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Bioecology Of Orchard Mites And The Effectiveness Of Modern Insecticides Against Them

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ABSTRACT

The article identifies the development of bugs, their biological properties, and the presence of more than 10 species of natural enemies, which reduce their number in the agrobiocenosis of seed orchards. 24% of Spiromectin vaccines (0,25 ha/l), 50% n.p. (0,33 ha/l), Universal 25% s.g. (0,2 ha/l) insectoacaracids were tested against bugs, and as a androgen variant, Himgold had 72% em. (1,0 ha/l.) drug was selected. Chemicals have been found to reduce the number of phytophagous bugs and their natural enemies. According to the results of the experiments, all insectoacaricides, except for the Universal 25% s.d.g., were highly effective against spidermites.

KEYWORDS

Bioecology, effectiveness, acaricide, biological, chemical, ignited, insecticide, drug, diapause, winter, agrobiocenosis, thymus, entomophagus.

INTRODUCTION

One of the main pests in the agro-biocenosis of seed orchards of our republic is a number of spider species. According to many authors, spiders have long been reported to be the most common pests in chemically treated orchards [8; 9; 10;].

Our observations revealed that during the 2016-2019 period in the orchards growing under the conditions of our Republic, 6 species of bugs were encountered. These are the pear swell-forming mite (*Eriophyespyri*), the brown fruit mite (*Briobiredikorzev*), the garden spider mite (*Schizotetranychuspruni*), the red hawthorn mite (*Amphitetranichusviennensis*), the common flat-bodied spider mite (*Tetranychusurticaali*).

Among these pests, 3 species common spider mite (*Tetranychusurticae*), garden spider mite (*Schizotetranychuspruni*), red hawthorn mite (*Amphitetranichusviennensis*) were recorded as the most common major pest. Garden spider mites and hawthorn mites multiply in the second half of summer and pose a serious threat to the yield of orchards. Although brown fruit cane is considered dangerous, it is observed to increase in spring and the first half of summer. In spring and the first half of summer, complex-acting insecticides (drugs approved for use in production) keep these pests at an economically safe level. In our experimental fields, the average amount of garden brown mite per 1 leaf did not exceed 0,7 replicates during 2016-2019.

MITE BIOECOLOGY

Garden spider mite -*Schizotetranychus prune*
Oudms – slightly smaller (400x200 μm), elongated species, green-yellow in summer and orange-red in winter, with 13 pairs of feathers on the shoulders in transverse rows.

The eggs are round (110 μm), clear, fuzzy-yellow [1; 4; 6;].

According to the author, who studied the biology and ecology of this pest in seed orchards, this type of mites reproduces by giving 10-12 generations per year. Females overwinter in cracks in the bark of trees. In the spring, as the leaves of the tree begin to shed, they wake up and get extra nutrition. During the remaining lifespan (40-60 days) it lays 50 eggs in total and starts a new joint. Wintering begins in August and lasts 2,0–2,5 months [13; 15;].

During the winter break, the mites are dark brown. When the average air temperature is + 8,5-9,0 oC and the buds begin to swell in early spring, these mites begin to break out of the winter range and this condition is observed until October. During the years of the study, the end of wintering of these mites in the conditions of Kibray district of Tashkent region coincided with the second half of March. But in some years in gardens close to mountainous areas this period was observed in early April. For example, in 2017, end of wintering diapause of mites was observed on March 28, in 2018 on March 22, and in 2019 on March 26. However, in the mountainous areas of Bostanlyk district, the emergence of garden mites from the winter range was observed on April 2, 2017 and April 5, 2018. The mites, initially located on the sunny side of the trees, move towards the newly sprouting buds, and they feed by sucking the aphids.

They feed and reproduce by settling on the underside of the leaf until November. During this time, the garden spider mite produced 9-10 generations in the territory of Bostanlyk district, and in the territory of Kibray district 10-12 generations. From October until the

onset of frost, their females entered the winter dormancy period.

The redhawthorn mite,

Amphytetranychusviennensis Zacher, has been described by many researchers as one of the main pests of orchards. [3; 6; 12;].

In the conditions of our country, hawthorn is still one of the most dangerous pests of orchards.

The red hawthorn beetle also overwinters with the garden spider as a mature

species. Mature breeds of these mites are also called red hawthorn mites because of their red color. The development cycle of the red hawthorn mite is like a garden spider mite, only going to winter a little later, in late October. Another difference of red hawthorn mite is that in the colonies formed during the winter dormancy, their number does not exceed 150 (Fig. 1).



Fig.1.

Our observations show that the hawthorn mite also emerges from the winter diapause at the same time as the garden spider mite, and the female species begins to feed on the buds and leaves. These herbaceous mites begin to multiply by mid-summer. When seed fruit trees are damaged by more than 50% by mites, the appearance of next year's crop buds decreases sharply. Annual branches of strongly damaged trees do not exceed 10–12 cm. If more than 80% of the trees are damaged, their branches will grow in the fall. As a result, the general condition of the trees deteriorates, they won't be ready for the

winter dormancy period, and in most cases, they wither.

In our years of research, it has been found that infestation of apple orchards with spider mites affects their productivity and growth (Table 1).

The average yield in seed orchards observed in 2016-2019 was 48,8-105,2 cen l/ha. In the 9,2-hectare apple orchard (Golden Delishes) of the “MadaniyatAzimovaSayyora” farm in Kibray district, 12,2% of trees were infested with spider mites in 2011, yielding an average of 105,2 quintals per hectare. In 2012, 18,6% of

apple orchards in the observed areas were infested with spider mites, resulting in a yield of 75,6 cen l/ha, which is 29,6 cen l/ha less than in the previous year. In 2013, infestation of apple orchards with spider mites was 9,4% and yields were 118 quintals per hectare. At the same time, it was observed that 12,8 quintals more than the harvest in 2016 and the growth

of the branch was 2,6 cm longer. In 2019, the damage to fruit trees again increased and amounted to 14,6%. And the yield was 87,2 cen / ha. Thus, the influence of spider mites in apple orchards is high, and it has been proven that they can greatly impair productivity when not controlled.

Table 1

Decreased productivity in apple orchards infested with spider mites.
(Tashkent region, Qibray district, "Culture AzimovaSayyora" farm)

Years of observation	Damage rate, %	Average yield from 1 ha, cen / ha		Average 1-year rod length, cm	
		In the year of observation	Decrease compared to 2016 y.	In the year of observation	Decrease compared to 2016 y.
2016	12,2	105,2	-	28,8	-
2017	18,6	75,6	-29,6	20,6	-8,2
2018	9,4	118	+12,8	31,4	+2,6
2019	14,6	87,2	-18	26,6	-2,2

In the agrobiocenosis of seed orchards, there are more than 10 species of natural enemies that reduce the number of garden spider mites.

Of particular importance are the following: stetorus beetle (*Stetorus punctillum* Ws.), Anthocoris caterpillar (*Anthocoris* sp.), Mite eating thrips (*Haplodiplosis* Riss.), Common green lacewing

(*Chrysopa carnea* Steph.), Wild mite-phytoseyids (phytoseyids). [5; 14; 15;].

Studies have shown that chemicals (insecticides) have a negative effect on natural entomophages in garden agrobiocenosis. The following table presents the results of experiments (Table 2).

As can be seen from the table, the ratio of acariphages and herbaceous mites in the

control variant was 1:310,0; 1:141,3, and 1:97,0 in the tree leaves in the control variant. In all variants, the density of enemies was not enough to reduce the number of spider mites

to an economically harmless level. Therefore, there was definitely a need to use an effective acaricide.

Table 2

Changes in the ratio of garden spiders and acariphages in areas chemically treated with GOLD BI 58 40% em.k (2.0 l/ha)

(Qibray district «MadaniyatAzimovaSayyora» f / x, prep. Sowing time 09.06.2019)

Options	Reported days	Average number of leaves per 1, pcs		Number of mite relative to 1 enemy, pcs
		Mites	acariphages	
Control	30. 05	31±2,9	0,1±0,01	1:310,0
	10. 06	325±17,2	2,3±0,73	1:141,3
	20. 06	291±23,2	3,0±0,44	1:97,0
Experience	until processing			
	09. 06	211,2±13,1	1,9±0,7	1:111,0
	after processing			
	10. 06	13,1±0,9	0	1:0,0
	20. 06	7,7±1,03	0,2±0,11	1:38,5
	30. 06	21,3±2,7	1,4±0,03	1:15,2

Summarizing from the table, the chemicals not only reduce the number of phytophagous mites, but also destroy their natural cousins. In this case, the recovery of spider mite populations after processing is faster than that of enemies. Acariphages usually cannot bring the number of mites to a level that is harmless to the farm.

RESEARCH METHOD

Research was carried out according to the special methodical instructions published in the edition of Sh.T. Khodjaev (2004) [2]. The presence of mite eggs on the tree branches was checked using a hand magnifier. To do this, after flowering, the lower part of 10 tree branches were taken from 4 parts by 10

leaves, a total of 40 (4 in reverse) and they were fully examined, and it was found that they had adult mites and their larvae.

RESULTS

One of the main pests of orchards is spider mites. In conditions of Uzbekistan, the common spider mite reproduces by giving 12-15 generations. The reproduction of spider mites is directly related to their nutrient environment. Especially when their females are fed with protein-rich plants, they are prolific and the time required for the development of a generation is also reduced.

During 2016-2019, we conducted research to study the developmental characteristics of spider mites in seed orchard areas and the biological effectiveness of chemicals against them.

In 2016-2019 we conducted a small field experiment to study the effectiveness of chemicals against spider mites in the orchards of "MadaniyatAzimovaSayyora" farm in Kibray district of Tashkent region. In the gardens, 4 types of anti-spider mite chemicals (acaricides and insecticides) Pyridaben 50% 0,30-0,33 l/ha, Universal 25% s.d.g. 0,15- 0,2 l/ha, Spiromectin 24% em.k. 0,20-0,25 l/ha, Ximgoldem.k. 0,8 -1,0 l/ha, the consumption rate was tested. In the control variant, the spider mites were not treated with acaricides. The drugs were

applied using a sprayer OPV-1200 with a flow rate of 1000 l/ha. According to the results of our research, in the orchard against spider mites Pyridaben 50% n.kuk was applied at a rate of 0,30 l/ha, the efficiency was 84,1% compared to the control on 7 reported days, and when was applied at the rate of 0,33 l/ha showed effectiveness by 83,6%. By the 14th day of the reporting period, these indices were 93,8-95,2%, respectively. (See Table 3).

In our variant, where the universal drug 25% s.d.g was consumed at a rate of 0,15 l/ha, the biological efficiency was 80,2% on day 7, while on day 14 this figure reached 85,5%. When this drug was used at a rate of 0,2 l/ha, the biological efficiency reached 90,1-96,1% compared to control. Spiromectin 24% em. preparation at a dose of 2,0 l/ha has the highest efficacy with 81,7% on day 7, 90,6% on day 14, and 89,9% on day 7 at a dose of 0,3 l/ha. and 96,3% on the 14th day.

In the variant in which the anti-spider mite drug Himgold 72% emk was applied at a rate of 0,8 l/ha, achieved biological efficiency on day 3 was 73,9% compared to control, on day 7 of our experiment it was 82,8% and on day 14 it was 90,7%. In the variant in which the drug was consumed at a rate of 0,25 l/ha, the efficiency was 71,7-90,2% and 96,4%, respectively, compared to the control.

Table 3

Biological effectiveness of acaricides against spider mites in seed orchards.

(“MadaniyatAzimovaSayyora” farm, Qibray district, Tashkent region. Small field experience, working fluid consumption 1000 l/ha, 2018-2019)

No	options	Consumption rate of the drug, l/ha	The average number of pests per 1 leaf, pcs				Biological efficiency, %		
			Until the medicine is sprayed	Afterspraying, day			3	7	14
				3	7	14			
1.	Pyridaben 50% n.kuk. (Piridaben)	0,30	35,7	11,7	7,1	3,5	69,1	84,1	93,8
		0,33	38,6	11,1	7,9	2,9	72,8	83,6	95,2
2.	Universal 25% s.d.g. (Emamectin-benzoate + abamectin)	0,15	41,3	16,0	10,2	9,5	63,4	80,2	85,5
		0,2	43,7	12,9	5,4	2,9	72,1	90,1	96,1
3.	Spiromectin 24% em.k.	0,20	36,3	13,1	7,8	5,3	65,9	82,8	90,7
		0,25	37,4	11,2	4,6	2,1	71,7	90,2	96,4

	(spirodiclofen + abamectin)								
4.	Химголд 72 % ЭМ.К.	0,8	41,7	12,3	9,2	3,6	73,9	82,9	94,4
	(гекситиазокс 60г/л +пропаргит 660 г/л) etalon	1,0	42,1	9,7	7,6	3,7	79,6	86,0	94,7
5.	control	-	43,6	46,2	54,5	69,1	-	-	-
ЭКФ ₀₅ ⁺ -							3,1	2,8	1,7

In small field experiments, the most effective doses of the drugs were selected and applied over a wide area against spiders under production conditions. The results obtained in the production experiments are given below. From these data, it can be seen that the drugs in all our experiments showed satisfactory results.

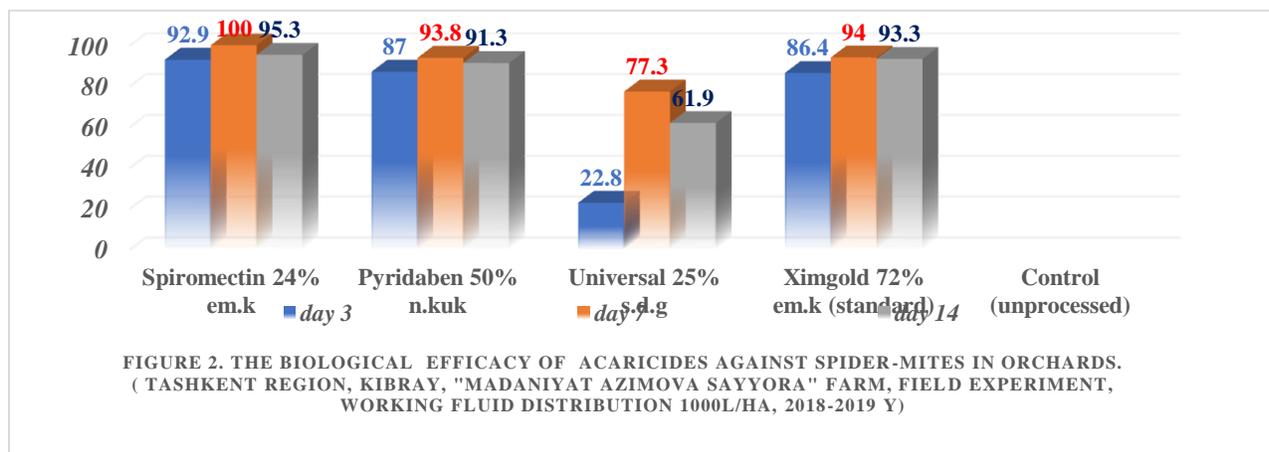
In experiments, four modern acaricides and insecticide-acaricides were tested: Spiromectin 24% em.k.-0.25 ha/l, Pyridaben 50% n.kuk. -0.33 ha/l and Universal 25% s.d.g. 0,2 ha/l, Ximgold -1,0 ha/l. (Figure 2).

According to the results of our study, Spiromectin 24% em.k at a rate of 0.25 l/ha, after treatment on the 3rd day of treatment achieved 92.9% biological efficiency compared to control and by the 7th day of treatment, the biological efficiency reached 100%

compared to control. The highest biological efficacy was observed on day 14 and was 95.3%.

Also, in the variant in which the drug Pyridaben 50% n.kuk was used at a rate of 0.33 l/ha, on the 3rd day of calculation, the biological efficiency was 87,0% compared to control, on the 7th day of calculation it was 93,8% and on the 14th day it was 91,3%.

In the variant in which the next Universal 25% s.d.g was applied at a rate of 0.2 l/ha, the biological efficacy was 22,8% compared to control on day 3, 77,3% on day 7, and on day 14 the figure rose to 61,9%. In our next standard variant, Ximgold 72% em.k when used at 1.0 l/ha, while the biological efficiency was 86,4% on day 3, 94,0% on day 7 compared to control and by the 14th day, it was 93,3%.



The results of the experiments show that all insecticides except Universal 25% s.d.g showed high biological efficacy against spider-mites. Although there was no short-term use of these drugs, no signs of resistance were observed in the populations tested against them.

CONCLUSION

Our observations revealed the occurrence of 6 species of herbivorous canals in the orchards grown in the conditions of the Republic in 2016-2019. These are: the pear-shaped mite (*Eriophyespyri*), the brown fruit mite (*Briobiaredikorzev*), the garden spidermite (*Schizotetranychuspruni*), the red hawthorn mite (*Amphitetranichusviennensis*), the common spidermite (*Tetranychusurticaali*) a species of flat-bodied mite (*Cenopalpuspulcher*) have been detected.

Among these pests, 3 species - common spidermites (*Tetranychusurticae*), garden spidermite (*Schizotetranychuspruni*), red hawthorn mite (*Amphitetranichusviennensis*), were recorded as the most commonly dangerous major dominant species.

It was observed that they feed on the lower part of the leaf and continue to reproduce

until November, during which time the garden spider reproduces by giving 9-10 generations in Bostanlyk district of Tashkent region and 10-12 generations in Kibray district.

In our years of research, it has been found that infestation of apple orchards with spidermites affects the yield obtained and the growth of twigs.

In the agrobiocenosis of seed orchards, it was noted that there are more than 10 species of natural enemies that reduce the number of garden spidermites.

Of particular importance are the following: stetorus beetle (*StetoruspunctillumWs.*), Anthocoris caterpillar (*Anthocoris sp.*), thrips (*HaplatripsalpesterRiss.*), Common green lacewing (*ChrysopacarneaSteph.*), Wild mite-phytoseyid (*Phytoseyid*).

Spiromectin 24% em.k. (0.25 ha/l), Piridaben 50% n.kuk. (0,33ha/l), Universal 25% s.d.g. (0,2 ha/l) insecticides were tested and Ximgold 72% em.k (1,0 ha/l.) was selected as the standard variant.

Compared to the control variant of tested acaricides and insecticides Spiromectin 24% em.k. demonstrated efficiency at 100% on day 7, Pyridaben 50% n.kuk drug 93,8% on the same

day, Universal 25% s.d.g drug 77,3%.The template variant Ximgold 72% em.k drug on day 7 achieved 94% efficacy.

Chemicals have been found to reduce the number of phytophagous mites as well as their natural enemies. According to the results obtained in the experiments, all insect acaricides except Universal 25% s.d.g have achieved high biological efficacy against spidermites.

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