

# MARINE NEMATODES FROM THE BAY OF BENGAL

## I. PHASMIDEA

BY

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(*With a plate*)

In January 1956 the writer made a large collection of free-living marine nematodes at Cox's Bazar, located on the Bay of Bengal below Chittagong near the Burma border. Most of the nematodes were obtained off Sonadia Island, a sand island about two miles from the mainland. The island has sand banks on its south side and broad mud flats on the north side. The prevailing current is from the southeast. The species reported here are of the Class Phasmidea, a group which is plant-parasitic, animal-parasitic, or free-living in soil and freshwater, but rarely in the sea.

### Family RHABDITIDAE

***Rhabditis (Choriorhabditis) marina* Bastian, 1865 var. *bengalensis*,**  
new variety

*Description* : Transparent body with fine striations ; lateral fields with six fine incisures, about 1/6 the body diameter wide, beginning just behind the stoma and ending just behind the spicule head. Six distinct lips with small papillae. Cervical papillae just above the level of the excretory pore. Stoma typical,  $15\mu$  deep, with conspicuous telorhabdions. Oesophagus with swollen corpus, slightly narrowed isthmus, and valvate bulb. Excretory pore just above the oesophageal bulb ; excretory sinus cell in the curve of the bulb. Testis extending almost to the oesophageal bulb, reflexed  $218\mu$ . Spicules  $48\mu$  long, cephalated, with internal division. Gubernaculum  $20\mu$  long. Bursa faintly striated, enclosing the tail tip. Genital papillae : 3 pairs of large preanal papillae, equally distributed ; 2 groups of 3 pairs each of postanal papillae. Fifth papillae turned outward at the tip ; all papillae extending to the bursal margin. Phasmids just behind the sixth pair of genital papillae. Tail 1.5 anal diameters long.

*Male* : 1.12 mm. ; *a*, 20 ; *b*, 5.8 ; *c*, 35.1.

*Habitat* : Living within a large clump of branching filamentous alga (*Siphonocladus*), collected from a sandy bottom in 1 foot of water at low tide.

*Type locality* : Sonadia Island, Bay of Bengal, Cox's Bazar, East Pakistan.

*Discussion* : This specimen differs from the published descriptions (e.g., Schuurmans Stekhoven, 1935 ; Meyl, 1955) and our own observations (at Woods Hole, U.S.A.) of the typical form of *Rhabditis marina* in the distribution of the preanal genital papillae. In *R. marina* the first pair of papillae is in line with the head of the spicules and the second and

third pairs are close together just anterior to the anus. While there is variability in the female tail (Osche, 1954), the position of the genital papillae is a constant character. Therefore we are designating a new variety to embrace our unique specimen.

#### Family CEPHALOBIDAE

#### *Halicephalobus* new genus

*Definition*: Cephalobidae, Panagrolaiminae. Lips 4, distinct. Pro-rhabdions distinct. Meso- and metarhabdions broken or obscure; telorhabdions distinct. Oesophagus with well-defined median bulb. Isthmus shorter than corpus. Terminal valvate bulb. Prodelphic ovary, doubly reflexed. Differs from all genera of Panagrolaiminae except *Tricephalobus* Steiner, 1936, in the possession of a median oesophageal bulb, and from all other genera in the double flexure of the ovary.

*Type species*: *Halicephalobus limuli* n. sp.

#### *Halicephalobus limuli* new species

*Description*: Cuticle with fine striations,  $1\mu$  wide. Faint lateral fields,  $1/8$  to  $1/10$  of the maximum body diameter wide. Lips 4, distinct, the lateral lips seemingly confluent with the ventro-submedial. Stoma cylindrical, total length  $11-12\mu$ . Prorhabdions distinct. Posterior part of stoma almost as wide as the anterior part, inclined slightly ventrally. Ventral telorhabdion more prominent than the dorsal one. Ventral metarhabdion distinct and unbroken (in living worms); dorsal metarhabdions broken. Musculature surrounds the base of the prorhabdions. Oesophagus composed of a long corpus, a swollen median bulb, a narrow isthmus, and a terminal valvate bulb. The nerve ring crosses at the mid-isthmus. The excretory pore is ventral to the nerve ring, just anterior to the terminal bulb. Cervical papillae located midway between the nerve ring and the terminal bulb. Phasmids indistinct, probably at 33% of the tail length. Prodelphic ovary, extending  $12-17.2\%$  of the body length forward, reflexing and extending  $7.1-14.6\%$  of the body length posterior to the vulva, then reflexing again to just before the vulva. Post-vulvar uterine sac lacking. One egg with shell in the uterus at a time,  $52 \times 18\mu$ , with a large distinct nucleolus. Tail uniformly tapering to a tip, conical,  $4.5-5$  anal diameters long.

*Female*:  $426-460\mu$ ; *a*,  $20-21.3$ ; *b*,  $4-4.8$ ; *c*,  $6.7-7$ ; *V*,  $59.3-61.2\%$ .

*Habitat*: Among algae and debris around the leg bases of the king or horseshoe crab (*Limulus*).

*Type locality*: Mouth of a small freshwater stream, Cox's Bazar, Bay of Bengal, East Pakistan.

*Discussion*: Four specimens of *Limulus* were collected in January, 1956, killed in 5% formalin in sea water, and preserved in a 5 gallon can with several fishes. After 5 months, scrapings of algae and debris were taken from the leg bases of the king crabs and examined. Hundreds of individuals of *Halicephalobus* were found, including many which were living and producing ova. The formalin at this time was still concentrated enough to preserve all the specimens in the can in good condition, but when living worms were transferred to fresh 5% formalin in distilled water they were killed. Some of the living nematodes were placed in tap water in a Petri dish, where they continued to survive and lay eggs.

Juveniles hatched out and grew to maturity, but there seems to have been no further reproduction. A few of the nematodes were still alive after 6 weeks. At no time were any males found, and reproduction seems to be without males.

Many members of the Family Cephalobidae have previously been reported from haline biotopes (e.g., Meyl, 1955). The commensal association of free-living marine nematodes with snails, crabs, crayfish, and gammarids is also well known (Baylis, 1915; Cobb, 1928; Chitwood, 1935; W. Schneider, 1932; Timm, 1951; Kinne and Gerlach, 1953).

Chitwood and Timm (1954) observed that *Rhabditis marina* can survive in either sea water or tap water. The writer has kept *Rhabditis ocypodis* Chitwood, 1935, alive for more than 6 weeks in both tap water and artificial sea water (3.1% saline). *R. ocypodis* is a commensal of the 'ghost crab', *Ocyropsis albicans*, on North Carolina (U.S.A.) beaches. Osmotic regulation or osmotic adjustment of marine nematodes has never been reported (cf. Krogh, 1939), but would make an interesting study. In unpublished experiments we have shown that *Paracanthocheilus caecus* (Bastian, 1865) is poikilosmotic rather than homoiosmotic. Due to the impermeability of the cuticle osmotic adjustment does not take place through the cuticle, but probably is a function of the ventral excretory cell and, to a lesser extent, the intestinal cells.

#### Family TYLENCHIDAE

##### *Tylenchus marinus* new species

*Description*: Body cylindrical, transparent, tapering rapidly anteriorly from the middle bulb and finely tapering posteriorly from just behind the anus; posterior half of tail uniformly tapering to a fine point. Cuticular striation very fine, not observed on the head. Lateral field with 4 faint incisures. Head not set off, not supported internally by sclerotized pieces; cheilorhabdions unsclerotized. Stylet fine,  $12.8\mu$  long, without distinct basal knobs but with sclerotized attachment points. Oesophagus tylenchoid; middle bulb well set off, with small valves and weak musculature; somewhat expanded terminal bulb, not extending over the anterior end of the intestine. Excretory pore opposite the beginning of the terminal bulb. Ovary single, outstretched, extending almost to the base of the oesophagus; short post-vulvar uterine sac. Cervical papillae opposite excretory pore. Phasmid at the end of the conical portion of the tail. Tail  $11.7\mu$  anal diameters long, with uncinata tip.

*Female*:  $610\mu$ ; a, 32; b, 5.6; c, 6; V, 71%.

*Habitat*: Living in the top inch of bottom mud on a mud flat at low tide.

*Type locality*: Sonadia Island, Bay of Bengal, Cox's Bazar, East Pakistan.

*Discussion*: The systematic position of this species is difficult to determine since the male is lacking. The only known genus of marine tylenchs is *Halenchus*, represented by *H. fucicola* (de Man, 1892) Cobb, 1933; *H. mediterraneus* (Micoletzky, 1922) Cobb, 1933; *H. zosterae* (Allgén, 1934) Chitwood, 1951; and *H. mexicanus* Chitwood, 1951. The first two species have a hooked tail, as in our specimen, but the oesophagus of *Halenchus* is characterized by the presence of free oesophageal glands overlapping the anterior of the intestine. It also has internal cephalic sclerotizations and a striated lip region. The plant-parasitic

genus *Ditylenchus* does not have such a lengthy tail. We are placing our specimen provisionally, therefore, in the genus *Tylenchus*.

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#### ABBREVIATIONS ON PLATE

C B	— copulatory bursa	OES	— oesophagus
C P	— cervical papilla	OES B	— oesophageal bulb
E	— egg	OES V	— oesophageal valve
EX P	— excretory pore	OV	— ovary
G P	— genital papilla	PH	— phasmid
GUB	— gubernaculum	SP	— spear
H	— hemizonid	SPIC	— spicule
INT	— intestine	ST	— stoma
L IN	— lateral incisures	UT	— uterus
N R	— nerve ring	V	— vulva