Study of the effect of some biocides on the control of strawberry mites, Tetranychus turkestani (Acari: Tetranychidae) on cucumber crop in protected cultivation in Basrah province.

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Abstract

The experiment was conducted in one of the greenhouses of the Agricultural Research Station, College of Agriculture ,University of Basrah for the autumn season 2020-2021 in order to know the effect of four biocides (Abamectin, Levo24%sl, Metrxine plus, Neem oli (FytomaxN)) during three time periods (10, 7,3) Days in the moving roles of Tetranychus turkestani mites on a cucumber plant.The experiment was organized according to the RCBD randomized complete block design with three replications. The results showed the excelled of the pesticide Metrxine plus in recording the highest average of the relative efficiency of pesticides on the moving roles of the strawberry mites amounted to 93.85%, while the pesticide Levo24%sl recorded the lowest relative efficiency rate of 75.77%.The results showed the superiority of Jha cultivar in recording the highest average of the cultivar's effect on the relative efficiency of pesticides, which amounted to 85.33%, while the mumtaz excellent cultivar recorded the lowest average of the effect of cultivars on the relative efficiency of pesticides on the moving roles of strawberry weeds, which amounted to 81.27%.The interaction showed the excelled of the biocide Metrxine plus in influencing the moving roles of liquorice, where the relative efficiency reached 100% after 10 days of the Jha cultivar , while Levo24%sl recorded the lowest relative efficiency of 74.20% on the variety, whichever is after 10 days of treatment with the pesticide for the adoption of integrated management of the pest, we must move towards the use of bio-pesticides Metrxine plus for its effectiveness against the teat of T. turkestani, and the cultivar Jha as one of the cultivars control to the pest.

Keywords: biocides, strawberry mites , Tetranychus turkestani, Cucumber

Introduction

Cucumis satives L. is an important herbaceous vegetable crop belonging to the Cucurbitaceae family, which includes 130 genera and 800 plant species (15) grown in tropical and subtropical regions around the world (27). It is one of the oldest vegetables planted by man and comes in fourth place after the tomato, cabbage and onion crops in terms of its importance in Asia (14) and in second place after the tomato crop in Europe (24). Agricultural pests are among the specific obstacles to the cultivation of the cucumber plant in Iraq, which have an economic impact on it, including insect pests and mites. After another, for many reasons, including the short life cycle, The length of the female's survival, the large number of eggs that one female lays, and the large percentage of females, which is not less than 80% of the dream population in all seasons (10), and the species of this family was called the ordinary red spider because most of them secrete arachnid tissue on the plant host. the Red. Tetranychus sp. One of the most important groups of multi-familial mites on various food and oil crops, the most important of which is the strawberry, Tetranychus turkestani, It affects a wide range of crops belonging to 15 plant families, including Cucumber, tomato, bean, Alfalfa, castor, parsley, soybean, pepper, strawberry and most low-lying crops (12),The strawberry mites feeds through the sucking piercing

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mouthparts, where it feeds on the underside of the leaves and covers them in the form of a net. Its feeding on the leaves leads to the destruction of plant tissues and cells, which leads to a decrease in the rate of plant photosynthesis and thus the appearance of yellow spots (22).Kabkaew et al. (18) explained that manufactured chemical pesticides have significant negative effects, including their bio-accumulation and their effect on the genetic systems of living organisms as a result of the wrong use, contrary to the recommended concentrations. Accordingly, the scientists stressed by returning to mother nature, which was known to use pesticides of plant origin, which is the most successful method in combating the pest as a result of its rapid decomposition when exposed to light, moisture and heat, and its transformation into non-toxic substances for humans and animals by the action of living organisms and the lack of emergence of resistant strains. The most important plant pesticides that have been used since ancient times are rotenone, nicotine and neem plants (2,25).There is a key point in the behaviour of mites, which is that the mite has high plasticity genetic.Since the number of his chromosomes does not exceed four pairs, so he can change the locations of genes on chromosomes faster than other animals, and this trait gave him the ability to show resistance to pesticides quickly, and for this reason, staying on one chemical substance in combating it does not achieve the aim in an integrated manner (1)The Neem tree preparation, Azadirachta indica, is one of the natural, organic, plant-based pesticides recommended in organic agriculture, and it has low toxicity to organisms and vital enemies (19).It contains the compound Azadiractin, which is the main active biological compound in the neem seed extract, which is responsible for inhibiting the growth and development of insects and as an inhibitor of feeding. Neem oil also changes the behaviour of some insects or reduce its ability to lay eggs on treated plants as it has a deadly effect on various insect stages as a result of containing many secondary compounds such as Deacetylnimbin, Deacetylsalanin, Nimbin, Salanin, and despite the toxicity of these compounds to pests, it is not toxic to mammals and vital enemies (20).Among the latest commercial preparations of plant origin that have proven effective in biological control programs for agricultural pests, are preparations that contain the active substance Oxymatrin, a new type of plant compound and an alkaloid mainly found in the shrub Sophra flavescencs, which belongs to the Fabaceae family Fabaceae, a type of Chinese herb that is used It has its roots since ancient times in the field of medicine to treat many diseases that affect humans and has recently been used in the field of insect control (22), Sophora contains many active secondary compounds, including alkaloid, quinolizidine, flavonoids and saponin, which are highly effective against insects, as they affect the insect's nervous system and affect the breathing process and disrupt the insect's movement. And against many pathogens (13,21).

Materials and methods

1- Preparing and cultivating the experimental field.

The field experiment was applied in Basrah province , Karma District , Agricultural Research Station in autumn season 2021-2020.The experimental land was prepared after tillage it twice orthogonally, after that it was planted with three replicates ,each replicate was divided into three furrow , each of which was 15 meters long (4). To furrow , the distance between them is 90 cm and the width of furrow is 80 cm. It was allocated for planting the three cultivars of cucumber (Ayham, Jha, Mumtaz). The cucumber seeds used in cultivation were brought from Al-Muqdadiyah Agricultural Materials Trading Company / Al-Sabtain Agricultural Materials Office / Basra / Al-Zubayr and when the plants emerged and reached the stage 4-5, the plants were actually reduced to one plant in each pit , and all recommendations related to crop service were followed (5).Triple super phosphate fertilizer was added by the amount

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of 18N-44P-0K at a rate of 200 gm at a fixed rate for all treatments before planting at the beginning of the preparation of the land, as well as nitrogen fertilizer (urea) was added at an amount of 250 gm for each rice and at a fixed rate for all treatments (7). The operations of hoeing and weeding the land were also conducted due to the presence of many varied weeds .

2- Field control.

Four pesticides were used: EC1.8Abamectin, Matrixcineplus, Levo24%SL, FytomaxN (Neem oil) and according to the recommended concentrations of the factory origin to eliminate the strawberry mites (Table 1). These pesticides were used in the field study. A 16-liter backspray was used to coundected the treatments after preparing it. pre-calibrated, To study the effect of different pesticide treatments on the roles of mites in protected cultivation conditions, the sampling process was continued by selecting plants randomly from each experimental unit in each replicate.Three leaves were taken from the three levels of each plant, the first from the upper third, the second from the middle third, and the third from the lower third of the plant. Thus, the sample size was 27 sheets of paper from each treatment that were placed in paper bags.They were taken to the laboratory and the numbers of mites in animated roles (non-adults and adults) were recorded one day before and after treatment (3,7,10) days. The efficiency of the pesticides was evaluated according to Henderson and Tilton equation (17).

$$\text{pesticide efficacy} = \%\frac{number\ of\ individuals\ after\ treatments\ x\ the\ number\ of\ individuals\ in\ the\ comparison\ before\ treatments}{The\ number\ of\ individuals\ before\ treatment\ x\ the\ number\ of\ individuals\ in\ the\ control\ after\ treatment} \times 100$$

1- Statistical analysis:

The laboratory experiment was conducted according to the complete randomized design (CRD) as a two-factor experiment and the averages were compared according to the L.S.D method under the probability level of 0.05 using the program GenStat Discovery Edition 3 (3).

Table (1) The pesticides used in the experiment.

Producing company	Recommended concentration	Effective Material	Commercial name of pesticide
Astrachem	0.5ml/L	Abamction	EC1.8%Abamction
Russell	0.5ml/L	2.4% Abamectine and Oxymatrin	Matrixcine plus
Sineria	0.3ml/L	Oxymatrin	Levo24%sl
Russell	1.5ml/L	Azadirachtin	FytomaxN

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Results and discussion

1. The effect of interaction between pesticides and plant cultivars on control to teat T.turkestani .

The results show in Figure (1) that the pesticide Matrixcine plus has caused the mortality of moving stage (adult and non-adult) with an effective average of 95.92% on Jha cultivar, while the most Ayham cultivar with 24% Levo treatment recorded the lowest average of pesticide efficacy amounted to 72.17%.

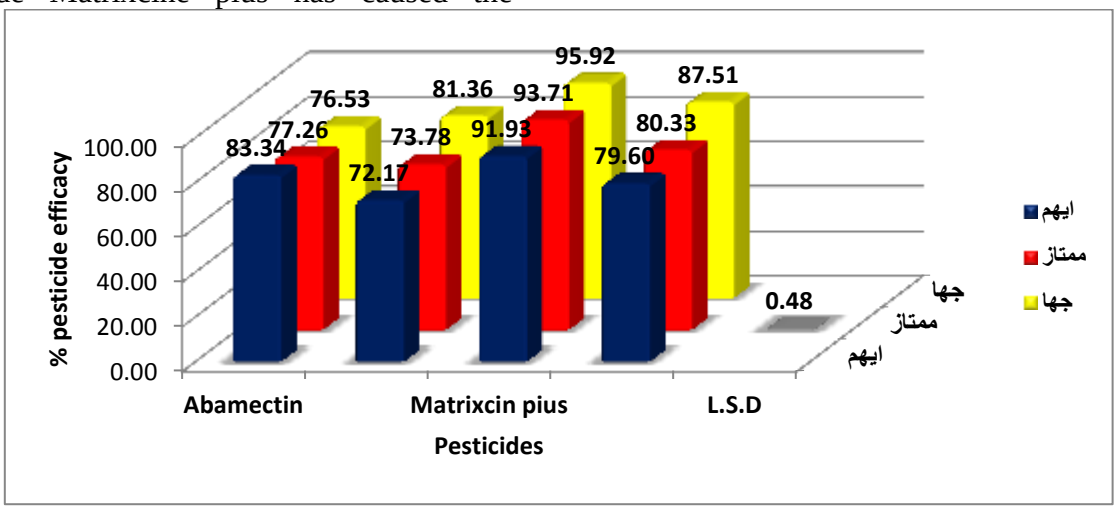

Figure 1: The effect of the interaction between biopesticides and cucumber cultivars on the moving stage of the strawberry mite. T.turkestani

2. The effect of interaction between biopesticides and sampling time on the moving stage of the mite T.turkestani.

The results shown in Figure (2) indicate that there were significant differences in the effectiveness of biopesticides on cucumber cultivars during the time periods of taking the reading, as Matrixcin plus recorded the highest percentage of pesticides effectiveness amounted to 98.03%. After 7 days of applying the pesticide, while the pesticide Levo recorded 24%SL The lowest average of pesticide effectiveness was 64.41% after 3 days of treatment with the pesticide.

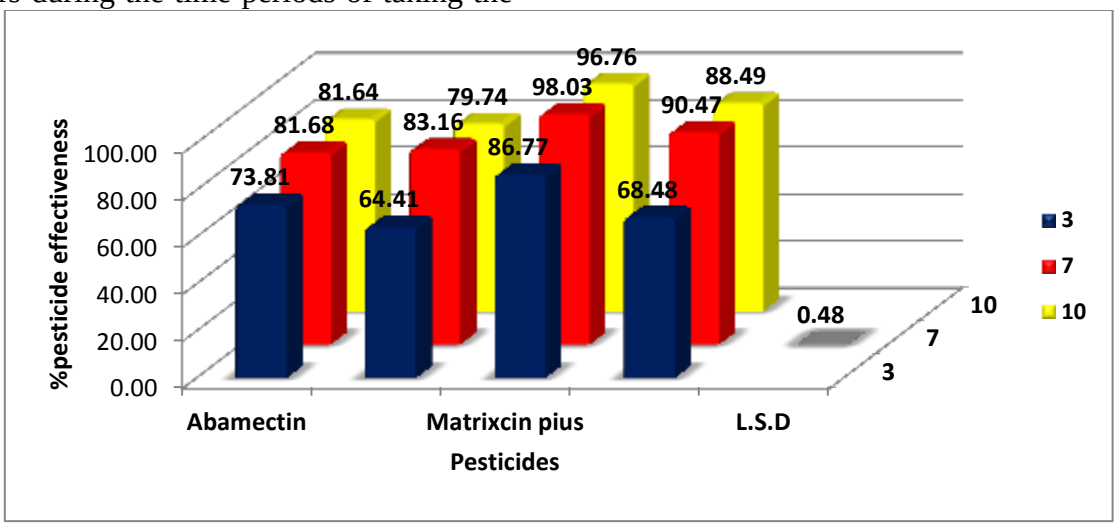

Figure 2: The effect of interaction between pesticides and time duration on moving stage of mite. T.turkestani

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3. The effect of the interaction between cucumber cultivars and sampling time on the moving stage of mite T. turkestani.

The results of the interaction between (cultivars and time period) shown in Figure (3) indicate that the cultivars showed excellent control to the strawberry mite in adult moving stage after the control procedure and for all the pesticides used in the experiment, as the effectiveness of the bio pesticides after 3 days of control reached 87.98% It began to rise until the highest percentage of the effectiveness of pesticides was recorded, reaching 98.13% after 10 days of treatment. The effect of chemical control was also clear in the variety, which of them is sensitive to mite. The effectiveness of pesticides reached 72.94% after 3 days of control and continued to rise until the effectiveness reached Bio-pesticides on the cultivar, whichever is after 10 days, to 78.31%

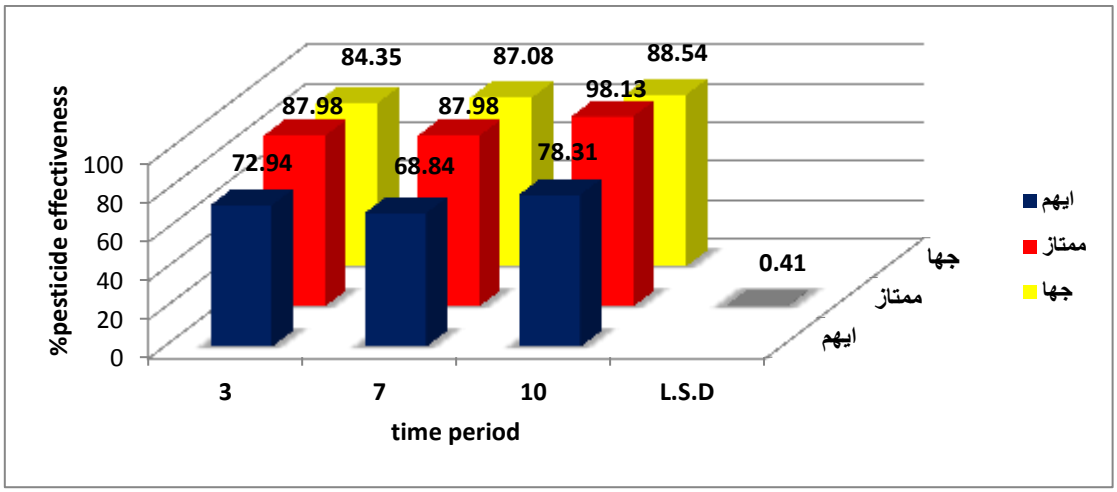

Figure 2:: The effect of the interaction between cucumber cultivars and the sampling time on the moving stage of the mite T. turkestani.

With regard to the interaction between the time period, cultivars and different pesticides, Matrixcin plus continued to excel on the rest of the pesticides in all periods of sampling and testing after 3, 7 and 10 days of treatment with an efficiency of 91.67 and 100.00% on the Jha variety after 3 and 7 days of treatment. The treatment, with an efficiency rate of 100.00%, passed 10 days of treatment on the mumtaz cultivar. These results can be explained because it contains two active substances, Abamactein + Oxymatrin, and thus has a double effect on the lesion, and because it is a localized systemic insecticide. It affects the lesion in the stomach after taking it orally, it takes 2-3 days after treatment to show its effectiveness clearly, and because it penetrates into the plant tissue, its decomposition and fading is slow and its effect on the lesion continues for a longer period, it is known that the duration of the survival of systemic pesticides longer than others.This result agrees with Al-Maliki (6) Marčić and others (23) who noted that these compounds have high toxicity, which is reflected in the high rate of fatalities, in addition to that it reduces female fertility and affects the nervous system, specifically in the enzyme acetylcholinesterase. repellent and anti-nutritional effects against dreaming. This is confirmed. We conclude from the above table that the teat of T. turkestani was greatly affected by the type of the studied plant variety and the reason for this is due to the existence of a difference in the shape and size of the plant leaves of the studied cultivars , it the leaves were broad and exposed to a greater amount of pesticides and that the food

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preference affected the mits gluttony and that eating a larger amount of food leads to an increase in the dose of the pesticide entering the body of mits(8). Saqr et al. (11) stated that the signfacntly of Metrxine plus is due to the fact that it contains two active substances, Abamactein + Oxymatrin. As Abamectin has achieved the highest killing rate in the first week, with its relative efficiency reaching 78.43%, and the effectiveness decreased in the third and fourth weeks to 53.58 and 42.44 %, respectively, with significant differences when used in the control of T. urticae on tomato.It also agrees with what was indicated by the Jumida mechanism (9) that the killing rate of the biocide Abamectin reached 100% after 3 days of treatment, but after 7 days it reached 96% when used in combating the red mite T.urticae on cotton. This is consistent with the findings of Szwejda (26) when studying the efficacy of some mite pesticides used to control T. cinnabarinus red mite and T. urticae two-spot mite on tomato and cucumber crops in greenhouses . Abamectin has shown high efficacy against the previous two types, with a relative efficiency of killing 98% for a period of two weeks.Han et al. (16) explained that Matrixcin plus contains active substances such as Matrine and other substances that have toxic effects on pests as well as on mites.

Table (2): The effect of biocides on the moving stage of the mite. T.turkestani

cultivar effect average	**% Effectiveness of Pesticide for Killing Motions After Treatment (Day)**			**Pesticide**	**cultivar**
	10	**7**	**3**		
81.76	86.39	85.15	78.48	**Abamectin**	**Ayham**
	74.20	81.08	61.23	**Levo 24%sl**	
	94.20	97.11	84.48	**Matrixcin plus**	
	82.63	88.61	67.58	**FytomaxN**	
81.27	81.59	84.17	66.02	**Abamectin**	**mumtaz**
	79.26	83.12	58.97	**Levo 24%sl**	
	100.00	96.98	84.17	**Matrixcin plus**	
	87.49	87.30	66.22	**FytomaxN**	
85.33	76.94	75.72	76.93	**Abamectin**	**Jha**
	85.77	85.29	73.03	**Levo 24%sl**	
	96.09	100.00	91.67	**Matrixcin plus**	
	95.37	95.52	71.64	**FytomaxN**	
	86.66	88.33	73. 36	**Days affect average**	

FytomaxN	**Matrixcin plus**	**Levo 24%sl**	**Abamectin**	**Pesticide effect average**
82.48	**93.85**	**75.77**	**79.04**	

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● Each number in the table represents an average of three replicates.

● L.S.D(0.05) cultivar effect average: 0.24.

● L.S.D (0.05) Date of reading: 0.23.

● L.S.D(0.05) Pesticide effect average: 0.27.

● L.S.D(0.05) interaction: 0.83.

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