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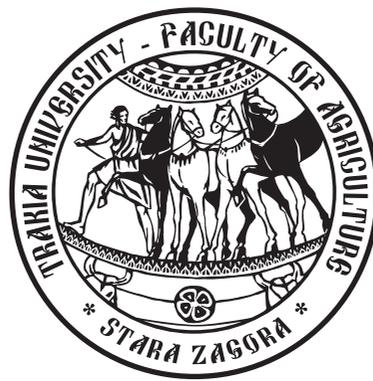
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Effectiveness of the insecticide “Mido 20 SL” in the fight with the green rose aphid populations (*Macrosiphum Rosae* L)

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Abstract. The study was carried out in the period 2008 – 2009 in the Institute of roses and aromatic plants – Kazanlak. The preparation was used against *Macrosiphum rosae* L. in a plantation with *Rosa damascena* Mill. at a dose of 500 ml/ha. Observations were made in the following continuity: preliminary treatment, on the 3rd, 7th and 14th day. The effectiveness of the insecticide “Mido 20 SL” was calculated according to the formula of Henderson and Tilton – in the range between 99.80 – 94.50 % for the period. “Mido 20 SL” is effective against *Macrosiphum rosae* L., but it has a toxic effect on useful insects in the plantation.

Keywords: rose aphid, insecticide, effectiveness

Introduction

The green rose aphid (*Macrosiphum rosae* L.) is one of the major pests on oil-bearing roses, decorative roses, and briars. It is spread throughout the rose production regions and is one of the most common and most dangerous enemies of one- and two-year-old sprouts of the Kazanlak rose (Margina et al., 1999). The body is green and shiny brown, up to 3.5 mm in length, with a sword-shaped stylet at the back end, and long black sap pipes (Harizanov and Harizanova, 1998). It winters as an egg on the stalk of a one- or two-year-old sprouts, around the prickles, the dormant buds, and in the cracks on the bark (Nikolova, 1969; Margina et al., 1999). The hatching of the larvae starts in spring, usually in April, when temperatures in the field reach an average of 10°C within 10 days. After hatching the larvae start sucking the sap of the growing buds, and at the end of April or the beginning of May the founding females appear on the young sprouts. They give birth to larvae and found colonies on the top parts of the shoots, the blossom stem and buds, from which they suck the sap. The colonies on the leaves prevail in June and July, on the tops of young sprouts – in June-July, and July-August, on the buds – in May and June (Nikolova, 1969). In intense reproduction their density reaches 250 per every 10 cm of the sprouts. The degree of attack varies from weak in April, average in May, to intense in June and July. Depending on the climatic conditions the rose green aphid develops from 6 to 7 generations a year, and in August through mid September a depression in the population density occurs. In suitable conditions (without severe droughts or extreme temperatures) the development can continue without a clear-cut depression throughout the whole vegetation period (Margina et al., 1999). *Macrosiphum rosae* is commercially harmful to young 1-2-year-old plantations, mainly in June and July, when the clusters of colonies on young sprouts start stunting the shrub development.

Other representatives of the family *Aphididae* on the oil-bearing rose are *Myzaphis bucktoni* Jakob., *Pentatrachopus tetrarhodus* Walk., and *Metopolophium dirhodum* Walk. (Sharonova, 1978; Kovaleva, 1984; Margina et al., 1999). *P. tetrarhodus* is reported to be one of the major pests on oil-bearing roses in Moldavia and

Crimea. In Bulgaria these species develop a lot more weakly in comparison with the rose green aphid.

The aim of present investigation was to establish the effect of insecticide “Mido 20 SL” for control of green rose aphids.

Material and methods

The experiment was carried out with a flowering rose plantation of *Rosa damascena* Mill. “Improved population № 5”, on an area of 150 m². The method used was the block linear method, with two variants in four replications. The area of a single lot was 15 m². The number of shrubs in a replication - 20. All the necessary agro-technical activities were done in the experimental area without treating with other insecticides except for “Mido 20 SL” (imidacloprid 200 g/l).

The data readings in the experimental area were done in accordance with the plan of studies, i.e. immediately before the treatment, on the 3rd, 7th and 14th day after the treatment with “Mido 20 SL” while recording the number of living aphids in the treated areas and those of the untreated reference area. In each of the monitored lots 10 young sprouts with developed colonies on them were marked beforehand – mainly in the top parts and the periphery of the bushes in the middle of each of the experimental lots. The study was carried out in accordance with the requirements of Directives 181/3/, 152/3/ and 135/3/ of European and Mediterranean Plant Protection Organization (EPPO), the Methodology of biological testing of the effectiveness of insecticides – Aphids on fruit-giving trees, bushes and small-fruit crops, National Plant Protection Organisation 11/2(1), EPPO 1/21 (2).

Results and discussion

In both years of the experiment the aphids appeared one by one as early as the beginning of April, and the first two colonies were

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observed in the second decade of the month. Until that moment the pest attack in the experimental area was recorded to be below the threshold of harm for the pest (10-15% of affected sprouts). With the emergence of the winged migrant aphid at the end of April the spread of the pests increased significantly and at the beginning of May the attack reached 25% of the young sprouts, and highly dense colonies could be observed. The peak in the development of the pest was reached in the second decade of May and the beginning of June.

The environmental conditions were favourable for the development of the rose aphid. In April the density of the natural aphidophagi in the experimental area was relatively low which enabled the quick development of the colonies and their spread onto the surrounding sprouts. In April the main aphidophagi were the adult 7-spot ladybirds (*Coccinella septempunctata*), and with a smaller share was the two-spot ladybird (*Adalia bipunctata*). Some predator bedbugs occurred as well, but also at low density. The beginning of May saw the emergence of the ladybirds' larvae, as well as the syrphid flies and the chrysopidae, especially in the second

decade of May. The highest density period for the aphidophagi coincided with the oil-bearing rose bloom, and the period immediately after it. The number of aphid colonies was significantly reduced on sprouts, where one could see the adults and larvae of aphidophagi.

The treatment of the different varieties in 2008-2009 was done in the bud formation phase at a rate of 500 l/ha. The maximum effect of the preparation was recorded till the 7th day after the treatment, and on the 14th day a new starting phase of aphid colony formation was observed. Till the 7th day separate flying migrant females were discovered which had come from neighbouring parts of the plantation. The average values for the readings for 2008 and 2009 are given in Table 1. The efficiency was evaluated on the basis of the data obtained from counting the number of living individuals on the marked sprouts, and the Henderson/Tilton formula was used in calculations. The average data for both years is given in Table 2.

During treatments no phytotoxic reactions were recorded on the leaves and other organs of the rose bushes. The experiment did not

Table 1. A summary table for the living individuals of *Macrosiphum rosae* on the marked sprouts of the red oil-bearing rose

Plant protection preparation	Date		Before treatment	3 rd day after treatment	7th day after treatment	14th day after treatment
	Number of reading	Number of sprouts	Number of living aphids	Number of living aphids	Number of living aphids	Number of living aphids
Mido 20 SL	1	10	174	0	2	26
	2	10	378	3	1	30
	3	10	374	0	2	19
	4	10	294	1	0	16
	Total	40	1220	4	5	91
Reference values	1	10	321	482	546	396
	2	10	280	412	515	537
	3	10	253	393	522	269
	4	10	233	301	328	259
	Total	40	1087	1588	1911	1461

Table 2. Effectiveness of "Mido 20 SL" against *Macrosiphum rosae* L. on oil-bearing roses

Variant	Marked sprouts /number/	Living aphids		Period of reading
		number	E %	
Mido 20 SL	40	1220	-	Before treatment
Reference values	40	1087	-	
Mido 20 SL	40	4	99.80	3 rd day after treatment
Reference values	40	1588	-	
Mido 20 SL	40	5	99.80	7 th day after treatment
Reference values	40	191	-	
Mido 20 SL	40	91	94.50	14 th day after treatment
Reference values	40	1461	-	

establish any unfavourable effect of the "Mido 20 SL" treatment on the development of oil-bearing roses. The blooming took place normally and no deformations or other signs of damage on the blossoms and on the vegetative parts of the plants were observed.

The monitoring of the marked and treated sprouts made it obvious that the preparation has an insecticide effect on the rose cicade on the oil-bearing rose. In laboratory conditions and a direct treatment it was found that there is a toxic effect on some larvae of the syrphid flies as well as ladybirds, and a strong toxicity against bees.

Conclusion

The preparation has high effectiveness against the green rose aphid on the oil-bearing rose, with the effect being the strongest before the 7th day after treatment – up to 99.8%. The aftereffect of the insecticide "Mido 20 SL" lasts for 10 days and it can successfully regulate the number of aphid colonies before the bloom of the oil-bearing rose. "Mido 20 SL" is toxic against rose cicades and other

pests on roses, but is fairly to highly toxic for the predator entomophagi on roses and for bees. That is why, it is necessary appropriate measures to be taken for their preservation.

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