. Anterior extremity, ventral view, showing arrangement of circum-oral and body spines. Scale bars = 100 μ m.

transferred. The only possible candidate is *S. interruptum* Sparks et Thatcher, 1958 with 22–23 spines in a double dorsal row and a single ventral row. This species was considered to fall between the genera *Stephanostomum* and *Monostephanostomum* by Bray and Cribb (2002).

Our knowledge of the genus is still fragmentary, but a pattern of host-specificity is emerging. Although it was originally described from members of the genus *Arripis* (a genus and, indeed family, endemic to the waters off southern Australia and New Zealand), many of

the species assigned to the genus since are parasites of members of the family Carangidae. *Monostephanostomum* appears restricted to the Indo-West Pacific Region.

Acknowledgements. We are grateful to Drs. Rob Adlard and Matt Nolan for assistance with the collection. This study has been supported by the Australian Research Council. Thanks are due to Drs. Boyko Georgiev and Andrea Waeschenbach for translation of Russian and German texts, respectively. David Gibson kindly read the manuscript.

REFERENCES

- BRAY R.A. 2005: Family Acanthocolpidae Lühe, 1906. In: A. Jones, R.A. Bray and D.I. Gibson (Eds.), Keys to the Trematoda. Volume 2. CABI Publishing and the Natural History Museum, Wallingford, pp. 603–619.
- BRAY R.A., CRIBB T.H. 2002: *Monostephanostomum georgianum* n. sp. (Digenea: Acanthocolpidae) from *Arripis georgianus* (Valenciennes) (Perciformes: Arripidae) off Kangaroo Island, South Australia, with comments on *Monostephanostomum* Kruse, 1979 and *Stephanostomum* Looss, 1899. Syst. Parasitol. 53: 61–68.
- BRAY R.A., CRIBB T.H. 2003: Species of *Stephanostomum* Looss, 1899 (Digenea: Acanthocolpidae) from fishes of Australian and South Pacific waters, including five new species. Syst. Parasitol. 55: 159–197.
- KRUSE G.O.W. 1979: Trematodes of marine fishes from South Australia. 6. *Monostephanostomum manteri* gen. et sp. n. (Acanthocolpidae). J. Parasitol. 65: 921–923.
- MADHAVI R. 1976: Digenetic trematodes from marine fishes of Waltair Coast, Bay of Bengal. Family Acanthocolpidae. Riv. Parassitol. 37: 115–128.
- PANDEY K.C., TEWARI S.K. 1984: On three new digenetic trematodes from marine fishes of Bombay coast, India. J. Zool. Soc. India 35: 60–65.
- PARUKHIN A.M. 1974: Some new trematode species of the family Acanthocolpidae Lühe, 1909 from fishes of the Red Sea and Indian Ocean. Izv. Tikhook. Nauchn.-Issled. Inst. Ryb. Khoz. Okeanog. (TINRO) 88: 110–116. (In Russian.)
- PARUKHIN A.M. 1976: [Parasitic worms of food fishes of the southern Seas]. Naukova Dumka, Kiev, 183 pp. (In Russian.)
- REIMER L.W. 1983: Acanthocolpidae (Digenea) aus Fischen der Küste von Moçambique. Angew. Parasitol. 24: 134–146.
- SAOUD M.F.A., NAHHAS F.M., AL KUWARI K.S.R., RAMADAN M.M. 2002: Helminth parasites of fishes from the Arabian Gulf: 10. Trematodes of the genus *Stephanostomum* Looss, 1899 (Digenea: Acanthocolpidae Lühe, 1901), with description of *Stephanostomum qatarense* n. sp. and redescription of *Stephanostomum triacanthi* Madhavi, 1976. Riv. Parassitol. 29 (63): 87–103.

Received 15 August 2006

Accepted 30 November 2006