OBSERVATIONS ON *Coomansus gerlachei* (de Man) (NEMATODA: MONONCHIDAE), A PREDACIOUS NEMATODE FROM THE ANTARCTIC

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ABSTRACT. A description is given of what is considered to be *Coomansus gerlachei* (de Man) collected from four localities in the Antarctic Peninsula region. The specimens differ notably from those described by de Man in that they possess a well-developed gubernaculum, a bifid tip to the spicule accessory pieces, dorsal and ventral invaginations in the wall of the female rectum and a possible glandular area on the ventral surface of the male tail.

Coomansus gerlachei (de Man) Jairajpuri and Khan, 1977, was originally placed in the genus *Mononchus* Bastian, 1865, by de Man (1904). Subsequently *gerlachei* and the 14 other species of *Mononchus* with a well-developed lip region, a barrel-shaped buccal cavity, short stout spicules and accessory pieces, and with caudal glands either absent or poorly developed were transferred to a new genus, *Clarkus,* by Jairajpuri (1970). *C. gerlachei* and the 11 other known species of *Clarkus* without a ventral ridge in the buccal cavity were later transferred to another new genus, *Coomansus,* by Jairajpuri and Khan (1977).

The type description of *C. gerlachei* was based on three males and seven females collected from fresh-water algae near Beneden Head (lat. 64°46′S, long. 62°42′W; formerly Cape van Beneden) on the Antarctic Peninsula (de Man, 1904). 12 years later, Steiner (1916) recorded six male, two female and one juvenile *C. gerlachei* from Possession Island (lat. 46°25′S, long. 51°43′E), which, apart from a few differences, closely resembled those described by de Man. Steiner (1916) also recorded two juveniles, which were thought to belong to this species, from the Comores in the western Indian Ocean. Rather surprisingly, single individuals of *C. gerlachei* have been reported from off the coast of Chile by Wieser (1953) and from the Falkland Islands by Allgén (1951). According to Meyl (1955), Wieser's specimen was probably *Mononchus major* Cobb, 1893.

More recently, numerous individuals of *C. gerlachei* have been reported (as *Clarkus gerlachei*) from several islands in the maritime Antarctic (Spaull, 1973*c*) and a single male *C. gerlachei* was found in the Mackenzie Delta in the Canadian Arctic (Mulvey, 1978).

A careful study of the island specimens has shown that most of their morphometric and allometric characters agree with those described for the type specimens by de Man (1904) and for the specimens described by Steiner (1916). There are, however, certain noteworthy features which do not conform with these earlier descriptions. A study of the type material was not possible as none of the original specimens of *C. gerlachei* is in the de Man collection at the Institute of Taxonomic Zoology in Amsterdam (personal communication from P.A.A. Loof) and other attempts to locate these specimens were unsuccessful. Also, the specimens of *C. gerlachei* described by Steiner (1916) are believed to be no longer in existence (personal communication from R. H. Mulvey). Unfortunately, it was not possible to collect specimens from the type locality. In the absence of type material and in view of their close similarity, the island specimens are tentatively considered to be conspecific with *Coomansus gerlachei.* A description of the specimens is herein given to supplement those of de Man and Steiner. The seasonal variation in numbers, distribution and feeding habit of *C. gerlachei,* together with an estimate of its biomass and oxygen consumption on Signy Island have been given elsewhere (Spaull, 1973*a, b, c, d*).

MATERIALS AND METHODS

Data were recorded from six males and six females collected from each of the following habitats and localities (Fig. 1):

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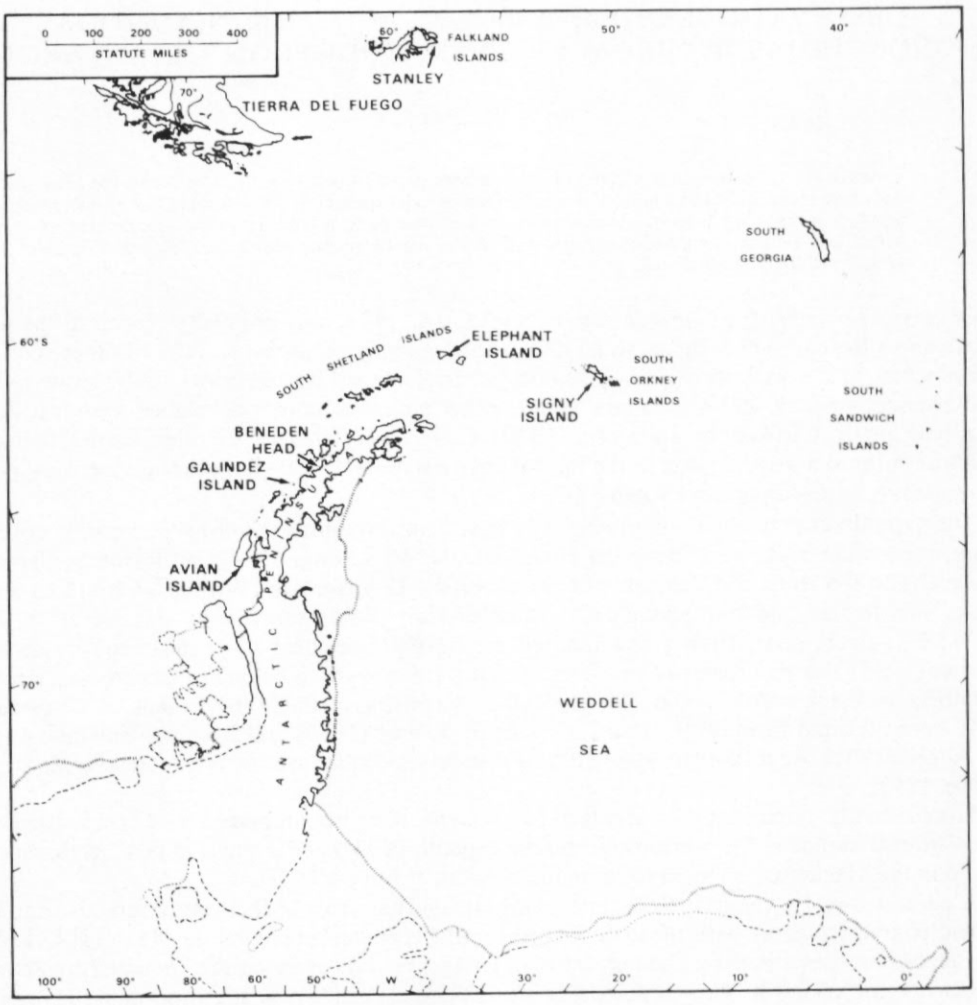

Fig. 1. Sketch map of the Antarctic Peninsula region showing the locations from which samples were collected.

Prasiola crispa (Lightf.) Menegh. (thallose alga) from melt stream *c.* 8 m a.s.l., collected by the author, 11 December 1968, from Signy Island (lat. 60°43′S, long. 45°38′W).
Soil below the grass *Deschampsia antarctica* Desv. from level ground *c.* 80 m a.s.l., collected by E. C. Walshaw, 21 March 1971, from Elephant Island (lat. 61°10′S, long. 55°14′W).

Brachytecium austro-salebrosum (C.Muell.) Par. (moss) from wet depression *c.* 25 m a.s.l., collected by S. P. Finigan, 21 January 1970, from Galindez Island (lat. 65°15′S, long. 64°15′W).

Drepanocladus uncinatus (Hedw.) Warnst. and *Bryum algens* Card. (mosses) from north-east-facing slope *c.* 10 m a.s.l., collected by W. Taylor, 1 February 1970, from Avian Island (lat. 67°46′S, long. 68°54′W).

The specimens were fixed in hot FA 4:1 (Seinhorst, 1966), processed by the glycerine-ethanol method (Seinhorst, 1959) and mounted in glycerine. *En face* mounts and ventral view mounts of vulva, anus and cloaca were made with fixed specimens stained in cotton blue. To help elucidate

TABLE I. MEAN AND RANGE OF MEASUREMENTS OF *Coomanus gerlachei* WITH STANDARD ERROR OF BODY LENGTH

	Signy Island 6♂, 6♀	*Elephant Island* 6♂, 6♀	*Galindez Island* 6♂, 6♀	*Avian Island* 6♂, 6♀	*Beneden Head* (de Man, 1904)	*Possession Island* (Steiner, 1916)
L, mm ♀	3.69 (3.46–3.95) SE = ±0.074	3.37 (3.14–3.68) SE = ±0.096	3.60 (3.44–3.65) SE = ±0.033	3.35 (3.05–3.63) SE = ±0.094	2.90–3.67	3.36–3.84
♂	3.60 (3.39–3.74) SE = ±0.048	3.28 (3.12–3.46) SE = ±0.055	3.67 (3.25–4.00) SE = ±0.119	3.40 (3.02–3.61) SE = ±0.087	2.90–3.20	3.08–4.22
a ♀	36 (30–40)	29 (26–30)	32 (29–35)	30 (27–33)	25–30	
♂	39 (36–42)	28 (27–29)	37 (32–41)	31 (29–34)	25–30	
b ♀	5.5 (5.2–5.7)	5.0 (4.7–5.3)	4.8 (4.7–4.9)	4.8 (4.4–5.1)	>5	4.1–4.2
♂	5.2 (4.9–5.5)	4.9 (4.8–5.0)	4.8 (4.6–5.1)	4.8 (4.5–4.9)	5	3.9–4.6
c ♀	20.7 (19.5–22.1)	18.1 (16.7–18.9)	19.6 (16.5–23.7)	16.6 (15.1–18.3)	16.3	16.7–19.0
♂	23.4 (22.0–24.3)	22.2 (20.7–25.3)	20.8 (19.6–22.1)	20.2 (18.3–21.7)	20–25	20.0–22.8
c′ ♀	3.0 (2.6–3.2)	2.8 (2.5–2.9)	2.8 (2.3–3.2)	3.1 (2.8–3.7)	2.6–3.1	
♂	1.6 (1.5–1.7)	1.5 (1.3–1.6)	1.9 (1.6–2.1)	1.9 (1.8–1.9)	1.6–1.9	
V, %	55.7 (54.4–57.0)	57.2 (56.4–59.5)	54.8 (50.5–57.0)	55.3 (54.1–56.3)	>50	55.1–58.1
Anterior ovary, %	12.3 (11.0–13.6)	12.9 (12.0–14.5)	12.1 (11.1–12.6)	12.2 (11.4–13.9)		
Anterior ovary length, µm	456 (382–536)	433 (393–471)	436 (382–457)	408 (354–500)		
Posterior ovary, %	12.5 (10.3–14.8)	12.8 (11.8–13.3)	12.3 (11.4–13.2)	11.9 (10.6–13.2)		
Posterior ovary length, µm	465 (357–586)	433 (379–479)	442 (407–464)	400 (336–479)		
T, %	53.8 (52.5–56.0)	47.7 (44.5–51.4)	54.9 (53.8–55.9)	52.4 (48.1–55.7)		
Anterior testis length, µm	415 (393–450)	361 (257–521)	510 (479–550)	479 (364–550)		
Posterior testis length, µm	396 (371–414)	358 (264–475)	478 (436–529)	417 (314–471)		
Stoma length, µm ♀	43 (41–44)	44 (43–46)	53 (51–54)	53 (50–56)	53	
Stoma length, µm ♂	43 (41–45)	44 (43–45)	53 (51–55)	51 (50–54)	53	
Stoma width, µm ♀	24 (23–24)	26 (24–29)	26 (26–27)	28 (26–29)	28	
Stoma width, µm ♂	23 (22–25)	25 (24–26)	26 (25–28)	28 (26–29)	24	
Position of dorsal tooth, % ♀	80.3 (78.6–80.9)	79.3 (76.8–86.2)	86.6 (84.9–87.5)	84.9 (83.3–87.1)	80.3–84.5	
Position of dorsal tooth, % ♂	78.6 (75.8–82.8)	78.2 (76.3–80.3)	86.3 (83.7–87.8)	83.2 (78.4–85.7)		
Oesophagus length, µm ♀	674 (636–714)	681 (664–707)	744 (696–775)	703 (664–750)		817–918
Oesophagus length, µm ♂	688 (679–704)	667 (636–700)	757 (686–793)	710 (679–736)		770–907
Tail length, µm ♀	179 (161–191)	187 (174–196)	187 (151–221)	202 (193–211)	192–231	202
Tail length, µm ♂	154 (151–158)	149 (137–160)	176 (154–189)	168 (161–174)	144–175	140–185
Spicule length, µm	163 (154–169)	166 (160–178)	158 (153–165)	148 (139–154)	140–160	
Number of supplements	(8–9)	(8–10)	(7–8)	(8–9)	9	11–14
Rectum length ♀	(48–58)	(55–63)	(53–64)	(54–60)	60–75	
Egg size, µm	(127–158)×(74–101)	(128–155)×(88–91)	—	—	140×90	

the form of the spicules and gubernaculum, lateral, dorsal and ventral view mounts were made of the male cloacal region using specimens fixed in Bouin's solution and stained in acid fuchsin. The method used was the same as that described by Stringfellow (1971), except that in stage 3 hot lactophenol was used in an attempt to prevent distortion, and, after the final stage prior to mounting in glycerine jelly, the nematodes were placed once more in hot lactophenol.

The tail and spicule length were measured along the arc. The length of the stoma was measured from the base to the anterior opening and does not include the lip or vestibule leading into the stoma. The width of the stoma includes the sclerotized walls and the position of the dorsal tooth, relative to stoma length, was measured from the base of the stoma. The oesophagus length was measured from the anterior extremity to the level of the oesophago-intestinal junction. The length of the anterior and posterior ovary does not include the flexure.

Description

Dimensions. See Table I.

Females. Body cylindrical, widest just anterior to vulva, tapering slightly towards head and anus; ventrally curved when heat killed. Cuticle with minute transverse striations. Minute cuticular pores irregularly distributed along whole length of body. Head not offset; six lips, roughly triangular in shape, with two rings of papillae, an inner ring of six and an outer ring of ten. Amphid aperture elliptical, 4.3–7.1 μm or one-eighth to one-sixteenth of corresponding body diameter. Position of aperture ranges from level with anterior opening of stoma to level with the tip of dorsal tooth.

Stoma with thick, heavily sclerotized walls. Dorsal tooth not opposed by a ventral ridge. Anterior end of oesophagus surrounding posterior one-third of stoma. Nerve ring 207–220 μm from anterior extremity. Oesophago-intestinal junction non-tuberculate. Intestine a simple tube. No pre-rectum. Rectum thick-walled, slightly arcuate. Dorsal and ventral walls of rectum each with a small invagination (Fig. 2a); these invaginations not seen when rectum viewed from ventral surface. Anus transverse, 21 μm wide, or two-fifths of corresponding body diameter.

Vulva transverse, elliptical, slightly post-equatorial, 14 μm wide or one-sixth of corresponding body diameter. Anterior and posterior vulva papillae occasionally paired. Vagina thick-walled, muscular, extending half-way into body. Up to nine oocytes arranged in a single row in proximal part of ovary with variable number of oocytes in multiple rows in distal part. Spermatheca invariably filled with fusiform sperm.

Tail conical, ventrally arcuate, terminus rounded. Caudal gland cells and associated duct absent. Minute caudal cuticular pores irregularly distributed; two such pores, that are most clearly seen when viewed end-on, open near caudal extremity.

Males. Anterior region similar to female. Body tapers slightly anterior and posterior from mi[illegible] region, but along the length of the supplements it is expanded. Pre-rectum not distinguishable. Rectal wall without dorsal and ventral invaginations. Testes paired, opposed, outstretched. Vas deferens a narrow tube, expanded at level of first supplement to form ejaculatory duct. Supplements pre-anal; a low posterior one and 7–10 mammiform, echinulate ones. Spicules paired, separate, arcuate, with bifid tip. Lateral accessory pieces very narrow, arched in towards midline, tips bifurcated (Fig. 2b and c). Gubernaculum strongly developed but difficult to interpret; it appears essentially as shown in Fig. 2b and c, and consists of two proximal (dorsal) arms, each of which bears a ventral keel; the arms combine to form a short distal (ventral) process. Ventral view of gubernaculum is confused by the presence of the strongly sclerotized, W-shaped cloacal wall (Fig. 2c). Ejaculatory and rectal glands well developed. Caudal gland cells and duct absent.

Tail short, conical, ventrally arcuate. Generally, three or four pairs of caudal papillae, two sub-ventral and one or two sub-dorsal. Cuticular caudal pores, sometimes opening through

low mounds, irregularly distributed, including two which open near tail terminus. Possible glandular area on ventral surface of tail near terminus; this area is often partly covered by soil debris which is apparently held on by a sticky secretion (Fig. 2d).

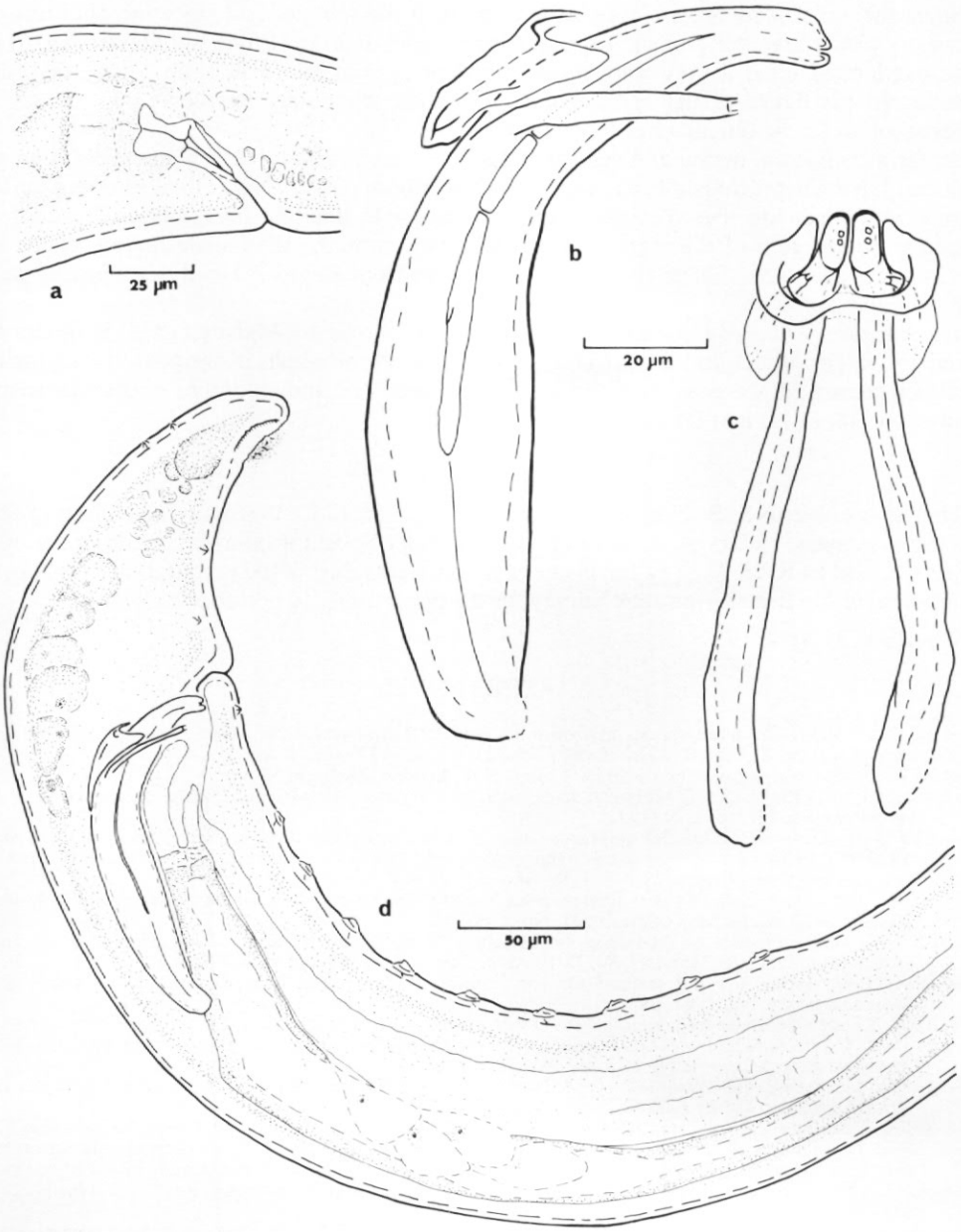

Fig. 2. *Coomansus gerlachei*. a. Rectum of female, lateral; b. Spicule, accessory piece and gubernaculum, lateral; c. Spicules, accessory pieces and gubernaculum with W-shaped cloacal wall around the tips of the spicules, ventral; d. Cloacal region of male.

Discussion

The specimens collected from Signy, Elephant, Galindez and Avian Islands differ from those described by de Man (1904) notably by the presence of a well-developed gubernaculum, the bifid nature of the accessory pieces, the possible glandular area on the male tail and the form of the female rectum.

Since the gubernaculum is closely associated with the spicules and since the bifid tips of the accessory pieces are rather small, it is possible that both de Man (1904) and Steiner (1916) might have overlooked them if they were present in their specimens. In fact, de Man (1904, fig. Ie) included in his figure of the spicule of *C. gerlachei* what may be the outline of part of a gubernaculum but he did not refer to it as such.

As far as is known, dorsal and ventral rectal invaginations and a ventral glandular area on the male tail have not previously been reported in the Mononchidae. No critical examination of the rectum was made on live specimens and it is possible that the invaginations result from a muscular contraction of the rectum during fixation; certainly, the female rectum of the island specimens is generally shorter than in the specimens from Beneden Head described by de Man (1904) (Table I).

The male *C. gerlachei* recorded from the Canadian Arctic by Mulvey (1978) is similar to the island specimens except that the tail is slightly shorter. Photographs of the posterior region of the specimen show both the possible glandular region on the tail and an outline of the gubernaculum (Mulvey, 1978, figs B and D).

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