

Two New Lepocreadiid Trematodes from Butterfly Fishes of Southern Japan

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Abstract Two new lepecreadiid trematodes were obtained from the pyloric caeca and intestine of the butterfly fishes, *Chaetodon auriga* and *C. auripes*, of southern Japan. *Neohypocreadium longisaccatum* gen. et sp. nov. differs from any of the known genera of Lepocreadiidae in having well developed dermal glands, testes lying symmetrically, a trilobed ovary situated between both testes, a preovarian uterus, a genital pore opening dorsally, and an excretory vesicle extending the preacetabular level. *N. dorsoporum* sp. nov. differs from *N. longisaccatum* in having a small cirrus pouch, a genital pore situated on the left side of the pharynx, and a long external seminal vesicle. A new subfamily Neohypocreadiinae is proposed for the genus *Neohypocreadium*.

This report deals with two lepecreadiid trematodes from the butterfly fishes, *Chaetodon auriga* and *C. auripes*, of southern Japan. The trematodes were washed in saline, fixed in alcohol-formalin-acetic acid (AFA) under slight pressure, stained with Heidenhain's hematoxylin and mounted in balsam. The specimens are deposited in the collection of the National Science Museum, Tokyo (NSMT).

Family Lepocreadiidae

Neohypocreadium longisaccatum gen. et sp. nov.

(Figs. 1–3)

Host. *Chaetodon auriga* FORSSKÅL (type host) and *C. auripes* JORDAN et SNYDER (Chaetodontidae).

Site. Pyloric caeca and intestine.

Locality. Ishigaki-jima (type locality), Amami-oshima and Kushimoto.

Date. 4-III-1973, 27-X-1979 and 13-XI-1985.

Specimen No. NSMT-PI 1317 a (holotype), 2278 and 3173 a.

Description. Based on 21 specimens. Body round to oval, slightly projecting both ends, 0.95–1.54 mm long by 0.90–1.43 mm wide. Cuticle spinose. Dermal

glands scattered, especially dense in forebody. Oral sucker subterminal, rounded or bowl-shaped, $61\text{--}107 \times 92\text{--}174\ \mu\text{m}$; prepharynx practically absent; pharynx ovoid, $56\text{--}87 \times 56\text{--}87\ \mu\text{m}$; esophagus $92\text{--}235\ \mu\text{m}$ long, bifurcating near midway between pharynx and acetabulum; caeca arcuate, extending to near posterior extremity where they are separated from each other by vitellaria and excretory vesicle. Acetabulum spherical, $97\text{--}176 \times 102\text{--}174\ \mu\text{m}$, just pre-equatorial. Sucker ratio 1: 0.88–1.47.

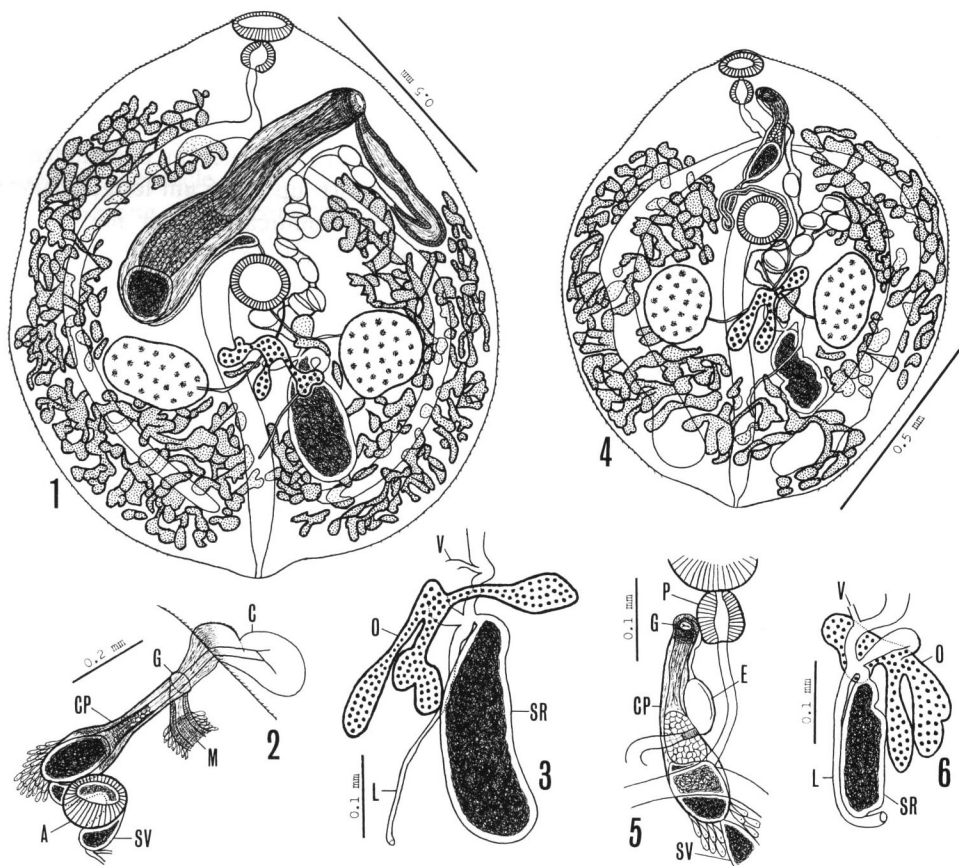
Testes round to oval, occasionally irregular in outline, symmetrical, obliquely behind acetabulum; the right $173\text{--}311 \times 112\text{--}306\ \mu\text{m}$; the left $148\text{--}316 \times 143\text{--}296\ \mu\text{m}$. Vas efferens arising from midlevel of each testis. Vas deferens absent. External seminal vesicle tubular, $188\text{--}428 \times 25\text{--}92\ \mu\text{m}$, a little twisted, shorter than cirrus pouch, terminating in zone of or around acetabulum. Cirrus pouch large, elongate, $352\text{--}750 \times 86\text{--}189\ \mu\text{m}$, lying obliquely, extending genital pore through left of caecal bifurcation to near anterior to right testis at level of posterior border of acetabulum. Cirrus pouch containing oval internal seminal vesicle $56\text{--}204 \times 25\text{--}148\ \mu\text{m}$, cylindrical pars prostatica $107\text{--}225 \times 66\text{--}143\ \mu\text{m}$ and eversible cirrus. Prostatic cells surrounding proximal portion of cirrus pouch. Genital pore dorsal, anterosinistral to caecal bifurcation.

Ovary trilobed, occasionally each lobe with bifurcated end, $117\text{--}306 \times 153\text{--}329\ \mu\text{m}$ as a whole, median, between both testes. Oviduct arising from anteromedian end of ovary, connected with short duct of seminal receptacle and then receiving vitelline reservoir. Laurer's canal originating from junction of seminal receptacle with oviduct, running backward to open dorsally some distance posterior to ovary. Seminal receptacle saccular, $137\text{--}312 \times 51\text{--}194\ \mu\text{m}$, posterosinistral to ovary. Uterus winding forward anterior to ovary and anterosinistral to acetabulum. Metraterm well developed, covered with glandular cells, bending in proximal portion, outside left caecum. Uterine eggs 3–37 in number, oval, $65\text{--}74 \times 44\text{--}51\ \mu\text{m}$. Vitellaria occupying lateral fields from near caecal bifurcation to posterior extremity, confluent in postovarian space. Excretory vesicle tubular, extending to preacetabular level, occasionally through right and anterior side of acetabulum to left side of it; pore terminal.

Discussion. Judging from the general anatomy, there is no doubt that the present new genus belongs to the family Lepocreadiidae, but it differs from any of the known genera of this family in having dermal glands, the testes arranged symmetrically, the trilobed ovary situated between both testes, the preovarian uterus, the genital pore opening dorsally, and the excretory vesicle extending to the preacetabular level.

According to YAMAGUTI (1971), the members of the subfamilies Callogeno-trematinae and Notoporidae in the Lepocreadiidae have dorsally located genital pores and ventrally situated mouths. The Callogenotrematinae contains only one genus and species, *Callogenotrema fistulariae* OSHMARIN, 1965 from *Fistularia petimba* from the South China Sea. This species differs from our species in having a fusiform body and a muscular ejaculatory sac instead of a cirrus pouch. On the other hand, *C. fistulariae* is quite alike *Neallolepidapedon hawaiiense* YAMAGUTI, 1965 from *Fistularia petimba* from Hawaiian waters in the shape of body, and the shape and

arrangement of organs, but some differences are seen in the male terminal genitalia, the position of genital pore, *etc.* Further examination is required whether the two are the same species or not. The Notoporidae contains two genera, *Notoporus* YAMAGUTI, 1938 and *Neonotoporus* SRIVASTAVA, 1942, both possessing somewhat fusiform body and neither true cirrus pouch nor seminal receptacle. Furthermore, the present new genus resembles *Pseudocreadium* LAYMAN, 1930 (Lepocreadiinae), *Hypocreadium* OZAKI, 1936 (Lepocreadiinae) and *Dermadena* MANTER, 1945 (Dermadeninae) in the body shape and the general arrangement of organs, but the members of the latter three genera have ventrally located genital pores.



Figs. 1-3. *Neohypocreadium longisaccatum* gen. et sp. nov. — 1. Entire worm, ventral view.

2. Male terminal genitalia, ventral view. 3. Ovarian complex, ventral view.

Figs. 4-6. *Neohypocreadium dorsoporum* sp. nov. — 4. Entire worm, ventral view.

5. Male terminal genitalia, dorsal view. 6. Ovarian complex, dorsal view. A, Acetabulum; C, everted cirrus; CP, cirrus pouch; E, egg in metraterm; G, genital pore; L, Laurer's canal; M, metraterm; O, ovary; P, pharynx; SR, seminal receptacle; SV, external seminal vesicle; V, vitelline reservoir.

A new subfamily and a new genus are proposed with the diagnosis respectively at the end of this report.

Neohypocreadium dorsoporum sp. nov.

(Figs. 4–6)

Host. *Chaetodon auriga* FORSSKÅL (type host) and *C. auripes* JORDAN et SNYDER (Chaetodontidae).

Site. Pyloric caeca and intestine.

Locality. Ishigaki-jima (type locality) and Amami-oshima.

Date. 4-III-1973 and 13-XI-1985.

Specimen No. NSMT-PI 1317 b (holotype) and 3173 b.

Description. Based on 11 specimens. Body nearly rounded, slightly pointed both ends, 0.81–1.27 mm long by 0.80–1.05 mm wide. Cuticle spinose. Dermal glands scattered, especially dense in forebody. Oral sucker subterminal, rounded or bowl-shaped, $51\text{--}97 \times 94\text{--}133\text{ }\mu\text{m}$; prepharynx very short, up to $26\text{ }\mu\text{m}$ long; pharynx ovoid, $51\text{--}72 \times 43\text{--}67\text{ }\mu\text{m}$; esophagus $61\text{--}170\text{ }\mu\text{m}$ long, bifurcating near midway between pharynx and acetabulum; caeca arcuate, terminating near posterior extremity where they are separated from each other by vitellaria and excretory vesicle. Acetabulum spherical, $107\text{--}164 \times 127\text{--}169\text{ }\mu\text{m}$, just pre-equatorial. Sucker ratio 1: 1.17–1.78.

Testes spherical to elongate, occasionally with incisions, symmetrical, obliquely behind acetabulum; the right $158\text{--}271 \times 148\text{--}235\text{ }\mu\text{m}$; the left $188\text{--}301 \times 97\text{--}235\text{ }\mu\text{m}$. Vas efferens arising from midlevel of each testis. Vas deferens practically absent. External seminal vesicle tubular, winding, longer than cirrus pouch, $377\text{--}536 \times 22\text{--}49\text{ }\mu\text{m}$, extending near pre- or postacetabular level. Cirrus pouch subcylindrical, sometimes arcuate, $149\text{--}270 \times 51\text{--}77\text{ }\mu\text{m}$, lying rather longitudinally between posterior to caecal bifurcation and genital pore, including elliptical internal seminal vesicle $61\text{--}128 \times 36\text{--}67\text{ }\mu\text{m}$, subglobular pars prostatica $35\text{--}102 \times 35\text{--}51\text{ }\mu\text{m}$ and cirrus $17\text{--}102\text{ }\mu\text{m}$ long. Prostatic cells surrounding proximal portion of cirrus pouch. Genital pore dorsal, on left side of pharynx.

Ovary trilobed, occasionally each lobe with bifurcated end, $137\text{--}288 \times 122\text{--}255\text{ }\mu\text{m}$ as a whole, median, between both testes. Oviduct arising from anteromedian end of ovary, connected with short duct of seminal receptacle and then receiving vitelline reservoir. Laurer's canal originating from junction of seminal receptacle with oviduct, running backward to open dorsally some distance posterior to ovary. Seminal receptacle saccular, $147\text{--}255 \times 51\text{--}164\text{ }\mu\text{m}$, posterosinistral to ovary. Uterus pre-ovarian, sinistral and anterior to acetabulum. Metraterm weak, narrow, $1/2$ to $3/4$ length of cirrus pouch. Uterine eggs 3–25 in number, oval, $61\text{--}72 \times 44\text{--}48\text{ }\mu\text{m}$. Vitellaria occupying lateral fields from near caecal bifurcation to posterior extremity, confluent posterior to ovary. Excretory vesicle tubular, extending to preacetabular level, occasionally through right and anterior side of acetabulum to left side of it; pore terminal.

Discussion. This species differs from the foregoing *Neohypocreadium longisaccatum* in that a small cirrus pouch does not extend the anterior margin of the acetabulum, a genital pore opens dorsally on the left side of the pharynx, and an external seminal vesicle is longer than the cirrus pouch.

***Neohypocreadiinae* subfam. nov.**

Lepocreadiidae. Body round to oval, spined. Dermal glands developed. Oral sucker subterminal; prepharynx very short or practically absent; pharynx moderately developed; esophagus short; caeca terminating near posterior extremity. Acetabulum as large as oral sucker, just pre-equatorial. Testes symmetrical, obliquely behind acetabulum. External seminal vesicle present. Cirrus pouch elongate or subcylindrical, enclosing internal seminal vesicle, pars prostatica and cirrus, extending postacetabular or postbifurcal level. Genital pore dorsal, anterosinistral to caecal bifurcation or on left side of pharynx. Ovary trilobed, median, between both testes. Seminal receptacle and Laurer's canal present. Uterus preovarian. Vitellaria extending along caeca, confluent posterior to ovary. Excretory vesicle reaching preacetabular level. Intestinal parasites of marine teleosts.

Type genus: *Neohypocreadium* gen. nov.

***Neohypocreadium* gen. nov.**

Lepocreadiidae, Neohypocreadiinae. Body round to oval, spined. Dermal glands scattered. Oral sucker subterminal; prepharynx very short or practically absent; pharynx moderately developed; esophagus short; caeca arcuate, terminating near posterior extremity. Acetabulum as large as oral sucker, just pre-equatorial. Testes round to oval, occasionally with incisions, symmetrical, obliquely behind acetabulum. External seminal vesicle tubular. Cirrus pouch large or small, elongate or subcylindrical, including internal seminal vesicle, pars prostatica and cirrus, extending postacetabular or postbifurcal level. Prostatic cells surrounding proximal portion of cirrus pouch. Genital pore dorsal, anterosinistral to caecal bifurcation or on left side of pharynx. Ovary trilobed, median, between both testes. Seminal receptacle saccular, posterosinistral to ovary. Laurer's canal opening dorsally some distance posterior to ovary. Uterus preovarian, anterosinistral to acetabulum. Metraterm well or poorly developed. Vitellaria occupying lateral fields from caecal bifurcation to posterior extremity, confluent posterior to ovary. Excretory vesicle tubular, reaching preacetabular level. Intestinal parasites of marine teleosts.

Type species: *Neohypocreadium longisaccatum* sp. nov.

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