

Three new *Chromadoropsis* species (Nematoda, Desmodoridae) from Southern Africa and the North Sea

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Three new *Chromadoropsis* species with four pharyngeal bulbi are described from Southern Africa, Namibia (S.W.A.) and the North Sea. *C. granulosus* sp.nov. is described from a sandy beach near Port Elizabeth. This species is characterized by a very distinct layer of yellow granules just below the cuticle. *C. namibiensis* sp.nov. is described from a sandy beach at Langstrand, Namibia. This species can be distinguished by the length and shape of the gubernaculum and spicules as well as the size of the capitulum. *C. longispiculosa* sp.nov. is described from the North Sea and is characterized by the long spicules and the presence of numerous porids. The genus *Chromadoropsis* Filipjev, 1918 is revised.

Drie nuwe *Chromadoropsis*-spesies met vier pharyngeale bulbi word van Suidelike Afrika, Namibia (S.W.A.) en die Noordsee beskryf. *C. granulosus* sp.nov. is versamel van 'n sandstrand naby Port Elizabeth. Hierdie spesie word gekenmerk deur baie duidelike geel korrelagtige lae direk onder die kutikula. *C. namibiensis* kom voor in 'n sandstrand by Langstrand, Namibia. Die spesie word onderskei deur die lengte en vorm van sy gubernaculum en spicule sowel as die grootte van die capitulum. *C. longispiculosa* sp.nov. van die Noordsee word gekenmerk deur lang spicule en die aanwesigheid van talryke poride. Die genus *Chromadoropsis* Filipjev, 1918 word hersien.

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During an ecological and taxonomic study of marine nematodes of South Africa, Namibia (S.W.A.) and the North Sea, three new species of *Chromadoropsis* were found. *C. granulosus* sp.nov. was found in the intertidal zone of Sundays River Beach, 30 km north of Port Elizabeth (25°52'E / 33°43'S). *C. namibiensis* sp.nov. was collected from the Bay of Cusp, Langstrand, Namibia (14°10'E / 22°04'S). Average particle sizes are 250 µm for Sundays River Beach and 260–300 µm for Langstrand. *C. longispiculosa* was found in a sublittoral coarse sandy station in the Southern Bight of the North Sea.

Material and Methods

All areas were sampled once. South African samples were taken with a copper corer 65 cm in length and 3,6 cm in diameter. Sundays River Beach was sampled at LWS and MWS at a depth of 0–30 cm. Stratified samples were taken of all sites and tidal levels of the Bay of Cusp, Langstrand. North Sea material was subsampled out of a Van Veen grab.

Extraction was done by decantation. The specimens were fixed in hot (60°C) neutral formalin and mounted in glycerine after dehydration (Seinhorst 1959).

Drawings were made with the aid of a drawing tube on a Leitz Dialux 20 microscope with interference contrast equipment.

All measurements are in micrometres; curved structures are measured along the arc.

Values in the formula (measurements) are as in Vincx, Sharma & Smol (1982). Body regions were named in accordance with Coomans (1979).

The holotype male and allotype females are deposited in the collection of the Instituut voor Dierkunde,

Rijksuniversiteit Gent, Belgium. Other paratype material is kept in the Department of Zoology, University of Port Elizabeth, Port Elizabeth, South Africa.

***Chromadoropsis granulosus* sp.nov.** (Figure 1A–H; Figure 2A–H)

Type material: Holotype male ♂₁ (slide no. 947), paratype female ♀₁ (slide no. 948) and other paratypes (♂_{2,3} and ♀_{2,3}) all from Sundays River Beach, Port Elizabeth.

Type locality: Samples were taken at MWS at 0–35 cm depth, 6 km north of Sundays River Mouth on 19 February, 1987.

Measurements

Holotype

$$\begin{array}{r} \text{♂}_1 \quad - \quad 76 \quad 200 \quad \text{M} \quad 1166 \\ \hline 16 \quad 32 \quad 30 \quad 30 \quad 29 \end{array} 1228 \mu\text{m}$$

$$a = 38,4; b = 6,1; c = 19,8; c' = 2,1; \text{spicule: } 40 \mu\text{m}$$

Paratype

$$\begin{array}{r} \text{♀}_1 \quad - \quad 77 \quad 225 \quad 665 \quad 1048 \\ \hline 20 \quad 38 \quad 37 \quad 38 \quad 28 \end{array} 1125 \mu\text{m}$$

$$a = 29,6; b = 5,0; c = 14,6; c' = 2,8; V = 59,1\%$$

Other paratypes

$$\begin{array}{l} \text{Males } (\text{♂}_{2,3}): \quad L = 1105\text{--}1120 \mu\text{m}; \quad a = 32,3\text{--}37,2; \\ \quad \quad \quad \quad \quad b = 5,4\text{--}6,0; \quad \quad \quad c = 16,1\text{--}16,3; \\ \quad \quad \quad \quad \quad c' = 2,2\text{--}2,4; \quad \text{spic: } 35\text{--}36 \mu\text{m}. \end{array}$$

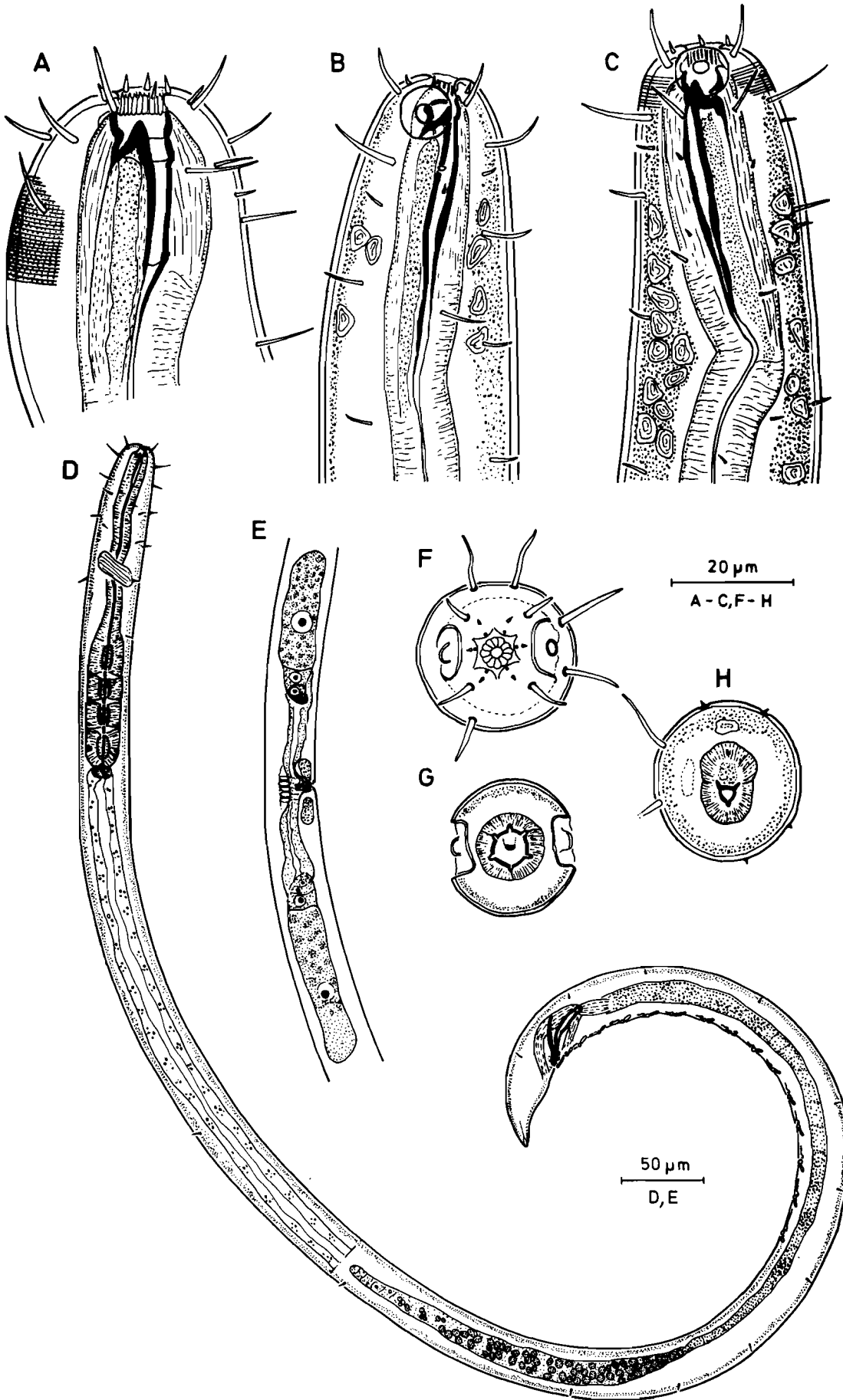


Figure 1 *Chromadoropsis granulosis* sp. nov. A: Anterior end of paratype ♀₁, B: Anterior end of holotype ♂₁, C: Anterior end of paratype ♀₂, D: Total view of holotype ♂₁, E: Genital system of paratype ♀₃, F: En face view of paratype ♂₂ (level of rugae), G: En face view of paratype ♂₂ (level of amphideal fovea), H: En face view of ♂₃ (pharyngeal level).

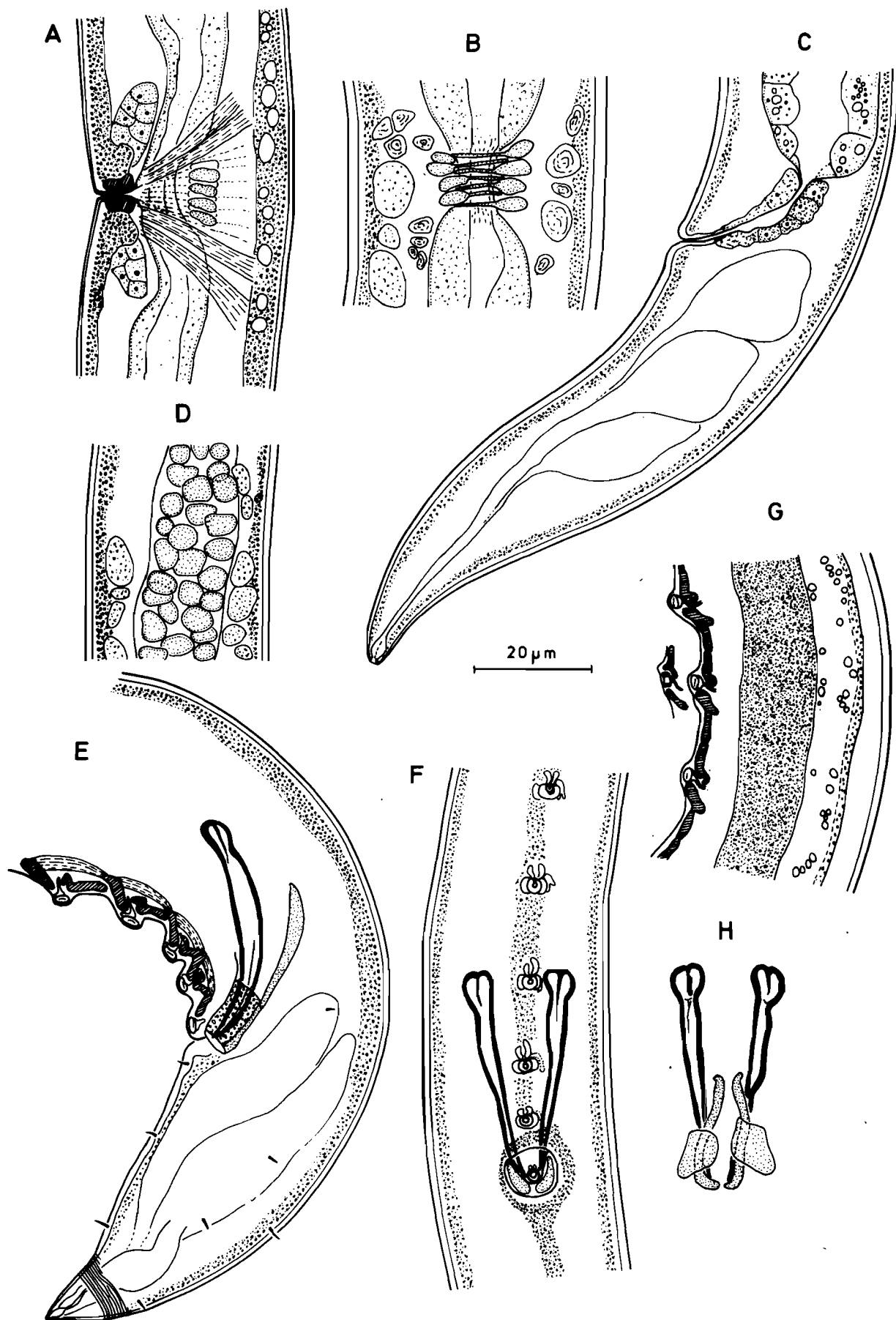


Figure 2 *Chromadoropsis granulosus* sp. nov. A: Vulva region of paratype ♀₃, B: Dorsal view of uterus with sphincter cells: paratype ♀₄, C: Tail view of paratype ♀₁, D: Sperm cells of paratype ♂₂, E: Tail region of holotype ♂₁, F: Ventral view of spicules and supplements of paratype ♂₂, G: Lateral view of supplements of holotype ♂₁, H: Dorsal view of spicules and gubernaculum of paratype ♂₂.

Females ($\varnothing_2, \varnothing_3$): L = 1164–1196 μm ; a = 34,8–35,4;
 b = 5,4–5,5; c = 13,5–18,2;
 c' = 2,6–3,8; V = 60,0–62,2%.

Description

Males: Body cylindrical with rounded head end and conical tail. Cuticle finely annulated; each annule with a row of very fine punctations; the annulation surrounds 50% of the amphideal fovea. Body is characterized by a very distinct and dense layer of small yellow granules throughout the body and just below the cuticle. Opaque cell bodies provided with internal concentric structures are present within this layer of yellow granules.

Lips intruded, not separated from the remainder of the body. Twelve prominent rugae present anterior to the dorsal tooth. The six internal labial sensilla papilliform; only visible in apical view (Figure 1F); the six external labial sensilla 2 μm long; the four cephalic setae are situated at the anterior border of the amphids and are 7 μm long. Eight subcephalic setae (11–12 μm long) are situated at the posterior border of the amphideal fovea. (Some of these setae are broken in σ_1). Other somatic setae present throughout the body, but less concentrated and shorter except for the head-neck region where they occur more concentrated. These setae are sometimes broken so that only a small pore is left.

The amphideal fovea has a circular outline, is ventrally wound and consists of a loop-shaped spiral of one turn; its diameter is 9 μm , or 48% of the c.b.d.

Buccal cavity with one big curved dorsal tooth. The dorsal pharyngeal gland cell opens at the base of the dorsal tooth. No ventral teeth.

Pharynx strongly muscular with a terminal bulb (35–40% of the pharyngeal length) which is divided into four smaller bulbi, their valves ranging from 10–20 μm in length with the smallest valve, second from anterior, 10–14 μm .

Cardia about 8 μm long.

Nerve ring at 38% of the neck length. Ventral gland and pore not found.

Reproductive system: monorchic with anterior testis situated at the left of the intestine. Sperm cells 5 μm in diameter. Spicules slightly curved with a small capitulum which has an internal shaft. They are about 1,4 of the anal body diameter long; musculature prominent. Gubernaculum simple and spoon-shaped; 30 μm long. Spicules and gubernaculum distal ends surrounded by a 9–10 μm long sheath scattered with yellow small granules (Figure 2E,F). The same granules are found throughout the body just below the cuticle. Fourteen to 17 pre-anal supplements are present at regular intervals; they consist of a cone-shaped papilla which is probably in connection with a prominent gland cell. The papilla is flanked by two sclerotized pieces which can overlap with the pieces of adjacent supplements when the cloacal region bends. The anterior sclerotized pieces of the different supplements are connected with each other by well-developed muscles (Figure 2E).

No setae are present on the ventral side of the region of the pre-anal supplements.

Tail conical. Three caudal glands present. Spinneret well developed. Tail tip more sclerotized than the remainder of the tail cuticle.

Females: Resemble males in most aspects. The six internal and the six external sensilla approximately 3 μm long. Tail shape more slender and tip not as sclerotized as in the males.

Didelphic-amphidelphic with reflexed ovaries both at the left side of the intestine. Two vaginal gland cells also present. No mature eggs present. A spermatheca could not be found. The uterine chamber is surrounded by eight constrictive dorsal cells: four left dorsal cells alternate with four right dorsal cells (cf. Figure 2A,B) and constrict the uterus with small offshoots.

Discussion

Chromadoropsis granulosus sp.nov. is characterized by the presence of four pharyngeal bulbi in both sexes, by a dense layer of yellow granules just below the cuticle, by the structure of the copulatory apparatus and by the presence of 14 to 17 pre-anal supplements which consist each of a median cone, flanked by long sclerotized pieces. The females are characterized by special opaque dorsal cell-bodies which surround the uterine chamber. Tail of males is conical with heavily sclerotized tip; tail of females is more slender.

Chromadoropsis namibiensis sp.nov. (Figure 3 A–E)

Type material and locality: Holotype male σ_1 (slide no. 949), paratype female \varnothing_1 (slide no. 950) and other paratypes (σ_2 and \varnothing_{2-5}) all from Langstrand, Namibia within the Bay of Cusp. Samples were taken 45–60 cm below surface, 12 m above LWS. Sampling date 17 June, 1986.

Measurements

Holotype

$$\sigma_1 \frac{- \quad ? \quad 267 \quad \text{M} \quad 1736}{23 \quad ? \quad 39 \quad 39 \quad 36} 1818 \mu\text{m}$$

$$a = 46,6; b = 6,8; c = 22,2; c' = 2,3; \text{spicule} = 43 \mu\text{m}$$

Paratype

$$\varnothing_1 \frac{- \quad ? \quad 271 \quad 1106 \quad 1684}{21 \quad ? \quad 34 \quad 37 \quad 31} 1788 \mu\text{m}$$

$$a = 48,3; b = 6,6; c = 17,2; c' = 3,4; V = 61,9\%.$$

Other paratypes

$$\text{Male } (\sigma_2): L = 1734 \mu\text{m}; a = 50,6; b = 6,9; c = 20,3; c' = 2,4; \text{spicule} = 40 \mu\text{m}.$$

$$\text{Females } (\varnothing_{2-5}): L = 1514-1771 \mu\text{m}; a = 35,3-43; b = 6,2-6,6; c = 16,5-20,3; c' = 2,5-3,5; V = 62,7-65,0\%.$$

Description

Body cylindrical with rounded head and conical tail. Cuticle annulated; each annule with a row of punctations;

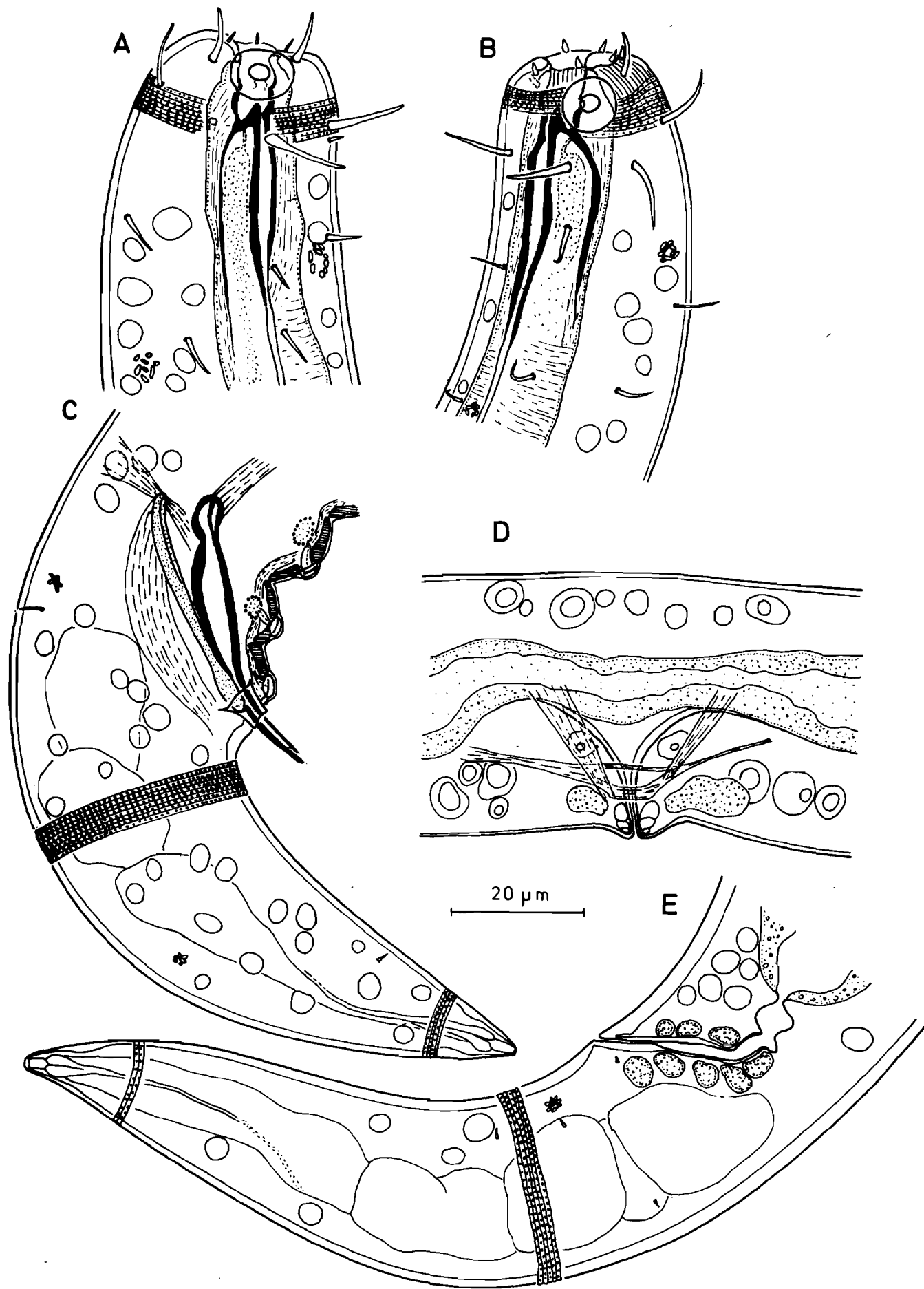


Figure 3 *Chromadoropsis namibiensis* sp. nov. A: Anterior end of holotype ♂, B: Anterior end of paratype ♀, C: Tail region of holotype ♂, D: Vulva region of paratype ♀, E: Tail end of paratype ♀.

the annulation partly surrounds the amphideal fovea. Longitudinal striae are present at the head end.

The body is characterized by a large concentration of large opaque cells approximately 3 µm in diameter.

Internal labial sensilla not visible in lateral view; the six external labial sensilla are 1,5–2,0 µm long; the four cephalic setae are situated at the anterior border of the amphids and are 8 µm long. Eight subcephalic setae (10–11 µm long) are situated at the posterior border of the amphideal fovea. Other somatic setae present throughout the body less concentrated and shorter.

The amphideal fovea consists superficially of two concentric ‘circles’ but on a deeper focus it consists of a loop-shaped spiral of one turn; its diameter is 8–9 µm.

Buccal cavity with one big dorsal tooth which has a spear-like appearance. The dorsal pharyngeal gland cell opens at the anterior dorsal part of the dorsal tooth. No ventral teeth.

Pharynx strongly muscular with a complex terminal bulb, (35–40% of the pharyngeal length) which is divided into four smaller bulbi, their values ranging from 11–18 µm in length with the second valve the smallest and 11–13 µm in length. Cardia 8 µm long. Nerve ring not observed, because of the numerous opaque cells in the neck region. Ventral gland and pore not found.

Reproductive system: One anterior testis situated at the left of the intestine.

Sperm cells 5 µm in diameter. Spicules slightly arcuate, about 1,2 anal body diameters long, capitulum distinct with an internal shaft. Velum absent. Prominent musculature. Gubernaculum simple, spoon-shaped; 34 µm long, 75% (90%) spicule length. The distal part of the gubernaculum is plate-shaped and surrounds the distal part of the spicule.

Fourteen to 16 pre-anal supplements present, arranged over a distance of 260–300 µm from cloaca; supplements consist of a cone-shaped structure flanked by two sclerotized pieces which can overlap with the pieces of the adjacent supplement when tail region bends; when tail straightens the pieces become more or less straightened again. Muscles are attached to these pieces (cf. Figure 3C). The cone structure of the papilla is ducted and connected to a small but prominent gland cell. No setae are present on the ventral side of the region of the pre-anal papillae.

Tail conical. Three caudal glands. Spinneret clearly visible.

Females: Resemble males in most aspects.

Didelphic-amphidelphic with reflexed ovaries both at the left side of the intestine. Vagina with prominent musculature, especially the sphincter is well developed. Two vaginal gland cells are present. No mature eggs present. A spermatheca is not visible.

Tail more slender than in the males.

Diagnosis

Chromadoropsis namibiensis sp.nov. is characterized by the presence of four pharyngeal bulbi in both sexes, by the presence of numerous opaque cells throughout the body, by the structure of the copulatory apparatus and by the

presence of 14 to 16 pre-anal supplements. The vagina is provided with a well-developed sphincter.

Chromadoropsis longispiculosa sp.nov. (Figure 4A–H)

Type material: Two males, two females and one juvenile. Holotype male ♂₁ (slide no. 951), paratype ♀₁ (slide no. 952) and other paratypes (♂₂, ♀₂, juvl) all from the Southern Bight of the North Sea.

Type locality: Station M10 (15°28'25"N / 01°57'00"E). Sampled 13 October, 1972.

Measurements

Holotype

♂₁ $\frac{- \quad 120 \quad 329 \quad M \quad 2145}{24 \quad 48 \quad 48 \quad 56 \quad 48} 2265 \mu\text{m}$

a = 40,4; b = 6,9; c = 18,9; c' = 2,5; spic = 70 µm

Paratype

♀₁ $\frac{- \quad 112 \quad 329 \quad 1533 \quad 2378}{24 \quad 47 \quad 48 \quad 56 \quad 36} 2510 \mu\text{m}$

a = 44,8; b = 7,6; c = 19,0; c' = 3,7; V = 61,1%.

Other paratypes

	Male (n = 1)	Female (n = 1)	Juvenile
L	: 2470	2000	1570
a	: 46,6	39,2	32,8
b	: 7,6	6,5	5,5
c	: 17,3	17,5	13,5
c'	: 3,3	2,5	3,7
spic/V	: 69 µm	60,3%	

Description

Males: Body cylindrical with rounded head end and conical tail. Cuticle finely annulated; each annule is bordered by a kind of a ‘dotted’ line, not always obvious; the annulation partly surrounds the amphideal fovea. Lips intruded, not separated from the remainder of the body. Longitudinal striae are present at the head end.

Six internal labial sensilla not visible; six external labial sensilla 2 µm long; the four cephalic setae are situated at the anterior border of the amphids and are 12 µm long. Eight subcephalic setae (12–13 µm long) are situated at the posterior border of the amphideal fovea. Other somatic setae are numerous and arranged in eight longitudinal rows throughout the body. These setae are often broken so that only a small pore is left, they are in connection with prominent elongated epidermal gland cells; these setae are the so called porids.

The amphideal fovea has a circular outline, is ventally wound and consists of a loop-shaped spiral of one turn; its diameter is 10 µm.

Buccal cavity with one big curved dorsal tooth. The

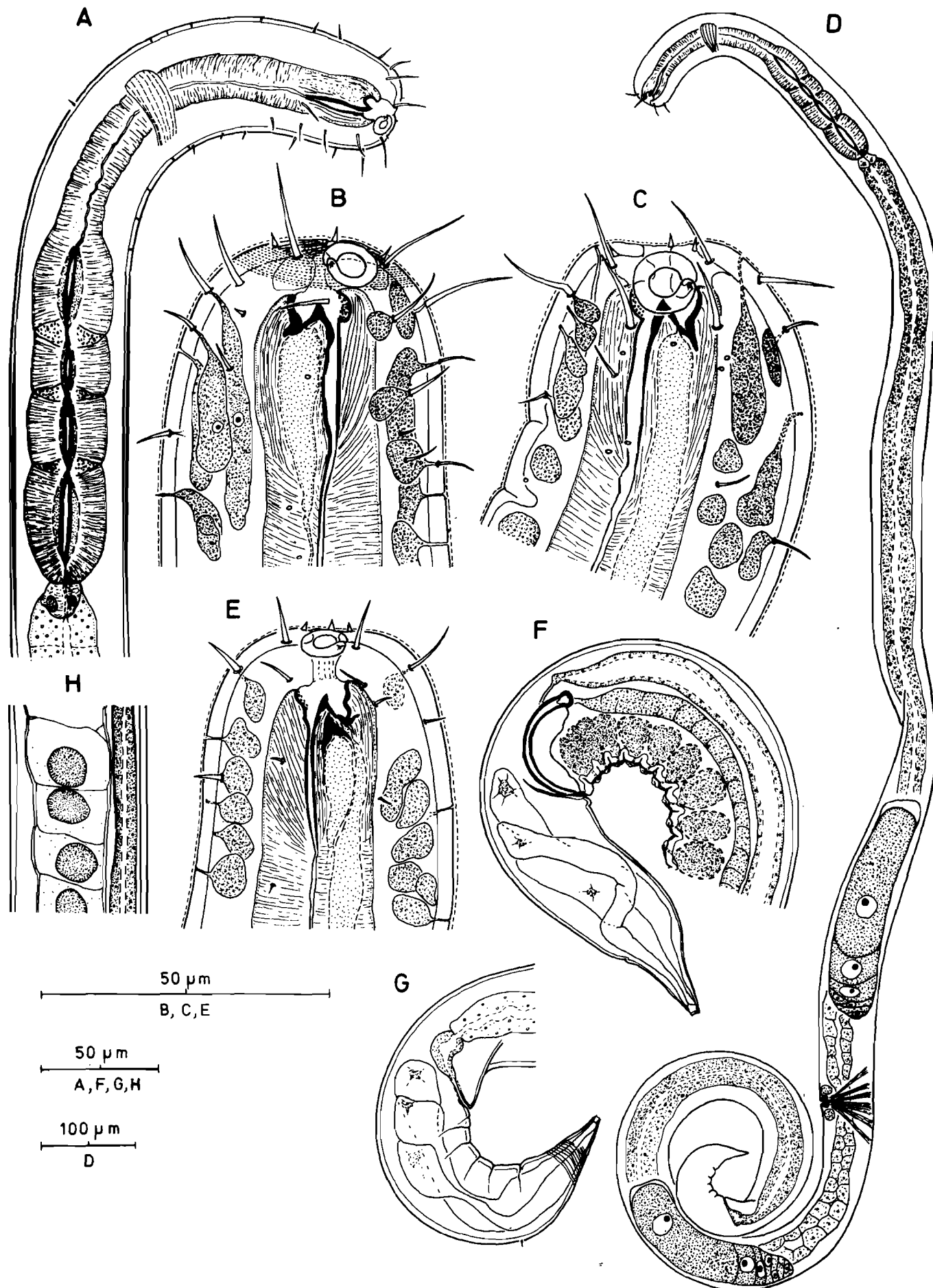


Figure 4 *Chromadoropsis longispiculosa* sp. nov. A: Pharyngeal region ♀₁, B: Head end ♀₁, C: Head end ♂₂, D: Total view ♀₁, E: Head end juv₁, F: Tail region ♂₁, G: Tail region ♀₁, H: Sperm cells at the level of the testis top.

dorsal pharyngeal gland cell opens at the base of the dorsal tooth.

Pharynx strongly muscular with a terminal bulb (45% of the pharyngeal length) which is divided into four smaller bulbi; the lumen of the terminal bulb is also divided into four more cuticularized regions. The second bulb is the smallest one.

Cardia well developed, about 10 µm long.

Nerve ring at 36% of the neck length.

Ventral gland and pore not found.

Monorchic with anterior testis situated at the left of the intestine. Sperm cells very large (25–30 µm in diameter).

Spicules regularly curved with small capitulum and prominent velum; they are about 1,5 of the anal body diameter long; musculature not prominent. Gubernaculum simple and plate-shaped; 27 µm long.

Twenty-one to 27 pre-anal supplements are present at regular intervals; they consist of a cone-shaped papilla which is in connection with a prominent gland cell. No setae are present on the ventral side of the region of the pre-anal supplements.

Tail conical with a ventral swelling, probably owing to the large ampullae of the three caudal glands. No cuticular modifications present.

Females: Resemble males in most aspects.

Didelphic-amphidelphic with reflexed ovaries both at the left side of the intestine.

Vagina supported distally by two triangular cuticular structures (in optical section); two vaginal gland cells also present. Uteri with large granular cells; no mature eggs present. A spermatheca could not be detected.

Juvenile: One juvenile (probably a Juv 4→♂) has been examined; the dorsal replacement tooth is in a very anterior position and is supported by a large granular mass.

Porids are quite numerous.

The four pharyngeal bulbi are present.

Diagnosis

Chromadoropsis longispiculosa sp.nov. is characterized by the presence of four pharyngeal bulbi in both sexes, by the presence of epidermal gland cells (especially numerous in the cervical region) in connection with somatic setae (i.e. porids), the long slender spicules with a prominent velum and the very large sperm cells.

Discussion

Chromadora vivipara de Man, 1907 has been designated as type species of the genus *Chromadoropsis* Filipjev, 1918 by Filipjev (1918).

However, Gerlach (1951), Wieser & Hopper (1967) and Lorenzen (1981) proposed that *Chromadoropsis* (and six other genera) can be considered as subgenus of one genus, i.e. *Metachromadora* Filipjev, 1918.

Re-examination of several '*Metachromadora* s.l.' species reveals that the genus *Metachromadora* is very heterogeneous and not well defined (Vincx 1986).

Therefore, we reinstate the subgenus *Chromadoropsis* to the genus level with following diagnosis.

Chromadoropsis Filipjev, 1918

Type species: *Chromadoropsis vivipara* (de Man, 1907) Filipjev, 1918.

Syn. Chromadora vivipara de Man, 1907.

Spiriniinae. Rounded head end. Cuticle faintly striated. Cephalic setae at the anterior level of the amphideal fovea. Eight subcephalic setae present at the posterior level of the amphideal fovea. Buccal cavity with prominent dorsal tooth and ventrosublateral teeth apparently lacking. Pharynx with buccal bulb and elongated terminal bulb (which consists of two or four parts). Ventral gland absent. Spicules with well-developed capitulum and/or velum. Pre-anal supplements consist of one central and two lateral cuticular plates. Conical tail.

List of valid species

Chromadoropsis clavata (Gerlach, 1957) comb.n.
syn. *Metachromadora (Metachromadora) clavata* Gerlach, 1957.

Chromadoropsis granulosus sp.nov.

Chromadoropsis longispiculosa sp.nov.

Chromadoropsis namibiensis sp.nov.

Chromadoropsis pacifica Murphy, 1966.

Table 1 Diagnostic differences between four *Chromadoropsis* spp., (B) — after Blome 1974; (G) — after Gerlach 1956

		<i>C. granu- losus</i>	<i>C. longi- spiculosa</i>	<i>C. na- mibiensis</i>	<i>C. quadri- bulba</i>	
Body length µm	♂	1105–1228	2265–2470	1734–1818	2223	(G)
	♀	1125–1196	2000–2510	1514–1788	1335–2087	(B)
Spic. length µm		35–40	69–70	40–43	50	(G)
					47–49	(B)
Spic. Velum		–	+	–	+	(G)
					+	(B)
Gub. length µm		30	27	34	28	(G)
					30	(B)
Sperm cells µm Ø		5	25–30	5	?	
Pre-anal suppl.		14–17	21–27	14–16	23	(G)
					26–27	(B)
Vaginal region		'constrictor cells'	–	sphincter	?	
Epidermal cells		granular dense	porids	opaque, large cells	?	

Chromadoropsis quadribulba (Gerlach, 1956) Wieser & Hopper, 1967.

Chromadoropsis vivipara (de Man, 1907) Filipjev, 1918.

Up to now, three of the seven species of *Chromadoropsis* have two pharyngeal bulbi: i.e. *C. clavata*, *C. pacifica* and *C. vivipara*.

The other species have four pharyngeal bulbi and are very similar in general morphology.

However, the differences tabulated in Table 1 between the four species are considered as diagnostic on the species level.

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