# Genera of plant parasitic nematodes associated with soybeans on the heavier textured soils of Essex, Kent, and Lambton counties in southwestern Ontario

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Nine genera of plant parasitic nematodes, Criconemoides, Helicotylenchus, Heterodera, Meloidogyne, Paratylenchus. Pratylenchus. Trichodorus, *Tylenchorhynchus*, and Xiphinema were found associated with soybeans in the heavier textured soils of Essex, Kent, and Lambton counties in southwestern Ontario. Most frequently encountered were *Helicotylenchus* species, present in 61% of the samples collected, Pratylenchus species, present in 59% of the samples. and Paratylenchus species, present in 25% of the samples. Heterodera, represented only by H. *weissi*, and Meloidogyne, represented only by M. hapla. were found in 3% and 1% of the samples respectively.

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On a constaté la presence de neuf genres de nématodes phytoparasites Criconemoides, Helicotylenchus, Heterodera, Meloidogyne, Paratylenchus, Pratylenchus, Trichodorus. Tylenchorhynchus et *Xiphinema*) associés au soja dans les sols lourds des comtés d'Essex, de Kent et de Lambton du sud-ouest de l'Ontario. Le plus frequent Btait Helicotylenchus (61% des Bchantillons prélevés) suivi, dans l'ordre, par Pratylenchus et Paratylenchus avec 59% et 25% des Bchantillons respectivement. Heterodera, représenté uniquement par H. weissi, et Meloidogyne, représenté seulement par M. hapla, ne constituaient que 3% et 1% respectivement des Bchantillons prélevés.

Soybean ***(Glycine max*** (L.) Merr.) is a crop of increasing economic importance in southwestern Ontario. Numerous reports (2, 3, 4) exist concerning nematode problems of soybeans in the United States and many other countries around the world. There is a lack of relevant information concerning the nematodes associated with soybeans in southwestern Ontario. In the summer of 1975, as part of a survey on the incidence of phytophthora root rot of soybeans on the heavier textured soils of Essex, Kent, and Lambton counties of southwestern Ontario, soil samples were collected from surveyed fields for nematode analysis. This paper deals with the results of the nematode analysis of these samples.

## Materials and methods

During July and August of 1975 a survey was conducted on the incidence of phytophthora root rot of soybean in southwestern Ontario. A total of 76 soybean fields were checked. Soil samples for nematode analysis were obtained from the root zones of both healthy and diseased plants when they occurred in the same field. Individual samples were thoroughly mixed, passed through a 4-mesh screen to remove large debris particles, and a 50 g subsample extracted using a modified Baerman pan technique (7). Plant parasitic nematodes in the extract were counted, identified to genus, and expressed as number of nematodes per kg of soil. All ***Meloidogyne*** species recovered were cultured on tomato ***(Lycopersicum esculentum*** Mill.) and identified to species. In the case of ***Heterodera*** sp., samples of larvae and cysts were identified by R. **H.** Mulvey of the Biosystematics Research Institute in Ottawa.

Since nematode occurrence and population density were the same in samples around healthy and root rot affected plants, results reported here are based on the average nematode count from affected and nonaffected sites in a field, or on an individual samples from fields in which diseased plants were not observed.

## Results

Nine plant parasitic nematode genera, ***Criconemoides*** Taylor, 1936; ***Helicotylenchus*** Steiner, 1945; ***Heterodera*** Schmidt, 1871; ***Meloidogyne*** Goeldi, 1887; ***Paratylenchus*** Micoletzky, 1922; ***Pratylenchus*** Filipjev, 1936; ***Trichodorus*** Cobb, 1913; ***Tylenchorhynchus*** Cobb, 1913; and ***Xiphinema*** Cobb, 1913; were found associated with the roots of soybean in this survey. The frequency of Occurrence and population density (range and mean) of the nine nematode genera are presented in Table 1.

The distributions of these nematodes within the soybean growing areas of Essex, Kent, and Lambton counties are given in Figures 1-3. It is interesting to note that only the three most frequently occurring nematodes in the survey, ***Helicotylenchus*** sp., ***Pratylenchus*** sp., and ***Paratylenchus*** sp., were found on Pelee Island.

The ***Meloidogyne*** species encountered during the survey was identified as ***M. hapla*** Chitwood, 1949, and the

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Table 1. Genera of plant parasitic nematodes, their frequency *of* occurrence and population densities, associated with soybeans in Essex, Kent, & Lambton counties

| Nematode genus | Samples (+/t)* | Percent occurrence | Population density (no./kg soil) | |
|---|---|---|---|---|
| | | | Mean | Range |
| *Helicotylenchus* | 46/76 | 61 | 478 | 20–5800 |
| *Pratylenchus* | 45/76 | 59 | 951 | 20–7000 |
| *Paratylenchus* | 19/76 | 25 | 849 | 40–7800 |
| *Tylenchorhynchus* | 13/76 | 17 | 115 | 20–400 |
| *Heterodera* | 2/76 | 3 | 270 | 240–300 |
| *Criconemoides* | 2/76 | 3 | 70 | 20–120 |
| *Xiphinema* | 2/76 | 3 | 70 | 20–120 |
| *Meloidogyne* | 1/76 | 1 | 260 | |
| *Trichodorus* | 1/76 | 1 | 40 | |

* +/t: number of positive samples over the total number of samples.

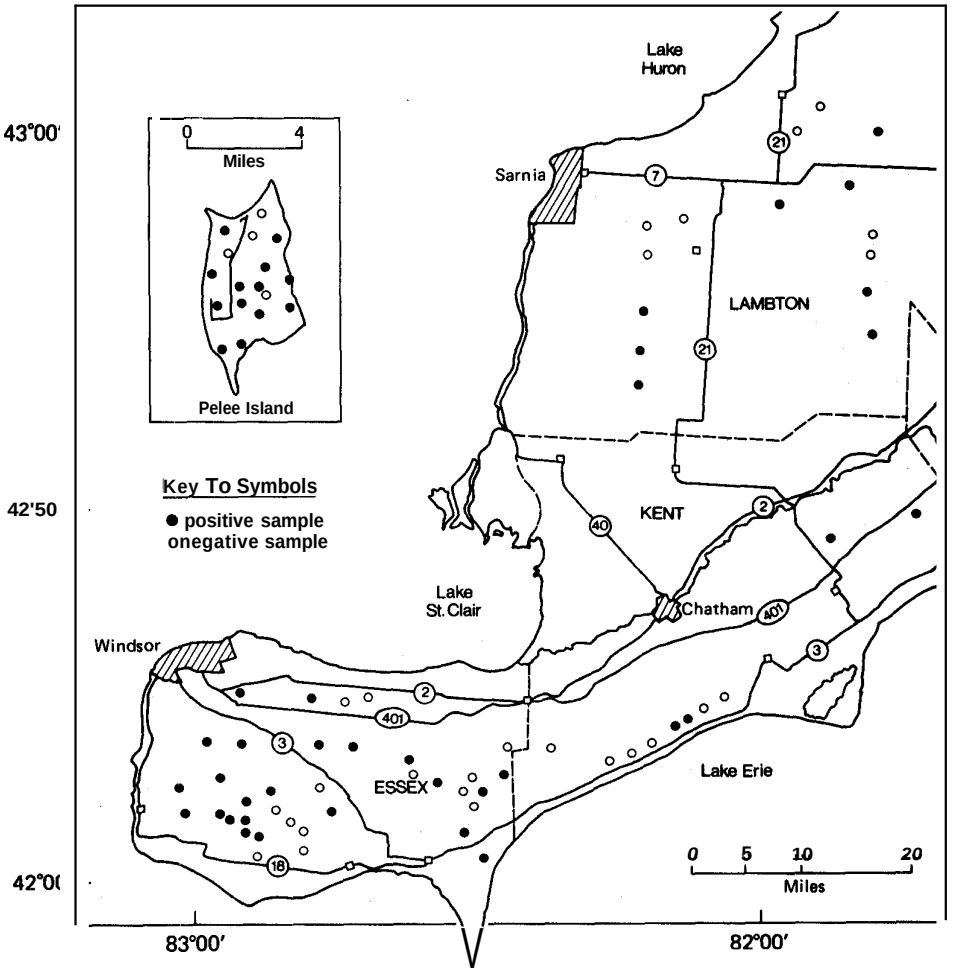


Figure 1. Distribution of *Helicotylenchus* species in soybean fields in southwestern Ontario, 1975.

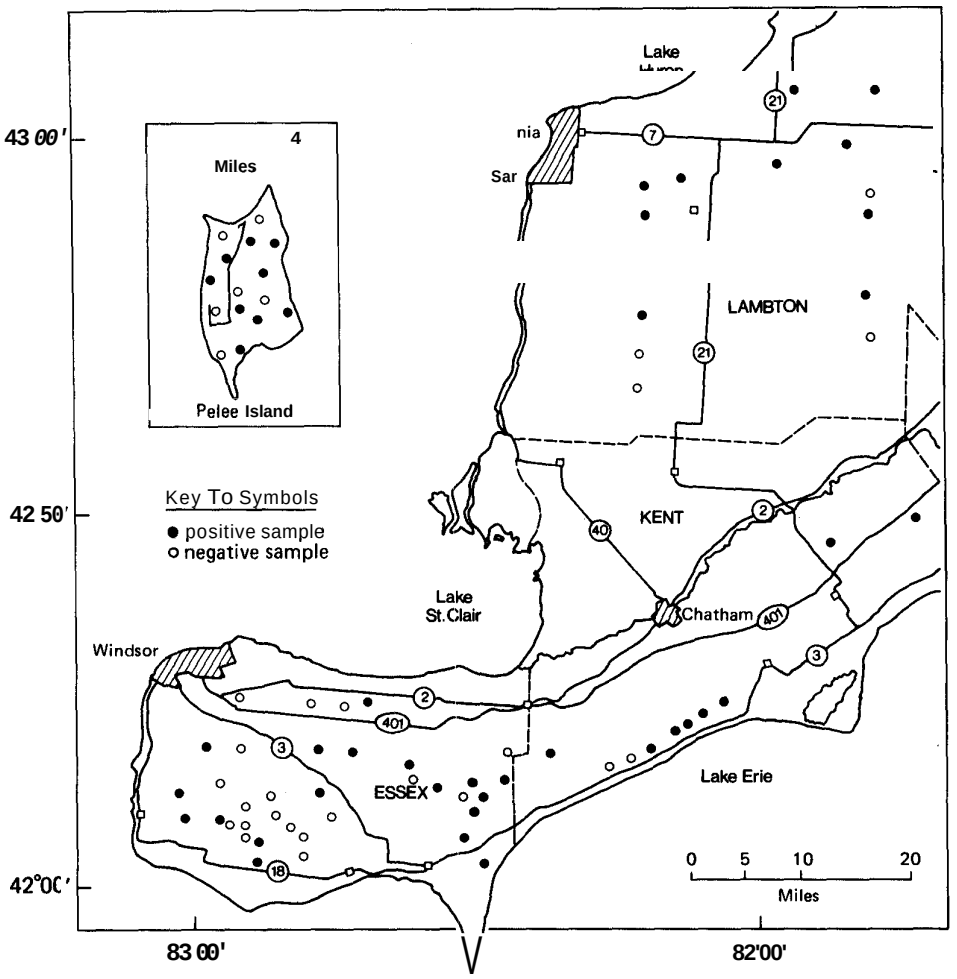


Figure 2. Distribution of *Pratylenchus* species in soybean fields in southwestern Ontario, 1975.

***Heterodera*** species was identified as ***H. weissi*** Steiner, 1949.

Two other stylet bearing genera, ***Aphelenchus*** Bastian, 1865, and ***Tylenchus*** Bastian, 1865, predominantly known as fungus feeding genera and of little economic importance, were both frequently observed in the samples.

## Discussion

Although nine genera of plant parasitic nematodes were found to be associated with soybean in Essex, Kent, and Lambton counties, the two nematode species, ***Heterodera glycines*** Ichinohe, 1952, and ***Meloidogyne incognita*** (Kofoid and White, 1919) Chitwood, 1949, that are of major economic concern in many soybean growing areas in the United States, were not found. In Essex County, ***M. incognita*** is a major problem in tomato and cucumber greenhouses (5), but it is not known as a field problem since it is unable to survive winter conditions in the field (1, 6). The soybean cyst nematode, ***H. glycines,*** has not been recorded from Canadian soil and its potential for winter survival in this area is not known.

***Pratylenchus, Helicotylenchus, Paratylenchus,*** and ***Tylenchorhynchus*** species occurred in population densities high enough in some fields to suggest that some loss in soybean yield might be occurring; however, additional research is required to determine if any of these nematodes are of real economic concern in soybeans in southwestern Ontario.

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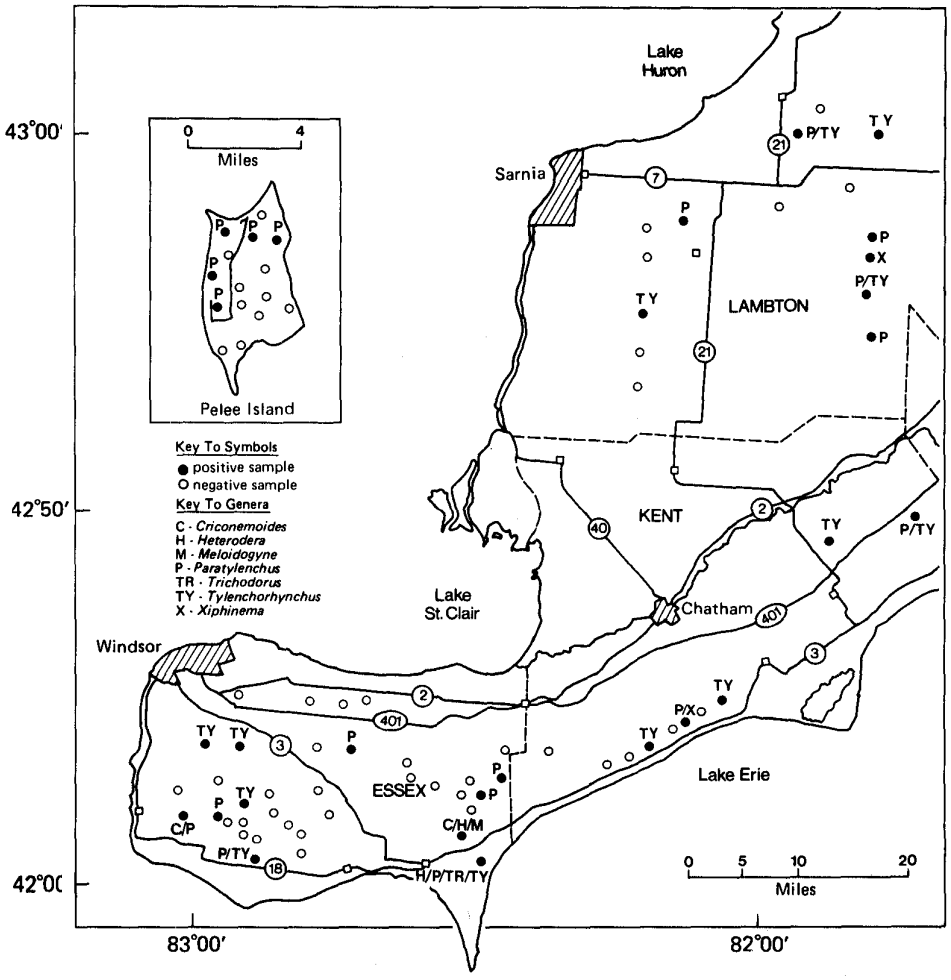


Figure 3. Distribution of ***Criconemoides, Heterodera, Meloidogyne, faratylenchus, Trichodorus. Tylenchorynchus,*** and ***Xiphinema*** species in soybean fields in southwestern Ontario, 1975.

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