

Two new and three redescribed species of *Viscosia* (Nematoda, Oncholaimidae)

N. Smol & J. Sharma

Marine Biology Section, Zoology Institute, State University of Gent, Ledeganckstraat 35, B-9000 Gent, Belgium

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Abstract

Viscosia coomansi sp. nov. and *Viscosia heterolaima* sp. nov. are described from Lake Grevelingen and Eastern Scheldt (The Netherlands). *Viscosia glabra* (Bastian, 1865) de Man 1890, *Viscosia franzii* Boucher 1977, and *Viscosia viscosa* (Bastian 1865) de Man 1890 are redescribed, taking into account new important characters. Juvenile specimens are depicted for *V. viscosa*. *Viscosia carnleyensis* Ditlevsen, 1921 is synonymized with *Viscosia glabra* (Bastian, 1865). *Mononcholaimus viscosus* Allgén, 1930 and *Mononcholaimus elegans* sensu Schuurmans-Stekhoven, 1942, 1950 (nec. Kreis, 1924) are synonymized with *Viscosia viscosa* (Bastian, 1865).

Introduction

The identification of a *Viscosia*-species is a difficult task due to the enormous number of species described and the tentative information within the descriptions. Moreover, about 70% of the known species are recorded only once in the literature, and often only one or few specimens were found, indicating that information on variability is lacking.

Five *Viscosia*-species from different habitats are compared and their similarities and differences discussed. We tried to improve the descriptions taking into account the important and new characteristics pointed out by Smol (in prep.).

Materials and methods

Localities

Dievengat: A polyhaline brackish water pool in the southern part of the nature reserve 'Het Zwin', situated in the extreme north-western corner of Belgium. A more detailed description is given by Smol *et al* (1981).

Sediment: well sorted fine sand underlying a 2–3 mm layer of detritus.

Coordinates: 51°21'00"N, 03°22'30"E. Salinity 8–40‰.

Sampled: October 1973–September 1977.

Eastern Scheldt: 51°32'40"N, 03°59'50"E.

Fine sandy sediment. Sampled: June 1979–May 1980.

Lake Grevelingen: 51°46'00"N, 03°56'00"E.

Fine medium sand. Sampled: June 1979–May 1980.

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Techniques

All samples were fixed in 4% formaldehyde at 70 °C. The nematodes were transferred to dehydrated glycerol (Seinhorst, 1959; De Grisse, 1965) and mounted on Cobb-slides for identification.

The drawings were made with the aid of a camera lucida on a Leitz Dialux 20 EB and a Wild M20 microscope.

All measurements, except ratios, are in micrometers. The values in the measurement formula indicate:

cephalic setae	nerve ring	ventral pore	pharynx	vulva/M	anus/cloacal aperture	total length
corresponding body diameter (c.b.d.)						

The buccal index formula, explained in the abbreviations, is used to describe the morphology of the buccal cavity:

$$BI = \frac{B}{LV \cdot D \cdot RV} ; \text{ br} \quad (\text{modified after Belogurov \& Belogurova, 1977})$$

Spicula are measured along the arc.

We use the terms 'ventral' pore and 'ventral' gland as the excretory function of these structures has not been proven. Other terminology is adapted from Coomans (1978).

The distinction between papillae and setae is made as follows:

≤ 2 μm = papillae;

> 2 μm = setae.

One male and one female of each species described in this paper are deposited in the collection of the Instituut voor Dierkunde, Rijksuniversiteit, Gent, Belgium.

Abbreviations

a	body length/ max. body diameter
b	body length/ pharyngeal length
br	length basorabdion/length buccal cavity (%)
c	body length/ tail length
c'	tail length/ anal body diameter
a.b.d.	anal body diameter
c.b.d.	corresponding body diameter
n	number of specimens examined
s.d.	standard deviation
\bar{x}	arithmetic mean
B	length/ width of buccal cavity
BI	buccal index
D	length dorsal tooth/ length buccal cavity (%)
L	body length (in micrometer)
LV	length left ventrosublateral tooth/ length buccal cavity (%)
M	middle of body
RV	length right ventrosublateral tooth/ length buccal cavity (%)
S	spicule length (in micrometer)
V	position of vulva from anterior as a percentage of the total body length

Locality: Lake Grevelingen, Eastern Scheldt, Western Scheldt in fine to medium grained sand.
Measurements

	$\delta\delta$ (n = 6)			♀♀ (n = 5)			
	\bar{x}	\pm s.d.	range	\bar{x}	\pm s.d.	range	
L	2222.5	\pm 190.2	(2000–2476)	2352.4	\pm 213.7	(1978–2497)	
a	46.6	\pm 5.1	(41.5–54.1)	42.6	\pm 8.5	(29.1–52.0)	
b	5.7	\pm 0.3	(5.3–6.2)	5.8	\pm 0.4	(5.1–6.2)	
c	16.3	\pm 1.4	(14.4–18.0)	16.7	\pm 0.9	(15.8–18.0)	
c'	4.6	\pm 0.2	(4.4–4.9)	4.9	\pm 0.3	(4.3–5.2)	
Vulva				52.6	\pm 1.9	(50–54)	
Spicules	29.3	\pm 1.5	(28–32)				
δ_1	10	212	261	420	–	2292	2427 (slide No. 503)
	21	45	45	50	56		
	a = 43.3	b = 5.8	c = 18.0				
δ_2	9	222	266	376	–	2065	2200
	19	41	42	48	53	31	
	a = 41.5	b = 5.9	c = 16.3				
♀_1	8	202	248	405	1266	2358	2497 (slide No. 504)
	21	39	40	41	48	28	
	a = 52.0	b = 6.2	c = 18.0	V = 50.7%			
♀_2	9	209	251	401	1299	2255	2405
	22	43	44	55	57	29	
	a = 42.2	b = 6.0	c = 16.0	V = 54.0%			
BI_{δ_1} :	$\frac{1.8 ; 49\%}{49\% 51\% 93\%}$			$\text{BI}_{\text{♀}_1}$:			$\frac{2.0 ; 54\%}{49\% 51\% 93\%}$

Description

Males: long, slender appearance, only slightly tapering towards anterior end.

Cuticle plain, lacking markings or ornamentation.

Lip region slightly demarcated. Lips with 6 internal labial papillae and a circle of 6 external labial setae (6 μm) + 4 cephalic setae (5 μm).

Amphideal fovea cup-shaped, 9 μm in diameter, 47% of c.b.d.; located 9 μm from anterior end.

Buccal cavity 25 μm long, 14 μm wide (range: 22–29 \times 12–14 μm). Prominent ventrosublateral tooth on right side; left ventrosublateral and dorsal teeth small, reaching midway of the buccal cavity.

Pharynx cylindrical and slightly broadened at base, pharyngeal valve located at 31 μm from anterior end.

Cardia distinct, muscular, 7 μm long.

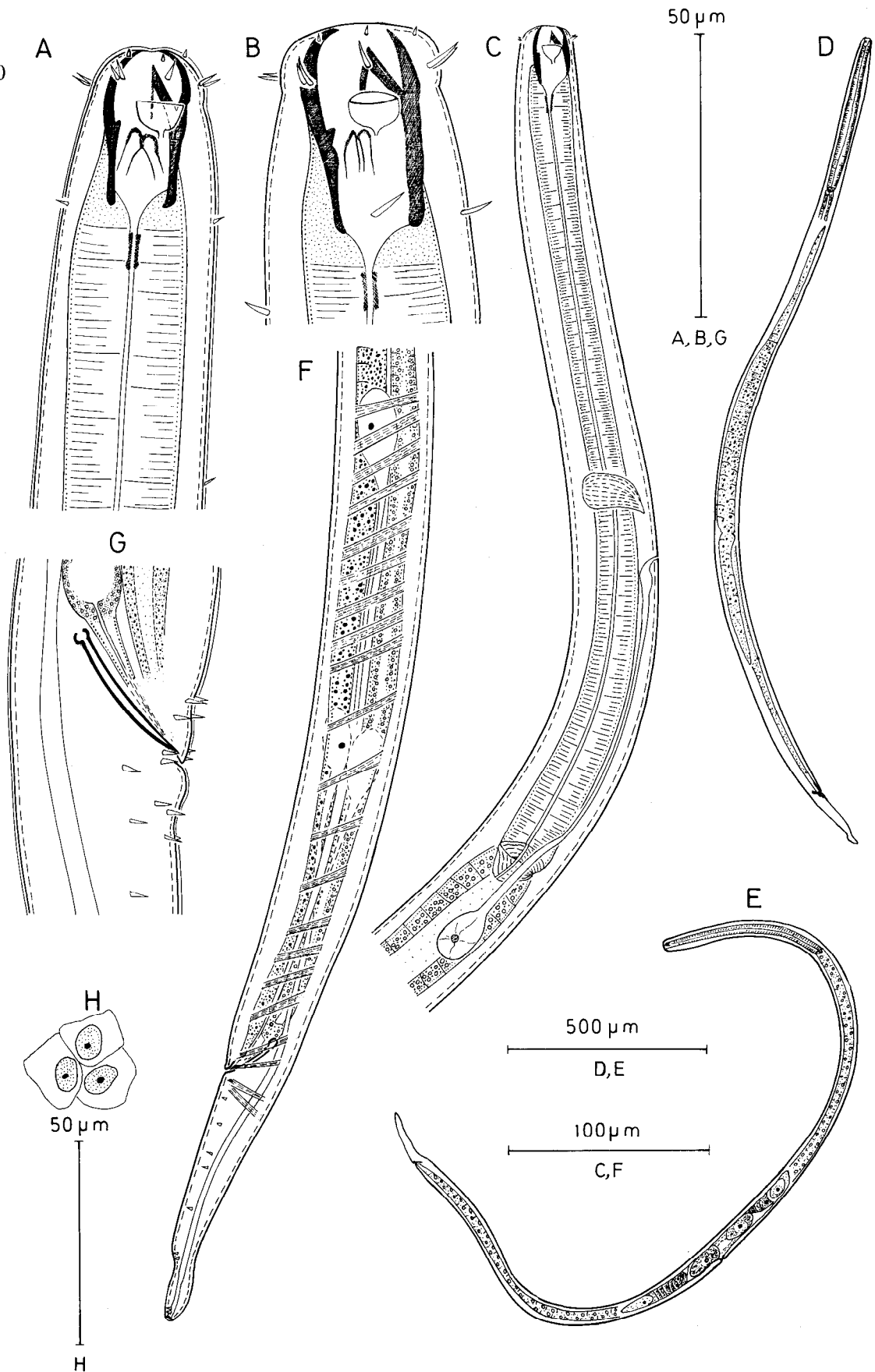


Fig. 2. *Viscosia franzii* Boucher, 1977

A. Head end ♂; B. Head end ♀; C. Pharyngeal region ♂; D. Total view ♂; E. Total view ♀; F. Tail shape, caudal glands ♂; G. Spicular apparatus ♂; H. Sperm cells ♂.

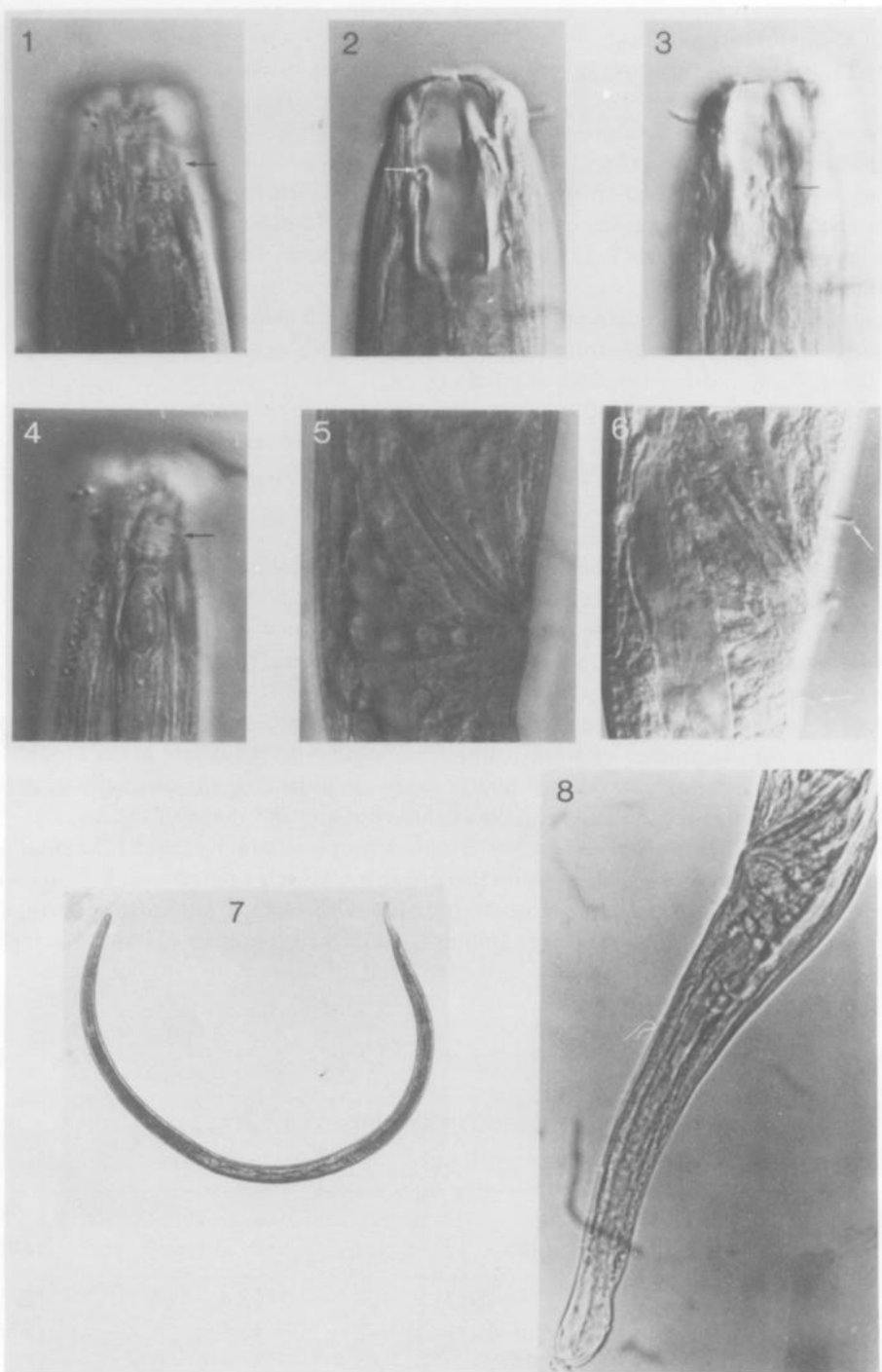


Plate 2. *Viscosia franzii* Boucher, 1977

1. Amphid (lateral view) ♂₁; 2. Dorsal tooth (lateral view) ♂₁; 3. left ventrosublateral tooth (lateral view) ♂₁; 4. Amphid (lateral view) ♀; 5. Spicule with 'forked' tip ♂₁; 6. Median perianal setae ♂₁; 7. Total view ♂₂; 8. Tail ♂₂.

Nerve ring at 59% of pharynx length.

Ventral pore 25 μm behind nerve ring; ventral gland cell on right side of intestine, 32 μm below base of pharynx.

Reproductive system with two opposed, outstretched testes, on right side of intestine. Vas deferens separated from the muscular ejaculatory duct by a sphincter (at the level of the most anterior caudal gland cell. Sperm amoeboid, 15–23 μm in diameter. Spicules straight, 28 μm long with small capitulum. 12 adanal setae. Copulatory muscle bands distinct, extending from cloaca to most anterior caudal gland cell.

Three caudal gland cells located 141, 153 and 230 μm from cloaca; the most anterior one left of intestine, the others to the right.

Tail stubby in appearance, tip demarcated; lateral setae on each side.

Females: similar to male except in the following:

Amphideal fovea 7 μm in diameter; 32% of c.b.d.

Buccal cavity 28 \times 12 μm (range: 20–29 \times 9–13 μm).

Reproductive system with two equally developed branches; both ovaries antidromously reflexed on right side of intestine; demanian system as noted by Rachor (1969) for *Viscosia*. Ovum: 92 \times 41 μm .

Discussion

Our specimens completely agree with the description of *V. franzii* by Boucher (1977), Riemann (1966) and Blome (1982). Boucher (1977) has made a valuable apical view of *V. franzii* (Fig. 7A) to clarify the exact position of the teeth, but he misinterpreted the figure from point of view of the observer instead of from point of view from the animal, which is common. The largest ventrosublateral tooth is thus situated on the right side (instead of left as described by Boucher, 1977 p. 751). The males we studied had no precloacal 'mamelon'.

V. franzii is closely related to *V. viscosa* in general shape; in the truncate, bi-knobbed (M-shaped according to de Man, 1890) form of the smaller left ventrosublateral tooth, and in the size of the amphid. However, it differs from it by the more strongly developed buccal cavity, in particular the distinctly larger dorsal tooth, the position of the smaller teeth (midway to the buccal cavity) and the shape of the tail.

V. franzii belongs to the *V. langrunensis*-group (Smol, in prep.), characterized by the small teeth situated about the middle of a broad buccal cavity. Within this group it is closely related with *V. brachylaima* Filipjev 1927, *V. epapillosa* Platonova 1971, *V. langrunensis* (de Man, 1890) and *V. papillosa* (Eberth, 1863). Among them *V. franzii* is easily recognized by the left sublateral tooth being truncate (M-shaped) instead of sharp.