Increasing Incidence of *Meloidogyne arenaria* on Flue-Cured Tobacco in South Carolina

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ABSTRACT


Disease loss in flue-cured tobacco caused by the root-knot nematode increased fourfold over the previous year during an epiphytotic in South Carolina. Nematode morphological characteristics and a host range differential test confirmed the widespread occurrence of *Meloidogyne arenaria* and *M. incognita*. Previously, *M. arenaria* was rarely isolated from flue-cured tobacco in South Carolina. Increased losses caused by the root-knot nematode are expected in the future.

The southern root-knot nematode, *M. incognita*, is frequently associated with field crops in the Pee Dee region of South Carolina (9). Widespread use of resistant cultivars and nonfumigant nematicides has greatly reduced the severe losses that were typical on tobacco during the early 1950s (6). Before 1982, Clemson University plant-problem clinic reports of *M. arenaria* and *M. javanica* in the Pee Dee region of South Carolina were restricted to several fields; they caused minimal losses in the state tobacco crop. During 1982, severe stunting was observed in many fields throughout South Carolina's flue-cured tobacco production areas. Affected fields were treated with contact nematicides and often planted in cultivars resistant to *M. incognita* races 1 and 3. Affected plants were chlorotic and stunted and possessed severely galled root systems. Microscopic examination yielded mature root-knot nematode females and egg masses. The widespread damage observed on *M. incognita*-resistant cultivars prompted this study. This paper reports on disease loss caused by root-knot nematode and the species and race identification of *Meloidogyne* spp. responsible for the epiphytotic observed on flue-cured tobacco.

MATERIALS AND METHODS

Losses reported in flue-cured tobacco by root-knot nematode were estimates based on the county extension agent's assessment of acreage affected within his county and average losses occurring among these problem sites. Estimates of disease losses were made in 1978, and comparisons were based on losses

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knot nematode problem fields previously planted to tobacco were examined. Root-knot nematode populations were cultured on tomato (*Lycopersicon esculentum* 'Rutgers') for 54 days. *Meloidogyne* spp. eggs were obtained by washing infected roots with 0.5% sodium hypochlorite for 3 min (4). The resulting egg suspension was immediately rinsed with tap water. Bioassay plants were inoculated with 10,000 eggs per root system by pipetting the egg suspension into a 3-cm hole next to the plant hypocotyl. Species determination was confirmed using morphological criteria described previously (9).

**RESULTS AND DISCUSSION**

Disease-loss estimates indicated a fourfold increase in root-knot nematode damage on flue-cured tobacco in South Carolina during 1982 over losses observed the previous year (Fig. 1). This dramatic increase in nematode damage on tobacco apparently coincides with a shift in the populations of root-knot nematode species present within the South Carolina tobacco production area. *M. arenaria* was identified in 64 of 96 root samples collected from root-knot nematode problem tobacco fields. Concomitant populations of *M. arenaria* and *M. incognita* occurred in 56 of the 96 root samples assayed. *M. javanica* was rarely isolated from tobacco and occurred in only four of the samples. The sudden increase in loss caused by root-knot nematodes during 1982 appeared to be environmentally triggered because a gradual increase in the incidence of *M. arenaria* or *M. incognita* was not observed. Root-knot nematode damage and reproduction on cultivars resistant to *M. incognita* was rarely observed in preceding years. Threshold populations on tobacco are lower for *M. arenaria* than for *M. incognita*, and the former has shown a much greater capacity to cause root damage (2,6). Barker et al (2) suggest tobacco infected with *M. arenaria* may be more susceptible to secondary root-rotting organisms than similar plants infected with *M. incognita*. In addition, *M. arenaria* may be more tolerant of some nonfumigant nematicides than other root-knot nematode species (7).

In South Carolina tobacco production, several disturbing trends have occurred. Adequate crop rotations are practiced on fewer farms each year. Root-knot nematode problem sites during 1982 were frequently planted to tobacco the preceding year and about 60% of all tobacco cultivars grown in South Carolina are resistant to *M. incognita*

LITERATURE CITED