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THE SITUATION WITH THE PHYTO - PARASITE NEMATODES IN THE IN THE REPUBLIC OF MACEDONIA

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Abstract

The purpose of this scientific and professional work is to display a real terrain situation with the phyto-parasite nematodes in all productive regions in the territory of the Republic of Macedonia. If before ten to fifteen years nematodes were known as a potential problem in agricultural production, in the last few years we can say that nematodes are real problem in the production with visible economic damages. During the intensification of agricultural production in the Republic of Macedonia, in some regions were found invaded by the presence of certain genera and species phyto – parasite nematodes in certain cultures where they are visible a lot of economic damages from their activity.The report will present the current state with the phyto – parasite nematodes in all production areas in the Republic of Macedonia with a special emphasis on the Strumica region and we will display nematode's card from our studies so far. We will provide strategic measures, proposed scientific, expert and practical aspect to prevent their further spread and concrete measures to successfully suppression to the nematodes.

Keywords: phyto - parasite nematode damage, strategic measures, suppression.

Introduction

In the Republic of Macedonia phytoparasite nematodes are poorly studied as a problem in the agricultural production. Following the situation in the last twenty years we can say that we have an intense development of significant populations of nematodes in cultivated crops. Previously it was thought that phytoparasite nematodes are only a potential problem in agricultural production, but in recent years they are more prevalent in almost all production areas and fundamental problem with important economic damages. Particular problem with nematode has the greenhouses and plastic tunnels production where development has great expansion due to favorable conditions and also because of the monoculture crop cultivation, and is not complying with crop rotation as one of the important measures to prevent their spread. But not less is the population of nematode in culture grown up in the open field. Here we mean of the present nematodes in tobacco, melons and other crops, as well as nematodes at vineyard and all fruit types. The first visible damage by parasite nematodes in the Republic of Macedonia has concluded Todorovski.B (1958) at tobacco. Gruichich and Vuckov (1986) carried out multi-year tests for the presence of parasite nematodes with the established presence of several genera of nematodes. Vuckov (1999) studied the presence of the nematodes from genus Melidogyne.

Material and metods

In order to determine the prevalence of phytopharasite nematodes in field inspections in different regions based on visual symptoms, we made a determination of the locations of taking away nematodes samples. Samples were taken with the depth probes 0-20 and 20-40cm from rhyzospheraical part depending on the crop. The weight of each taken sample was from 600-1000gr, taken evenly from multiple locations

depending on the size of the field. Samples taken from the field were getting up in the refrigerator at a temperature of 5 C, where later in continuity were processed in nematode laboratory.The processing of collected samples was performed by the method of Seinhorst (1956).From the multi monitoring and studies about the prevalence and transmission (spreading) of nematodes we can say that the natural migration is not as great and depends on the type of soil, moisture and other factors. For one season they migrate to several meters. At those places they form "oases" where plants are in full growth stagnation and later fully dying. The most common mode of transmission and spread of nematodes is with professional equipment, irrigation, drainage which is spreading locally. But in the transmission and spreading of nematode on longer distance, the lead role has the man. Here we will say how in the Strumica region nematode spreading to almost all production locations in plastic tunnels where visible is the damage caused by their activity.It is known that earlier in the Strumica region dominant crop was cotton. As uneconomic crop, cotton was replaced by vegetable crops grown under greenhouses and open field. At the time it was built the first greenhouse in Bansko because of the warm water that has in this locality. Here began the first seedling production on vegetables (tomatoes, cucumbers, peppers, etc.). So small was the knowledge that in the soil may be presence of nematodes. Thanks to the hot water they had conditions for fast development. Seedlings produced in Bansko are carried in almost all manufacturing villages with greenhouses, and nematodes start to spread in the Strumica region. Spreadding of nematodes may be through the importing planting material from fruits and vineyards coils. It is necessary the imported seedling material and areas where produce seedlings to make a nematode analysis that so we can have a control of presence nematode, because some of them carriers viruses.Our multiscientific and practical work with nematodes indicates that to this problem until now was given little attention, and nematodes from year to year show an expansion of the spread in all production regions in Republic of Macedonija. In greenhouse production, which is represented by more than 260 hectares (Bansko, Hamzali, Bogdanci, Gevgelija, Valandovo, Veles, Kocani Vinica, Stip, Kumanovo, Sveti Nikole) each year in larger or smaller scale nematodes cause problem in production. Southeastern part of the Republic of Macedonia (Valandovo, Bogdanci, Gevgelija and Strumica) depending on the year have visible damage to cultures grown in plastic tunnels. Just in Strumica region every year there are 3.500-4.000 hectares of greenhouses where nematodes from year to year are more prevalent. The main reasons for there spreadding is no-attention to the crop rotation as an important measure to prevent spreading of nematodes. Another important reason is the insufficient knowledge about the presence of nematodes who need to figure out with nematode analysis. With nematode analysis determines the genus, species and population that is present and if it is above the threshold of harmfulness. On this basics we should go with expert professional access where the results, with a quality downloads process and quality measures, will not miss. Processing of the soil, optimum soil moisture, optimum temperature and reading the nematode analysis we select the asset and its incorporation in the rhyzosphere part from the soil. After the application is taken again analyzes for determining the results of the intervention - if the efficiency of the applied product give some results. All of the above-mentioned works are carried out under the supervision of an expert because almost all nematocides are dangerous toxins. Unfortunately the current state with the application of chemical agents in the industrial sector is with using them mainly arbitrary and uncontrolled.

Results and discussion

For the presence of nematodes in the production regions in Macedonia we have not correct trials. We have taken nematode samples where we determinate presence of genus of nematodes: Aphelenchus, Aphelechoides, Ditylenchus, Pratilenchus, Tylenchus, Helicotyleuchus, Xiphinema, Longidorus,

Beleodorus, Meloidogyne. Taking nematode trials and confirming the presence of nematode from all production regions will continue and from where on the basis of the results will be made nematode map on level on R.Macedonia. We had a specific multi-year studies for dominant presence of phytoparasite nematodes in Strumica region. Studies concluded that the genus Meloidogyne is dominant with several of his species. Based on studies there are five types:

- Meloidogyne incognita
- Meloidogyne arenaria
- Meloidogyne hapla
- Meloidogyne incognita varacrita
- Meloidogyne javanica

From the specific studies came the first nematode map of the presence of the genus Meloidogyne with its types in the Strumica region.

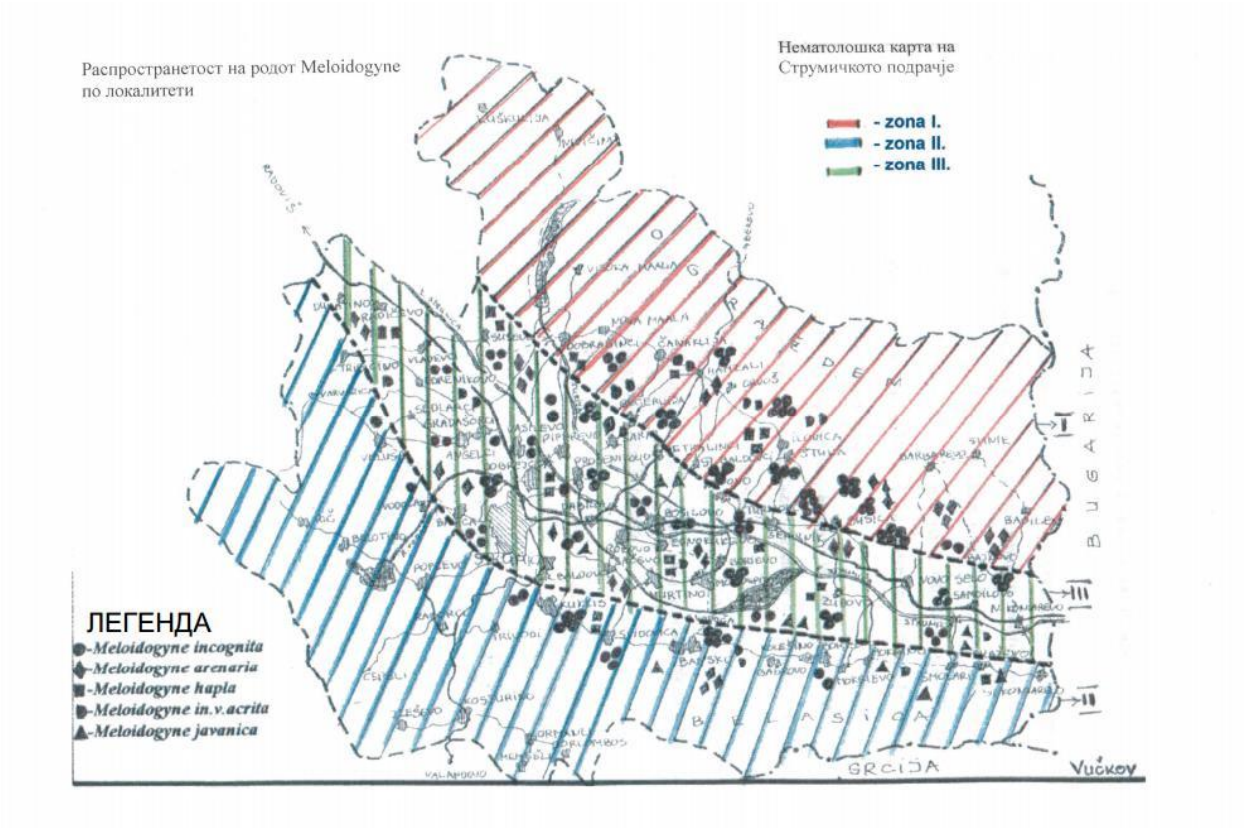

Fig.1 Nematoloshka map

The shown nematode map (Fig. 1), on the basis of a detailed determination can be concluded that the genus Meloidogyne present five types:

- Meloidogyne incognita with 74.5%
- Meloidogyne arenaria with 11.4%
- Meloidogyne hapla with 7.4%
- Meloidogyne incognita varacrita with 3.1%
- Meloidogyne javanica with 2.3%

Apart from the dominant presence of the genus Meloidogyne in many nematode analyses we found quite overwhelming presence of nematode from the genus Ditylenchus spp. and Pratilenchus spp. which are also dangerous for the agricultural production.

From scientific and expert perspective from everything in front of the presentation we can conclude:

- Nematodes from year to year are in the greater presence in the field
- The specific tests genus Meloidogyne - found that:

  Meloidogyne incognita with 74.5%
  Meloidogyne arenaria with 11.4%
  Meloidogyne hapla with 7.4%
  Meloidogyne incognita varacrita with 3.1%
  Meloidogyne javanica with 2.3%

- The introduction of mandatory nematode analysis is a measure that we will have a control of the presence of phytoparasite nematodes.
- Expert access and quality timely taken measures can give good results in preventing spreading nematodes.
- It is necessary to pay more attention to the problem with phytoparasite nematodes.

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MELOIDOGYNE INCOGNITA, NEMATODE PARASITES OF VEGETABLE CROPS

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Abstract

Phyto parasite nematodes in the last few years are presented in agricultural production. Special emphasis will be given to the study of species Meloidogyne incognita - nematode belonging to the genus Meloidogyne. In this work will be given a description of Meloidogyne incognita, their spread, conditions under which it develops with a description of the development if the symptoms caused by this nematode in plants. Economic damages in this type of nematode are especially visible in garden crops.

Keywords: nematodes, incognita, damage symptoms.

Introduction

For the occurrence, harmfulness and spreading of the phytoparasite nematodes in the Republic of Macedonia there are very few data. Scientific labor of B.Todorovski for nematodes at the tobacco, Todorovski&Jovanovski (1979), then Gruicic with their attacks of nematodes at the vegetable crops - Gruicic (1971) and as well as the scientific papers phytoparasite nematodes in the greenhouses in Macedonia Krnjaic (1977), Korunich etc.. (1982), also the data from R.Vuckov for phytoparasite nematodes - potential problem in the Strumica region, Vuckov (1985) and the phytoparasite nematodes in the Strumica region with special emphasis on Meloidogyne spp., Vuckov (1999) clearly indicate the importance of this problem in agricultural production. We can conclude that to this problem was given a little bit attention and the result of this is increasing their presence.Based on everything completed until now there is a need to intensify the studies for nematodes in the intensive production areas (Strumica, Gevgelija, Valandovo) where we have take a lot of nematode soil samples from the rhyzospheraical part in order to examine the presence of the economically harmful phytoparasite nematodes.

Material and methods

Soil nematodes samples taken from places where the plants are with concluded characteristic symptoms: backlog in growth, changing the color from green to light-yellow, rough trunk thickening, stiffness of the leaves and characteristic thickening of the root, formation of knots as characteristic symptoms which create nematode of the genus Meloidogyne. While we were taking nematode samples we take care to be from the places where it is already manifested phrased symptoms and where the plants are in full growth stagnation, but also and from the border areas where plants look still "healthy".

With the soil samples from that places we took also plant material from the plants - especially near the root where there is already shaped knots (fig.1).

Fig.1 Symptoms of root attacked by a nematode of the genus Meloidogyne

After taking the nematode samples we place it in a refrigerator at a temperature of $+5^0$ C.
The processing nematode samples was by the method of Seinhorst (Seinhorst,1956). This method is based on sedimentation and it is a very fast, high-quality and relatively simple method for separating nematode with free lifestyle (migratory forms of nematodes).
This determination is based on the keys of Goodeya (1963)&Loof (1978).
The infected roots with visible symptoms (knots) we evaporated it and preserved it in jars with 4% formalin for further making permanent preparations of the perinal field of an adult female for the determination of the species. During the first half of 2012 from 30 different places were taken nematode analysis under our choice, on the basis of symptoms on plants.

Results and discussion

From the studies the most prevalent, numerous and the most common endoparasitic species in the southeastern region of Macedonia (Bogdanci Strumica and Gevgelija) is the genus Meloidogyne, which has 36 species (Lamberti&Taylor,1979).Based on the samples we found that the dominant species is Meloidogyne Incognita with representation from 74.5%, then Meloidogyne arenaria 11.4%, Meloidogyne hapla 7.4%, Meloidogyne incognita var. acrita 3.1%, Meloidogyne javanica 2.3%. Especially great damages they cause at the garden crops grown outdoors or in plastic tunnels production.Based on the symptoms that were found: backlog in growth at tomato plants, tiny leaves, yellowing and stiffness leafy mass, unbalanced internodes, abuses at the trunk, minor and anemic fruits which ripen prematurely. From those greenhouses were taken soil samples from the rhizosphere part, by the already mentioned methods, and we established presence of the nematodes.
In this paper we will give a description of the genus Meloidogyne incognita (Kofoidet&White,1919; Chitwood,,1949). This species is parasite to more than 700 plant species (Goodey etoll,1965) and it is typical polifag mainly dominant on vegetable crops (tomatoes, cucumbers, salad, pepper and others.), and after that on tobacco, some fruit species and vineyards. On the root causes thickening with different shape and size on which basically determines the type.Female's units are spherical with a strongly expressed back

part. Female size is in ranges 440-774 x 330-530. Male length is from 1.110 to 1.955 and the invasione larvae from 333 to 404 microns. The shape of the perinal field of M.Incognita is high with poorly formed transition to the normal morphology of the cuticle to the rest of the body. Transvezialnite lines on the dorsal arch are gentle and curves from zig - zag to corrugated form, individual and densely arranged. Lateral lines are poorly expressed. Anus is strongly expressed and round (Fig.2).

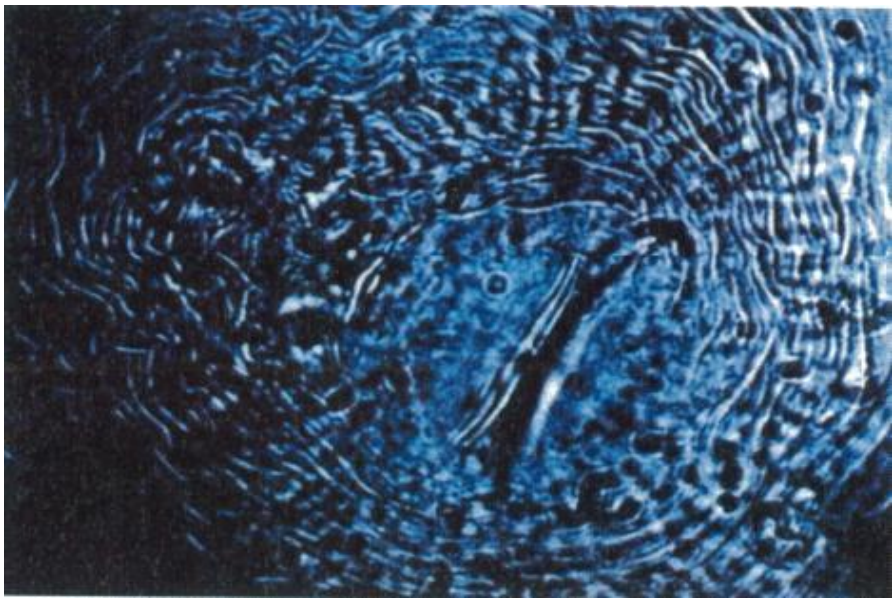

Fig.2 Appearance od the perinal field with Meloidogyne incognita

By the specific organoleptic symptoms on the plants, the laboratory determination based on the perinal field and previous studies showed that Meloidogyne incognita is dominant at all garden crops. His cycle development is in the root tissue, after the collapse of the root invasione larvae witch are in the II larvae stage go into the soil and are moving very fast and soon get into the root of the other host culture, with the strong stilet they enter into the root where secrete a secretions that destroys the cell membrane and is coming to the root thickening (hypertrophy), which are the typical symptoms that causes Meloidogyne incognita.
During this cycle larvae feeds on from the sap of the plant. The females are fixed and located at the root. The mature female creates a gelatinous mass in which there are more than 1.000 eggs. The first coating of the larva is in within the egg and from the egg hatched out inavasione larvae from II larvae stage that is able to infect other roots. Males of M.incognita the whole entire life cycle retain in form like worms. The females complete there development in the root and live as endoparasite. When the conditions are favorable and there is a host culture, larvae of M.incognita has a very high potential for intensive attack to the raised culture either in plastic tunnels or in greenhouse production of vegetable crops and has tangible economic harm.
Studies have concluded that the percentage of representation of genus Meloidogyne is: Meloidogyne incognita 11.4% Meloidogyne arenaria 11.4%, 7.4% Meloidogyne hapla meloidogyne incognita var. acrita 3.1%, Meloidogyne javanica 2.3%.
Female individuals are with sizes L=440-744 W=330-530 microns.
Males are with a length of 1.110 – 1.995 microns.

Meloidogine incognita beside dominance is one of the most aggressive species with great potential to spread quickly in areas with dominated garden crops. For these reasons this species as well as the others species and genera of phytoparasite nematodes needs more attention to their study and implementation of appropriate measures to prevent their spreading.

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