

THRIPS (THYSANOPTERA: THIRIPIDAE) - IMPORTANT PEPPER PESTS IN GREENHOUSES, IN STRUMICA REGION, REPUBLIC OF MACEDONIA

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ABSTRACT

During two years of research (2011-2012) qualitative and quantitative analysis of thrips (Thysanoptera: Thripidae) is made. Studies have been made on three localities, in greenhouses, in Strumica region. Qualitative analysis showed presence of two thrips species at pepper in greenhouses: *Frankliniella occidentalis* Pergande and *Thrips tabaci* Lind. Quantitative analysis showed that in the three localities, in both years of research, *F. occidentalis* is more numerous. Compared, by localities, *F. occidentalis* is the most numerous in locality Sachevo, in 2012, with 689 individuals caught. The lowest incidence *F. occidentalis* showed in locality Hamzali, in 2011, with 357 individuals caught. *T. tabaci* is the most numerous in locality Sachevo in 2012, with 113 individuals caught, and the lowest incidence had in locality Hamzali, in 2011, with 62 individuals caught.

Key words: greenhouses, pepper, harmful insects, trips

INTRODUCTION

Pepper (*Capsicum annuum*) is one of the main vegetable crops in the world, and in our country. More significant rise in the spread of peppers in the Republic of Macedonia has the seventies of the XX century, primarily as a result of the construction of irrigation systems and the development of canned industry. In R. Macedonia, almost, there is no area where pepper is not grown. In some areas, despite agri-environmental conditions, there is a long tradition of cultivation of this crop. Most prevalent is in Strumica - Radovish area, Gradsko – Rosoman area, Skopje, Kocani, Prilep, Tetovo and in some other smaller areas.

In the last few years due to favorable and controlled conditions for growing, pepper production is more prevalent in greenhouses. The highest production of pepper in a greenhouses is in Strumica and Skopje region. Today, almost all pepper varieties (kurtovska kapija, chilly, white long etc.) are grown in these regions, in greenhouses. This way of production contribute to obtain higher yield and quality, as well, to avoid some harmful insects that are present in an open filed. Some of those insects that, year by year, become more important as pests that do serious harm to the pepper are the thrips (Thripidae: Thysanoptera). These species cause direct damages to the pepper with their feed, and are also vectors of many viral diseases of pepper. For these reasons we have set as a goal for determining the qualitative and quantitative analysis of the thrips (Thripidae: Thysanoptera).

MATERIAL AND METHODS

The experiments were performed in two years (2011 and 2012), from seedling of pepper (10th of April) till the end of the vegetation (30th of October), in greenhouses, on an area of 0,4 ha, in three localities: Hamzali, BANSKO and SACEVO, in Strumica region. Usual agro-technical measures, including the use of fertilizers and pesticides, were applied during pepper vegetation. Tests were performed with appropriate methods in field and laboratory conditions.

1. Field studies

From each greenhouse, randomly are taken 50 plants for detail examination. From every part of the plant (stem, leaf, flower and fruit) separately, with brush, in appropriate containers filled with 75% alcohol, carefully are collected present insects and are carried to the laboratory for further examination. The control was performed every 10 days during the entire vegetation of pepper.

Before seedling the pepper, the weed vegetation around the greenhouses was examined for determining presence of trips, and the common weeds encountered are: *Galinsoga parviflora* Cav., *Amaranthus retroflexus* L., *Chenopodium album* L., *Echinochloa crus-galli* L., *Sorghum halepense* L. The weed vegetation around greenhouses is a place for flying of some individual insect, in early spring, before seedling the pepper. From this perspective it is important to examine the weed vegetation to recognize the presence of trips.

2. Laboratory studies

In the laboratory triage and examination under a microscope and binocular to the material collected from the field is performed. During the triage of material, species from Thripidae family are allocated. Determination of the studied species is performed in Laboratory of Entomology in Strumica, at the Department of Plant Protection and Environment, Faculty of Agriculture, “Goce Delchev” University – Stip.

RESULTS AND DISCUSSION

During two years of research (2011-2012) the qualitative analysis of the material showed that there are two trips species: *Frankliniella occidentalis* Pergande and *Thrips tabaci* Lind.

The presence of both trips species was determined at the weed vegetation around the greenhouses, before seedling the peppers, but the treatment with total herbicide Glifosat is carried out, where weeds are destroyed, and thus the thrips.

In two years of research both trips species were registered in the three localities Hamzali, Sacevo and Bansko. Quantitative analysis showed that in both years of research, in locality Hamzali, the presence of *F. occidentalis*, is much higher than *T. tabaci* Lind. (Table 1). In 2011 *F. occidentalis* was represent with 357 individuals or 85.2 % of the total number of individuals caught, while *T. tabaci* is present with 62 individuals or 14.8 % of the total number of individuals caught. In 2012 the presence of *F. occidentalis* is higher compared to 2011, and amounted to 485 individuals or 87.7 % of the total number of individuals caught. *T. tabaci*, in 2012, was represented with 68 individuals or 12.3 % of the total.

Table 1. Presence of trips (Thysanoptera: Thripidae) in locality Hamzali in 2011-2012

Species	2011		2012	
	Number of individuals	Presence (%)	Number of individuals	Presence (%)
<i>F.occidentalis</i>	357	85,2	485	87,7
<i>T. tabaci</i>	62	14,8	68	12,3
Total	419	100	553	100

In locality Sacevo, the presence of *F. occidentalis*, in both years of research, is much higher than *T. tabaci* (Table 2). In 2011 *F. occidentalis* was represent with 513 individuals or 84.4 % of individuals caught, while *T. tabaci* was represent with 95 individuals or 15.6 % of the total number of individuals caught. In 2012 the presence of *F. occidentalis* is higher compared to 2011 and amounted to 689 individuals or 87.7 % of the total analyzed individuals. The analysis showed that *T. tabaci* in 2012 was present with 113 individuals or 14.1 % of the total number of analyzed individuals.

Table 2. Presence of trips (Thysanoptera: Thripidae) in locality Sacevo in 2011-2012

Species	2011		2012	
	Number of individuals	Presence (%)	Number of individuals	Presence (%)
<i>F.occidentalis</i>	513	84,4	689	85,9
<i>T. tabaci</i>	95	15,6	113	14,1
Total	608	100	802	100

Quantitative analysis of locality Bansko showed that the presence of *F. occidentalis* in both years of examinations is much higher compared to *T. tabaci* (Table 3). In 2011 the presence of *F. occidentalis* is 452 individuals, or 84.6 % of the total number of individuals caught, while *T. tabaci* is represent with 82 individuals or 15.4 % of the total number of individuals caught. In 2012 the presence of *F. occidentalis* is higher compared to 2011 and amounted to 521 individuals or 84.2 % of the total number of individuals caught. The analysis showed that the presence of *T. tabaci* in 2012 is 98 individuals or 15.8 % of the total number of individuals caught. In 2012 the number of *F. occidentalis* is increased compared to the number of *T. tabaci*. The percentage of participation is lower compared to 2011 due to the much greater numerical presence of *T. tabaci* in 2012.

Table 3. Presence of trips (Thysanoptera: Thripidae) in locality Bansko in 2011-2012

Species	2011		2012	
	Number of individuals	Presence (%)	Number of individuals	Presence (%)
<i>F.occidentalis</i>	452	84,6	521	84,2
<i>T. tabaci</i>	82	15,4	98	15,8
Total	534	100	619	100

CONCLUSIONS:

Based on the results, we can conclude the following:

- Over two year research of pepper in greenhouses, the presence of two trips species (Thysanoptera: Thripidae) was established: *F. occidentalis* and *T. tabaci*, in three localities of examinations.
- In the locality Hamzali in two years (2011-2012) of trials *F. occidentalis* was, represented with 85.2 % in 2011 and 87.7 % in 2012. *T. tabaci* was represented with 14.8 % in 2011 and 12.3 % in 2012 .
- In the locality Sacevo in two years (2011-2012) of trials *F. occidentalis* was represented with 84.4 % in 2011 and 85.9 % in 2012. *T. tabaci* was represented with 15.6 % in 2011 and 14.1 % in 2012.
- In the locality Bansko in two years (2011-2012) of trials *F. occidentalis* was represented with 84.6 % in 2011 and 84.2 % in 2012. *T. tabaci* was represented with 14.8 % in 2011 and 12.3 % in 2012.
- In the three localities and in both years of examinations more numerous is the species *F. occidentalis*.
- Compared by localities, the most numerous *F. occidentalis* is in Sacevo, in 2012 with 689 individuals caught, and the smallest numbers in locality Hamzali, in 2011 with 357 individuals caught.
- In the three localities and in both years of examinations with lower numbers is the species *T. tabaci*.

- Compared by localities, the most numerous *T. tabaci* is in Sachevo, in 2012 with 113 individuals caught, and the smallest numbers in locality Hamzali, in 2011 with 62 individuals caught.

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