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THE EFFECT OF TEMPERATURE ON APPEARANCE OF TOMATO RUSSET MITE (*ACULOPS LYCOPERSICI* M.) ON TOMATO AND THE DAMAGES THAT CAUSES

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ВЛИЈАНИЕ НА ТЕМПЕРАТУРАТА ВРЗ ПОЈАВАТА НА ЦРВЕНО-КАФЕНОТО ПАЈАЧЕ (*ACULOPS LYCOPERSICI* M.) КАЈ ДОМАТОТ И ШТЕТИТЕ КОИ ГИ ПРИЧИНУВА

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ABSTRACT

The aim of our examinations was to show the effect of temperature on the appearance of tomato-russet mite (*Aculops licopersici* M.) in summer-autumn crop of tomato production and the damages that cause. The examination were conducted in greenhouses with area of 0,1-0,5 ha in the areas of the villages Kukliš, Prosenikovo, Piperevo and Monospitovo. Control was made in the period from July till October in interval of ten days. Leaves from ten tomato plants were collected and the number of adult tomato-russet mites was counted. The damages were estimated by occupation of the leaves with tomato-russet mite and by the damages on the fruits which are more important.

Up to now, in our examinations, the appearance of tomato–russet mite (*Aculops licopersici* M.) was not noticed. It could be said that the high temperatures and high relative humidity of the air in the greenhouses are one of the main reasons for the mass appearance of the mite. The other reason to mention is not on time treating with acaricides by the farmers, because of the stagnation of the price of the tomatoes on the market.

Key words: temperature, tomato, mite, damages.

АПСТРАКТ

Целта на нашите испитувања беше да се покаже влијанието на температурата врз појавата на црвено-кафеното пајаче (*Aculops lycopersici* M.) во летно-есенски турнос на производство на домати и штетите кои ги причинува. Испитувањата беа извршени на пластеници со површина од 0,1-0,5 ha, во реоните на селата Куклиш, Просениково, Пиперево и Моноспитово. Контрола на површините беше вршена од почетокот на јули до крајот на октомври, 2008 година, во интервал од 10 дена. Беа собирани листови од 10 растенија домати, при што беа броени адултните форми. Штетите се проценуваа според зафатеноста на пајаците на лисната маса и спрема штетите на плодовите кои се позначајни.

Во нашите досегашни испитувања не беше забележана појава на црвено-кафеното пајаче *Aculops lycopersici* Massee. Може да се каже дека високите температури и високата влажност на воздухот во пластениците се една од главните причини за масовна појава на пајачето. Друга причина за голем интензитет на појава на пајачето кое причинува штети со големо економско значење на тие одредени парцели може да се наведе дека е ненавременото интервенирање на земјоделците со акарициди, поради стагнирањето на цената на доматите на пазарот.

Клучни зборови: температура, домати, пајаче, штети.

INTRODUCTION

The tomato russet mite, *Aculops lycopersici* Massee, is an important pest in the greenhouse production of tomato, pepper and other species of the Solanaceae family. It was first described in Australia (Massee, 1937), but now is cosmopolitan. In Republic of Macedonia this pest is noticed in more regions, of which, one is our, Strumica, region where it caused great damages, especially the year of 2008.

The tomato russet mite belongs to the family Eriophyidae (Arachnida: Acarina). The adults are about 0,15 – 0,2 mm long and 0,05 mm wide. Their bodies are torpedo-shaped and cream to light gray-brown in color. The female produces an average of 16 eggs during the ovipositional period. Offspring of both sexes are produced by fertilized females. Unfertilized females only produce males. The eggs are rounded and colorless to white. The eggs are laid on leaves and stems of plants. Both males and females hatch in 2-3 days. Larvae are white in color and look similar to the adults, but they are smaller and less active.

The tomato russet mite does not bear winter temperatures, because of what it could overwinter only on plants that are grown in greenhouses, or in other covered places. Its optimal growing conditions are temperature of 25°C and high atmosphere humidity. Its growth stops on temperature lower than 10°C. The infestations commit the overwintered species in the beginning of the vegetation on tomatoes grown in greenhouses and those grown in open field. In addition, different insect species that are met on tomatoes (leaf aphids, whiteflies), as well as the wind, have the big role for transmitting of that mite. During the summer, mites are met on the green parts of the plants, where they feed with sap sucking.

The female mite lays its eggs on the hidden places of the plant as, the base of the leaves, in the apertures of the stem etc. During its life, a mite lays around 50 eggs. The incubation period in optimal conditions of development lasts around 2 days, so the whole development cycle is around 6-7 days. That kind of mite gives a lot of generations and for a short period of time riches high population number, because it reproduces during the whole year. It could be met in all parts of the infested plant.

In this study, the effect of the temperature on the appearance of the tomato russet mite and the damages that it causes will be discussed.

MATERIAL AND METHODS

The examination were conducted in greenhouses with area of 0,1-0,5 ha in the areas of the villages Kukliš, Prosenikovo, Piperevo and Monospitovo in summer-autumn crop of tomato production. Control was made in the period from July till October in interval of ten days. Leaves from ten tomato plants were collected and the number of adult tomato-russet mites was counted. The damages were estimated by occupation of the leaves with tomato-russet mite and by the damages on the fruits which are more important.

Collected material from the field was carried in the laboratory for entomology on the agriculture faculty in Strumica, on University "Goce Delcev" - Stip, where triage and determination of the species was made, and the count condition of the mites on the leaves was also affirmed.

Also the temperature and the humidity of the air were registered in the meteorological station, Strumica.

RESULTS AND DISCUSSION

As it was mentioned above, the examinations were conducted on four localities in Strumica region, in the areas of the villages Kukliš, Prosenikovo, Piperevo and Monospitovo in summer-autumn crop of tomato production.

The appearance of the tomato russet mite was noticed in the beginning of the third decade of July, when optimal conditions for its growth appear. The most intensive appearance is in August when the maximal temperature of the air is 39 °C, and the average decade temperature is 28 °C

(Table 1). Dropping of the temperature caused decreasing of the intensity of appearance of the mites.

Table1. Temperature of air measured in the meteorological station Strumica

Month	Decade	Average decade temperature	Apsol. max. day temp.	Apsol. min. day temp.
	I	26,1	33,9	16,7
VII	II	26,4	34,2	16,3
	III	23,3	30,8	15,7
	I	27,0	38,2	14,2
VIII	II	27,6	39,0	13,0
	III	28,0	37,3	15,5
	I	24,9	37,8	12,5
IX	II	17,9	35,6	5,0
	III	13,2	22,4	4,3
	I	14,2	25,2	6,2
X	II	14,4	24,5	6,3
	III	14,3	23,0	4,2

The most mass appearance was in the region of the village Piperevo, where it was determined 213 adults of tomato russet mite in August, when the appearance is most intensive. The least number of the mite was noticed in the region of the village Monospitovo, where in August were noticed only 11 individuals (Table 2).

Table2. Number of tomato-russet mite by localities and months

Locality / month	Piperevo	Monospitovo	Kuklis	Prosenikovo
VII	163	3	6	7
VIII	**213**	**11**	15	18
IX	95	6	9	12
X	32	4	7	9

On Figure 1 a graphical performance is given for the intensity of the appearance of the mite in the regions of the villages Piperevo, Monospitovo, Kuklis and Prosenikovo.

Tomato russet mite causes serious damages on tomato plants. It starts feeding on the base of the plant and continues upward. They punctuate vegetative epidermal cells to feed with the cell content. Places the mites fed turn on brownish, stems longitudinally get cleavages, and the leaves stay smaller and turn on brown russet in color. When the infestation is superior leaves desiccate, without falling and the plant dies (Figure 2).

The first symptom that appears is whitening on the underside of the leaves below, which then get bronze color, and in the end turn on white and die. The lower parts of the stem lose the hairs, get brown russet color or have smoky appearance, and could develop smaller cleavages on the surface. Some of those symptoms are similar with the symptoms caused by other mites and some thrips, so it is necessary determination of the mite. Onward feeding of the mites on tomato plants causes it's wilting, the leaves desiccate and the plant dies.

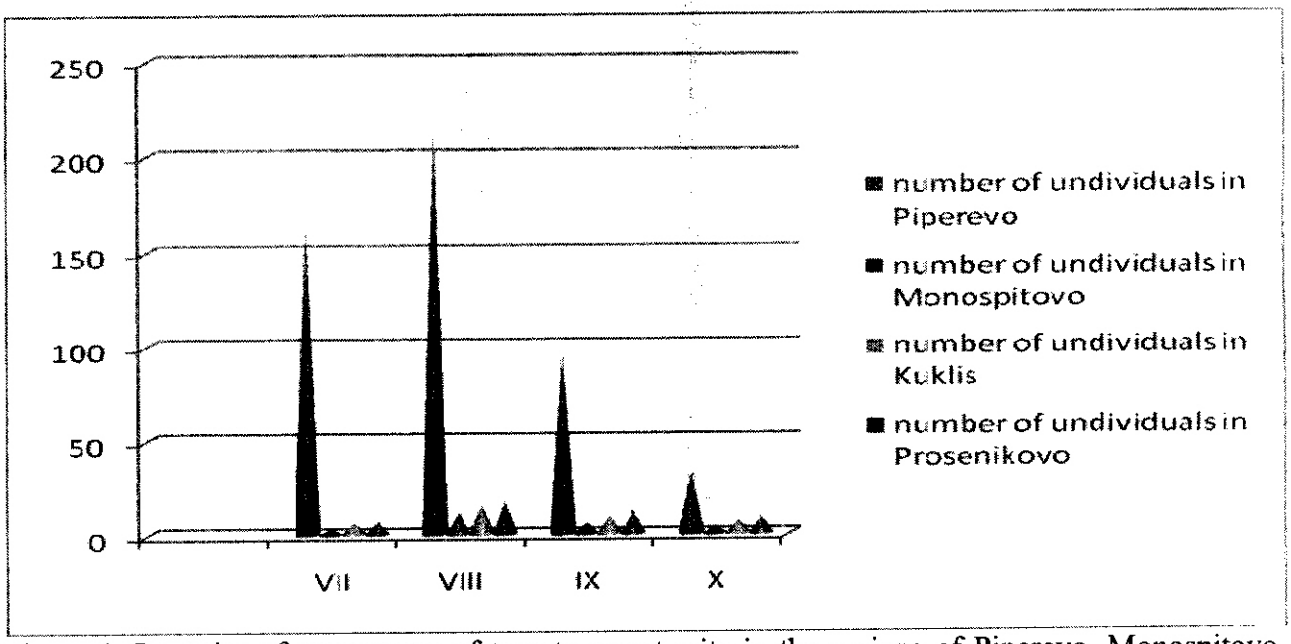

Figure 1. Intensity of appearance of tomato-russet mite in the regions of Piperevo, Monospitovo, Kuklis and Prosenikovo

Figure 2. Damages on tomatoes caused by tomato-russet mite *Aculops lycopersici* Massee

The tomato russet mite causes damages also on tomato fruit. There it forms brown russet net of cleavages (Figure 3) that are a result of the early attack on those organs. Injured epidermal tissue cannot grow and that's why the fruits cleavage. Usually, plants infested with tomato russet mites do not forms fruits. But, if the fruits are already formed they have sun burnings because of the lost of leaves mass.

Figure 3. Damages on tomato fruits caused by tomato-russet mite *Aculops lycopersici* Massee

CONCLUSIONS

In our examinations, so far, the appearance of tomato russet mite *A. lycopersici* Massee was not noticed. Maybe, there it was, but not with that number to cause economically important damages.

It could be concluded that the appearance of the mite in the examined localities is not mass; respectively the intensity of appearance is not the same in all localities. So, the most mass appearance was in the region of village Piperevo, where the damages on the production are estimated on 30 %.

I could be said that high temperatures and high relative humidity of the air in the greenhouses are one of the main reasons for mass appearance of the mite. The other reason for great intensity of appearance of the mite that causes economically important damages is not on time intervention with acaricides by the farmers, because of the stagnation of the price of tomatoes on the markets.

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