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CHEMICAL CONTROL OF *THRIPS TABACI* ATTACK ON THE CROP OF *CALENDULA OFFICINALIS*

Cristina Zepa (Coradini)[1], Valeriu Tabără[1], Irina Petrescu[1], Ioan Pălăgeşiu[1]

[1]University of Agricultural Sciences and Veterinary Medicine of Banat, 300645 Timişoara, Timiş County, Romania.
E-mail: cristina.coradini@yahoo.com

ABSTRACT

The attacked not treated crops of *Calendula officinalis* can be compromised; therefore it is very important to know the number of specimens of *Thrips tabaci* on plants, in order to intervene with efficient treatments, which should reduce the number of pest populations.

The products Mospilan 20 SP 0.04%, Confidor Energy 0.08%, Fastac 10 EC 0.04%, Actara 25 WG 0.02% and Calypso 480 SC 0.02% were tested for the control of common thrips (*Thrips tabaci*) on the crop of *Calendula officinalis* decorative plants from the protected areas of the Didactical Station of Timişoara, where the density of the thrips populations was on average 19.11 insects/flower, much higher than the accepted economical level of damaging (1-2 adults/flower).

The tested products proved good efficiency in controlling the population of *Thysanoptera* from the flower glass houses. The most efficient in controlling the tobacco thrips were the products Actara 25 VG and Confidor Energy, having an efficiency of over 97%, followed by Fastac 10 EC RV, with an efficiency of over 86%.

Seven days after the treatments in the marigold crop, the smallest number of living insects was collected from the plots treated with Actara 25 VG (3.33 insects/plot), followed by the plots treated with Confidor Energy (4.33 insects/plot), these two products being indicated for controlling the thrips from the marigold crop.

Key words: tobacco thrips, marigold crop, efficiency, insecticides.

INTRODUCTION

In Romania, as a consequence of increased demand for cut flowers, the flower culture has reached a maximal level in 1989, in glasshouses, as well as in the field. After 1989, the cultivated area with flowers has increased much, especially in the private sector.

In the glasshouse climate, the large number of cultivated flower species per unit area, the high atmosphere humidity, the high temperatures during summer, as well as the deficient airing of the spaces, constitute important agents, which determine the appearance and the rapid breeding of many flies, which, besides the fact that they reduce the flower quantity, greatly affect their quality.

In the protected crops, by assuring the optimal conditions for plants (temperature, humidity, nourishment etc.), very favorable conditions for specific flies are often produced, and therefore they extend rapidly, causing considerable damages.

The flower crops, as well as other crops from the protected areas have been invaded by a dangerous pest, the tabbaco thrips (*Thrips tabaci*), which extended rapidly, producing important damages. *Thrips tabaci* is a wolverine species (Pălăgeşiu, 1997, 2002), noticed on over 50 host plants from the families of *Solanaceae*, *Cucurbitaceae* etc. (Manoliu et al., 1993). This insect is one of the most frequent and most important affecting the quantity and the quality of flower production from the protected areas, so efficient controlling measures are required.

The adults and the larvae sting and suck the cellular juice from the attacked leaves and flowers. Following the attack, characteristic symptoms appear: appearance of white or silver stains, necrosis of the leaves and their pleating, drying of the growing meristems, damage of the petals, destruction of the anthers and of the pollen, flower abortion etc. (Roman, 1999; Georgescu, 2006).

Even bigger damages can be observed when the number of insects is high and they

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transmit viruses to plants, making them even more susceptible to the attack.

The white stains, becoming brownish afterwards, which the tryps cause to flowers and fruits as a consequence of the feeding process, as well as the transmission of the TSWV virus (Tomato Spotted Wilt Virus), which induces typical necroses, lead to a decrease in the economical value of the products from the glasshouses.

Researches regarding the controlling of the common tryps were published recently by Nasruddin and Smitley (1991), Helyer et al. (1995), Robb et al. (1995), Andjus and Trdan (2005), Chatzivassiliou (2008), Clough and Corp (2008), McPherson (2009), Nault and Shelton (2010).

In Romania, Pop et al. (1993), Costache and Roman (1998), Roman (1999, 2005), Muntenaşu (2006) and Muntean (2007) performed researches in this field.

This study was aimed at testing some modern pesticides, accepted in the E.U. in controlling of the harmful *Thysanoptera* from the protected areas and especially of the *Thrips tabaci* species.

MATERIAL AND METHODS

The experiments were placed at the Didactic Plant Breeding Station Timişoara.

For studying the populations of *Thysanoptera* from the point of view of distribution on the attacked organs and of their way of attack, the following stages were covered: the collecting of the entomology material, the preparation and the preserving of the *Thysanoptera,* including the worm and adult phases, the statistical processing of the data.

All these study phases contributed to obtaining statistical data, which describe as accurately as possible the infesting rate of the flower crops from the glass houses of Didactic Plant Breeding Station Timişoara. Insects were collected from the marigold culture using the shaking procedure of the plant's organs. After collecting insects in carrier bags, they were killed with acetone and were transported and labeled in laboratory for determining, preserving and sorting. The collected insects were put on a white paper and were sorted with binocular loupe; the leavings (eg. petals, leaflets) were removed with the help of pincers, others insects were removed with a spatular bristle and the studied species were counted. The sorted entomological material was then preserved as microscopic slides: a drop from preserving field (balsam' Canada) was put with the help of a small glass baguette on a glass blade degreased with ethyl alcohol of 70 degree; the insects passed in succesive baths of xilol and absolute alcohol were introduced in preserving field to be completely covered with lamell; the blisters were eliminated through pressing or heating and the lamellae were labeled and preserved in special boxes. The pest species from marigold crop were identified through morphology observations under a binocular microscope.

The researches for controlling the *Thysanoptera* were performed during 31 May - 07 June at the Didactic Plant Breeding Station in Timişoara by spraying with different insecticides using hand-pump of type GDM of professional "Eva Totally". The experiment regarding the controlling the tobacco thrips from the *Calendula officinalis* crop had 6 treatments (including a control without any treatment) in 3 replications, each plot consisting of a number of 7 plants.

The treatments were: V_2 - Mospilan 20 SP (0.04%), V_3 - Actara 25 VG (0.01%) V_4 - Confidor Energy (0.08%), V_5 - Calypso 480 SC (0.02%), V_6 - Fastac 10 EC RV (0.04%) and a not treated control. Samples were collected before the treatment (31 May), after 24 h (01 June), 48 h (02 June), 72 h (03 June) and 7 days after the treatments (07 June).

The samples from the chemical treatments experiment were collected in the morning during 8-11, when the temperature was between 20-25ºC and the humidity was of 60-70%. The collected entomological material was sorted out and tested.

RESULTS AND DISCUSSION

The number of *Thrips tabaci* adults/flower in the experimental plots of marigold crop in protected areas before the treatment varied between 10 and 29

(Table 1). This was considerably higher than the economical damaging level (1-2 adults/flower) overstepped.

The smallest average density was of 15.66 ± 2.60, and the highest was of 21.00 ± 1.63. The average number of collected insects/flower was 19.11.

24 hours after the treatments in the marigold crop, the smallest number of collected living insects was on plots treated with Actara 25 VG (83.66±11.95 insects/plot) and the ones treated with Calypso 480 SC (92.66±11.49 insects/plot). This indicates the fact that these products had the highest efficiency in controlling the tobacco thrips, already in the first day following the treatment.

48 hours after the treatments, the smallest number of collected insects from the treated plots was of 35.33±6.91 in the plots treated with Actara 25 VG and 59.00±9.58 in the plots treated with Calypso 480 SC.

72 hours after the treatments, the smallest number of living individuals was collected from the plots treated with Actara 25 VG (29.33±4.96 insects/plot) and Fastac 10 EC RV (59.66±10.94 insects/plot).

A number of 69.66±8.76 insects/plot were collected from the plots treated with Mospilan 20 SP (Table 2).

Table 1. The density of the *Thrips tabaci* populations, collected from the flower greenhouses, before treatment at Didactic Plant Breeding Station Timişoara

The collecting date	Adults number/flower ($x \pm s_x$)					
	V_1	V_2	V_3	V_4	V_5	V_6
	21.00±1.63	20.66±3.21	18.33±3.60	20.00±4.03	19.00±2.50	15.66±2.60
Average = 19.11						

Table 2. Testing the efficiency of some insecticides used in the controlling of the tobacco thrips (*Thrips tabaci*) from marigold crop, at Didactic Plant Breeding Station Timişoara.

The collecting date	The living adults number/plot ($x \pm s_x$)					
	V_1 (untreated)	V_2 (Mospilan 20 SP 0.04%)	V_3 (Actara 25 VG 0.01%)	V_4 (Confidor Energy 0.08%)	V_5 (Calypso 480 SC 0.02%)	V_6 (Fastac 10 EC RV 0.04%)
31.05.2007 (before treatment)	168.00± 27.41	163.33± 30.81	164.33± 37.12	174.66± 18.68	159.00± 29.61	164.00± 26.62
01.06.2007 (24 hours after treatment)	175.00± 19.33	100.33± 16.32	83.66± 11.95	118.00± 11.10	92.66± 11.49	96.00± 13.14
02.06.2007 (48 hours after treatment)	182.00± 16.56	68.66± 13.65	35.33± 6.91	88.00± 14.72	59.00± 9.58	61.00± 9.64
03.06.2007 (72 hours after treatment)	190.33± 18.20	69.66± 8.76	29.33± 4.96	62.33± 10.09	61.00± 4.93	59.66± 10.94
07.06.2007 (7 days after treatment)	186.66± 11.41	42.66± 2.23	3.33± 1.19	4.33± 1.09	30.66± 2.38	24.00± 4.03

Seven days after the treatments, the smallest number of living insects was collected from plots treated with Actara 25 VG 0.01% (3.33 ± 1.19 insects/plot), followed by the ones treated with Confidor Energy 0.08% (4.33 ± 1.09 insects/plot).

It is obvious that the number of thrips population considerably diminished following the applied treatments, the best results for controlling thrips from marigold crop being obtained by using the insecticides Actara 25 VG and Confidor Energy.

Table 3. The efficiency of insecticides in controlling the tobacco thrips from the protected areas of Didactic Plant Breeding Station Timişoara

Comercial name	Active substance	Conc. (%)	The effectiveness coefficient E % Henderson-Tilton			
			24 hours	48 hours	72 hours	7 days
Mospilan 20 SP	acetamiprid 20%	0.04	41.02	61.19	62.35	76.49
Actara 25 VG	thiametoxam 25%	0.01	51.12	80.15	84.24	98.17
Confidor Energy	imidacloprid 75 g/l + deltametrin 10 g/l	0.08	35.14	53.49	68.50	97.76
Calypso 480 SC	tiacloprid 480 g/l	0.02	44.05	65.74	66.13	82.64
Fastac 10 EC RV	alfa-cipermetrin 100g/l	0.04	43.80	65.66	67.88	86.82

All tested products had a good efficiency in the controlling of the populations of thysanoptera from the flower greenhouse, and this efficiency increased in time from 24 hours to seven days after applying the treatment (Table 3). The best efficiency in controlling the Californian thrips at all time intervals after the treatment was obtained with Actara 25 VG. Confidor Energy also had efficiency over 97% after seven days, but was less efficient in the first 3 days after the treatment.

CONCLUSIONS

Several modern type insecticides were tested in greenhouse on heavily infested marigold crop, where the average density of *Thrips tabaci* was 19.11 adults/flower (varying from 15.66 and 21.00), much higher than the accepted economical damaging level (1-2 adults/flower).

Seven days after the treatments in the marigold crop, the smallest number of living insects was collected from plots treated with Actara 25 VG (3.33 insects/plot) , followed by the ones treated with Confidor Energy (4.33 insects/plot). The products Actara 25 VG and Confidor Energy had an efficiency of over 97%. These two products are indicated for controlling the thrips from the marigold crop.

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