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THREE NEW SPECIES OF *Glyphidohaptor* KRITSKY, GALLI AND YANG, 2007 (MONOGENEA: DACTYLOGYRIDAE) PARASITIZING GILLS OF SPINEFOOTS (TELEOSTEI: SIGANIDAE) FISH FROM INDIA

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ABSTRACT

The present paper describes three new species of monogeneans parasitizing the gills of siganid fish hosts. This paper provides first taxonomic description of *Glyphidohaptor dicondylus* n.sp., *Glyphidohaptor canaliculatus* n.sp. and *Glyphidohaptor mandapamensis* n.sp. from marine fish host *Siganus canaliculatus* (Park, 1797), caught at coastal areas of Mandapam (Tamil Nadu). These new species are characterized by the structure of hard body parts. This is new geographic record of these monogenean worms from India.

KEYWORDS: Dactylogyridae, *Glyphidohaptor*, India, Monogenea, New Species, *Siganus canaliculatus*, Teleostei

During a survey of monogenean biodiversity on commercially important marine fishes in India, specimens of *Siganus canaliculatus* (Park, 1797) were collected from coastal areas of Mandapam, Tamil Nadu. When examined, these were found infected with monogenean parasites belonging to the genus *Glyphidohaptor* Kritsky, Galli and Yang, 2007. Of the total 28 piscine host examined, 22 were found infected with 91 monogenean worms. Comparative morphometric analysis reveals that the collected monogenean specimens under investigation are markedly different from their conspecifics on the basis of differences noticed in the structure of hard body parts. These findings add three new species to the previously reported four *Glyphidohaptor* species. Earlier, species under the genus *Glyphidohaptor* were recorded from different nations other than India. India is a new geographic record for this monogenean parasite.

MATERIALS AND METHODS

Siganid specimens were collected form coastal areas of Mandapam (Tamil Nadu). Their gills were removed and placed on the ice for short duration for narcotization of worms. Thereafter, gills were fixed 5% formalin solution. The fixed gills were brought to laboratory. The gills were gently scraped to dislodge the fixed monogeneans. Examination of gills was carried out under stereomicroscope. Methods of staining, mounting and illustration of dactylogrids were those described by Kritsky *et al.* (1986). Measurements (in micrometers) were made with a calibrated micrometer; average measurements are followed by ranges and number of specimens measured (n) in parentheses. Numbering of hook pairs follows Mizelle and Price (1963). Some voucher specimens were deposited in the helminthological collection of the Zoological Survey of India, Kolkata, India. Name of host follows those provided in FishBase (Froese and Pauly, 2025).

RESULTS

***Glyphidohaptor dicondylus* n.sp. (Figure 1)**

Taxonomic Summary

Type host: *Siganus canaliculatus* (Park, 1797)

Type locality: Mandapam, Tamil Nadu, India.

Site of infection: Gill filaments.

Host specimens examined: 22

Etymology: The specific name is from Greek (di=two + kondylus= knob) and refers to the shape of ventral bar.

Description (Based on 34 Specimens: 20 Mounted in Canada balsam and 14 Mounted in Glycerine)

Body 2080 (1940-2164; n=20) long, fusiform; greatest width 450 (426-471; n=20), usually in the mid trunk region. Tegument smooth. Cephalic region narrow; cephalic lobes poorly developed; 3 bilateral pairs of head organs. Eye spots 2 pairs, posterior pair larger than the anterior pair; granules ovate, variable in size. Pharynx spherical 110 (96-118; n=10) in diameter; oesophugus short to nonexistent; intestinal caeca 2, extending upto posterior region of body proper, confluent posterior to gonads. Peduncle narrow, gradually tapering posteriorly; haptor not well demarcated from peduncle, 110 (103-116; n=15) long, 125 (119-128; n=15) wide. Anchors dissimilar; each with well differentiated roots, slightly

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curved to straight short shafts, short points; inner root of dorsal anchor slightly smaller than outer, inner root of ventral anchor extremely shorter than outer, not extending upto mid length of outer root; dorsal anchor, outer length 75 (72-78; n=15), inner length 72 (69-74; n=15), outer root 34 (32-36; n=15), inner root 33 (31-36; n=15), point 2 (1-2; n=15); ventral anchor, outer length 77 (74-79; n=15), inner length 44 (41-47; n=15), outer root 42 (38-44; n=15), inner root 8 (6-9; n=15), point 4 (3-4; n=15). Dorsal bar 20 (19-21; n=15) long with bifid ends; ventral bar 45 (46-49; n=15) long, spectacle shaped with blunt ends. Hooks 7 pairs, similar, larval type; each 25 (24-26; n=10). Male copulatory organ 135 (132-137; n=15) long, a sclerotized tube tapering anteriorly with enlarged base. Accessory piece 137 (134-139; n=15) long with tapering distal end. Testis 225 (218-237; n=10) long, 140 (132-148; n=10) wide, ovate, intercaecal; course of vas deferens not observed. Ovary elongate-oval 230 (221-239; n=10) long, 168 (156-178; n=10) wide, slightly overlapped by testis, intercaecal; oviduct, vagina not observed. Vitellaria dense, from pharynx to throughout trunk, except on reproductive organs.

Remarks

Glyphidohaptor dicondylus n.sp. closely resembles with *G. phractophallus* Kritsky, Galli and Yang, 2007, *G. sigani* Kritsky, Galli and Yang, 2007, *G. plectocirra* (Paperna, 1972) Kritsky, Galli and Yang, 2007 and *G. mandapamensis* n.sp. (Fig. 3) in the shape ventral bar and tubular copulatory complex. However, it differs from *G. phractophallus*, *G. sigani*, *G. plectocirra* and *G. mandapamensis* n.sp. in having deeply bifid cylindrical roots of dorsal anchor (roots not deeply bifid with broad base in all previously described species); very short inner root of ventral anchor (inner root slightly larger than outer in all previously described species); forcipulate dorsal bar (rod shaped with upwardly directed terminals in all previously described species) and sword shaped accessory piece (accessory piece of variable shapes but not sword shaped in any of the previously described species).

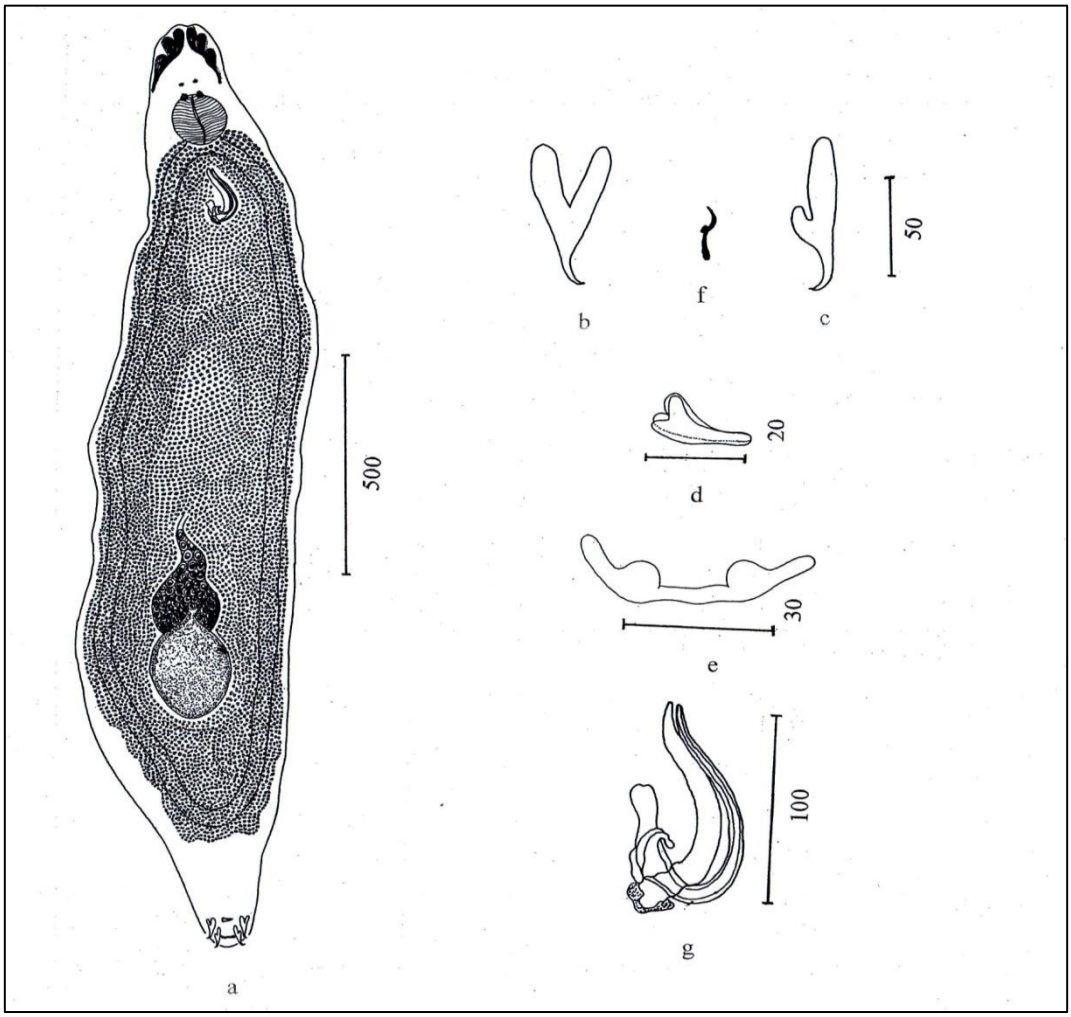

Figure 1: *Glyphidohaptor dicondylus* n.sp. (a) whole mount (composite, dorsal view); (b) dorsal anchor; (c) ventral anchor; (d) dorsal bar; (e) ventral bar; (f) hook; (g) copulatory complex

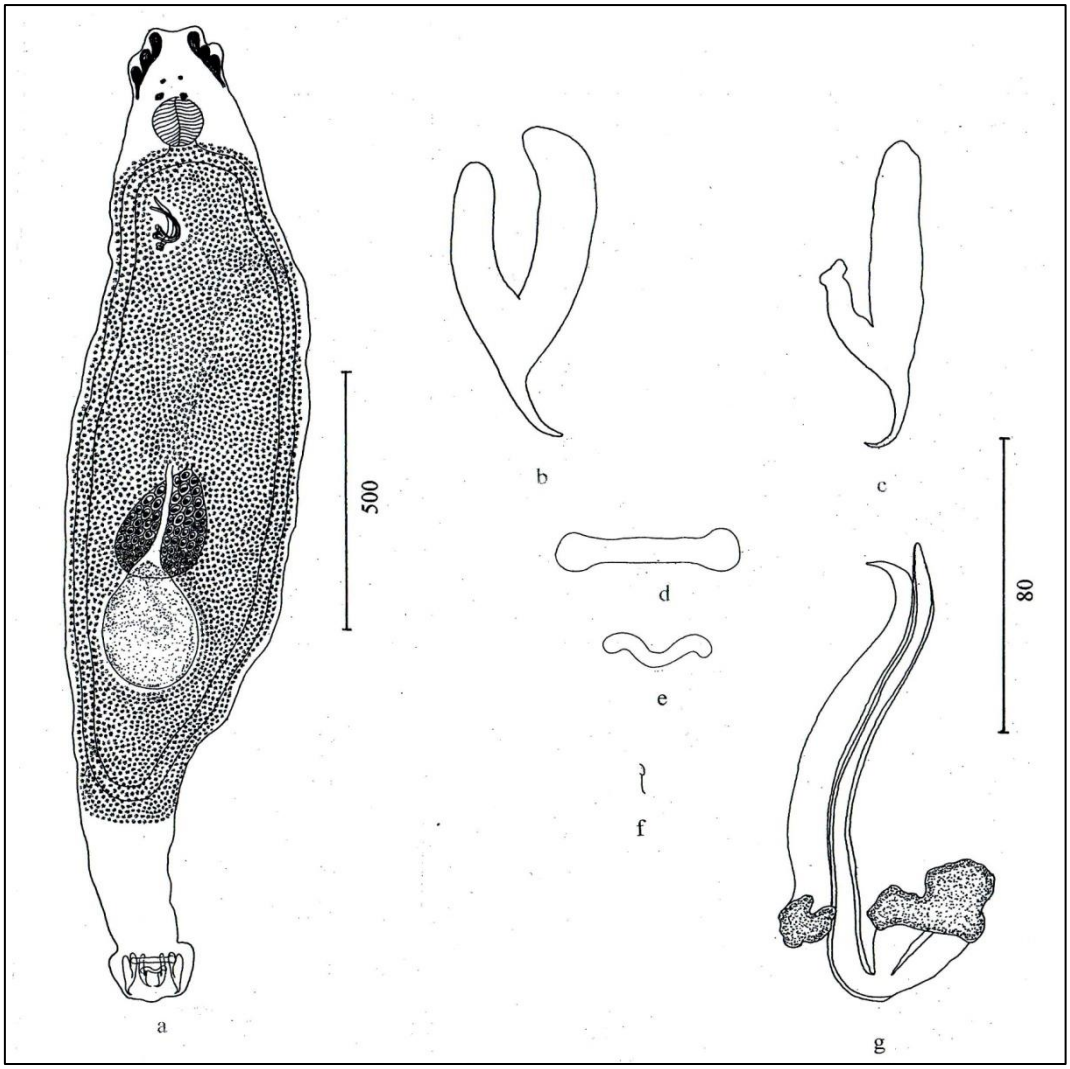

Figure 2: *Glyphidohaptor canaliculatus* n.sp. (a) whole mount (composite, dorsal view); (b) dorsal anchor; (c) ventral anchor; (d) dorsal bar; (e) ventral bar; (f) hook; (g) copulatory complex

***Glyphidohaptor canaliculatus* n.sp. (Figure 2)**

Taxonomic Summary

Type host: *Siganus canaliculatus* (Park, 1797)

Type locality: Mandapam, Tamil Nadu, India.

Site of infection: Gill filaments.

Host specimens examined: 22

Etymology: The specific name refers to the species of host fish.

Description (Based on 25 Specimens: 18 mounted in Canada balsam and 7 mounted in Glycerine)

Body 1890 (1862-1915; n=15) long, fusiform; greatest width 454 (440-468; n=15), usually in the mid trunk region. Tegument smooth. Cephalic region broad; cephalic lobes moderately developed; 3 bilateral pairs of head organs with anterior, posterior pairs associated with respective cephalic lobes. Eye spots 2 pairs, posterior pair larger than the anterior pair; granules ovate, variable in size. Pharynx spherical 98 (95-101; n=7) in diameter; oesophugus short to nonexistent; intestinal caeca 2, extending upto posterior region of body proper, confluent posterior to gonads. Peduncle moderate to narrow, gradually tapering posteriorly; haptor subhexagonal, 113 (109-116; n=14) long, 159 (154-164; n=14) wide, haptoral lobes short. Anchors dissimilar; each with well differentiated long roots, slightly curved to straight short shafts, short points; inner root of dorsal anchor slightly larger than outer, inner root of ventral anchor shorter than outer; dorsal anchor, outer length 74 (71-77; n=15), inner length 79 (77-82; n=15), outer root 38 (36-39; n=15), inner root 44 (43-45; n=15), point 6 (6-7; n=15); ventral anchor, outer length 83 (80-85; n=15), inner length 50 (48-51; n=15), outer root 49 (47-51; n=15), inner root 19 (17-22 n=15), point 5 (5-6; n=15). Dorsal bar 47 (45-50; n=15) long with swollen ends; ventral bar 37 (36-39; n=15) long, marginally bent posteriorly with slightly expanded ends. Hooks 7 pairs, similar, larval type; each 7

(6-7; n=10). Male copulatory organ 169 (156-181; n=15) long, a sclerotized tube with enlarged base gradually tapering anteriorly. Accessory piece 116 (114-120; n=15) long with spinous tip. Testis 253 (241-261; n=10) long, 177 (166-185; n=10) wide, ovate, intercaecal; course of vas deferens not observed. Ovary pyriform 218 (209-229; n=10) long, 159 (151-168; n=10) wide, slightly overlapped by testis, intercaecal; oviduct, vagina not observed. Vitellaria dense, from pharynx to throughout trunk, except on reproductive organs.

Remarks

Glyphidohaptor canaliculatus n.sp. is not closely related to any of the previously described species of this genus. However, general structure of copulatory complex suggests affinity with *G. dicondylus* n.sp. (Fig. 1). *G. canaliculatus* n.sp. differs from *G. dicondylus* by larger inner root of dorsal anchor (roots almost equal in *G. dicondylus*); rod shaped dorsal bar (forcipulte in *G. dicondylus*); wing shaped ventral bar (spectacle shaped in *G. dicondylus*) and simple, tubular accessory piece of copulatory complex (more complex accessory piece in *G. dicondylus*).

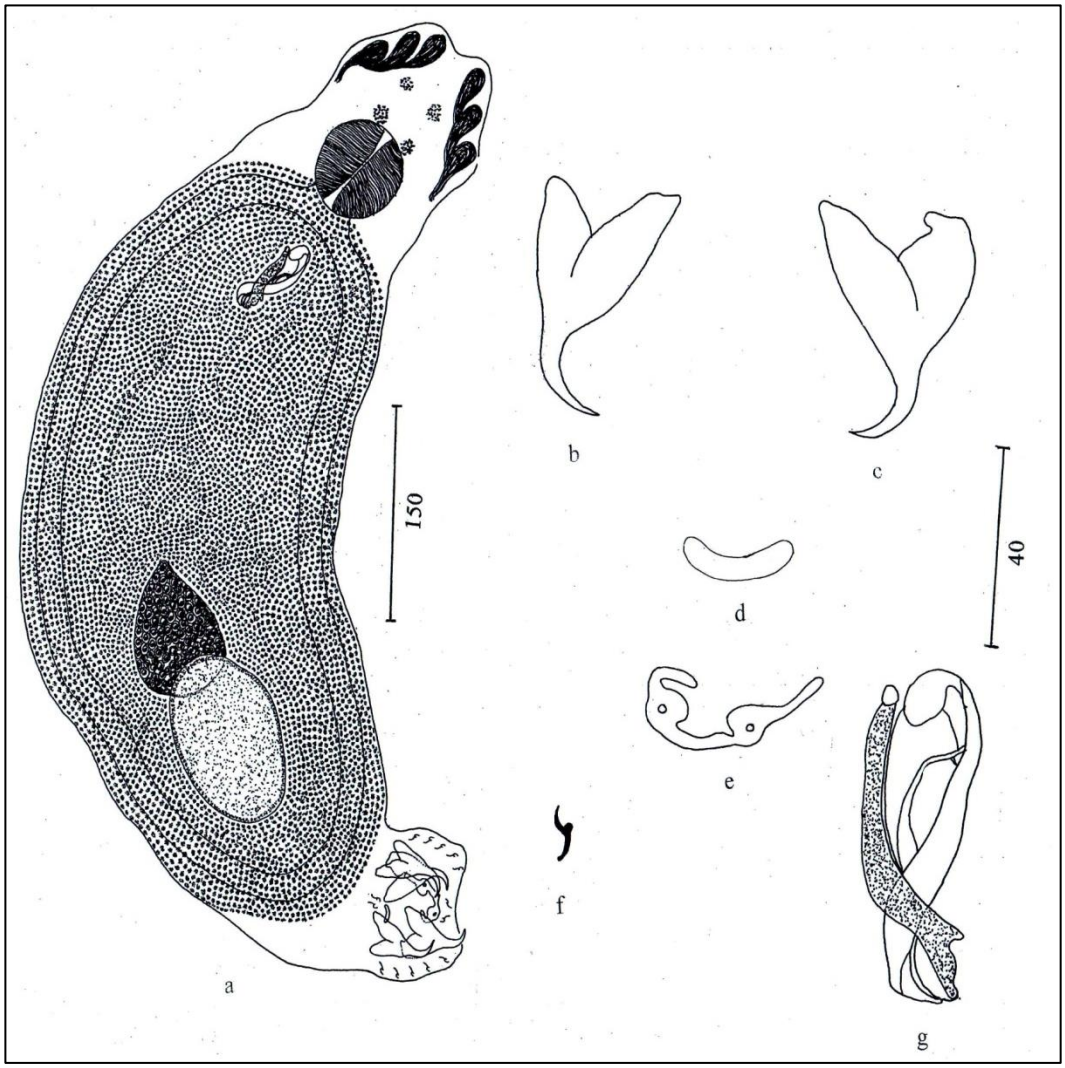

Figure 3: *Glyphidohaptor mandapamensis* n.sp. (a) whole mount (composite, dorsal view); (b) dorsal anchor; (c) ventral anchor; (d) dorsal bar; (e) ventral bar; (f) hook; (g) copulatory complex

***Glyphidohaptor mandapamensis* n.sp. (Figure 3)**

Taxonomic Summary

Type host: *Siganus canaliculatus* (Park, 1797)

Type locality: Mandapam, Tamil Nadu, India.

Site of infection: Gill filaments.

Host specimens examined: 22

Etymology: The specific name is from the name of locality from where the hosts were collected.

Description (Based on 32 Specimens: 20 mounted in Canada balsam and 12 mounted in Glycerine)

Body 805 (779-831; n=10) long, robust; greatest width 254 (244-268; n=10), usually in the mid trunk region. Tegument smooth. Cephalic region broad; cephalic lobes moderately developed; 3 bilateral pairs of head organs with anterior, posterior pairs associated with respective cephalic lobes. Eye spots 2 pairs, frequently dissociated, posterior pair slightly larger than the anterior pair; granules ovate, variable in size. Pharynx spherical 63 (61-66; n=8) in diameter; oesophugus short to nonexistent; intestinal caeca 2, extending upto posterior region of body proper, confluent posterior to gonads. Peduncle short to nonexistent; haptor subhexagonal, 59 (54-73; n=12) long, 107 (102-111; n=12) wide, haptoral lobes short. Anchors dissimilar; each with well differentiated roots, evenly curved short shafts, short points; inner roots slightly larger than outer; dorsal anchor, outer length 43 (41-45; n=15), inner length 46 (44-48; n=15), outer root 14 (12-15; n=15), inner root 18 (16-20; n=15), point 9 (8-9; n=15); ventral anchor, outer length 45 (43-47; n=15), inner length 46 (44-48; n=15), outer root 12 (11-14; n=15), inner root 19 (17-21 n=15), point 8 (8-9; n=15). Dorsal bar 24 (23-25; n=15) long, rod shaped; ventral bar 59 (57-62; n=15) long, spectacle shaped with two fenestrae. Hooks 7 pairs, similar, larval type; each 11 (11-12; n=12). Male copulatory organ 91 (79-105; n=15) long, bent anteriorly, gradually tapering posteriorly with small shield on ventral side. Accessory piece 69 (64-73; n=15) long, with bent blunt tip. Testis 125 (109-138; n=7) long, 79 (61-92; n=7) wide, ovate, intercaecal; course of vas deferens not observed. Ovary pyriform 94 (78-107; n=9) long, 65 (51-78; n=9) wide, slightly overlapped by testis, intercaecal; oviduct, vagina not observed. Vitellaria dense, from posterior margin of pharynx to throughout trunk, except on reproductive organs.

Remarks

Glyphidohaptor mandapamensis n.sp. closely resembles with *G. phractophallus* Kritsky, Galli and Yang, 2007, *G. sigani* Kritsky, Galli and Yang, 2007, *G. plectocirra* (Paperna, 1972) Kritsky, Galli and Yang, 2007 and *G. safiensis* Jufaili *et al.*, 2020 in general structure of anchors, ventral bar, and tubular copulatory organ (=cirrus). However, it differs from *G. phractophallus*, *G. sigani*, *G. plectocirra* and *G. safiensis* in having very small (often difficult to observe), slightly curved, rod shaped dorsal bar (flat, ribbon like dorsal bar with anteriorly directed ends in *G. phractophallus*, *G. sigani*, *G. plectocirra* and *G. safiensis*) and simple tubular accessory piece of copulatory complex (more complex accessory piece of variable shapes in *G. phractophallus*, *G. sigani*, *G. plectocirra* and *G. safiensis*). *G. mandapamensis* n.sp. also resembles with *G. dicondylus* n.sp. in shape of ventral bar. It differs from *G. dicondylus* in having broad base of anchors (cylindrical roots and narrow base in *G. dicondylus*); very short inner root of ventral anchor (inner root slightly larger than outer in *G. dicondylus*), curved rod shaped dorsal bar (dorsal bar forcipulate in *G. dicondylus*) and tubular accessory piece with distal end bent upon itself (sword like accessory piece in *G. dicondylus*).

DISCUSSION

The family Siganidae includes 29 species of ray finned fishes, commonly known as “Spinefoots” or “Rabbitfishes” (Fishbase 4/2025). Siganids are marine perciforms occurring throughout the tropical and subtropical Indo-pacific region except for the waters of the Hawaiian Islands and Easter island (Woodland, 1990). Siganids are of considerable commercial importance. Many of the species are consumed as food and also used as ornamental fishes and maintained in aquaria. According to Lim (2002) *Siganus* species act as host for species of four monogenean genera: *Tetraancistrum* Goto and Kikuchi, 1917; *Microcotyle* van Beneden and Hesse, 1863; *Pseudohaliotrema* Yamaguti, 1953 and *Pseudohaliotrematoides* Yamaguti, 1963. Kritsky *et al.*, 2007 proposed the genus *Glyphidohaptor* to accommodate *Pseudohaliotrema plectocirra* (Paperna, 1972) Kritsky, Galli and Yang, 2007 on *Siganus luridus* (Ruppell, 1829) and S. rivulatus (Forsskal, 1775) from Red Sea and also added two new species: *G. phractophallus* on *Siganus fuscescens* (Houttuyn, 1782) and *G. sigani* on *S. doliatus* (Guerin-Meneville, 1829), *S. punctatus* (Schneider and Forster, 1801), *S. corallinus* (Valenciennes, 1835) and *S. lineatus* (Valenciennes, 1835) from Great barrier Reef, Australia. Kritsky *et al.*, 2007 further pointed out the synonymy of genus *Pseudohaliotrematoides* with *Tetraancistrum*, as done by Young (1967). Yang *et al.*, 2007 described a microcotylid, *Polylabris mamaevi* on *S. fuscescens* from Gulf of Tonkin, South China Sea. Jufaili *et al.*, 2020 described *Glyphidohaptor safiensis* from the gills of wild white-spotted rabbit fish *Siganus canaliculatus* (Park, 1797) from Persian Gulf, the Gulf of Oman and the Arabian Sea. During the present study description of three new species of the genus *Glyphidohaptor* (*G. dicondylus*, *G. canaliculatus* and *G. mandapamensis*) infecting *S. canaliculatus* (Park, 1797) has been added. Description of these 3 new species is based on elaborate comparative morphometric analysis with their congeners. These new species are markedly different from previously described species in having very significant to moderate variations in the morphometrics of hard parts (structure of haptoral armaments and copulatory complex).

REFERENCES

Al Jufaili S.H., Machkevsky V.K., Al Kindi U.H. and Palm H.W., 2020. *Glyphidohaptor safiensis* n.sp. (Monogenea: Ancyrocephalidae) from the white-spotted rabbitfish *Siganus canaliculatus* (Park) (Perciformes: Siganidae) off Oman, with notes on its phylogenetic position within the Ancyrocephalidae Bychowsky & Nagibina, 1968 (sensu lato). Systematic. Parasitology, **97**(6): 727-741.

Froese R. and Pauly D., 2025. Fish Base. World Wide Web electronic publication. www.fishbase.org, (04/2025).

Kritsky D.C., Galli P. and Yang T., 2007. Dactylogyrids (Monogenoidea) parasitizing the gills of spinefoots (Teleostei: Siganidae): proposal of *Glyphidohaptor* n. gen., with two new species from the Great Barrier Reef, Australia, and *G. plectocirra* n. comb. from Ras Mohammed National Park, Egypt. Journal of Parasitology, **93**(1): 39-46.

Kritsky D.C., Thatcher V.E. and Boeger W.A., 1986. Neotropical Monogenea. 8. Revision of *Urocleidoides* (Dactylogyridae, Ancyrocephalinae). Proc. Helminthol. Soc. Wash., **53**(1): 1-37.

Lim L.H.S., 2002. Three new species of Pseudohaliotrema Yamaguti, 1953 (Monogenea: Ancyrocephalidae) from Siganus species (Siganidae) and the description of a mechanism for cross-insemination. Journal of Natural History, **36**(14): 1639-1660.

Mizelle J.D. and Price C.E., 1963. Additional haptoral hooks in the genus *Dactylogyrus*. Journal of Parasitology, **49**: 1028–1029.

Paperna I., 1972. Monogenea from Red Sea Fishes. I. Monogenea of fish of the genus *Siganus*. Proceedings of the Helminthological Society of Washington, **39**: 33–39.

Woodland D.J., 1990. Revision of the fish family Siganidae with descriptions of two new species and comments on distribution and biology. Indo-Pac. Fish, **19**:136.

Yang T., Kritsky D.C. and Pan J., 2007. *Polylabris lingaoensis* sp.n. and *Polylabris* cf. *mamaevi* Ogawa et Egusa, 1980 (Monogenoidea: Microcotylidae) from perciform fishes in the Gulf of Tonkin, South China Sea. Folia Parasitologica., **54**: 27-33.