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PLANT PARASITIC NEMATODES ASSOCIATED WITH POOR GROWTH OF POTATO PLANTS IN THE WIELKOPOLSKA REGION IN POLAND

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Abstract: Thirty-six species of plant parasitic nematodes were found associated with poor growth of potato plants in the Wielkopolska region. In this paper the species are listed, with frequency in samples and locality of sites.

Key words: nematodes, potato, occurrence, Poland

INTRODUCTION

Potatoes are one of the most distributed and the most important cultivated plants in Poland. That is why the knowledge on pests and diseases caused by them is of such a great importance for Polish agriculture. Nematodes are undoubtedly one of very important causes of potato diseases in the world. They may be pests in their own right but also cause problems when they interact with other disease organisms (Brodie et al. 1993). However, little is known about nematodes parasitising on potatoes in Poland. Data from Polish literature concern mainly *Globodera rostochiensis* Woll. (Wilski 1956a; 1956b; Kamiński 1962; Jasińska 1960; Jasińska and Szulc 1961). Only Radziwinowicz (1972) took migratory nematodes into consideration.

The purpose of this study was to study the nematode fauna associated with potato agrobiocenosis in the Wielkopolska region, excluding cyst nematodes.

MATERIAL AND METHODS

Investigations took place in April – July 2001. Total 100 samples of plants and soil were collected from 50 potato fields in the Wielkopolska region, two samples from each field. All samples were collected from the depth of about 30 cm. All plants chosen for the investigations showed distinct symptoms of inhibition in growth.

For each sample nematodes were extracted from 200 cm^3 of soil by centrifugal method and from roots by modified Bearmann's method (Hooper 1986). After ex-

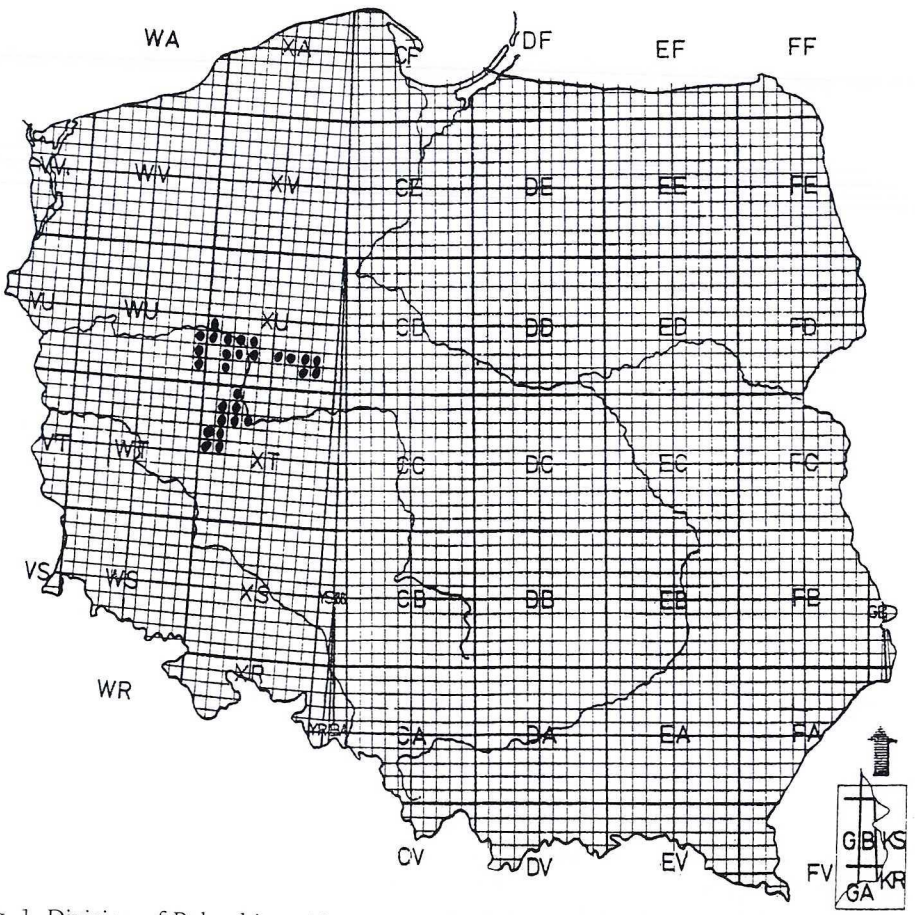

Fig. 1. Division of Poland into 10×10 km grid. The investigated squares marked by black spots

traction nematodes were fixed in formalin and then identified under a microscope by using temporary slides (Dobies and Zamojska 2001).

Locality of each sample was given accordingly to the UTM system (Fig. 1).

RESULTS

List of species in order of frequency in samples.

1. *Pratylenchus neglectus* (Rensch, 1924) Filipjev & Schuurnans Stekhoven, 1941. – total – 69%, in roots – 58%, in soil – 52%.
   Squares: XU03, XU04, XU11, XU12, XU13, XU22, XU23, XU32, XU33, XU62, XU71, XU72, XU81, XU82, XT06, XT15, XT16, XT17, XT18, XT27, XT28, XT29, XT37, WU91, WU92, WU93.
2. *Tylenchorhynchus dubius* (Bütschli, 1873) Filipjev, 1936 – total – 54%, in roots – 43%, in soil – 39%.
   Squares: XU03, XU11, XU12, XU13, XU22, XU23, XU32, XU33, XU62,

XU71, XU72, XU81, XU82, XT15, XT16, XT17, XT18, XT27, XT28, WU91, WU92, WU93.

3. *Geocenamus microdorus* (Geraert, 1966) Brzeski, 1991 – total – 45%, in roots – 29%, in soil – 39%.
   Squares: XU03, XU04, XU11, XU13, XU23, XU32, XU33, XU62, XU71, XU72, XU81, XU82, XT05, XT06, XT15, XT16, XT17, XT27, XT28, XT29, XT37, WU92, WU93.
4. *Praylenchus crenaus* Loof, 1960 – total – 38%, in roots – 26%, in soil – 26%.
   Squares: XU03, XU11, XU12, XU13, XU22, XU23, XU33, XU52, XU62, XU71, XU72, XU81, XT15, XT17, XT18, XT27, XT28, XT29, XT37.
5. *Filenchus misellus* (Andrássy, 1958) Raski & Geraert, 1987 – total – 32%, in roots – 14%, in soil – 30%.
   Squares: XU03, XU11, XU12, XU52, XU62, XU71, XU72, XU81, XU82, XT05, XT06, XT15, XT16, XT17, XT18, XT27, XT37, WU92.
6. *Geocenamus nothus* (Allen, 1955) Brzeski, 1991 – total – 27%, in roots – 18%, in soil – 19%.
   Squares: XU03, XU11, XU32, XU33, XU62, XU71, XU72, XU81, XU82, XT05, XT06, XT15, XT16, XT17, XT18, XT28, XT37, WU91.
7. *Filenchus andrassyi* (Szczygieł, 1969) Andrássy, 1979 – total – 22%, in roots – 13%, in soil – 10%.
   Squares: XU12, XU23, XU32, XU33, XU62, XU71, XU72, XT15, XT16, XT17, XT18, XT27, XT28, XT37.
8. *Meloidogyne hapla* Chitwood, 1949 – total – 22%, in roots – 13%, in soil – 21%.
   Squares: XU12, XU23, XU33, XU62, XU71, XU81, XT05, XT06, XT15, XT27, XT28, XT29, WU93.
9. *Geocenamus brevidens* (Allen, 1955) Brzeski, 1991 – total – 21%, in roots – 12%, in soil – 15%.
   Squares: XU12, XU52, XU71, XU82, XT15, XT16, XT27, XT28, XT37.
10. *Tylenchorhynchus maximus* Allen, 1955 – total – 20%, in roots – 14%, in soil – 18%.
    Squares: XU72, XU82, XT05, XT06, XT15, XT16, XT17, XT18.
11. *Filenchus quartus* (Szczygieł, 1969) Lownsbry & Lownsbery, 1985 – total – 19%, in roots – 11%, in soil – 14%.
    Squares: XU03, XU04, XU11, XU32, XU62, XU72, XU81, XU82, XT05, XT15.
12. *Seinura* spp. Fusch, 1931 – total – 14%, in roots – 10%, in soil – 8%.
    Squares: XU03, XU12, XU32, XU72, XU82, XT06, XT15, XT18, XT28, XT29, XT37.
13. *Geocenamus tenuidens* Thorne & Malek, 1968 – total – 10%, in roots – 7%, in soil – 8%.
    Squares: XU03, XU12, XU23, XU32, XU52, XU62, XT18, XT37, WU93.
14. *Trichodorus primitivus* (de Man, 1880) – total – 7%, in roots – 1%, in soil – 6%.
    Squares: XU12, XU23, XT15, XT37.
15. *Tylenchus elegans* de Man, 1876 – total – 7%, in roots – 2%, in soil – 5%.
    Squares: XU11, XU12, XU33, XT28, XT37, WU92.

16. *Coslenchus costatus* (de Man, 1921) Siddiqui, 1978 – total – 6%, in roots – 1%, in soil – 6%.
    Squares: XU11, XU12, XT27, XT28.
17. *Ditylenchus longimatricalis* (Kazachenko, 1975) Brzeski, 1984 – total – 6%, in roots – 5%, in soil – 3%.
    Squares: XU03, XU04, XU82, XT06, XT17.
18. *Pratylenchus flakkensis* Seinhorst, 1968 – total – 5%, in roots – 4%, in soil – 3%.
    Squares: XU12, XU23, XU32.
19. *Pratylenchus projectus* Jenkins, 1956 – total – 4%, in roots – 1%, in soil – 4%.
    Squares: XU11, XU72, XT28, XT37.
20. *Ditylenchus equalis* Heyns, 1964 – total – 3%, in roots – 3%, in soil – 2%.
    Squares:XU03, XT06.
21. *Filenchus hamatus* (Thorne & Malek, 1968) Raski & Geraert, 1987 – total – 3%, in roots – 2%, in soil – 2%.
    Squares: XU03, XU12, XT37.
22. *Rotylenchus robustus* (de Man, 1876) Filipjev, 1936 – total – 3%, in roots – 1%, in soil – 2%.
    Squares: XU33, XU82.
23. *Ditylenchus medians* (Thorne & Malek, 1968) Fortuner & Maggenti, 1987 – total – 2%, in roots – 1%, in soil – 1%.
    Squares: XU03, XT37.
24. *Geocenamus hexagrammus* (Sturhan, 1966) Brzeski, 1991 – total – 2%, in roots – 1%, in soil – 1%.
    Squares: XU71, XT15.
25. *Paraphelenchus* spp. Micoletzky, 1922 (Micoletzky, 1925) – total – 2%, in roots – 1%, in soil – 1%.
    Squares: XU12, XU82.
26. *Basiria graminophila* Siddiqi, 1959 – total – 1%, in roots – 0%, in soil – 1%.
    Squares: XU33.
27. *Ditylenchus anchilisposomus* (Tarjan, 1958) Fortuner, 1982 – total – 2%, in roots – 1%, in soil – 1%.
    Squares: XU13, XT37.
28. *Ditylenchus longicauda* Choi & Geraert, 1988 – total – 1%, in roots – 1%, in soil – 0%.
    Squares: XT16.
29. *Ditylenchus destructor* Thorne, 1945 – total – 1%, in roots – 1%, in soil – 0%.
    Squares: XT15.
30. *Filenchus hamuliger* Brzeski, 1998 – total – 1%, in roots – 0%, in soil – 1%.
    Squares: XU71.
31. *Filenchus sandneri* (Wasilewska, 1965) Raski & Geraert, 1987 – total – 1%, in roots – 0%, in soil – 1%.
    Squares: XU32.
32. *Filenchus vulgaris* (Brzeski, 1963) Lownsbery & Lownsbery, 1985 – total – 1%, in roots – 1%, in soil – 0%.
    Squares: XT15.

33. *Geocenamus quadrifer* (Andrassy, 1954) Brzeski, 1991 – total – 1%, in roots – 1%, in soil – 1%.
    Squares:XU03.
34. *Helicotylenchus digonicus* Perry in Perry, Darling & Thorne, 1959 – total – 1%, in roots – 0%, in soil – 1%.
    Squares: XU23.
35. *Hirschmanniella gracilis* (de Man, 1880) Luc & Goodey, 1964 – total – 1%, in roots – 0%, in soil – 1%.
    Squares: XT37.
36. *Tylenchus arcuatus* Siddiqi, 1963 – total – 1%, in roots – 1%, in soil – 1%.
    Squares: WU93.

DISCUSSION

In the entire material, investigated during the study, the most frequently found nematodes are the ones that are not potato pests. They are species frequently found in soil, nearby roots or in plant tissues.

Ditylenchus destructor was recorded only in one sample of roots although it is known as a popular nematode pest in Poland (Kornobis and Stefan 1991).

The presence of *Trichodorus primitivus* was recorded in 7% of samples. This species was the only representative of the family *Trichodoridae*. It provides the evidence that *Trichodoridae* occur relatively seldom, and there is nothing to suggest that they transfer viruses in potato agricultures in Wielkopolska. It is possible that it will be changed in future, together with creating of new varieties of potato that will be more susceptible to viruses.

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POLISH SUMMARY

NICIENIE – PASOŻYTY ROŚLIN STOWARZYSZONE Z OBJAWAMI ZAHAMOWANIA WZROSTU ROŚLIN ZIEMNIAKA W WIELKOPOLSCE

W miesiącach od kwietnia do lipca 2001 pobrano 100 prób gleby i roślin z 50 pól uprawnych ziemniaka na obszarze Wielkopolski. Z prób tych wyizolowano 36 gatunków nicieni – pasożytów roślin. W pracy zestawiono listę stwierdzonych gatunków nicieni, uszeregowaną według częstotliwości występowania w próbach. Podano także lokalizację stanowisk według europejskiego systemu UTM.