

A NEW LOXOSOMATID FROM BRAZIL

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(with two plates)

On a collecting trip with my husband to the rocks of the peninsula of Itaipú, on the western border of the bay of Santos, we gathered tubes of Terebellidæ at the low-water line. Among these tough tubes I found a small material (about ten specimens) of a new Loxosomatid that I take the pleasure to name *Loxocalyx mortenseni*, in honour of our dear friend, Dr. TH. MORTENSEN in Copenhagen.

From the tufts of tubes that we brought to the laboratory, the specimens let themselves go and dropped into the water. One animal was found attached to the abdomen of a Copepod that brought it to the surface of the examining-dish. Changing of their place is more frequent also in the non-larval stages of Loxosomatids than was mentioned in Cori's last monograph (1936, p. 80). Not only *Loxosoma saltans* Asshet. and *L. davenporti* Nickers. creep about (Assheton 1912, p. 124-127), but also recently detached buds of *L. annelidicola* (Bened. & Hesse) move like looper-caterpillars (Prouho 1891, p. 111) and those of *L. nitschei* Vig. (Roper 1913, p. 56) and *L. crassicauda* Sal. (Atkins 1932, p. 331) were observed to swim freely.

Description of *Loxocalyx mortenseni*, n. sp. (Fig. 1-3)

The animals are small, measured in balsam mounts 0,525 mm. ; 0,520 ; 0,490 ; 0,400 ; etc. in total length. The measurements of an old male and the oldest bud are, in millimeters :

Total length : 0,512 ; 0,317.

Length of adhesive plate : 0,110 ; 0,095.

Length from beginning of foot-gland to end of plate : 0,220 ; 0,146.

Length from tip of tentacles to fundus of stomach : 0,280 ; 0,183.

Breadth of adhesive plate : 0,135 ; 0,070.

Breadth of stalk : 0,050 ; 0,036.

Breadth of calyx on the level of the stomach : 0,120 ; 0,085.

Breadth of calyx on the level of the testes : 0,150 ; 0,085.

Breadth of lophophore : 0,170 ; 0,120.

It is difficult to determine the exact proportion of calyx and stalk, because they are not sharply separated from one another, but certainly the calyx is longer than the stalk. The calyx is about twice as long as broad, and the lophophore (n) is a little wider than the calyx. In mature animals the swelling of the gonads (t) increases the diameter of the upper part of the calyx.

The tentacles (u) are ten in number in all specimens, also in the buds. They are slightly curved in the preserved specimens and nearly as long as the diameter of the lophophore. The border of the atrium has high, ciliated cells (j) that form a thick ring around the center of flat cells, in the middle of which the rectum (r) arises. The stomach occupies the whole breadth of the calyx. Its outline is smooth and almost spherical. There are no lateral lobes. The external wall of the alimentary tract is of nearly equal height from the end of the œsophagus (f) to the anal opening (a). The atrial wall (l) of the stomach is lined with high cells with basal nuclei filled with big yellow granules of storing nature, the "hepatic spherules" of Harmer (1885, p. 276), "liver-lobes with constructive metabolism" of Assheton (1912, p. 129) and Atkins (1932, p. 328). The lateral walls of the stomach show each a field (k) of high, strongly staining cells with a big, nearly central nucleus, the "pancreatic diverticles", "glandular portions", or "secretory cells" of earlier workers. The stomach is set off from the intestine (i) by a fold of higher cells (x), and a sphincter (w) separates intestine and rectum (r). The aspect of the latter varies greatly according to the phase of function. Its cells are rather low, or high and stuffed with large yellow spherules (Atkins 1932, p. 370) that resemble those in the "liver-lobes". The outermost part of the rectum is even sometimes everted into the atrium. Similar variation of the aspect of the rectum has been described by Atkins (1932, p. 329).

The calyx tapers gradually towards the stalk and contains a foot-gland (g) before it has reached its smallest diameter. At this level the axis of the animal forms a wide angle towards the anal side of the calyx, and the stalk continues with equal width, till it ends obliquely in the adhesive plate (p). In the old specimens the foot-gland is an almost perfect sphere that contains a small number of peripheral nuclei embedded in a homogenous mass; in the buds the cells composing the gland are still separated from one another.

The adhesive plate (p) is approximately hexagonal, and its border is provided with a row of 30-31 glandular cells (c), each of which ends with a round papilla. On the oral side the row of adhesive cells is incised at the onset of the stalk. Here the border of the plate forms two knobs (d). The anal side of the plate is slightly concave and limited by two corners of the hexagon. The gland-cells liken those drawn by Harmer (1885, t. 19 f. 7, 8) from the calyx of *L. crassicauda*, and a papilla of secretion (sp) is always fastened before the outlet. *L. neapolitana* has similar adhesive cells at the tip of the foot (Kowalewsky 1866, f. 1, 2). From the foot-gland a strand of denser tissue (tr) runs to the anal border of the plate. This strand is specially in older buds (h) accompanied by two rows of cells that correspond to the "duct" or groove of the foot-gland (Schmidt 1876, f. 2, 3; Harmer 1885, f. 2, 20; Atkins 1932, p. 231 f. 2 B). The muscles of the plate are all longitudinal fibres (z).

Two or even three buds (b) occur simultaneously on every side of the calyx, the youngest ones orally to the oldest. They are fixed to the parent near the end of their foot with the future upper side of the basal plate. The glandular cells of the border of the plate appear in their definitive shape already in a bud of 0,25 mm. with quite short tentacles. The oldest fixed

bud, that fell off during manipulation, is 0,317 mm. long.. In these buds the groove of the foot-gland is clearly recognizable with two rows of juxtaposed cells (h).

Of the excretory organs nothing was seen, as little as of the nervous system and sense organs. Of the present material 5 specimens were males with well developed paired testes (t) of equal size on both sides, four of them with sperm in the vesicula seminalis (v). Three were females with no more than one big ovum (o) of 0,075-0,084 mm. at a time, none of them with embryos. Of the three oldest buds one, still attached to the male parent, had a gonad (q) that was too small for the sex to be determined.

Discussion of *Loxocalyx mortenseni*

I think that *Loxocalyx** Mortensen (1911, p. 405) is a well defined genus of the family Loxosomatidæ Hincks (1880, p. 571 : Loxosomidæ). It is characterized by a foot-gland persisting throughout life. Cori (1936, p. 111) asserts that Harmer (1915) did not consider the establishment of *Loxocalyx* as ascertained, but this is one of the unfortunately numerous inexactitudes of Cori's for the most part useful monograph of the Entoprocta. Really Harmer (1915, p. 7) gave an inventory of this genus, described a new species of *Loxocalyx* (p. 6) and transferred (p. 8) an other formerly described by him as *Loxosoma* (1885, p. 263) to Mortensen's genus.

Harmer was in doubt about the value of *Loxosomella* Mortensen (1911, p. 399, 406) with foot-gland in the buds, but not in the adults, and included the species of the Siboga-collection with this character (*annulatum*, *velatum*) in the genus *Loxosoma* Keferstein (1862, p. 131). Indeed Schmidt (1878, p. 72-73) found a persisting foot-gland in *Loxosoma crassicauda* Salensky (1877, p. 2), the genotype of *Loxosomella*. Atkins observed (1932, p. 324-326) that the foot-gland in this species atrophies so slowly that it was still present in more than 77% of the specimens already attached to their substrata.

The present species has a permanent foot-gland and therefore belongs to *Loxocalyx*. An external secretion of this gland was not observed, and the fastening of the animal to the tubes of the Terebellid is due to the unicellular glands on the border of the pedal plate. Thereby *L. mortenseni* is distinguished from all other species of *Loxocalyx*. These are, in chronological order : 1) *neapolitana* (Kowalewsky 1866, p. 3). The four adhesive papillæ, as well as the absence of alate expansions of the foot approximate this species to *mortenseni*. But *neapolitana* has no dilated basal plate, and a glandular groove, the "duct" of Kowalewsky and other older authors, unites the foot-gland with the end of the stalk. It is noteworthy that this inhabitant of the tubes of *Phyllochætopterus*, as well as *Loxosoma loxalina* Assheton (1912, p. 118) and *L. saltans* Assh. (ibid., p. 118), both from tubes of Maldanids, have such "toe-like organs" (p. 128), comparable with those of *Loxocalyx mortenseni*. But other Loxosomatidæ associated with tubicolous Poly-

(*) If this original spelling is maintained, as Harmer (1915, p. 6), Atkins (1932, p. 340) and Cori (1936, p. 111) do, those specific names that are adjectives must be used with female termination. But if the form "*Loxocalix*" was adopted, male terminations must be applied.

chæta have no such organs, viz. *Loxosoma annelidicola* (Prouho 1891, t. 5 f. 3, 7-8, 11), *L. davenporti* Nickers., a figure of which I know only from Osburn's paper (1912, t. 18 f. 1), and the already mentioned *L. crassicauda* Salensky.

2) *singulare* (Schmidt 1876, p. 3); see no. 7.

3) *raja* (Schmidt 1876, p. 3), the genotype, with wing-like expansions of the foot, as occur in all species of *Loxocalyx* with exception of *neapolitana* and *mortenseni*.

4) *cochlear* (Schmidt 1876, p. 3; figure: id. 1878a, p. 181). This is one of the two species of the genus with only 8 tentacles in the full-grown stage. The foot has narrow alate expansions. It is certainly a good species, not a synonym of *neapolitana*, as Barrois (1877, p. 8, 9) said.

5) *alata* (Barrois 1877, p. 7, 9). The name was introduced to substitute that of no. 2, correctly recognized by Barrois as different from *Loxosoma singulare* Keferstein (1862, p. 131). But, as Harmer says (1915, p. 8), *alata* was very incompletely characterized by Barrois. As its stalk is twice as long as the calyx (Barrois, l. c., t. 16 f. 4), it is probably not identical with no. 2, the stalk of which is considerably shorter than the calyx. *L. alata* continues an uncertain species.

6) *tethyx* (Salensky 1877, p. 3, 6; Harmer 1885, p. 261). This species has generally 12, sometimes 13 or 14 tentacles. The stalk is in most cases at least twice and up to six times as long as the calyx. Wing-like expansions of the foot are present.

7) *pes* (Schmidt 1878, p. 69). A very typical *Loxocalyx* with large alate expansions of the foot, that contains a volumous foot-gland and a distinct plantar groove (Schmidt 1876, t. 1 f. 2). The name substitutes that of n. 2.

8) *leptoclini* (Harmer 1885, p. 263; 1915, p. 8). The foot has strongly marked alate expansions. The length of the stalk varies: in the mediterranean material it is as long as the calyx; in the malayan one nearly twice this length.

9) *alata* (Jullien & Calvet 1903, p. 29), p. 29). Although identified with no. 5, it seems to be different (Harmer 1915, p. 8), because the stalk is much shorter than the calyx. The wing-like expansions of the foot make it probable that the species belongs to *Loxocalyx*, but a foot-gland is neither described nor drawn.

10) *lineata* Harmer (1915, p. 6). Characterized by four longitudinal lines along the stalk, that has usually twice the length of the calyx.

11) *sawayai* Marcus (1939, p. 115). With 8 tentacles like no. 4, but smaller, with a more rhombic foot and a stalk usually much shorter than the calyx.

Loxosoma harmeri E. Schultz (1895), the original description of which I have not seen, has been approached to *Loxocalyx* by Mortensen (1911, p. 405), and Cori's figure (1930, f. 9; 1936, f. 18) and text (1936, p. 105) support this view. Harmer (1915, p. 15) maintains *harmeri* in *Loxosoma*. In any case, this species with cirriform organs at the margin of the calyx and the foot-gland situated immediately above the small adhesive disc differs widely from *Loxocalyx mortenseni*.

Resumo

Encontrei tubos de Terebellidæ no costão do forte Itaipú (Santos), perto da linha da vasante e, nêstes, uma nova espécie das Loxosomatidæ, *Loxocalyx mortenseni*. A glândula do pé (g) situa-se a longa distância da placa adesiva (p). O sulco glandular (h) que liga a glândula ao pé, nos botões, envolve nos adultos. A placa basilar adere ao substrato por meio de células secretoras (c) que orlam o bordo da placa hexagonal. A única espécie do gênero, em que semelhantes células glandulares basilares ocorrem, é *L. neapolitana* (Kow.), mas aí são pouco numerosas, 2 maiores, externas e 2 menores, internas. Além disso, *L. neapolitana* não possui placa adesiva, e o sulco da glândula do pé persiste nos adultos, como nas outras espécies de *Loxocalyx*.

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PLATE I

Loxocalyx mortenseni, n. sp.

- Fig. 1 — Living specimen in lateral view.
Fig. 2 — Living animal seen from oral side.
Fig. 3 — Animal alive ; anal view.
Fig. 4 — Transverse section of stalk.
Fig. 5 — Transverse section on the level of the knobs (d).
Fig. 6 — Transverse section of adhesive plate.

c, glands on the border of the adhesive plate. d, knobs on the border of the adhesive plate. sp, papilla of secretion. tr, strand of denser tissue.

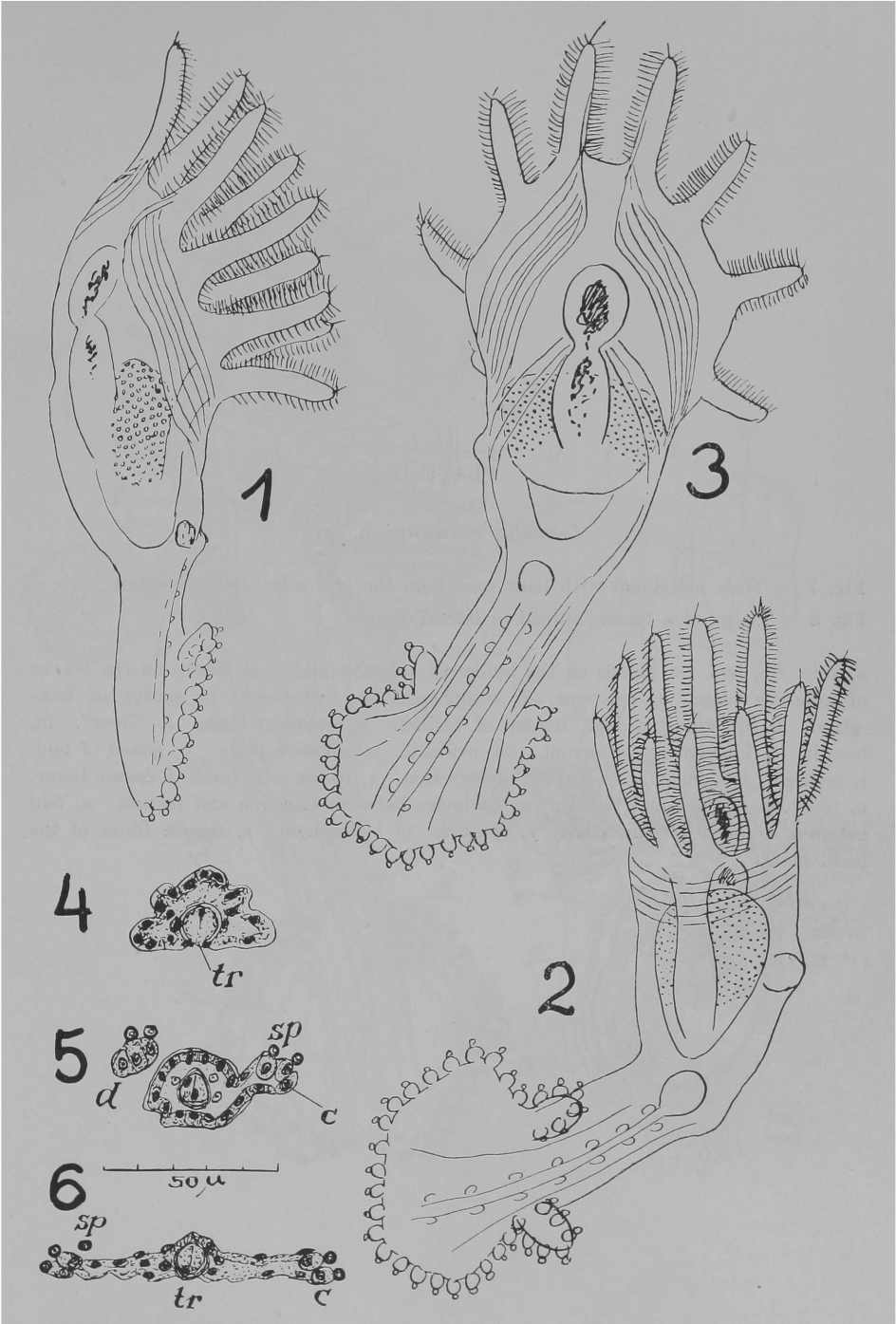


PLATE II

Loxocalyx mortenseni, n. sp.

Fig. 7 — Male individual with buds seen from the oral side. Balsam-mount.

Fig. 8 — Calyx of a female animal in lateral view.

a, anus. b, bud. c, glands on the border of adhesive plate. d, knobs on the border of adhesive plate. e, epistome. f, oesophagus. g, foot-gland. h, groove of foot-gland. i, intestine. j, high border of atrium. k, secretory cells. l, "liver". m, mouth. n, lophophore. o, ovum. od, oviduct. p, adhesive plate. q, gonad of bud. r, rectum. s, stomach. sp, papilla of secretion. t, testes. tr, tract of denser tissue. u, tentacles. v, seminal vesicle. w, sphincter between intestine and rectum. x, fold between stomach and intestine. y, sphincter of lophophore. z, muscle fibres of the basal plate.

