DISTRIBUTION OF PRATYLENCHUS SPP. 
AND OTHER STYLET-BEARING NEMATODE GENERA IN SOILS 
IN THE FLUE-CURED TOBACCO AREA OF SOUTHERN ONTARIO 

Th.H.A. Olthof and B.E. Hopper

Abstract

In a survey for nematodes associated with flue-cured tobacco, a total of 86 soil and root samples was collected at regularly spaced intervals within a 1,100-square-mile area covering Norfolk county and Darts of surrounding counties. Three species of the root-lesion nematode (Pratylenchus) appeared to be randomly distributed throughout the main tobacco area. P. penetrans occurred in 40% of the samples; P. neglectus in 36%, and P. crenatus in 2%. Representatives of eight other stylet-bearing nematode genera also were found, with relative frequencies of occurrence as follows: Tylenchorhynchus, 33%; Pratylenchus, 29%; Tylchonus, 12%; Meloidogyne, 7%; Xiphinema and Haplolaimus, each 4%; and Heterodera and Aphelenchus, each 1%.

Introduction

Five species of Pratylenchus Filipjev [viz. P. neglectus (Rensch.) Filippjev and Schuurmans Stekhoven (Honner, 1971), P. penetrans (Cobb) Sher and Alien, P. crenatus Loof, P. pratensis (deMan) Filippjev and P. thornei Sher and Alien] have been found in southern Ontario (Potter and Townshend, 1973). With the possible exception of P. thornei, routine procedures used by the Ontario Nematode Diagnostic and Advisory Service are insufficient to distinguish among species. Pratylenchus penetrans is generally recognized as the principal cause of brown root rot of tobacco in southern Ontario (Elliot & Marks, 1972; Olthof et al., 1973). Mountain (1954, 1955) has shown that P. neglectus also is capable of causing lesions and stuntting growth. There is no information on the pathogenicity of the other three Pratylenchus species in Ontario, nor on the relative pathogenicity of the five Pratylenchus species on flue-cured tobacco.

Mountain (1954) found large numbers of Pratylenchus spp. and small numbers of 12 other stylet-bearing nematode genera within and around the roots of diseased tobacco plants from southern Ontario. The relative frequency of occurrence of the three Pratylenchus spp. on tobacco were not indicated; however, 75% of a Pratylenchus population in soil cropped to rye consisted of P. neglectus and the remainder of P. penetrans. Townshend (1966) found that almost all soil samples with a suspected brown root rot problem contained P. penetrans. A survey in 1968 (Potter & Townshend, 1973) showed that P. neglectus was the most widespread species in southern Ontario, except for Norfolk county and the Niagara Peninsula, where P. penetrans occurred more commonly. This latter observation confirmed previous findings in peach (Mountain & Boyce, 1958), in celery (Townshend, 1962a), and in strawberry (Townshend, 1962b).

This paper presents the results of a survey of the flue-cured tobacco area in southern Ontario to determine the distribution of different Pratylenchus species and genera of other stylet-bearing nematode associated with tobacco soil and roots. A brief summary of the results has been reported earlier (Olthof et al., 1968).

Methods

To ensure uniform distances between sampling sites and to avoid bias, the flue-cured tobacco area was covered with a grid system that resulted in 86 sampling sites on 4-mile centers. Samples were collected during June, July, and August, 1963, from tobacco fields or close to the predetermined sites within the 1,100-square-mile area. Soil samples were taken to a

1 Nematologist, Research Station, Agriculture Canada, Vineland Station, Ontario L0R 2E0
2 Nematologist, Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Miami, Florida 33149.
Observations and discussion

The distribution of the three Pratylenchus spp. found in this study is shown in Fig. 1. Of the 86 samples, 32% had a pure population of P. penetrans; 29% contained a pure population of P. neglectus; 6% consisted of pure P. crenatus, and in 21% no Pratylenchus spp. were detectable. Mixtures of penetrans and neglectus; penetrans and crenatus; and neglectus and crenatus comprised, respectively, 6%, 2% and 1% of the total number of samples. All three species appear to be randomly distributed throughout the main area except for two small tobacco growing areas southwest of London, where only P. neglectus was found. Potter & Townsend (1973) also noted the absence of P. penetrans and P. crenatus in these areas and the presence of P. penetrans and P. neglectus in the main tobacco growing area.

In addition to Pratylenchus, eight other genera were found (Figs. 2 & 3). The stunt nematode, Tylenchorhynchus Cobb., occurred in 33% of the samples but never in large numbers. The pin nematode, Paratylenchus Nicoletzyk, was found in 29% of the samples. Whether either nematode parasitizes tobacco is not known. Tylenchus Bastian occurred in 12% of the samples, indicating that it is more common than Mountain (1954) suggested. The root-knot plant, Meloidogyne, and the cyst nematode, Heterodera Schmidt, occurred in, respectively, 7% and 1% of the samples. The presence of Meloidogyne in tobacco soils is well known (Elliot & Marks, 1972) and, although parasitic on tobacco, it is not considered to be a great threat to tobacco production. The Heterodera was probably the clover cyst nematode, H. trifolii Goffart, which has survived from a previous rotation crop.

The dagger nematode, Xiphinema Cobb., and the lance nematode, Hoplolaimus Baday, both occurred in 4% of the samples. The former
probably occurs more commonly, but the extraction procedure used discriminates against recovery of the larger nematodes. Although Xiphinema is a known vector of plant viruses, its role, if any, in Ontario tobacco production is not known. The lance nematode, also reported by Mountain (1954), appears to be confined to a small area near Simcoe, Ontario. No damage to tobacco has been attributed to this nematode, but as yet only small populations have been found. Only one sample was infested with Aphelenchus, although Mountain (1954) reported that this was the most common stylet-bearing nematode apart from the root-lesion nematode.

Acknowledgment

The authors are grateful to Mr. H.C. Watson, Tobacco Extension Specialist, Ontario Ministry of Food and Agriculture, Delhi, Ontario, for delineating the flue-cured tobacco areas and for advice.

Literature cited


