

STUDIES ON ROOT-KNOT NEMATODES OF THE GENUS MELOIDOGYNE IN THE GOLD COAST

PART I.

COMPARATIVE DEVELOPMENT ON SUSCEPTIBLE AND RESISTANT HOST SPECIES¹⁾

BY

F. C. PEACOCK

University College of the Gold Coast, Achimota²⁾

Factors influencing the host-parasite relationship have been shown to be environment, host suitability, and specificity of the eelworm population (GODFREY 1931, GODFREY and OLIVEIRA 1932, TYLER 1933). BARRONS (1939) suggested that larvae enter the roots of resistant plants as readily as they do those of susceptible plants, but fail to develop in the former. SASSER and TAYLOR (1952) showed that, in addition to normal entry and development of root-knot larvae, there is also (i) failure to enter roots, (ii) entry of reduced numbers with little or no development, (iii) entry of large numbers with varying degrees of development ranging from none to a few individuals reaching maturity, and concluded that resistance was not of the same nature in all plants. MACBETH and TAYLOR (1944) have shown that *Crotalaria spectabilis* Roth reduced the severity of root-knot on tobacco grown subsequently. STEVENSON and JONES (1953) list root-knot resistant varieties of cowpea, soybeans, and peppers.

The development of a root-knot nematode population on a number of susceptible and resistant host plants has been studied in the Gold Coast. Varieties of maize and cowpea, and some common legumes, have been examined for resistance to root-knot eelworm.

METHODS

Plants were raised from seed sown in sterile loam soil in 3½" pots; seedlings were thinned to leave 2 plants per pot, and the soil around the roots was inoculated with a suspension in distilled water of newly hatched larvae. Each plant received a 'dose' containing 500 larvae

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2) Now at Jealott's Hill Research Station, Bracknell, England.

(i.e. 1,000 per pot). The nematode population used for the inoculum was a culture of larvae of *Meloidogyne* sp. On the basis of host-specificity tests (SASSER 1954) it is suggested that this nematode is *Meloidogyne incognita* var. *acrita*. It is parasitic on red pepper and maize, but not on groundnut; it is not, or only sparingly, parasitic on cotton, but SASSER and NUSBAUM (1955) suggest that this species has strains or races which differ in their ability to attack certain crops, of which cotton is one. Measurements and study of the perineal pattern (EDWARDS, unpublished) has so far not made confident identification possible. Egg-masses were collected from a single tomato plant, washed and placed in distilled water in petri dishes. The water containing newly hatched larvae was drawn off each day with a pipette and replaced with distilled water. In this way it was possible to use larvae all hatched during the same 24-hour period. Plants were examined at 2-day intervals, the roots being washed and stained by the acid fuchsin/lactophenol technique (GOODEY 1949). Observations were made on (i) host reaction, (ii) development of eelworm larvae within the root (using the grouping of *Meloidogyne* stages of development suggested by CHRISTIE 1946), (iii) production of the gelatinous matrix, oviposition, first viable eggs, egg-counts and percentage of viable eggs.

Two root-systems (i.e. the contents of one pot) were washed, stained and cleared, for each of the species of plant. Whole roots in lactophenol were examined carefully under a lowpower dissecting microscope first, then selected pieces were dissected out; when counts of nematodes in different growth categories were required, these selected pieces were placed between two glass slides and gently pressed whilst watching through the microscope. In this way all nematodes in the tissue were seen including some which failed to take up the stain adequately. Soil temperatures during the 33-day period of observation varied from 26°-31° C.

OBSERVATIONS

Table I illustrates the varied response of different plants to the parasite.

Although the inoculation consisted of larvae hatched within the same 24-hour period, considerable variation occurred in the life-cycles of individuals. Larvae were deposited on inoculation at varying distance from a root, roots and parts of root within the same root-system are known to be differentially attractive (LINFORD 1939) or even repel-