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Trematodes from Red Sea fishes: *Gibsonius aegyptensis* gen. nov., sp. nov. (Lepocreadiidae Odhner, 1905) and *Helicometra interrupta* sp. nov. (Opecoelidae Ozaki, 1925)

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Abstract

Specimens of the marine fishes *Rhabdosargus haffara* (Sparidae) and *Cociella crocodila* (Platycephalidae) were caught in the Red Sea off the coast of Sharm El-Sheikh, South Sinai, Egypt. Eight (20%) and 15 (43%) of these fishes, respectively, were found to harbour intestinal trematodes. *R. haffara* was parasitised by *Gibsonius aegyptensis* gen. nov., sp. nov. (Lepocreadiidae) and *C. crocodila* by *Helicometra interrupta* sp. nov. (Opecoelidae). *Gibsonius* is similar to *Myzoxenus* Manter, 1934 and *Diploproctia* Mamaev, 1970 in having a ventral sucker with two longitudinal lips of a lamellar nature at its aperture, but differs greatly from each in other features: from *Myzoxenus* in having tegumental spines heavily distributed throughout the entire body surface, symmetrically arranged testes, a cirrus sac extending well posterior to the ventral sucker, a median genital pore, and vitelline follicles terminating posteriorly at the testicular level; and from *Diploproctia* in having an oval body, intestinal caeca which end blindly near the posterior extremity, a median genital pore between the intestinal bifurcation and ventral sucker, a pretesticular unlobed ovary, a uterus mainly situated dextral to the ovary, and vitelline follicles terminating posteriorly at the testicular level. *Helicometra interrupta* sp. nov. is similar to *H. equilata*, *H. nasae* and *H. pteroisi* in having a short forebody and a long cirrus sac extending posterior to the ventral sucker, but differs significantly in having a shorter forebody (about 10% of body length), a curved cirrus sac extending posteriorly to a third of the distance between the ventral sucker and the ovary, vitelline follicles which terminate anteriorly at considerable distance posterior to ventral sucker and which are distinctly interrupted twice in the pre-testicular region, and smaller eggs.

Key words

Digenea, Lepocreadiidae, *Gibsonius aegyptensis* gen. nov., sp. nov., Opecoelidae, *Helicometra interrupta* sp. nov., fishes, Red Sea

Introduction

This is the third recent paper on the trematode fauna of Red Sea fishes (see Hassanine and Gibson 2005a, b). The present report deals with two new species and a new genus from sparid and platycephalid fishes.

Materials and methods

During February of 2005, 40 and 35 specimens of the fishes *Rhabdosargus haffara* (Sparidae) and *Cociella crocodila* (Platycephalidae), respectively, were caught in the Red Sea off the coast of Sharm El-Sheikh, South Sinai, Egypt, and kept alive in aquaria. Fish identifications were based on Randall (1983) and the modern names follow Froese and Pauly (2004). Standard parasitological techniques were used to examine the alimentary canal of the fish. Trematodes were removed from their host fishes under a dissecting microscope and observed live under a compound microscope. Some worms were fixed in alcohol-formalin-acetic acid (AFA) under a slight coverslip pressure and preserved in 75% ethyl alcohol. Whole-mounts were stained in alum carmine, cleared in terpineol and mounted in Canada balsam. Measurements are quoted as the range, with mean in parentheses, and are given in micrometres. The specimens are deposited in the Helminthological Collection of the Red Sea Fishes, Marine Science Department, Faculty of Science, Suez Canal University, Ismailia, Egypt.

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Results

Family Lepocreadiidae Odhner, 1905
Subfamily Lepocreadiinae Odhner, 1905

Prior to 2004, more than 30 subfamilies were described under the Lepocreadiidae Odhner, 1905. More recently, Bray (2005) has comprehensively reviewed this family, accepting the validity of only three subfamilies, the Lepocreadiinae Odhner, 1905, Lepidapedinae Yamaguti, 1958 and Aephnidiogeninae Yamaguti, 1934, based on essential differences in the structure of the male terminal genitalia. He accepted 60 genera as valid within the Lepocreadiinae, two of which, i.e. *Myzoxenus* Manter, 1934 and *Diploproctia* Mamaev, 1970, are unique among the other genera of this subfamily in having a ventral sucker with two longitudinal lamellar lips at its aperture (one on each side).

***Gibsonius* gen. nov.**

Description: Lepocreadiidae, Lepocreadiinae. Body small, oval. Tegument heavily spined. Oral sucker subterminal. Ventral sucker moderately large, just pre-equatorial, provided at its aperture with two longitudinal lamellar lips (one on each side). Prepharynx very short. Pharynx well developed. Oesophagus short. Intestinal bifurcation anterior to ventral sucker. Caeca simple, ending blindly near posterior extremity. Testes two, symmetrical, separated, in middle of hindbody. External seminal vesicle very short, surrounded by dense mass of gland cells. Cirrus sac claviform, extending well posterior to ventral sucker; contain vesicular internal seminal vesicle, oval pars prostatica and long ejaculatory duct. Genital pore medial, between ventral sucker and intestinal bifurcation. Ovary entire, pretesticular, immediately posterior to ventral sucker. Seminal receptacle and Laurer's canal present. Uterus intercaecal, mainly winding dextrally to ovary, with well differentiated metraterm. Eggs moderately large. Vitelline follicles irregular, numerous, extending in lateral fields from level of testes to level of pharynx. Excretory vesicle I-shaped, reaching anteriorly as far as testes. Excretory pore terminal. Intestinal parasites of marine teleosts. Type species: *G. aegyptensis*.

Undoubtedly, these differences exclude the current species from both *Myzoxenus* and *Diploproctia*. Therefore, *Gibsonius* gen. nov., as defined below, is proposed as a new lepocreadiid genus for this species.

***Gibsonius aegyptensis* gen. nov., sp. nov.** (Fig. 1)

Description: Based on 14 fully-gravid specimens. Body small, oval, somewhat dorso-ventrally flattened, 802–1,350 (1,076) in length, 503–804 (654) wide at its middle. Forebody 271–463 (367) in length, representing 30–35% of total body length. Tegument heavily spined. Oral sucker subterminal, round, 158–214 (173) in diameter. Ventral sucker moderately large, subglobular to subrectangular, situated just pre-equatorial, 162–264 × 194–293 (213 × 239), provided at its aperture with two longitudinal lamellar lips (one on each side). Sucker-width ratio 1:1.22–1.37. Prepharynx very short, 23–30 (27) in length. Pharynx globular, well developed, 48–62 × 62–90 (55 × 76). Oesophagus short, 44–56 (50) in length. Intestinal bifurcation just anterior to ventral sucker. Caeca simple, curving back laterally, extending parallel with body wall ending blindly near posterior body end. Testes 2, suboval, symmetrical in middle of hindbody, well separated, subequal, 122–201 × 102–154 (162 × 128). External seminal vesicle very short, somewhat swollen, situated slightly anterior to left testis, surrounded by a dense mass of gland cells. Cirrus sac elongate-claviform, 292–403 (348) in length, 64–88 (76) wide near its base, extending along the left margin of ovary and ventral sucker, containing vesicular internal seminal vesicle, oval pars prostatica and long ejaculatory duct. Genital pore medial, occurs between ventral sucker and intestinal bifurcation. Ovary transversely oval, pretesticular, localised immediately posterior to ventral sucker, slightly submedian, 74–123 × 121–195 (99 × 158). Seminal receptacle oval, in postero-dextral position to ovary. Laurer's canal present. Uterus relatively long, intercaecal, mainly winding dextral to ovary, modified terminally into distinct metraterm. Eggs oval, thin-shelled, operculate, yellowish, moderately large, 60–72 × 35–42 (66 × 39). Vitelline follicles irregular in shape, small, numerous, extending anteriorly in lateral fields from level of testes to level of pharynx; at level of anterior margin of testes, transverse vitelline collecting ducts arise from vitelline follicles on each side; opening into small round intertesticular vitelline reservoir. Excretory vesicle I-shaped, extending anteriorly as far as testes; excretory pore terminal.

Type host: *Rhabdosargus haffara* Forsskål (Sparidae).

Site: Intestine.

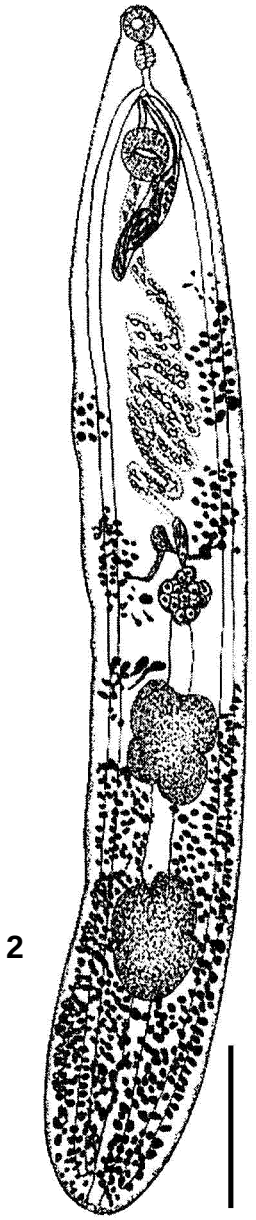
Type locality: Red Sea off Sharm El-Sheikh, South Sinai, Egypt.

Prevalence: 8/40 fishes examined; 20%.

Type material: Holotype and paratypes are deposited in the Helminthological Collection of the Red Sea Fishes, Marine Science Department, Faculty of Science, Suez Canal University, Ismailia, Egypt.

Etymology: The new genus is named for Dr D.I. Gibson, Department of Zoology, The Natural History Museum, London, in recognition of his great contributions to marine helminthology.

Discussion: Using the revision of Bray (2005), the present trematode keys closely to *Myzoxenus* Manter, 1934 and *Diploproctia* Mamaev, 1970 which are the only two known lepocreadiid genera in which the ventral sucker has two longitudinal lamellar lips at its aperture. *Gibsonius aegyptensis* gen. nov., sp. nov. has this feature, but differs greatly from each of these in several other characteristics: from *Myzoxenus* it differs in having tegumental spines distributed over the whole body surface (vs. distributed only on the anterior region of the body), symmetrically arranged testes (vs. tandem), a cirrus sac extending well posterior to the ventral sucker (vs.



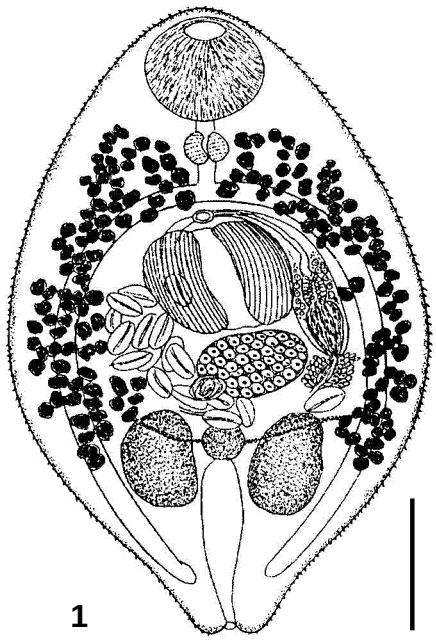


Fig. 1. *Gibsonius aegyptensis* gen. nov., sp. nov. from *Rhabdosargus haffara*, Red Sea. Scale bar = 250 μm. **Fig. 2.** *Helicometra interrupta* sp. nov. from *Cociella crocodila*, Red Sea. Scale bar = 500 μm

mainly situated in forebody), a median genital pore (vs. submedian), and vitelline follicles terminating posteriorly at testicular level (vs. reaching close to the posterior extremity); and from *Diploproctia* it differs in having an oval body (vs. scoopshaped), intestinal caeca which end blindly near the posterior extremity (vs. reaching to posterior body wall and appeared to having ani), a median genital pore between the ventral sucker and the intestinal bifurcation (vs. antero-sinistral), a pretesticular unlobed ovary (vs. acinous and overlapping the posterior margins of the testes), a uterus mainly situated dextrally to ovary (vs. dorsally to ventral sucker) and vitelline follicles terminating posteriorly at testicular level (vs. extending close to the posterior extremity).

Family Opecoelidae Ozaki, 1925
Subfamily Plagioporinae Manter, 1947

***Helicometra* Odhner, 1902**

Helicometra Odhner, 1902 is a large cosmopolitan genus containing about 40 species. Through the years 1902–1987, many of its species underwent numerous taxonomic changes and a large number of synonyms were proposed (see Nicoll 1910; Palombi 1929a, b, 1931; Manter 1933, 1954; Siddiqi and Cable 1960; Fischthal and Kuntz 1965; Pritchard 1966; Durio and Manter 1968; Naidenova and Overstreet 1969; Dogilkh 1969; Hafeezullah 1971; Yamaguti 1971; Sekerak and Arai 1974; Bray 1979, 1987).

Stenopera Manter, 1933 was erected for *S. equilata* Manter, 1933, and distinguished from *Helicometra* by its short forebody, long cirrus sac which extends far posterior to the ventral sucker, and by the vitelline follicles which are confined to the hindbody. Gupta (1956) described *S. pteroisi* in which the vitelline follicles extend into the forebody to reach the intestinal bifurcation. Siddiqi and Cable (1960) stated that all the characteristics used to distinguish *Stenopera* from

Helicometra were of a specific nature, and considered the former as a synonym of the latter. Fischthal and Kuntz (1964) seemed unaware of the work of Siddiqi and Cable (1960), when they described *S. rectisaccus*. Later, Fischthal and Kuntz (1965) agreed with Siddiqi and Cable (1960), transferring *S. pteroisi* and *S. rectisaccus* to *Helicometra*. Pritchard (1966) resurrected *Stenopera*, and transferred *H. boseli* Nagaty, 1956 and *H. nasae* Nagaty et Abdel-Aal, 1962 to it. Yamaguti (1971) also listed *Stenopera* as a valid genus, but Hafeezullah (1971) and Sekerak and Arai (1974) agreed with Siddiqi and Cable (1960) in considering *Stenopera* a synonym of *Helicometra*. Sekerak and Arai (1974) also synonymised *H. boseli* with *H. equilata* and *H. rectisaccus* with *H. nasae*. More recently, in a revision of the Opecoelidae, Cribb (2005) also considered *Stenopera* a synonym of *Helicometra*.

Currently, *H. equilata* (Manter, 1933) Siddiqi et Cable, 1960 (synonyms: *S. equilata* Manter, 1933 and *H. boseli* Nagaty, 1956), *H. nasae* Nagaty et Abdel-Aal, 1962 [synonyms: *S. rectisaccus* Fischthal et Kuntz, 1964 and *H. rectisaccus* (Fischthal et Kuntz, 1964) Fischthal et Kuntz, 1965], and *H. pteroisi* (Gupta, 1956) Fischthal et Kuntz, 1965 are a small group within *Helicometra*, and mainly characterised by the short forebody and the long cirrus sac which extends posterior to the ventral sucker.

***Helicometra interrupta* sp. nov.** (Fig. 2)

Description: Based on 20 fully gravid specimens. Body elongate (with nearly parallel lateral margins), dorso-ventrally flattened, 2,936–4,045 (3,490) in length, 455–628 (542) wide at its middle. Forebody very short, 310–431 (371) in length, representing about 10% of body length. Tegument unspined. Oral sucker subterminal, subspherical, 90–110 (100) in diameter. Ventral sucker round, relatively close to oral sucker, 128–171 (150) in diameter. Sucker-width ratio 1:1.42–1.70. Prepharynx very short or absent. Pharynx well developed, slightly elongate, 77–96 × 60–80 (87 × 70). Oesophagus short, 55–68 (62) in length. Intestinal bifurcation midway between pharynx and ventral sucker; caeca simple, narrow, ending blindly near posterior body end. Testes 2, quadrilobed, intercaecal, tandem, well separated, situated anteriorly in second half of body; anterior testis 290–384 × 260–345 (337 × 303); posterior testis 370–445 × 280–361 (408 × 321). Cirrus sac elongate-claviform, curving around left margin of ventral sucker, 491–671 (581) in length, 70–85 (78) wide at its middle, reaching posteriorly to about 1/3 of distance between ventral sucker and ovary, containing slightly winding seminal vesicle, distinct pars prostatica and relatively long ejaculatory duct. Genital pore medial, ventral to intestinal bifurcation. Ovary quadrilobed, medial, situated at about middle of body, 149–190 × 165–226 (170 × 196). Seminal receptacle claviform, immediately pre-ovarian. Laurer's canal present. Uterus helical, relatively long, intercaecal, mainly winding between level of seminal receptacle and cirrus sac. Metraterm well differentiated. Eggs oval, thin-shelled, with unipolar filament, yellowish, 28–33 × 19–23 (31 × 21); polar filament as long as egg length. Vitelline follicles irregular in shape, small, numerous, extending in lateral fields from near posterior extremity to considerable distance posterior to ventral sucker; follicles confluent in post-testicular region, distinctly interrupted twice in pretesticular region. At level of seminal receptacle, transverse vitelline collecting ducts arising from vitelline follicles on each side and opening into small saccular vitelline reservoir situated medially, anterior to ovary. Excretory vesicle I-shaped, extending anteriorly as far as ovary; excretory pore terminal.

Type host: *Cociella crocodila* Tilesius (Platycephalidae).

Site: Intestine.

Type locality: Red Sea off Sharm El-Sheikh, South Sinai, Egypt.

Prevalence: 15/35 fishes examined; 43%.

Type material: Holotype and paratypes are deposited in the Helminthological Collection of the Red Sea Fishes, Marine Science Department, Faculty of Science, Suez Canal University, Ismailia, Egypt.

Etymology: The specific name refers to the interrupted appearance of the vitelline fields in the pretesticular region.

Discussion: As indicated above, *H. equilata*, *H. nasae* and *H. pteroisi* are currently the only three species of *Helicometra* in which the forebody is short, and the cirrus sac is long and extends posterior to the ventral sucker. *H. interrupta* sp. nov. shares these same characteristics, but differs significantly in the following characters:

– The forebody is shorter, representing about 1/10 of body length (vs. about one 1/5 of body length).

– The cirrus sac is arch-shaped, extending posteriorly to about 1/3 the distance between ventral sucker and ovary (in *H. equilata* and *H. pteroisi*, the cirrus sac is distinctly sigmoid, longer, and extends posteriorly to midway between the ventral sucker and ovary; in *H. nasae*, the sac is shorter, nearly straight, and extends to only 1/6 of this distance).

– The vitelline follicles terminate anteriorly at a considerable distance posterior to the ventral sucker, and are distinctly interrupted two times in the pretesticular region (in *H. equilata* and *H. nasae*, the follicles are continuous and extend anteriorly to the posterior margin of the ventral sucker; in *H. pteroisi*, the follicles extend more anteriorly into the forebody).

– The egg length is relatively short, 28–33 (in *H. equilata* 45–56; in *H. nasae* 30–50; in *H. pteroisi* 38–41).

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