

Descriptions of Two New Species of *Chronogaster* Cobb, 1913 from India¹

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Abstract: Two new species of *Chronogaster* in India were described and illustrated, based on light and scanning electron microscopy. *Chronogaster neotypica* n. sp. collected from a sewage slurry was characterized by a medium-sized body, a ventral tail mucro without additional spines, absence of longitudinal incisures in lateral fields, and by the presence of crystalloids in the body. Diagnostic for *C. spinicauda* n. sp. collected from soil around roots of mango were a medium-sized body, a tail mucro with 10 spines, and absence of lateral lines and crystalloids. Males were not found.

Key words: *Chronogaster neotypica* n. sp., *C. spinicauda* n. sp., description, morphology, nematode, scanning electron microscopy.

The genus *Chronogaster* was established with *C. longicollis* Cobb, 1913 as its type species. Later it was reviewed (1) and rediagnosed (6) and several new species added (3-7). The genus at present contains 31 species. Heyns and Coomans (2) gave detailed observations on the morphology and discussed the taxonomic value of each character. They also provided a compendium and a key to the identification of species (2,3). This paper describes two new species of *Chronogaster*.

MATERIALS AND METHODS

Soil samples were processed by sieving and decantation and the modified Baermann's funnel technique. For permanent mounts, specimens were dehydrated by the slow method and mounted in anhydrous glycerine. For scanning electron microscopy (SEM), freshly isolated specimens were fixed in glutaraldehyde, then post-fixed in osmium tetroxide and dehydrated in an acetone series. Critical point dried specimens were coated with gold and observed in a Hitachi S 2300 SEM at 15 kV.

SYSTEMATICS

Chronogaster neotypica n. sp. (Figs. 1A-E, 3A-C)

Description: Measurements of holotype female and paratype females are in Table 1.

Female ($n = 15$): Body arcuate to spiral upon fixation, tapering towards extremities, more pronounced posteriorly. Cuticle transversely striated, striae 0.5-1.0 μm apart. Lateral lines absent. Crystalloid bodies present, more densely aggregated around basal esophageal bulb than in other parts of body. Lip region wide, high, continuous with body contour. Lips separate apically, fused at base, labial papillae indistinct. Cephalic setae 3.5 μm long, arising from base of nonstriated lip region.

TABLE 1. Measurements (μm) of *Chronogaster neotypica* n. sp. females.

Characters	Holotype	Paratypes ($n = 15$)	
		Range	Mean \pm SD
L	960	950-1300	990.0 \pm 110
a	45.8	37-64	52.9 \pm 7.9
b	4.6	3.9-4.8	4.5 \pm 0.9
c	6.5	6.5-9.4	8.4 \pm 0.5
c'	7	7-11.5	9.5 \pm 0.8
V	48	45-50	47.5 \pm 2.7
Stoma	6	6-8	6.5 \pm 0.8
Esophagus	207	157-242	205.0 \pm 25.3
Anal body diameter	17	15-21	17.8 \pm 1.9
Tail	105	102-140	128.0 \pm 10.2

Received for publication 26 October 1992.

¹ Supported in part by a grant from the Council of Scientific and Industrial Research to the first author and a Special Assistance Program of the University Grants Commission to the Section of Nematology.

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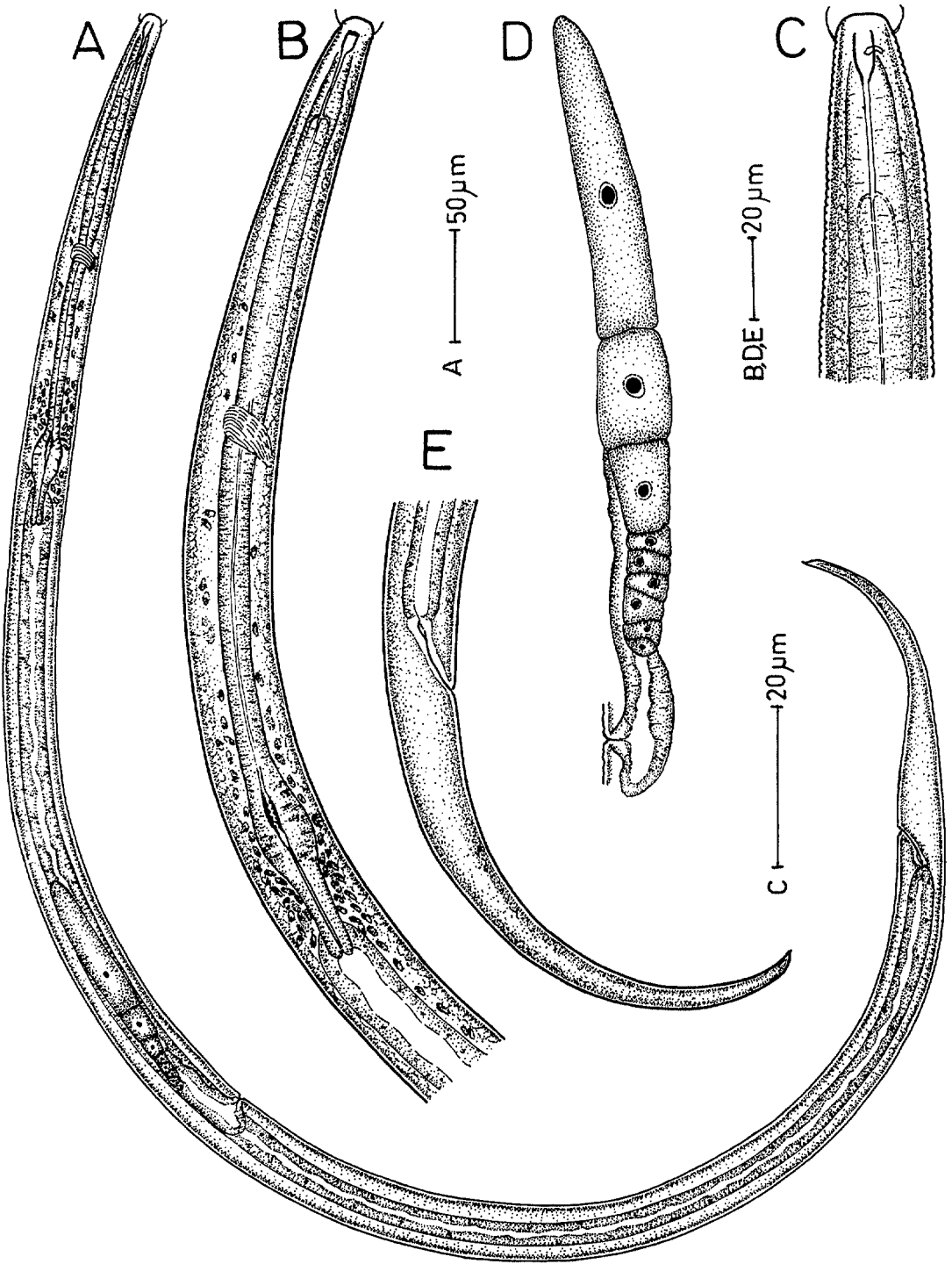


FIG. 1. A–E. *Chronogaster neotypica* n. sp. females. A) Entire female. B) Esophageal region. C) Anterior end. D) Reproductive system. E) Tail.

Amphids transverse, 2.5 μm across, anterior edge 2–3 annules posterior to lip region, 2.5–3.0 μm from anterior end.

Stoma cylindroid, 6–8 μm long, radial tubules 13–22 μm from base of stoma. Esophagus 157–242 μm long, basal bulb

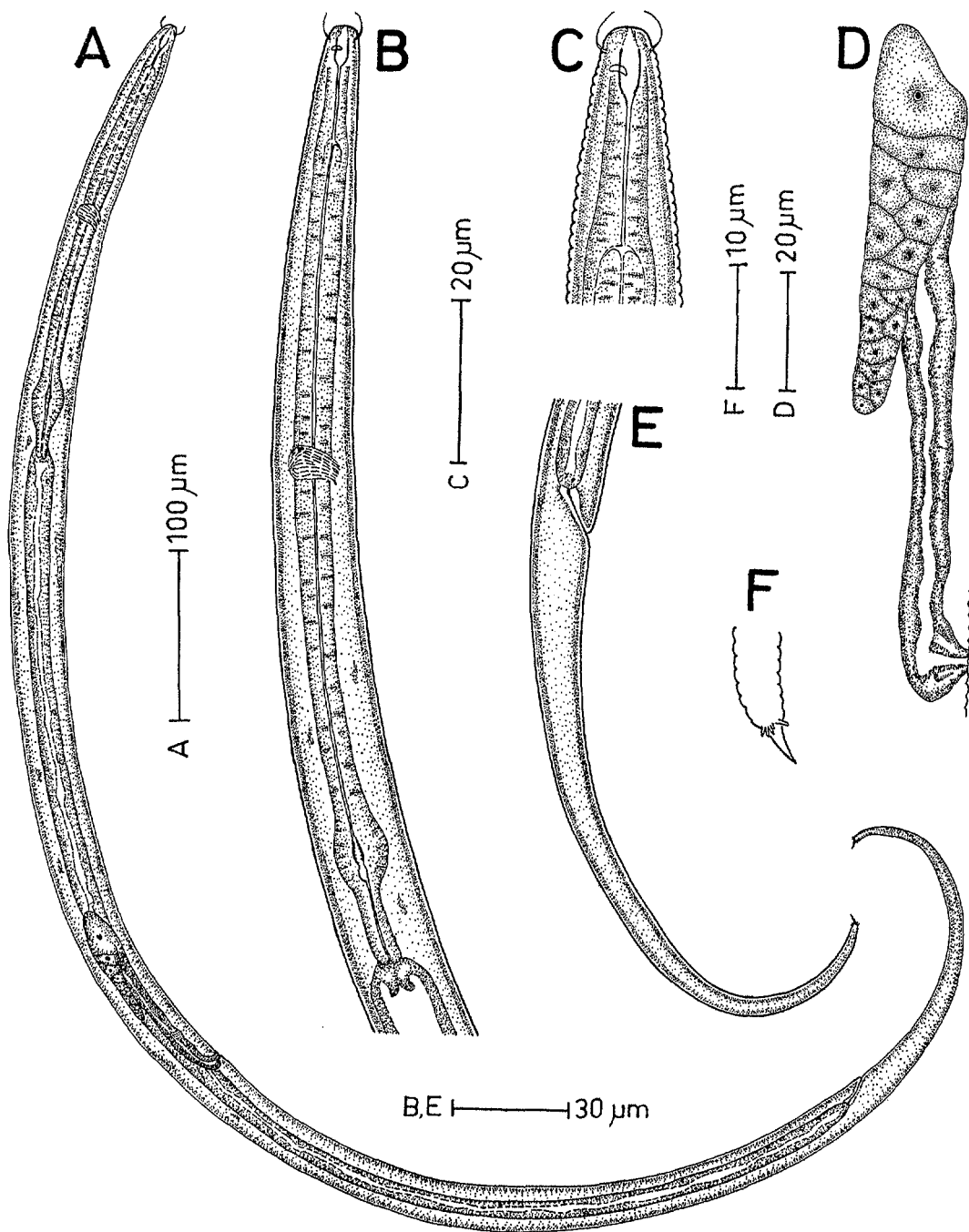


FIG. 2. A-F. *Chronogaster spinicauda* n. sp. females. A) Entire female. B) Esophageal region. C) Anterior end. D) Reproductive system. E) Tail. F) Tail terminus.

oval, 18–22 × 12–14 µm, with triradiate denticulate valve, postbulbar projection (pbp) 10–18 µm long. Nerve ring 98–128 µm from head end. Vulva a transverse slit, vulval lips radially striated, extending over three body annules. Prodelphic, ovary re-

flexed, intrauterine eggs rare in specimens studied. Postuterine sac 6–15 µm long. Tail elongate conoid, tapering regularly from anus, terminus with single ventral mucro.

Male: Not found.

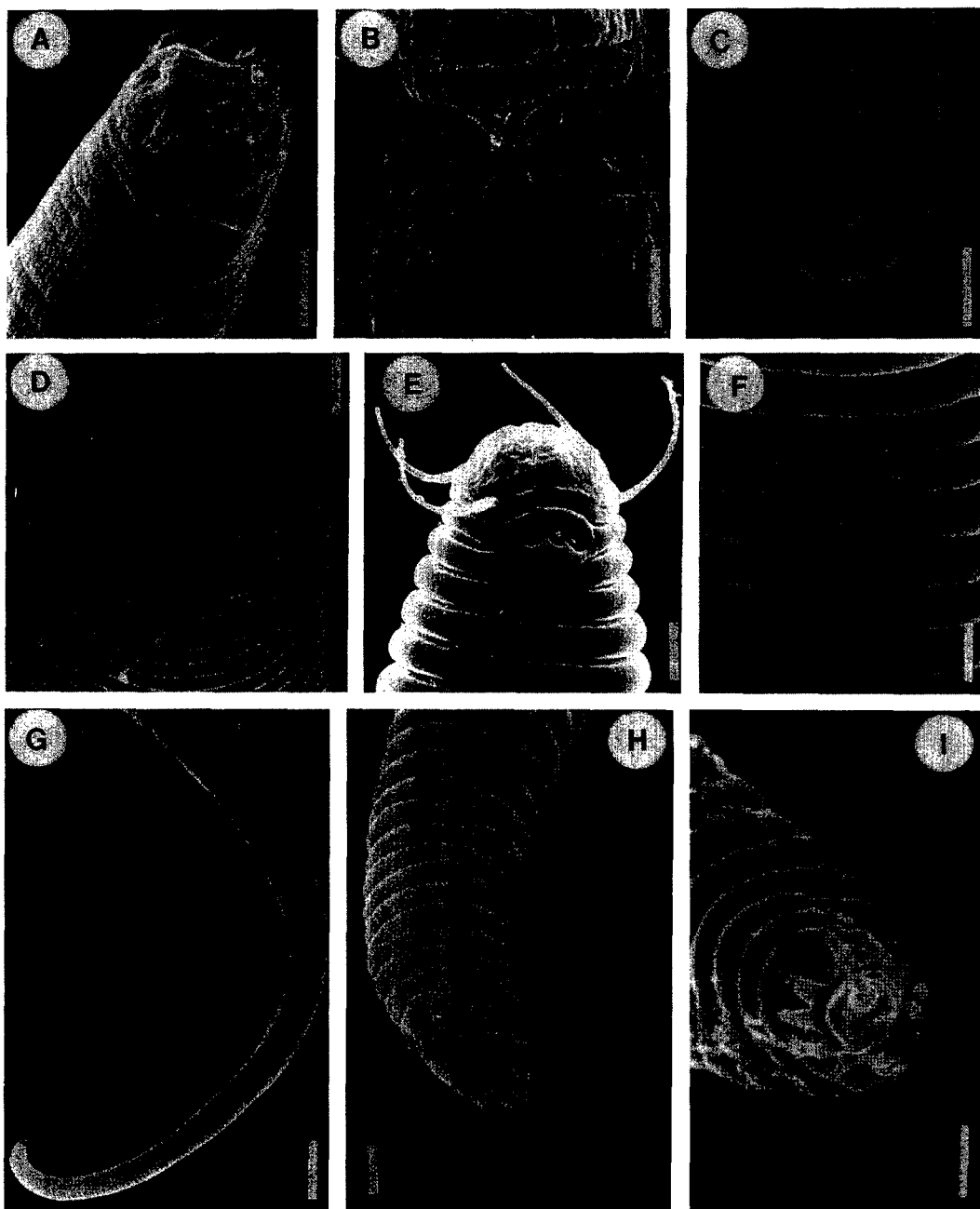


FIG. 3. SEM micrographs of two *Chronogaster* species. *Chronogaster neotypica* n. sp. A) Anterior end. B) Vulva. C) Tail tip. *Chronogaster spinicauda* n. sp. D) En face. E) Anterior end, lateral. F) Vulva G) Tail. H) Tail tip. I) Tail tip end on view. (Scale: bar = 2 μ m in A-F; 10 μ m in G; 1 μ m in H,I).

Diagnosis: *Chronogaster neotypica* n. sp. is characterized by a medium-sized body, presence of crystalloids in the body, a ventral tail mucro without spines, and absence of incisures in the lateral fields.

Relationship: Of the 31 nominal species,

Chronogaster neotypica n. sp. is most similar to *C. typica* de Man, 1921, *C. glandifera* Heyns & Coomans, 1980, *C. bigubernacula* Khera, 1972, and *C. rotundicauda* Heyns & Coomans, 1983. It differs from *C. typica* by a smaller c' value (7.0–11.5 vs. 12–14),

shorter distance of radial tubules from stoma (13–22 vs. 27 μm), and absence of lateral lines (nil vs. two); from *C. glandifera* by a shorter body (950–1,300 vs. 1,330–1,470 μm), shorter cephalic setae (3.5 vs. 9.0–12.0 μm long), the presence vs. absence of crystalloids, and the absence vs. presence of glandular bodies; from *C. bigubernacula* in having a longer postbulbar projection (10–18 vs. 12 μm), shorter setae (3.5 vs. 5 μm), narrow annules (0.5–1.0 vs. 1–2 μm), and serrated vs. nonserrated esophageal bulb valves; and from *C. rotundicauda* by the type of tail terminus (straight vs. ventrally bent).

Type habitat and locality: Sewage slurry at the Department of Zoology, Aligarh Muslim University, Aligarh.

Type designation: Holotype female on slide *Chronogaster neotypica* n. sp./1 deposited in the Nematode Collection, Department of Zoology, Aligarh Muslim University, Aligarh. Twelve paratype females on slides *Chronogaster neotypica* n. sp./2–7, deposited at the Aligarh Muslim University. Two paratype females deposited in the U.S. Department of Agriculture Nematode Collection, Beltsville, Maryland.

Chronogaster spinicauda n. sp.
(Figs. 2A–F, 3D–I)

Description: Measurements are in Table 2.

Female ($n = 10$): Body arcuate upon fixation, tapering towards extremities, more

pronounced posteriorly. Cuticle transversely striated, striae 0.5–1.5 μm apart at various regions of body. Lateral lines absent. Crystalloids and glandular bodies absent. Lip region dome-shaped, continuous with body contour. Lips not prominent, fused at base, labial papillae indistinct. Lips irregularly striated (SEM), possibly due to shrinkage of lip region during fixation. Cephalic setae 6–8 μm long arising from base of lip region. Amphidial apertures crescentic, 2.5–3.0 μm wide, located on second or between second and third body annules. Stoma cylindroid, 8–10 μm long, radial tubules 18–20 μm posterior. Esophagus 243–274 μm long, basal bulb oval, 18–21 \times 12–14 μm , valve triradiate serrated, pbp 21–29 μm long. Nerve ring 106–124 μm from head end, at 42–45% of esophageal length. Excretory pore 138–150 μm from head end, at 47–57% of esophageal length. Vulva a transverse slit, lips irregularly striated, extending over three annules. Prodelphic, ovary reflexed, postuterine sac 4.5–8.0 μm long. Intrauterine eggs rarely present. Spermatozoa not observed in females. Tail elongate conoid, tapering regularly. Ten small spines surrounding a large terminal mucro.

Male: Not found.

Diagnosis: *Chronogaster spinicauda* n. sp. is characterized by a medium-sized body, absence of incisures and crystalloids, and a terminal mucro surrounded by 10 spines.

TABLE 2. Measurements (μm) of *Chronogaster spinicauda* n. sp. females.

Character	Type population			Kaziranga, Assam population ($n = 3$)	
	Holotype	Paratypes ($n = 10$) Range	Mean \pm SD	Range	Mean \pm SD
L	1176	1020–1410	1280–0.80	1,030–1,140	1,060–0.45
a	46.11	43–58	50 \pm 0.80	36–40	38 \pm 1.5
b	4.5	4.06–5.60	4.8 \pm 0.45	4.27–4.31	4.29 \pm 0.09
c	6.2	6.20–8.90	7.8 \pm 0.80	6.2–6.6	6.4 \pm 0.12
c'	12	10.5–12.5	11 \pm 0.45	10.5–12.5	11.0 \pm 0.91
V	50	50–52	51 \pm 0.9	52–53	52.5 \pm 0.5
Stoma length	8	8–10	9.5 \pm 0.7	8–10	9.5 \pm 0.6
Esophagus length	261	247–274	258 \pm 18.2	243–265	252 \pm 10.5
Anal body diameter	15	12–16	14.5 \pm 0.9	15	15 \pm 0
Tail	181	150–187	175 \pm 12.5	157–183	169 \pm 12.6

Relationship: The new species most closely resembles *C. andrassyi* Loof & Jairajpuri, 1965 in morphometrics but can be differentiated by shorter cephalic setae (6–8 vs. 8–9 μm), small body annules (0.5–1.5 vs. 2.0–2.5 μm), shorter distance of radial tubules from stoma (18–20 vs. 24 μm), shorter pbp (21–29 vs. 33 μm), and larger number of spines at the tail tip (10 vs. 4 spines).

Type habitat and locality: Soil around the roots of mango (*Mangifera indica*) from Company Garden, Bareilly, Uttar Pradesh.

Type designation: Holotype female on slide *Chronogaster spinicauda* n. sp./1, deposited in the Nematode Collection, Department of Zoology, Aligarh Muslim University, Aligarh. Seven paratype females on slides *Chronogaster spinicauda* n. sp./2–4, deposited at the Aligarh Muslim University. Two paratype females deposited in the U.S. Department of Agriculture Nematode Collection, Beltsville, Maryland.

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