

# Occurrence in Senegal of a biotype of *Meloidogyne javanica* parasitic on strawberry

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## ABSTRACT

*During a crop rotation experiment in Senegal, strawberry considered as a non-host, was found to be heavily parasitized by Meloidogyne javanica.*

## RÉSUMÉ

*Au cours d'un essai de rotation de cultures au Sénégal, des fraisiers, considérés comme plantes non-hôtes étaient fortement parasités par Meloidogyne javanica.*

that of the five species and subspecies he tested only *M. hapla* Chitwood, 1949 caused galling and was able to reproduce on the four varieties of strawberry included in his trial. *M. javanica* (Treub, 1885) Chitwood, 1949 did not produce galls nor did it reproduce on strawberry. In 1958, a strain of *M. javanica* from Israel was reported attacking strawberry (MINZ, 1958). It was presumed that this strain originated in Japan (STRICH-HARARI & MINZ, 1961). In 1962, another report of a *M. javanica* population attacking strawberry in Zambia was published (MARTIN, 1962). Since then no other reports of this phenomenon have been found in the literature.

## INTRODUCTION

Strawberry (*X-Fragaria ananassa* Duch.) was first reported to be susceptible to root-knot nematodes in 1933 (BUHRER *et al.*, 1933). SASSER (1954) reported

## EXPERIMENTAL

**FIELD OBSERVATIONS.** During 1974, a crop rotation experiment was established at Camberene, Senegal (Centre pour le Développement de l'Horticulture,

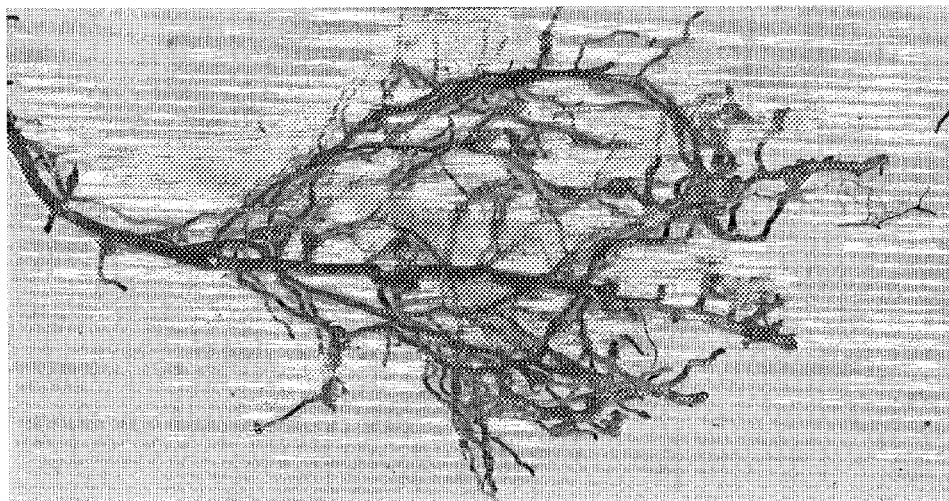


Fig. 1. — Strawberry roots infected with *Meloidogyne javanica* collected from Camberene, Senegal

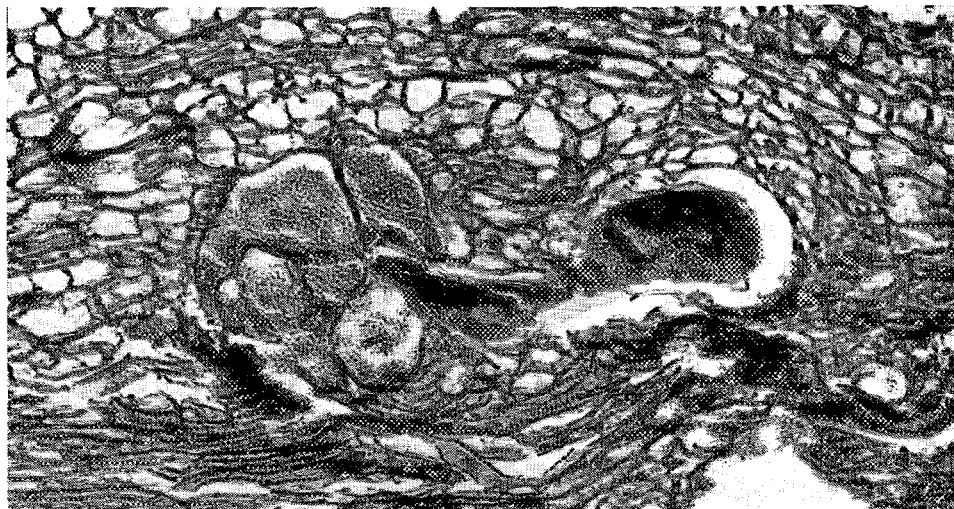


Fig. 2. — Section of strawberry root infected with *Meloidogyne javanica*

F.A.O.) in which the effects of various crops, including strawberry (var. Cambridge obtained from France) were studied on populations of *Meloidogyne* and subsequent crop growth in a field heavily infested with a mixed population of *Meloidogyne*. At the end of the experiment, approximately 12 months after planting, all strawberry plants were dug and the roots carefully examined. Severe root-knot nematode infection was observed on many of these plants. (See fig. 1). On one plant more than 1600 egg masses were selected for obtaining 2nd-stage juveniles for later experimentation.

**SPECIES DETERMINATION.** Thirty *Meloidogyne* females were dissected from field-infected strawberry roots and perineal patterns made according to the technique of Taylor and Netscher (1974). All patterns conformed to the description of *M. javanica*.

**HISTOLOGICAL OBSERVATIONS.** Infected strawberry roots were fixed for a minimum of 48 hours in FAA. Galled roots were imbedded in paraffin, sectioned at a thickness of 15  $\mu$  with a Leitz Minot microtome 1212 and stained with safranin and fast green. Photographs were taken with a Leitz «Orthomat» photomicroscope. Detailed observations of infected roots demonstrated typical host-parasite relationships existed between *M. javanica* and tissues of strawberry roots. Galled tissues contained nematodes in various stages of development with prominent giant cell development in the vascular system adjacent to the anterior end of the parasite. Hypertrophy and hyperplasia was conspicuous in cortical tissues at these infection sites; abnormal development of xylem and phloem cells was observed.

Figure 2 illustrates strawberry roots infected with *M. javanica*.

**HOST RANGE INVESTIGATIONS.** Egg masses were removed from field-infected strawberry roots and

placed on tissue paper suspended in water. After 48 hours, 2nd-stage juveniles that had passed through the tissue were collected and put into lots of 5 000 each. Two pots each of root-knot susceptible tomato (Roma), root-knot resistant tomato (Rossol), *Capsicum*, egg-plant, kenaf, roselle, sweet potato, cotton, sorghum, peanut, and strawberry were inoculated and placed in the greenhouse. One pot of each plant species or variety was sacrificed after one month, and the second pot after two months. Soil was washed from the roots and the roots examined and rated for root-knot infection. Results are given in Table I.

## DISCUSSION

On the basis of the origin of the strawberry planting material used in this experiment and on the known occurrence of *M. javanica* in the field at Camberene, it is concluded that this strain of *M. javanica* capable of attacking strawberry has been selected from the indigenous population. SAUER and GILES (1959) reported a similar phenomenon with *M. javanica* in which repeated cropping with a root-knot resistant tomato variety selected an aggressive strain capable of breaking the resistance.

Although the primary difference between this strain and the population used by SASSER (1954) is in the ability of the former to parasitize strawberry, it also appeared to be more aggressive on okra and on *Capsicum*. These differences might also be a result of varietal differences.

The observation of this strain under field conditions again demonstrates how little is known concerning

TABLE I

REACTIONS OF TEST PLANTS TO INOCULATION WITH *MELOIDOGYNE JAVANICA* ISOLATED FROM STRAWBERRY AT CAMBERENE, SENEGAL, COMPARED WITH PUBLISHED RESULTS OF AN U.S. ISOLATE OF *M. JAVANICA*

Scientific name	Common name	Senegal population Index <sup>2</sup> (Variety)	U.S. population <sup>1</sup> Index <sup>2</sup> (Variety)
<i>Arachis hypogaeae</i> L.	Peanut	0	0 (Spanish)
<i>Capsicum frutescens</i> L.	Capsicum	1 (Yolo Wonder)	0 (Cal. Wonder + Worldbeater)
<i>X. Fragaria ananassa</i> Duch.	Strawberry	4 (Cambridge)	0 (4 var.)
<i>Gossypium hirsutum</i> L.	Cotton	0	0 (Coker 100)
<i>Hibiscus cannabinus</i> M.	Kenaf	4	4 (PI 189208c)
<i>Hibiscus esculentus</i> L.	Okra	4	3 (Clemson spineless)
<i>Hibiscus sabdariffa</i> L.	Roselle	0-1 (THS-22)	—
<i>Ipomoea batatas</i> (L.) Lam.	Sweet Potato	0 (local)	0 (Md. Colden)
<i>Lycopersicon esculentum</i> Mill.	Tomato	4 (Roma)	4 (Rutgers)
		1 (Rossol)	
<i>Sorghum vulgare</i> Pers.	Sorghum	4	—

<sup>1</sup> Results taken from SASSER (1954).

<sup>2</sup> Index based on a 0-4 rating system (SASSER, 1954):

0 = no infestation or no development

1 = extremely light infection or no development

2 = light infection

3 = moderate infection

4 = severe infection.

naturally occurring variability within species of *Meloidogyne* and emphasizes that host reaction cannot be used with confidence as the sole criterion for species determination.

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