

Rôle of Males in Reproduction of the
Reniform Nematodes, *Rotylenchulus* spp.
(Tylenchida: Hoplolaimidae)¹

It is known that a number of nematode species reproduce by parthenogenesis even in those species where both males and female are frequently found (TRiantAPHYLLOU and HIRSCMANN, 1964). According to an extensive survey on plant parasitic nematodes made in Japan, it is obvious that at least two distinguishable groups of the reniform nematodes are in this country; one is assumed to be identical with *Rotylenchulus reniformis* according to LINFORD and OLIVEIRA (1940), and the other appears to be *Rotylenchulus* species, very close to that one described by YOKOO and TANAKA (1954). The sex ratio of the former species is estimated at approximately 1:1 and males of the latter species are extremely rare in both the field and glass-house conditions. Attempts were made to find the mode of reproduction of these populations of the reniform nematodes, and preliminary report is herein presented.

A population of *Rotylenchulus reniformis*, established from a single egg mass collected at Mizuho, Nagasaki, and another population of *Rotylenchulus* sp., mostly females, and located at Asahi, Chiba, were maintained on tomatoes (var. Fukuju No. 2) in the glass-house. To examine the role of the male in *R. reniformis* aliquots of two ml of nematode suspension containing 100 young females and

no males were pipetted into the potted tomato roots (three replications) in the first treatment and 100 young females and about 120 males in the second. With the other species the same aliquots of suspension of 100 young females without males were poured around the potted tomato roots. After the inoculation the tomato pots were kept in the glass-house where the air temperature varied between 22°C and 37°C, and supplied with fertilizers. One month latter, the adult females with their egg masses on the roots were dissected out, placed in a small Syracuse watch glass with a drop of tap water, and kept in a large petri dish with moistened filter paper at 25°C for one month. During this period, every four days, the emerged larvae were counted and incubated in another watch glass containing water about 2 mm deep at 25°C for 35 days. At the end of the egg incubation the unhatched eggs were examined. Some cytological studies on oögenesis were carried out by means of the technique after TRIANTAPHYLLOU (1963).

From the data obtained, it was revealed that the inseminated females of *R. reniformis*, which were inoculated with males, produced about 125 eggs on the average and 85 per cent of these normally gave rise to larvae, which developed to young females or males in water with approximately equal sex ratio, whilst the non-inseminated females of the same species, produced a smaller number of eggs than that of the inseminated, and no larvae emerged out of these unfertilized eggs. In the second species, the nematodes normally reproduced

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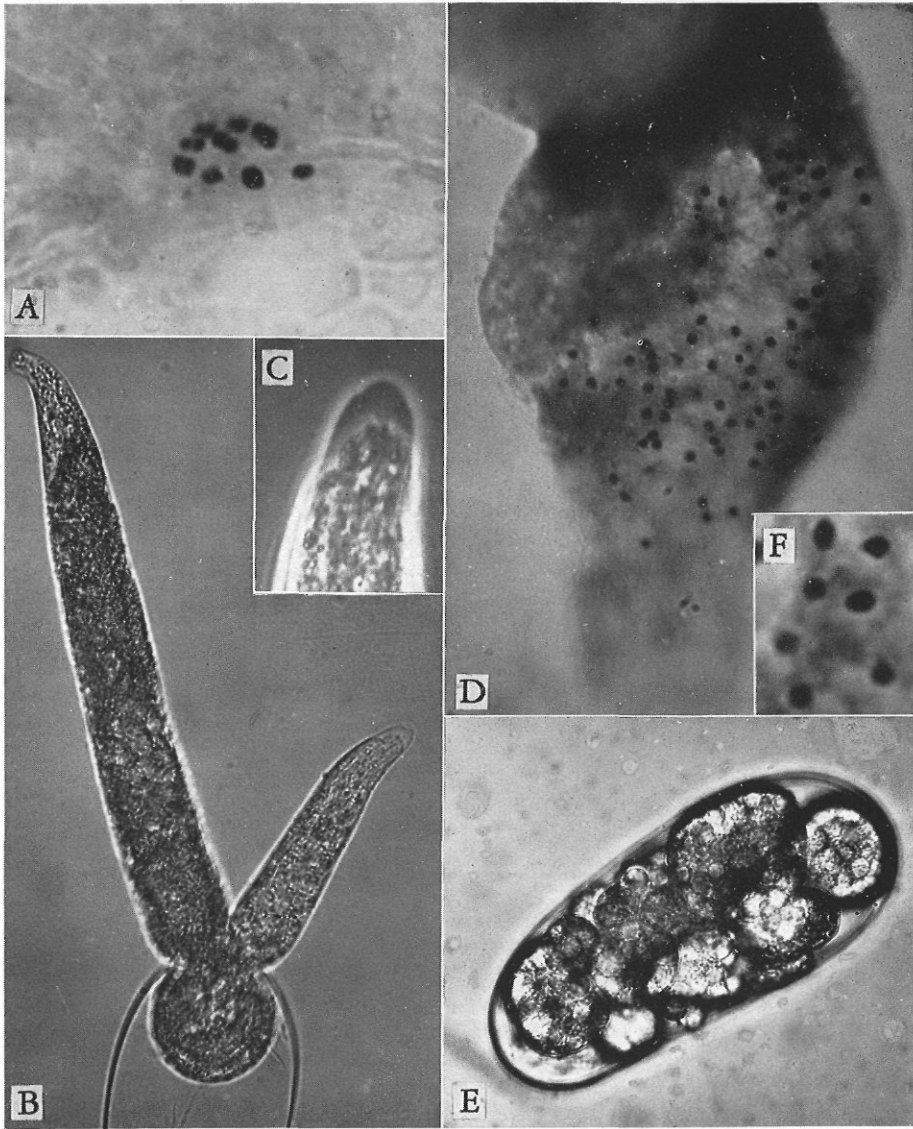


Fig. 1. Photomicrographs of *Rotylenchulus reniformis*. A: Chromosomes (nine bivalents) in prophase in the first division of meiosis of oocyte (2,530 \times). B: First molting of larva within the egg (released by pressing, 500 \times). C: Enlarged head region of B (with phase-contrast microscope, 1,690 \times). D: Sperms in spermatheca of inseminated female (1,260 \times). E: Unfertilized egg undergoing cleavage division (470 \times). F: Enlarged view of sperms in the spermatheca (2,530 \times).

in the absence of males and more than 99.4 per cent of the hatched larvae developed to young females.

Observations of eggs indicated that a certain number of these unfertilized eggs of *R. reniformis* could undergo the cleavage division but did not attain the complete blastula, and the first molting of larva took place within the egg (Fig. 1, B, C and E). It was demonstrated that there was a large number of sperms in the spermathecae of the inseminated females but none in the non-inseminated, and nine bivalent chromosomes were observed in prophase in meiosis of oöcyte of *R. reniformis* (Fig. 1, A, D and F).

It should be noted as an interesting fact on embryology of nematodes that the cleavage division in some eggs of *R. reniformis* can take place even when the fertilization of eggs does not occur, although the sperms may always be needed by the eggs in order to complete the cleavage division. On the other hand TRIANTAPHYLLOU and HIRSCHMANN (1964) cited their unpublished data that the fusion of sperm and egg nuclei took place in the mature egg of *R. reniformis*. It may be likely that the reproduction in the second species of *Rotylenchulus*

tested here is by parthenogenesis. Further examinations are to be carried out.

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