

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:

| | | | | | | |
|--------------------------------------|---------------|-----------------|---------|---------|--------------------------|--------------|
| 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:

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

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:

≤ 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: Eastern Scheldt, The Netherlands
 Measurements

| | ♂♂ (n = 5) | | | ♀♀ (n = 5) | | |
|----------|------------|-------------|--------------|------------|------------|---------------|
| | \bar{x} | \pm s.d. | range | \bar{x} | \pm s.d. | range |
| L | 2766.2 | \pm 173.7 | (2567–3043) | 2830.4 | \pm 96.1 | (2719–2938) |
| a | 114.6 | \pm 12.7 | (97.4–126.8) | 123.9 | \pm 12.0 | (113.0–144.1) |
| b | 7.1 | \pm 0.5 | (6.7–7.8) | 8.1 | \pm 0.1 | (8.1–8.2) |
| c | 21.6 | \pm 1.0 | (20.7–23.0) | 20.4 | \pm 1.3 | (18.9–22.5) |
| c' | 7.6 | \pm 0.8 | (6.6–8.7) | 9.4 | \pm 1.0 | (8.3–10.4) |
| Vulva | | | | 43.0 | \pm 2.6 | (39–46) |
| Spicules | 19.4 | \pm 2.2 | (16–22) | | | |

| | | | | | | | | | |
|-------------------------------|-----------|-----|-------------|-----|-------------------------------|-----------|----------------------|-------------|--|
| ♂ ₁ (holotype) | 9 | 192 | 251 | 412 | – | 2913 | 3043 (slide No. 507) | | |
| | 18 | 23 | 23 | 23 | 24 | 16 | | | |
| | a = 126.8 | | b = 7.4 | | c = 23.4 | | | | |
| ♂ ₂ (paratype) | 11 | 185 | 318 | 404 | – | 2583 | 2714 | | |
| | 20 | 24 | 24 | 24 | 24 | 18 | | | |
| | a = 113.1 | | b = 6.7 | | c = 20.7 | | | | |
| ♀ ₁ (allotype) | 6 | 162 | 183 | 335 | 1065 | 2575 | 2719 (slide No. 508) | | |
| | 13 | 19 | 19 | 20 | 23 | 14 | | | |
| | a = 118.2 | | b = 8.1 | | c = 18.9 V = 39.2% | | | | |
| ♀ ₂ (paratype) | 6 | 157 | 205 | 342 | 1193 | 2606 | 2739 | | |
| | 13 | 20 | 21 | 21 | 22 | 16 | | | |
| | a = 124.5 | | b = 8.0 | | c = 20.6 V = 43.6% | | | | |
| BI _{♂₁} : | 1.9 ; 47% | | 66% 59% 81% | | BI _{♀₁} : | 1.8 ; 27% | | 36% 41% 91% | |

Description

Males: long, slender body, often curved.

Cuticle plain, lacking ornamentation.

Lip region demarcated by a slight depression. 6 inner labial papillae and 6 outer labial (5 μm) + 4 cephalic setae (4 μm long).

Amphideal fovea cup-shaped, 7 μm wide, 43% of c.b.d.; aperture situated 6 μm from anterior end.

Buccal cavity 21 μm long and 11 μm wide (range: 24–25 × 13 μm). Large ventrosublateral tooth located on right side and reaching till 5 μm from anterior end; left ventrosublateral tooth and dorsal tooth sharp, positioned in the anteriormost part of the buccal cavity.

Pharynx narrow throughout its length, slightly broader at base.

Nerve ring at 46% of pharyngeal length. Ventral pore at 27 μm behind nerve ring; bottom of ventral gland cell located at 146 μm from the base of the pharynx, on right side of intestine.

Cardia muscular, 13 μm long.

Reproductive system with two opposed, outstretched testes; sperm spherical 10–11 μm in diameter. Spicules straight, 20 μm long.

Three caudal glands located 144, 179 and 183 μm from cloacal opening; the first one to the left of the intestine, the second and third one on the right side.

Adanal area with 3 prominent pairs and one single minute seta, located on the edge of an ala.

Tail narrowing shortly behind cloacal opening, cylindrical throughout its length; latero-ventrally there are 8 small setae.

Females: similar to the males except in the following respects:

Outer labial setae (8 μm) + cephalic setae (7 μm) longer.

Buccal cavity $15 \times 7 \mu\text{m}$ (range: $15\text{--}17 \times 6\text{--}8 \mu\text{m}$). Large right ventrosublateral tooth reaching almost to the tip of the buccal cavity. Two smaller teeth (left ventrosublateral and dorsal teeth) not reaching to the middle of the buccal cavity and blunt.

Amphids 5 μm wide, 41% of c.b.d. located at 5 μm from anterior end. Reproductive system with two antiodromously reflexed ovaries, on right side of the intestine; germinae zone of reflexed part of posterior branch reaches anterior to the vulva. Demanian system 'viscosioid', osmosium at a larger distance from the ovarium than in the other species described. Ovum: $21\text{--}22 \mu\text{m} \times 129\text{--}133 \mu\text{m}$.

Discussion

V. heterolaima sp.n. is characterized by a sexual dimorphism in the size and position of the teeth in the buccal cavity. While the large right ventrosublateral tooth reaches almost the anterior end in the female, its tip is situated further back in the male. Furthermore the small teeth are pointed in the male and reach the first half of the buccal cavity, but are blunt in the female and are situated within the second half of the buccal cavity. According to this *V. heterolaima* sp.n. has an intermediate position between the *Viscosia*-groups (see also Smol, in prep.).

The outer labial and cephalic setae of the female are longer than those of the male. The female tail is also longer as evidenced by the higher c' -index.

V. heterolaima sp.n., together with *V. elongata* Filipjev, 1922, and *V. tenuissima*, Allgen, 1959 are recognized as long filiform *Viscosia*-species, characterized by an a -ratio ≥ 100 . *V. heterolaima* and *V. elongata* differ from *V. tenuissima* by having the right ventrosublateral tooth being the largest instead of the left one.

The female specimens of *V. heterolaima* are very close to the female of *V. elongata* as described by Filipjev, 1922. Filipjev based his description on only one female, found in the Black Sea. When redescribing it, Schuurmans-Stekhoven (1950) based his description on a single male found in the Mediterranean Sea, but did suggest a sexual dimorphism in the amphid size. The male specimens of *V. heterolaima* described here differ considerably from the male of *V. elongata* as described by Schuurmans-Stekhoven (1950), especially in the size and position of the smaller teeth. In the perianal region males of *V. elongata* lack any trace of prominent ala and have longer perianal setae.

Whether the male of *V. elongata* described by Schuurmans-Stekhoven (1950) is conspecific or not with the female of *V. elongata* described by Filipjev (1922) is unclear for the moment. Until more material is found at the type localities to elucidate this problem, we propose *V. heterolaima* as a new species.

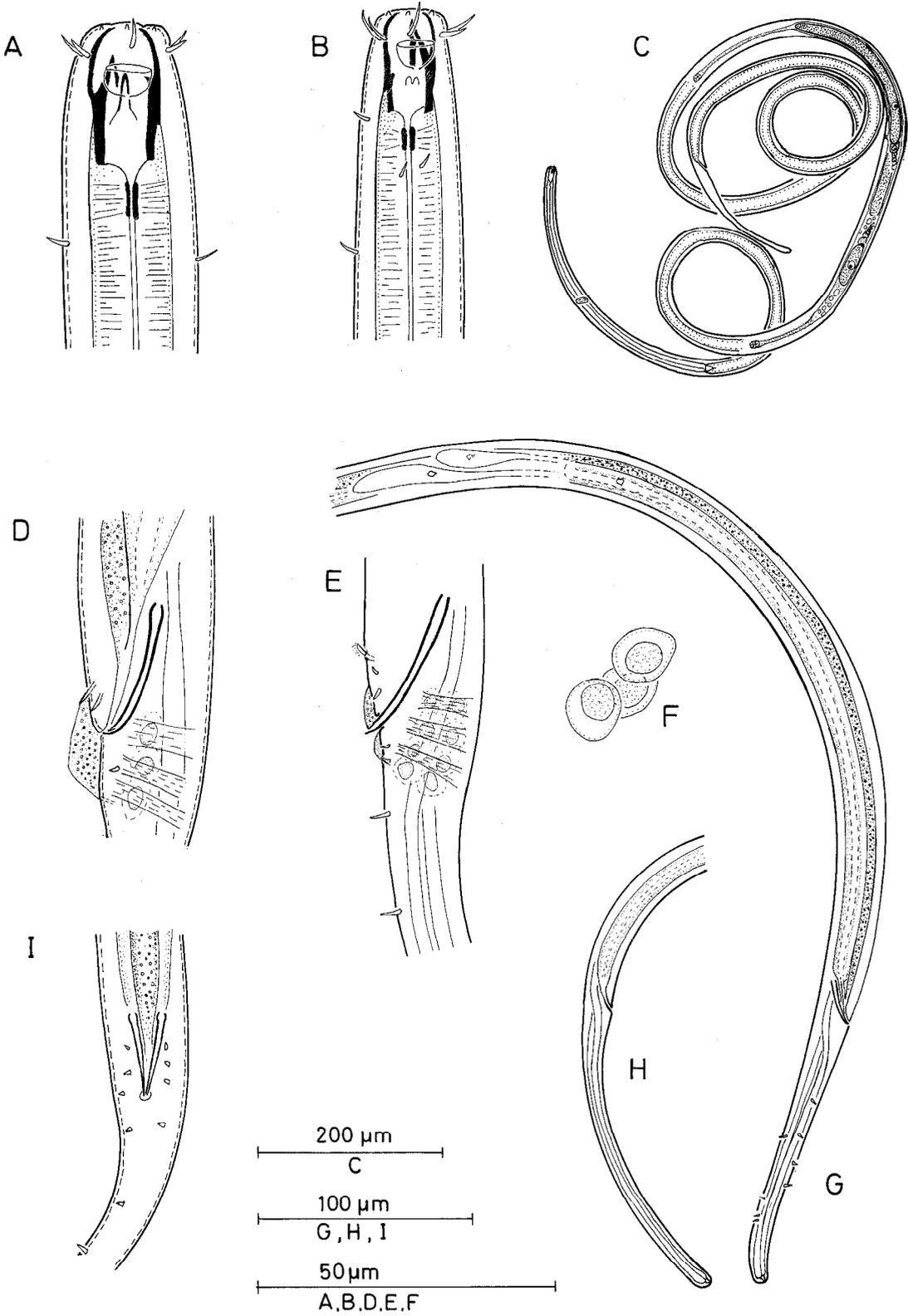


Fig. 4. *Viscosia heterolaima* sp.n.

A. Head end ♀; B. Head end ♂; C. Ventral gland ♀; D. Tail shape ♂; E. Tail shape ♀; F. Spicular apparatus (lateral view) ♂; G. Spicular apparatus (ventral view) ♂; H. Sperm cells ♂; I. Total view ♀; J. Vulvar region ♀.

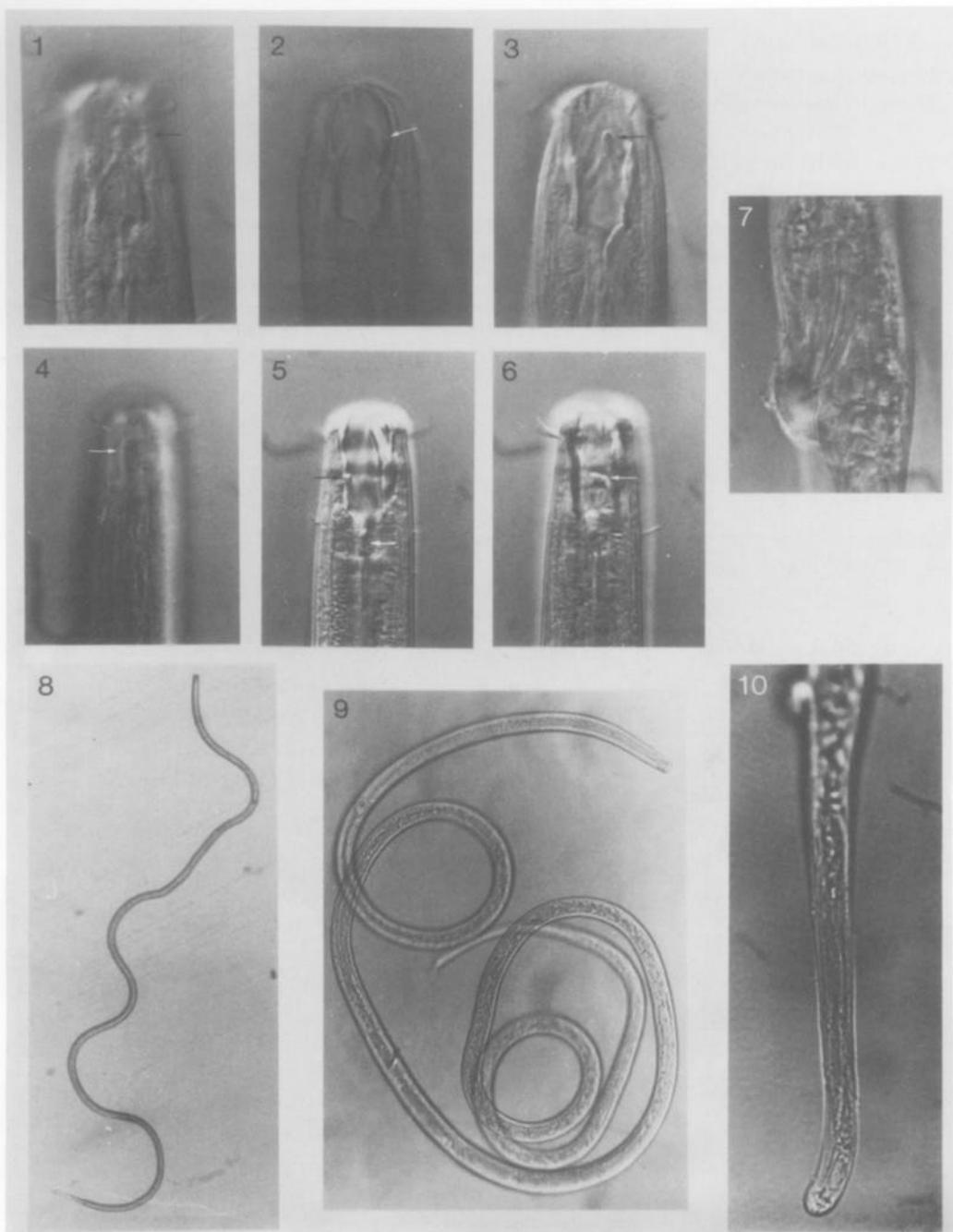


Plate 4. *Viscosia heterolaima* sp.n.

1. Amphid (lateral view) ♂₁; 2. Dorsal tooth (lateral view) ♂₁; 3. Left ventrosublateral tooth (lateral view) ♂₁; 4. Amphid (lateral view) ♀₁; 5. Dorsal tooth (lateral view) ♀₁; 6. Left ventrosublateral tooth (lateral view) ♀₁; 7. Spicular apparatus ♂₁; 8. Total view ♂₂; 9. Total view ♀₁; 10. Tail ♂₂.