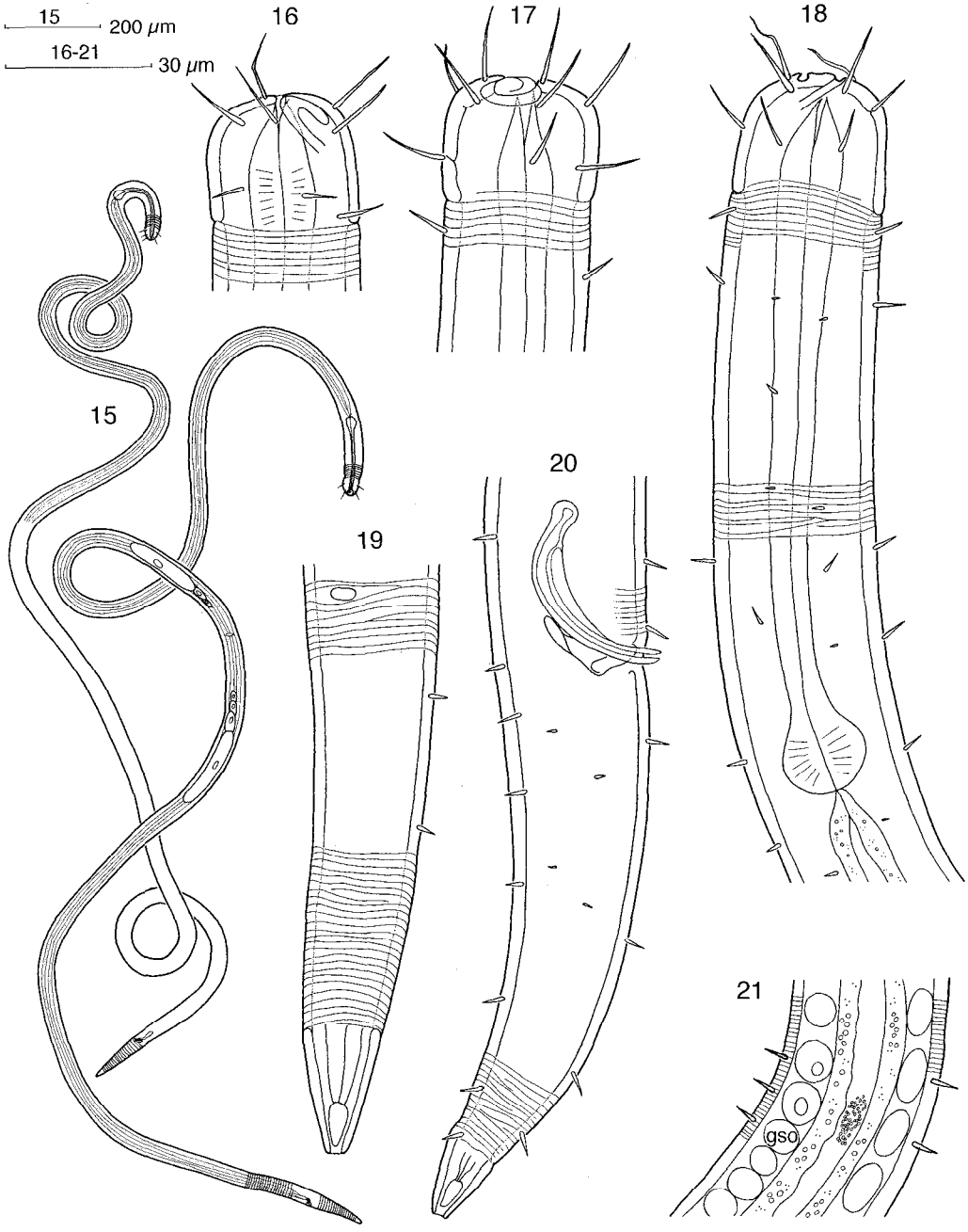
Leptonemella vestari sp.n.

Type material: Holotype: male, L = 3220, a = 80.5, b = 26, c = 27, NHMW-EV 3832; **Allotype:** female, L = 3556, a = 102, b = 30, c = 25, NHMW-EV 3833. **Paratypes**: male, L = 2952, a = 84, b = 20, c = 24, NHMW-EV 3834; male, L = 2751, a = 91, b = 20, c = 21, NHMW-EV 3835; length (L) in µm.

Additional material: several specimens in the authors' collection and those used for SEM.



Figs 15-21: *Leptonemella vestari* sp.n. (15) total view of holotype (NHMW-EV 3832) and allotype (NHMW-EV 3833); (16) head of male paratype (NHMW-EV 3835) with additional seta (as); (17) head of allotype; (18) anterior end and pharyngeal region of paratype (NHMW-EV 3834), showing cephalic capsule and pharynx; (19) caudal region of allotype; (20) caudal region of holotype with spicular apparatus and postcloacal setae; (21) midbody region, showing glandular sensory organs (gso) and intestine with clusters of granular material.

Type locality: Bay of Veštar, south of the town of Rovinj, Croatia (45°02'8"N, 13°41'1"E), northern Adriatic Sea; moderately well-sorted, coarse sand dominated by biogenic calcareous components low in organic matter; shallow subtidal at 3-4 m water depth, rare compared to *L. juliae* sp.n..

Etymology: The species is named after the Bay of Veštar, the type locality.

Description: Body long, cylindrical, completely covered by a multilayered coat of cocci (1.5-1.8 µm long) (Fig. 24) except for head and tip of the conical tail (Figs 15, 19). Bacteria white in incident and dark in transmitted light. Cuticle strongly annulated, annuli 0.7-0.8 µm wide (13-15 annuli/10µm). Solid non annulated cephalic capsule 26-30 µm long and 2 µm thick, slightly rounded and heavily cuticularised.

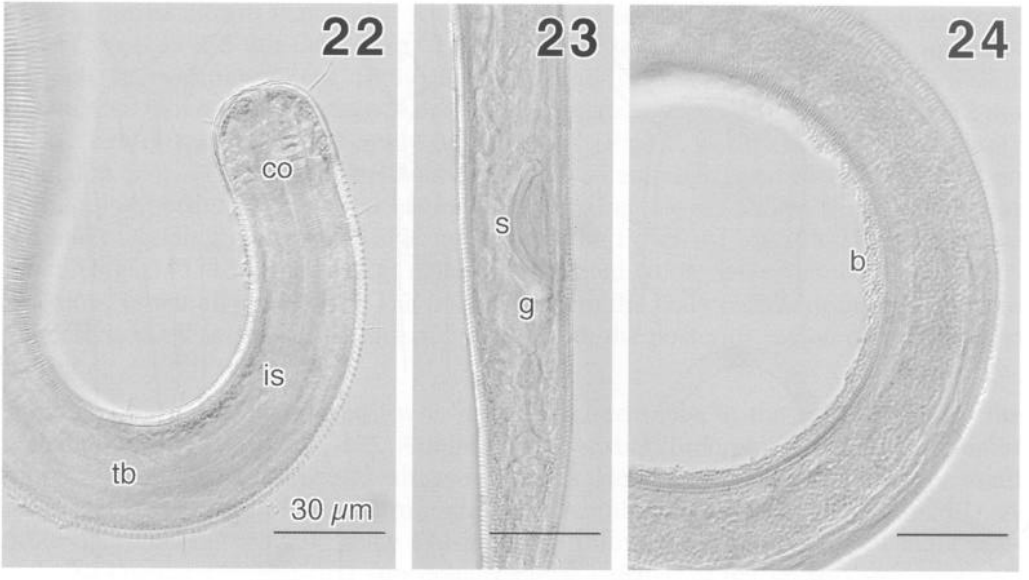
Large amphids (24-26 µm long) with deeply incised fovea close to the anterior end of the cephalic capsule. Amphids with sexual dimorphism: spiral in females with 1.5 turns, loop-shaped in males (Figs 16, 17). Mouth opening surrounded by circle of six minute labial papillae (1 µm long), only seen in *en-face* view (Fig. 26). Arrangement of cephalic setae similar to that in *L. juliae* sp.n. but setae shorter and sometimes additional single setae posterior to the second circle of subcephalic setae (at the termination cephalic capsule and annulated body cuticle) are seen (Figs 16, 25). Four cephalic setae (15-17 µm), a circle of eight subcephalic setae (10-13 µm) at the level of the amphid. The second circle of eight subcephalic setae more posterior with 14-16 µm long setae. Short somatic setae, 7 µm long, in six rows (except in the cervical region, where eight rows can be seen) over most of the body (Fig. 27). Females without anal setae. Males with 3

short (5.5 µm long) precloacal setae and 4 postcloacal setae of the same size (Fig. 20). A pair of small, stout terminal setae (5 µm) on the tail tip (Fig. 28). The tail contains three caudal glands, which open separately at the terminal spinneret (Fig. 28).

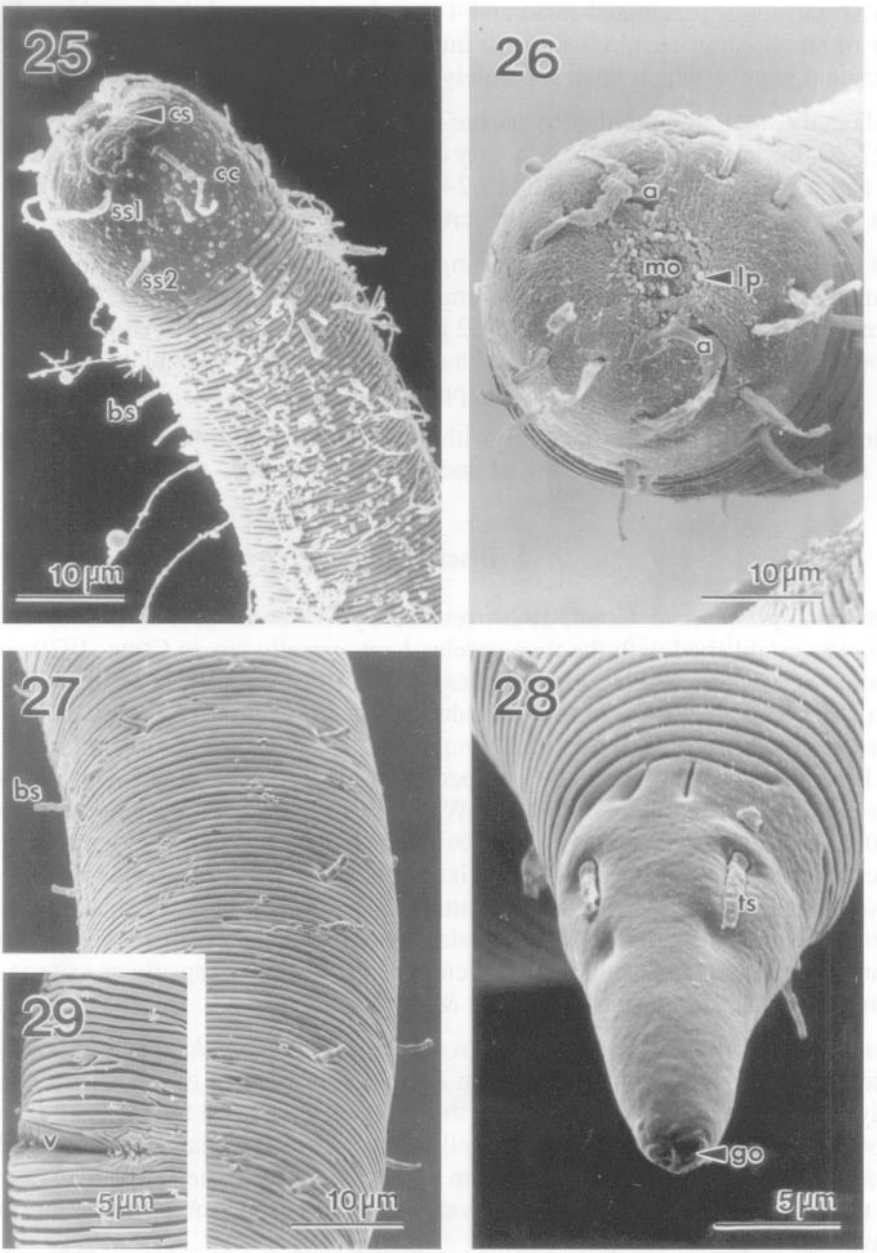
Buccal cavity small and tubular, tri-partite pharynx consisting of a slightly swollen corpus (27-30 µm long, 13 µm wide), a very long, narrow isthmus (92-99 µm long, 9 µm wide) and a spherical terminal bulb (19-24 µm long, 20 µm wide) (Figs 18, 22). Nerve ring at approximately two-thirds of the length of the pharynx.

Single outstretched testis in males, starting at 25-30% of the body length, length 350-370 µm. Vas deferens filled with small granules. Spicula slightly cephalate proximally, arcuate, length 33-37 µm (chord) or 43-52 µm (arch), with a velum. Gubernaculum well developed, consisting of a proximal and a distal piece joined by a plate and forming an angel, length 16-19 µm (Figs 20, 23). Supplements absent.

Female reproductive system didelphic with two opposed antidromous ovaries (Fig. 15). Vulva a small transverse slit at 51% of body length (Fig. 29).



Figs 22-24: *Leptonemella vestari* sp.n., interference contrast micrographs of holotype (NHMW-EV 3832); (22) anterior region, with the tri-partite pharynx consisting of corpus (co), isthmus (is), and terminal bulb (tb); (23) cloacal region with the spicular apparatus consisting of spiculum (s) and gubernaculum (g), (24) midbody region, showing symbiotic bacteria (b).



Figs 25-29: *Leptonemella vestari* sp.n., SEM photographs of (25) anterior body region of a female, showing cephalic capsule with a circle of cephalic setae (cs), two circles of subcephalic setae (ss1+2), and somatic setae (bs); (26) *en-face* view of anterior end of male, showing amphids (a), mouth opening (mo) surrounded by six labial papillae (lp) and circles of cephalic and subcephalic setae: (27) midbody region, showing the annulation and rows of somatic setae (bs); (28) caudal region of female, showing the tip of the tail with terminal setae (ts) and caudal gland openings (go); (29) midbody region, showing the vulva (v).

Discussion

The genus *Leptonemella* COBB, 1920, revised by GERLACH (1950) and by BOUCHER (1975), was established with the type species *Leptonemella cincta* COBB, 1920 collected from a sandy beach in Miami, Florida. GERLACH & RIEMANN (1973) recognised six species in the genus, but BOUCHER (1975) denoted *L. froeyensis* (ALLGEN, 1946) and *L. parabullata* (ALLGEN, 1929) as *species inquirendae* because of the incomplete descriptions. BOUCHER (1975) compared five species in his key, including *Leptonemella granulosa* described in that paper. PLATT & WARWICK (1988), not following the opinion of BOUCHER (1975), recognised seven species. We consider the following species as belonging to *Leptonemella*: *L. aphanothecae* GERLACH, 1950; *L. cincta* COBB, 1920; *L. gorgo* GERLACH, 1950 and *L. granulosa* BOUCHER, 1975. On the basis of material collected close to the type locality in the Maldive Islands we place *Leptonemella sigma* GERLACH, 1963 in the genus *Laxus* using the characters of the cephalic capsule as criteria, as defined in OTT & al. (1995) and URBANCIK & al. (1996 b).

Leptonemella cincta is distinguished from all other *Leptonemella* species by its slit-like amphid. *Leptonemella juliae* differs from *L. aphanothecae*, *L. gorgo* and *L. granulosa* in body size and proportions, especially the short pharynx, and the long somatic setae. The four cephalic setae of *L. juliae* as well as the eight subcephalic setae from the first circle are the longest measured setae from all known *Leptonemella* species. *L. juliae* is much thicker than *L. granulosa*. Moreover the somatic setae of *L. juliae* are twice as long as these setae from *L. granulosa*.

Leptonemella vestari differs from *L. aphanothecae* and *L. granulosa* in body size and proportions, and in the length of the setae in the second subcephalic circle, which are equal to that of the first. In this respect *L. vestari* is similar to *L. gorgo*. It differs, however, from the latter species in the shape of the gubernaculum, which is much more complex in *L. vestari*, and in the number of pre- and postcloacal setae in the midventral line of males, with *L. gorgo* having 5 precloacal and 8 postcloacal setae, *L. vestari* 3 and 4 respectively (Table 1).

Tab. 1. Differental diagnosis using selected features. * Cobb (1920); + Gerlach (1964); # personal observation on paratype R3774 AB (Muséum National d´Histoire Naturelle, Boucher 1975)

species	*L. aphanothecae*	*L. cincta*	*L. gorgo*	*L. granulosa*	*L. juliae*	*L. vestari*
amphid (female)	spiral	slit*,+	spiral	spiral	spiral	spiral
cephalic circle	short (15-20 µm)	medium (27 µm)+	medium (20-27 µm)	short (13-17 µm)	long (30-31 µm)	short (15-17 µm)
subcephalic circles	first circle longer (13-17 µm) than second (8-12 µm)	first circle longer (25 µm) than second (10 µm)+	nearly equal (first: 16-19 µm, second: 16-19 µm at least)	first circle longer (11-15 µm) than second (5-6 µm)	first circle longer (27-29 µm) than second (9-13 µm)	nearly equal (first: 10-13 µm, second: 14-16 µm)
somatic setae	short to medium (7-9 µm)	without*	short (7 µm)	short (3-4 µm)#	long (10-13 µm)	short (7 µm)
no. of pre- / postcloacal setae	0 / 0	0 / 0	5 / 8	3# / 6	5-6 / 0	3 / 4
gubernaculum	medium (15-20 µm); paired, median joined, with curved slender apophysis	medium (24 µm)+; single, one piece, slender, rod-shaped, parallel to spicules	short (17 µm); one rod-shaped piece without apophysis, parallel to spicules	short (15-16 µm); as open groove with two parallel apophyses parallel to spicules	long (26-28 µm); two pieces joined by a membranous part, parallel to spicules, without apophysis	short to medium (16-19 µm); two pieces joined by a plate, forming an angel, without apophysis

At present it is premature to give a revised definition of the genus *Leptonemella* and to formulate a new key. Several species await their description (F. Riemann, pers. comm., J.A. Ott, pers. obs.). The multilayered bacterial coat, the structure of body cuticle and cephalic cuticle - the latter with a dominant median zone (URBANCIK & al. 1996b) - the simple construction of the tri-partite pharynx, and - in those species where the amphid has not been reduced to a pore or slit - the sexual dimorphism of this organ can be used as distinctive characters for *Leptonemella*.