



MELOIDOGINS AND MELOIDOGYNOSIS OF VEGETABLE CROPS IN THE SURKHANDARYA REGION

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Article history:	Abstract:
Received: 8 th February 2022 Accepted: 10 th March 2022 Published: 28 th April 2022	Development of a system of anti-nematode measures for the fight against the most dangerous phytohelminths is impossible without knowledge about the fauna of nematodes, biology, ecology, distribution and their harmfulness.
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Agriculture occupies a leading place in the development of the national economy of Uzbekistan. Favourable climatic conditions with an abundance of sunny days make it possible to cultivate various types of crops, in particular, vegetable crops (tomato and cucumber), which contain micro-and macro-elements, carbohydrates, mineral salts, vitamins and other necessary components for the human body.

In the Surkhandarya region, 2157 hectares of arable land were allocated for vegetable crops, the gross harvest amounted to 273.884 tons.

To increase the yield of the main crops, Uzbekistan has taken a course toward the intensification of agriculture. However, concentration and intensification, being the basis of an intensive system of agricultural production, inevitably leads to a deterioration in the phytosanitary state of crop rotation fields. In particular, the specialization of individual farms in vegetable crops contributes not only to the activation of various kinds of pests, contributes to the progressive accumulation of the invasive beginning in the soil.

In Uzbekistan, the decrease in the yield of vegetable crops from their infection with phytohelminths ranges from 10 to 100%, depending on the density of their populations and other factors (3. 1995. 24 s).

Development of a system of anti-nematode measures for the fight against the most dangerous phytohelminths is impossible without knowledge about the fauna of nematodes, biology, ecology, distribution and their harmfulness.

Thus, based on the literature data of many researchers, root-knot nematodes are widespread in many countries of the world with the manifestation of high harmfulness both in the open and protected ground, with a decrease in the yield of vegetable crops by 10-100%.

RESEARCH MATERIAL

The material for this work was plant samples, soil samples collected in 2020-2021 from household plots belonging to 14 districts of the Surkhandarya region: Altynsay, Angor, Baysun, Bandikhan, Denau, Jarkurgan, Kizirik, Kumkurgan, Muzrabad, Sariassy. Termez, Uzun, Sherabad, Shurcha districts.

Vegetable crops were subject to examination: tomato - *Lycopersicum esculentum* Miel, and cucumber - *Sisimis sativus* L.

To study root-knot nematodes of the fauna of other parasitic species during meloydoginosis of vegetable crops, 802 soil samples and 2406 plant samples were collected and analyzed.

To study the phytohelminthological situation concerning root-knot nematodes and their harmfulness, 9785 plants were analyzed in the surveyed areas.

METHODOLOGY FOR STUDYING THE SPECIES AND RACIAL COMPOSITION OF ROOT-KNOT NEMATODES

The study of the phytohelminthological situation of root-knot nematodes was carried out from 2020-to 2021 using the methods of the route and stationary surveys of vegetable crops.

The survey of vegetable crops was carried out after harvesting differentiated for different groups of ripeness of tomato and cucumber: in June-August and September-October.

In the field, the infection of tomato and cucumber plants with root-knot nematodes was established by a thorough visual inspection of the root system, which was then placed in plastic bags and provided with appropriate labels, then delivered to the phytohelminthological laboratory of Termez State University.

To determine the species of root-knot nematodes, the affected part of the root tissue was placed in a Petri dish with water and analyzed under magnification with an MBS-6 binocular. Galls were opened with a dissecting needle

and an eye scalpel, and female root-knot nematodes were carefully removed from them. The isolated females were placed on a piece of Plexiglas in a drop of water or glycerin and viewed with a binocular. Using a sharp eye scalpel or a sharp knife specially made for this purpose, the head end of the female's body was cut off so that it would not burst, then the back part was carefully cut off. The cut-off part of the female body was carefully cleaned from internal organs and foreign bodies using a thin dissecting needle with a curved tip for this purpose.

The prepared anal-vulvar plate was transferred to a glass slide in a drop of glycerin or lactophenol (1 part of carbolic acid, 1 part of lactic acid, 2 parts of glycerol and 1 part of distilled water, oriented so that the outer surface of the cuticle was facing the eye. After that, it was covered with a coverslip glass and viewed under an MBIZ or Biolam-M microscope. Permanent preparations were prepared in glycerin, using paraffin rings (5. 1959, p. 67-69).

In total, 1550 permanent and 1842 temporary preparations of anal-vulvar plates were prepared and analyzed.

Experimental work on the study of the species and racial composition of root-knot nematodes was carried out under stationary conditions at the experimental botanical site of Termez State University, where optimal conditions were created for the growth and development of differentiator plants and the vital activity of the nematode.

SPECIES AND RACIAL COMPOSITION OF ROOT-KNOT NEMATODES ON TOMATO AND CUCUMBER

At present, more than 70 species of nematodes of the genus *Meloidogyne* are known, of which 4 species were found in Surkhandarya: southern root-knot nematode - *M. incognita*, cotton - *M. asrita*, peanut *M. arenaria*, Javanese - *M. javanica*.

The discovered species of root-knot nematodes are usually distributed in displaced populations, which exacerbates the pathogenic process in the emerging foci of meloydoginosis on crops of tomatoes and cucumbers and causes more tangible damage, reaching up to 80-90% crop shortages in some fields.

The favourable soil and climatic conditions of the Surkhandarya region allow the growing of various crops, including vegetables, throughout the year. In this regard, root-knot nematodes, which are parasites of many crops, having year-round host plants and other favourable environmental conditions for their active life, annually cause significant economic damage to many farms (3. 1995. 24 s).

The results of our studies on the identification of types of root-knot nematodes, the study of preparations of anal-vulvar plates and other above-mentioned characteristic taxonomic features, confirmed that four species of root-knot nematodes parasitize on tomato and cucumber in the conditions of the Surkhandarya region: *M. incognita*, *M. acrita*, *M. arenaria*, *M. javanica*.

It should be noted that the identification of root-knot nematode species by the structure of anal-vulvar plates was not always accurate, since there were doubts. In practice, the use of this feature often leads to a subjective assessment, and this method did not justify itself in identifying the racial composition of root-knot nematodes. To objectively address these issues and obtain accurate diagnostic data in our work, we used a set of differentiator plants, which made it possible to accurately determine and identify the physiological races of meloidogins.

In all isolates, the above differentiating plants were affected quite well, and thus we did not find the *M. javanica* race.

Thus, the result of the inventory and identification of the species and racial composition of root-knot nematodes on tomato and cucumber was the basis for concluding that the root-knot nematodes *M. incognita* had races 3, 43B *M. arenaria* race 23B in *M. asrita* and *M. javanica* races were not found.

SYMPTOMS OF MELOYDOGINOSIS OF VEGETABLE CROPS

In vegetable plantations, meloidoginosis often manifests itself in the form of foci of a round or oblong shape. In the centre of the foci, we observed dead or stunted plants, which differ from healthy and slightly affected plants in the colour of the foliage. By the end of the growing season, the foci merged and the entire plantation was heavily affected by meloidoginosis.

With meloidoginosis of vegetable crops, characteristic symptoms were observed: a lag in growth and development, a decrease in size, in the number of leaves, stems, flowers, dwarfism, leaf chlorosis, wilting between waterings, premature ripening of fruits, small fruit and reduced taste of fruits. With severe damage to plants by meloydoginosis (4-5 points), leaves and stems wither and dry up, starting from the lower tiers of plants, from the middle of the growing season, mass death of plants was observed.

In this regard, the assessment of plant damage by meloidoginosis only by external signs is insufficient. Therefore, gall formation in the root system of plants should also be determined. On the roots of plants affected by meloydoginosis, we observed, when carefully digging out (in the roots of affected plants), galls in the form of thickenings, swellings, tumors 3B, the size of the galls varied from several millimetres to several (1-2) centimetres (photo).



Photo. The root of a tomato is affected by gall nematodes, in a mixed population (Orig.).

Under favourable conditions for root-knot nematodes (in summer at a temperature of 28-32 C, with watering and sufficient soil moisture, on sandy loamy soil), galls on plant roots formed 15-20 days after germination in tomato and cucumber plantations.

In vegetable crops affected by meloydoginosis, the length and number of roots decreased; at a later stage of the disease, the roots rotted due to infection with concomitant parasitic organisms of fungi and bacteria, which led to necrosis of the root tissue, partial and then complete death of the root system. In the roots of plants, the flow of water and nutrients from the soil to the aerial part of the affected plants is hindered.

With the onset of high air temperatures (40-45 C), premature wilting of the leaves was observed due to lack of moisture and often the death of the plant.

When the main root of tomato and cucumber was damaged by gall nematodes, its tip died off, as a result, the root did not penetrate the deeper layers of the soil, allowing the plants not to use the necessary nutrients and water from the deeper layers of the soil horizon. The nutrition of plants affected by root-knot nematodes occurred due to the formation of numerous lateral or adventitious roots, but on which galls soon developed and were found, in the foci of severe damage to tomato and cucumber plants by meloydoginosis, soon after planting or sowing they were completely covered with galls and syngalls (4. 2020).

Thus, a survey on farms and in the private sector of vegetable fields showed the presence of a large number of foci of meloydoginosis on tomato and cucumber crops. On plants affected by meloydoginosis, these cultures were numerous galls and singalls were found in the form of thickenings, swellings, tumours and tubercles; on the above-ground organs of plants, lag in growth and development, a decrease in the size and number of leaves, stems, flowers, dwarfism, leaf chlorosis, attachment between waterings.

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