

STUDIES ON THE MORPHOLOGY AND CYTOLOGY OF *PRATYLENCHUS ZEAЕ* WITH A REPORT ON THE OCCURRENCE OF ITS MALE

BY

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Morphological studies on *Pratylenchus zeaе* Graham, 1951, infesting sugarcane at the Indian Agricultural Research Institute Farm revealed some variations from the dimensions recorded for this nematode. Graham's description (1951) of the nematode being somewhat fragmentary, Sher & Allen (1953) improved upon it and named a neotype from the material supplied by Graham from the type locality. Taylor & Jenkins (1957) recorded great variation in the body length and shape of the tail for the species. Roman & Hirschmann (1969) studied the morphology and morphometrics of six species of *Pratylenchus*, including *P. zeaе*, and concluded that a high degree of variability exists in most of the taxonomic characters. In all these reports adult females have been studied. Additional information based on the Indian population is presented here along with measurements of the different larval stages of the nematode. A male was also collected and is being reported for the first time for the species.

Measurements : Females (25) : L = 0.50-0.60 mm (0.57 mm) ; a = 22-32 (28) ; b = 4.7-6.7 (5.7) ; c = 12-18 (15) ; V = 70-80 (77) ; stylet = 15-18  $\mu$ m (17  $\mu$ m) ; width of stylet knob = 2  $\mu$ m ; length of stylet knob = 1  $\mu$ m.

Male (1) : L = 0.4 mm ; a = 27 ; b = 2.7 ; c = 13 ; T = 40 ; spicules = 20  $\mu$ m ; gubernaculum = 4.5  $\mu$ m.

Fourth-stage larvae, developing females (10) : L = 0.41-0.56 mm (0.48 mm) ; a = 19-24 (21.5) ; b = 3.2-4.4 (3.8) ; c = 18-22 (20) ; V = 66-70 (68) ; stylet = 11-15  $\mu$ m (13  $\mu$ m).

Third-stage larvae (10) : L = 0.38-0.46 mm (0.42 mm) ; a = 16 - 21 (19) ; b = 2.8-3.6 (3.2) ; c = 15-18 (16) ; stylet = 15-17  $\mu$ m (16  $\mu$ m).

Second-stage larvae (10) : L = 0.21-0.26 mm (0.23 mm) ; a = 15-19 (17) ; b = 2.3-2.7 (2.5) ; c = 10-13 (12) ; stylet = 11-15  $\mu$ m (13  $\mu$ m).

Description : Female : Body straight or slightly ventrally curved when relaxed by gentle heat (Fig. 1A and B), tapering towards the extremities, more so posteriorly. Cuticle with fine striations interrupted by 4 lateral lines which extend from the vicinity of median bulb to tail, occupying 1/3 of the body-width. Lip region with 3 striations. Stylet well developed with flattened knobs. Dorsal oesophageal gland opening 3-4  $\mu$ m behind the stylet base. Excretory pore located about the junction of oesophagus and intestine. Hemizonid immediately anterior to excretory pore. Ovary outstretched with a single row of oocytes ; vulva a transverse slit, sometimes with a protruding lip ; spermatheca not observed. A dorsal extension of intestine posterior to rectum present in most of the individuals. Phasmids small, pore like and located almost midway on the tail. Tail variable in shape, generally round or sub-acute with about 20-25 annules (Fig. 1C).

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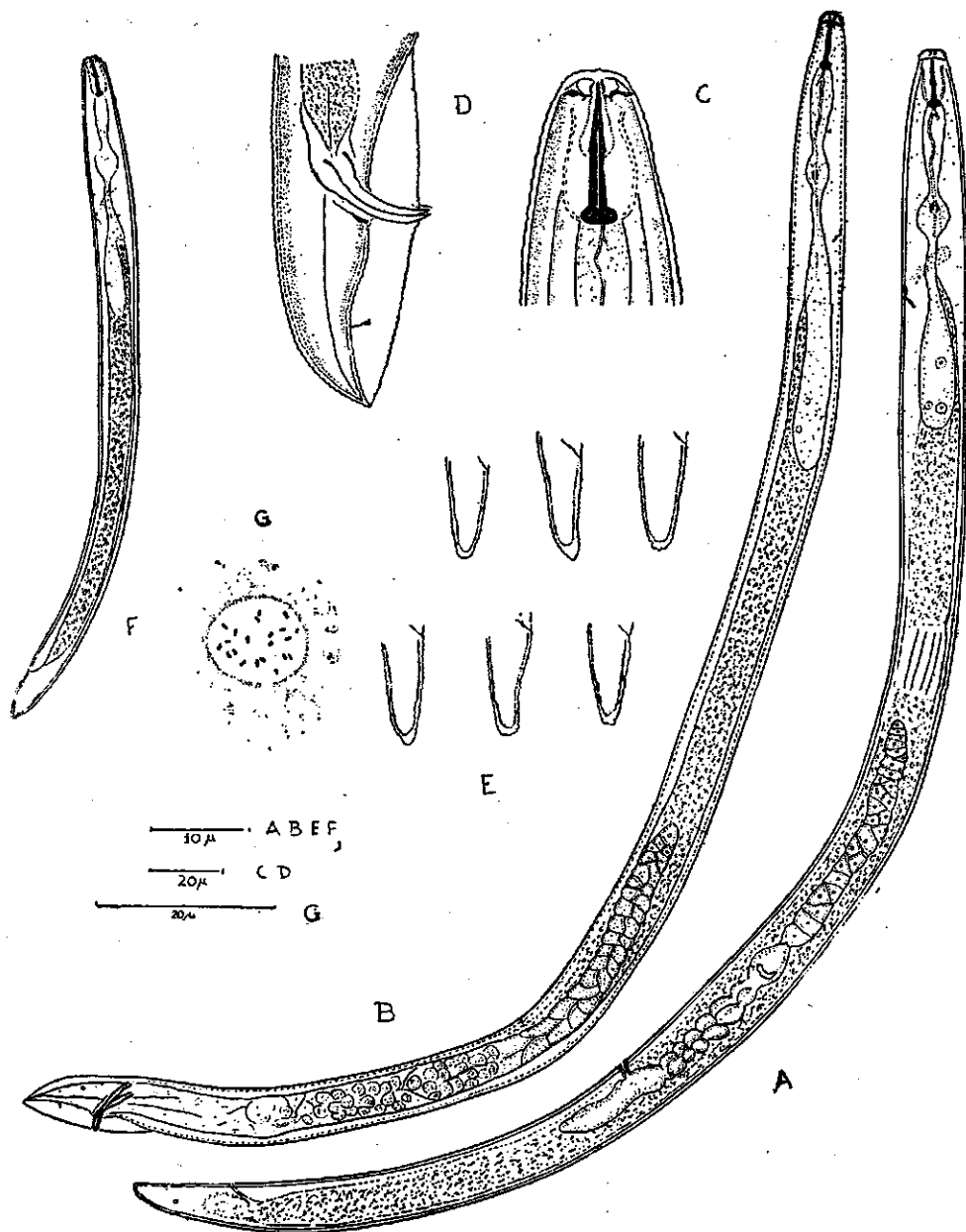


Fig. 1. A—Adult female; B—Adult male; C—Anterior end of adult female; D—Tail of male; E—Variations in tail shape of females; F—Second stage larva; G—Egg nucleus showing chromosomes.

**Male :** Body ventrally curved when relaxed, morphologically similar to the females. Testis outstretched, with multiple rows of spermatocytes. Spicules well developed, arcuate dorsally with 2 swellings. Bursa enveloping the tail tip and extending slightly beyond the anterior end of the spicules.

**Larvae :** Similar to adults except in body size and development of the reproductive parts. Tail tip of second-stage larvae slightly pointed (Fig. 1D).

In spite of some differences in morphology and range of body measurements from descriptions given by earlier workers (l.c.) the present population is considered by us to be one of geographical variation.

**Cytological studies :** Chromosomes in the oocytes and eggs were stained employing the technique used by Triantaphyllou & Hirschmann (1967). One-celled eggs were either dissected out of the female body or picked up from the callus tissue culture in a drop of distilled water in a syracuse watch glass.

It was observed that the oocytes reach their full size after entering the oviduct. No sperm was observed in the spermatheca and no chromosomes could be seen during the oögonial development. The fully developed oocytes pass one by one through the spermatheca and reach the anterior part of the uterus. In some cases chromosomes were easily observed at this stage but there was no pronucleus. The chromosome number was counted as  $n=21$  (Fig. 1G). Cytologically this population appears to be similar to the North Carolina U.S.A. population (Roman & Hirschmann, 1969a; Roman & Triantaphyllou, 1969), however, the number of chromosomes within a species vary from population to population (Roman & Triantaphyllou, 1969).

Though several species need to be studied to arrive at any definite conclusion yet it appears that the absence of male and sperms in spermatheca of the females, and presence of one polar body indicate reproduction by mitotic parthenogenesis. The high number of chromosomes indicates a polyploid condition which may have evolved from a related diploid amphimictic species.

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