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

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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:

$$\frac{\text{cephalic setae} \quad \text{nerve ring} \quad \text{ventral pore} \quad \text{pharynx} \quad \text{vulva/M} \quad \text{anus/cloacal aperture} \quad \text{total length}}{\text{corresponding body diameter (c.b.d.)}}$$

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

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

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:

$\leqslant 2\ \mu m$ = papillae;

$> 2\ \mu m$ = 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

Descriptions

Viscosia glabra (Bastian, 1865) de Man, 1890 (Fig. 1 & Plate 1)
syn. nov.: *Viscosia carnleyensis* Ditlevsen, 1921

Locality: Lake Grevelingen, The Netherlands
Measurements

	♂♂ (n = 5)		♀♀ (n = 5)	
	$\bar{x}$ ± s.d.	range	$\bar{x}$ ± s.d.	range
L	2035 ± 95.3	(1890–2151)	2069 ± 151.2	(1900–2234)
a	51.3 ± 5.2	(46.8–59.2)	38.5 ± 6.6	(37.2–48.7)
b	6.1 ± 0.2	(5.8–6.2)	6.0 ± 0.4	(5.5–6.4)
c	9.8 ± 0.6	(8.8–10.3)	9.0 ± 0.8	(8.4–10.3)
c′	10.0 ± 0.5	(9.5–10.7)	8.9 ± 0.9	(7.3–9.5)
Vulva			51.2 ± 1.3	(50–53)
Spicules	26.4 ± 2.3	(24–30)		

♂$_1$

6	182	211	336	–	1851
15	34	38	39	38	19

a = 52.7 b = 6.1 c = 10.1

2055 (slide No. 501)

♂$_2$

6	171	206	325	–	1675
16	38	38	38	39	22

a = 48.5 b = 5.8 c = 8.8

1890

♀$_1$

7	176	210	347	1186	2018
18	43	50	52	60	29

a = 37.2 b = 6.4 c = 10.3 V = 53.1

2234 (slide No. 502)

♀$_2$

8	181	209	328	1040	1839
12	46	48	49	53	25

a = 39.2 b = 6.8 c = 8.8 V = 56.6

2076

BI$_{♂1}$: 1.8 ; 44% / 74% 74% 96%

BI$_{♀1}$: 2.1 ; 44% / 74% 74% 97%

Description

Males: long, slender appearance with long thin tail.

Cuticle without ornamentation.

Head tapering towards anterior end. Lips with one circle of 6 minute internal labial papillae and a second circle of 6 external labial papillae + 4 cephalic papillae.

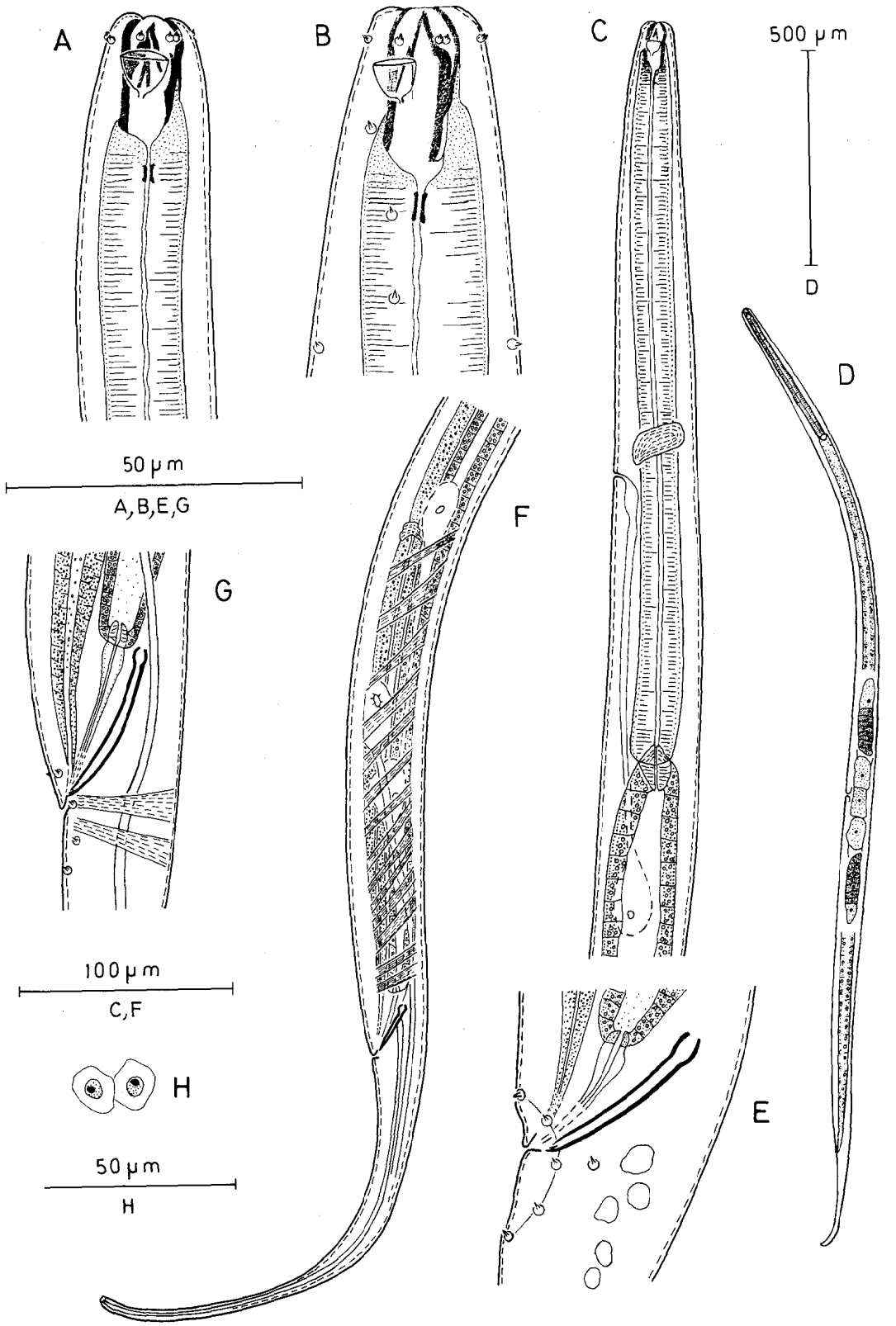

Fig. 1. Viscosia glabra (Bastian, 1865)
A. Head end ♂1; B. Head end ♀2; C. Pharyngeal region ♂1; D. Total view ♂1; E. Spicular apparatus ♂2; F. Tail shape, caudal glands ♂1; G. Spicular apparatus ♂1; H. Sperm cells ♂1.

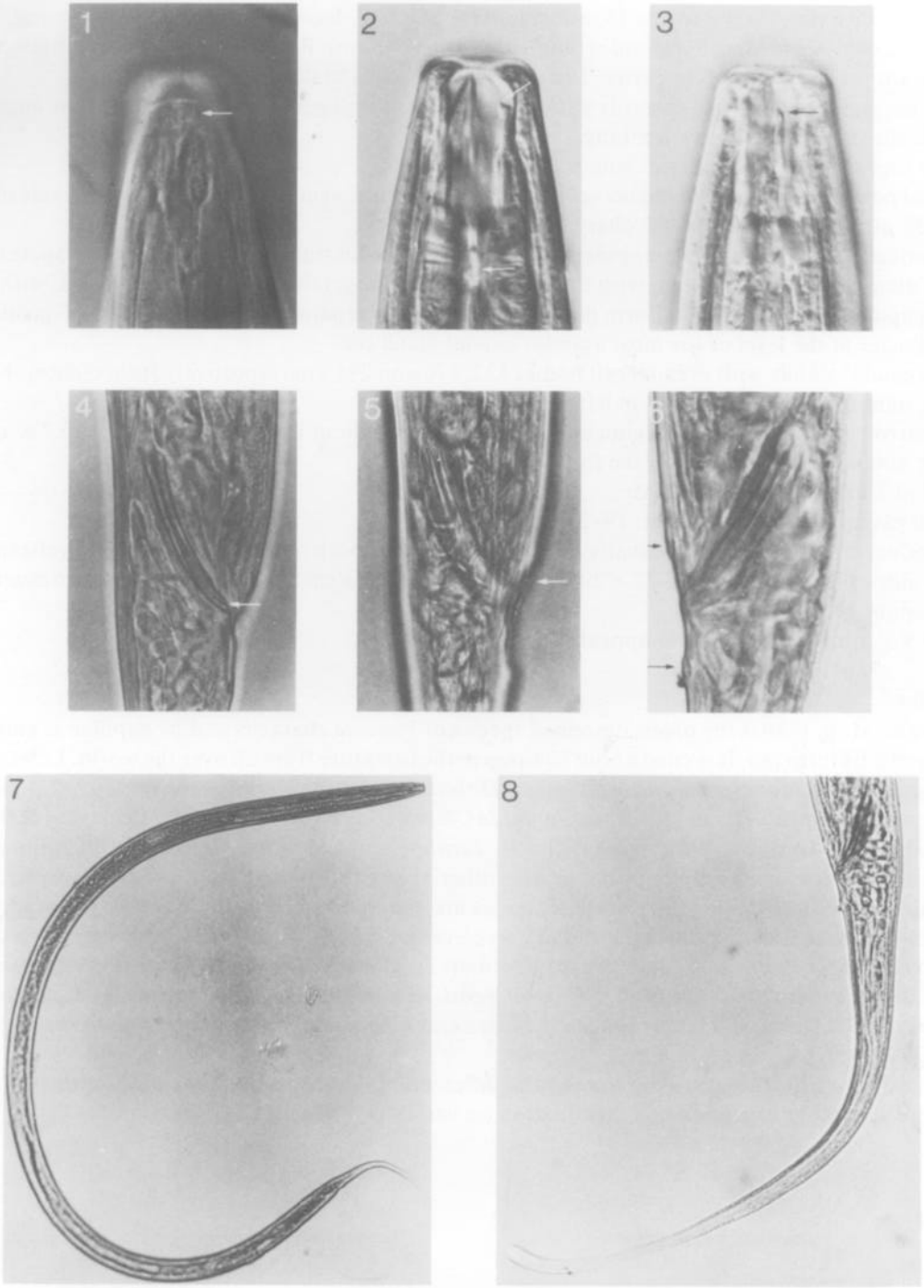

Plate 1. Viscosia glabra (Bastian, 1865)
1. Amphid (lateral view) ♂$_1$; 2. Dorsal tooth (lateral view) ♂$_1$; 3. Left ventrosublateral tooth (lateral view) ♂$_1$; 4. Spicule with 'forked' tip ♂$_1$; 5. Median perianal papillae (preanal) ♂$_2$; 6. Median perianal papillae (postanal) ♂$_2$; 7. Total view ♂$_2$; 8. Tail ♂$_2$.

Amphids with cup-shaped fovea, 15 μm wide, 47% of c.b.d., located 6 μm from anterior end.

Buccal cavity 18 μm long, 8 μm wide (range: 17–21 × 8–10 μm). Right ventrosublateral tooth prominent, reaching almost to tip of buccal cavity. Left ventrosublateral and dorsal tooth smaller.

Pharynx slightly broadened towards base. Pharyngeal valve distinct, located 7 μm below buccal cavity.

Cardia distinct, muscular, 11 μm long.

Nerve ring at 54% of pharyngeal length.

Ventral pore about 40 μm behind nerve ring; ampulla distinct; ventral cell located on right side of intestine, about 136 μm from the base of the pharynx.

Reproductive system with two opposed outstretched testes on right side of the intestine; sperm spherical, 7 μm in diameter; spicules paired, with 'forked' tip, 30 μm long; faint perianal alae present, with 4 pairs of minute papillae and 2 median setiform papillae. Vas deferens separated from the muscular ejaculatory duct by a sphincter at the level of the most anterior caudal gland cell.

Three caudal glands with preanal cell bodies 132, 176 and 294 μm respectively from cloaca; the first and third on right side and the second on left side of the intestine.

Tail narrowing in postcloacal region and cylindrical throughout its length; 204 μm or 10.7 × a.b.d. long.

Females: similar to male except in the following:

Amphid 7 μm wide, 39% of c.b.d.

Buccal cavity 19 × 11 μm (range: 19–21 × 9–11 μm).

Reproductve system with two equally developed branches; both ovaries antidromously reflexed, located on right side of intestine; eggs 62–77 × 29–33 μm. Demanian system 'simple' consisting of an ovarial sac and an osmosium.

Tail 8.9 × a.b.d., but similar in appearance to that of males.

Discussion

V. glabra de Man, 1890 is the oldest described species of *Viscosia* characterized by papillae as anterior sense organs and a filiform tail. It is cited about 60 times in the literature from all over the world. Later on, closely related species were discovered: *V. carnleyensis* (Ditlevsen 1921), *V. meridionalis* Kreis 1932, *V. nuda* Kreis 1932, *V. pseudoglabra* Kreis 1932, *V. macramphida* Chitwood 1951, *V. poseidonica* Belogurov & Belogurova 1977 and *V. sp.* Gerlach, 1957. Except for *V. carnleyensis* which was frequently mentioned, and *V. macramphida*, most of the descriptions of the other species were based on only a few specimens. The similarities and differentiating data of these species are summarized by Smol (Table 2; in prep.).

In 1921 Ditlevsen described a new species, *V. carnleyensis*, closely related to *V. glabra*, but differing from it mainly by a higher a-ratio (63.5 against 40–45). As more species were found, this character became useless (see Table 2, Smol in prep.) and we consider *V. carnleyensis* as a synonym of *V. glabra* (suggestion already made by Allgen, 1959). The relationship between *V. glabra* and *V. macramphida* has been pointed out by Wieser & Hopper (1967) and by Smol (in prep.).

We refrain from further discussion about the differentiating characters of the other species of the group until more accurate description and information on variability become available.