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Effect of cucumber varieties and some chemical pesticides on the population density of *Bemisia tabaci*

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ABSTRACT

The current study was conducted to evaluate the sensitivity of three varieties of water cucumber Syrian, Dutch, French and the effectiveness of three insecticides Joker, Harvest, Chase against the tobacco *Bemisia tabaci* Meza Tabachi in Hawija area - Kirkuk governorate. In the fall from August to December 2020, and the results showed that the Syrian variety made the varieties resistant to *Bemisa tabaci*, as it reduced the insect population density to 32.40 adult insects/10 leaves and 28.75 nymphs / 16. cm^2 in. As for the French and Dutch cultivars 44.85, 44.38 adults / 10 leaves and 40.77 and 39.95 nymphs / 16 cm^2 respectively with insecticidal effect on the insect, the results showed that the joker was the best. More effective in reducing insect populations, where the average density was 32.6 insects/10 leaves and 33.39 nymphs/16 cm^2 compared with Shays and Harves, where the average population density was 41, 3 and 47.72. adult. /10 leaves and 36.39 and 39.69 nymph 6 cm^2. The lowest population density of insects was recorded in the Syrian cultivar treated with Joker pesticide, with an average of 24.54 insects/10 leaves and 27.26 16 cm nymphs. All pesticides showed better efficiency in reducing insects. One day of spraying, then its efficiency began to decline after the third and seventh days of spraying, while the lowest population density of nymphs was recorded after the seventh day of spraying with pesticides, and the lowest population density was 24.52 insects/10. Leaves and 9.81 nymphs/16 cm^2 after the second spray of pesticides compared to the previous period and the first spray with an average population density of 53.91, 33.45 adults/10 leaves and 48, 53 and 21.07 nymphs/16 cm^2 respectively. The Joker was marked by low adult population density after 1 and 3 days for each of the first sprays, so what is it? On average, after 1 and 3 days of spraying 3.21, 4.77, 2.76, 3.76 insects/10 leaves, respectively, and for spraying days of nymphs 8.66, 4.88 and 3.88 nymphs were counted. / 16 cm^2 each, respectively.

Introduction

Cucumber is one of the plants of the cucurbit family and it is an economically significant vegetable that is grown in summer, spring and autumn for the consumption of its fresh vegetables and for making pickles. The area planted with the cucumber crop is about (69502) dunums, with a productivity of (149,302) tons for the year 2019 [1].

The plants of cucumber are infected with many pests, involving the tobacco *Bemisa tabac*, as nymphs and adults suck the juice of the plant, which leads to yellowing of the plant and other indirect damage through the transmission of several viral diseases, including wrinkling and yellowing of the plant. Cucumber leaves and aphid secretion that aids in the growth of the fungus and collects dust that hinders the growth of the fungus. The process of photosynthesis in plants [2], taking into account the high susceptibility of this fly and the ability of its incomplete stages to protect itself, as it secretes a layer of wax that covers its body and lays eggs inside the plant tissues [3] which makes chemical pesticides one of the appropriate solutions to combat this insect. Carboturan and dislfoton have been used at a rate of [4] Liter. hectares of each and was found to be very

effective in resisting and killing the insect by reducing its number and density [5] as well as using nicotine compounds against it and was very effective in reducing population density adults [6].

Varieties are regarded suitable solutions for insect resistance because of their effective role in applied insect resistance as a result of improving genetic traits and choosing the best [4], and plant protection with chemical pesticides is preferred and desirable and cannot be abandoned in integrated control [4]. [7] For pesticides, chemical pests take center stage through agricultural pest control because it is a quick, effective and economical method and has a significant role in increasing production, and the selection of chemicals for pest control is important in implementing [8]and [9] and for the purposes of integration in the use of different control procedures in resistance and *Bemisia tabaci* control in cucumber plants, the study aimed to understand the effect of using different pesticides and resistant varieties on the low population density of insect, different stages of the lesion.

Materials and Research Methods

The effect Study of pesticides and Varieties on the population density of the *Bemisia tabaci*

The present study was conducted in Hawija district - Kirkuk governorate in the farms of a farmer for the agricultural season 2020/2021 from August to December 2020, and the experiment land was divided into three sectors in which the three cucumber varieties (Syrian, Dutch, French) were planted in individual panels. The distance between one plant and another is 30 cm on 1/8/2020, with three replicates for each class in nine experimental units. The infestation of this insect appeared on August 24, 2020, and a month after planting also, and when the population density of adults reached (8-16) insects. For each plant leaf, it was then sprayed with chemical pesticides, which belong to different groups, as in Table (1), on each plant variety, at a rate of three repetitions for each pesticide used, using a manual sprayer with a constant pressure of 2 liters on 10/9/2020, and the population density of adults and nymphs was calculated. *B. tabaci* a day before spraying and after 1, 3 and 7 days of spraying, and spraying was repeated a week after the first spray [10] and [5].

Study of Pesticides Effect and Varieties on Population Density of Adult *Bemisia tabaci*

The population density of adults on the three varieties of cucumber has been calculated in the early morning by direct counting them on the lower surface of the leaves after turning them over quietly and by ten leaves for each variety separately and after the spraying process as in paragraph (1-2).

Study of Pesticides Effect and Varieties on Population Density of *Bemisia tabaci* Nymphs

The population density of nymphs on the three varieties of cucumber was calculated on the basis of the number of nymphs per 4 cm^2 of leaf of the plant by 4 parts per leaf and per 10 leaves and for each variety separately and after placing them in nylon bags and transporting them to the laboratory to calculate the number of nymphs on them based on the dissection microscope [7] Before and after the spraying process, as in paragraph (1-2) [11]

Table 1: Chemical Pesticides Utilized in the Study

-60 ml/ 100 water liter	Lambdacyolothrin50%	Barathroid	Harvest 50%Ec
20 gm/ 100 water liter	500g/kypymetrozin	Class lll(IGR)	Chess 50
-25 gm/ 100 water liter	Acetamaprid 25%	Neonecotinoid	Joker 25% Sp

Statistical Analysis

The obtained data were statistically analyzed using a computer according [12], and the averages were compared using Duncan's polynomial test at a 5% probability level, according [13] .

Results and discussion

Effect of Pesticides and Varieties on the Population Density of Adult *Bemisia tabaci*

The results that are shown in table (2) point out the effect of the cultivars on the population density of adult *Bemisia tabaci* if it was less densely populated on the Syrian variety, which amounted to (32.40) insects/10 leaves, which differed significantly on the French and Dutch cultivars, which amounted to 44.85 and 44.38 insects/10. One leaf for each of them, respectively, as for the effect of the pesticide on the population density, it reached its lowest rate with the Joker pesticide, which amounted to (32.61) insects/10 leaves, which differed significantly from the

Table 2: Effect of varieties and chemical pesticides on the population density of *Bemisia tabaci* adults

The rate	Population density of adult *Bemisia tabaci* insects / 10 papers			The category
	Pesticide			
	Harvs	joker	Shees	
44.85	59.62	36.32	38.61	Dutch
32.40	36.84	24.54	35.83	Syrian
44.38	46.72	36.98	49.46	French
	47.72	32.61	41.3	The average
4.36	3.7			L.S.D%5
8.48				

Harvest and Shays pesticides, which reached (41.3 and 47.72) insects/10 leaves. For each of them, respectively, and the lowest population density was on the Syrian variety treated with Joker, which amounted to (24.54) insects/10 leaves, which differed significantly from the rest of the treatments in that the highest population density was in the Dutch variety treated with Harves, which amounted to (59.62 insects/ 10 sheets.

The results in table (3) for the effect of periods on population density where the highest rate was (36.91) insects/10 leaves after 3 days of spraying which differed significantly from the period after (1 and 7) days if we reached (25.68 and 24.37) insects/10 leaves for each of them, respectively, spraying had a significant effect if it reached its lowest rate after the second spray, which amounted to (24.52) insects/10 leaves, which differed from before spraying and spraying. The first spray where we got to 53.91 and (33.45 insects/10 leaves each). Respectively, its lowest rate with Joker was in the first and second sprays and after (1 and 3) days of spraying, which were (3.21, 4.77, 2.76 and (3.76 insects/10 leaves) respectively, which differ from each other. The rest of the treatments, and this may be due to the fact that the population density was the lowest in the Syrian cultivar due to the differences in genetic factors between the cultivars that gave them protection and resistance against the insect [14]. Varieties play an effective role in the applied resistance to insects by defining the genetic characteristics and choosing the best Including [15], and the superiority of that is due to the difference in the nature of the formulas and procedures that characterize the nicotinoid group, with high systemic activity [16], and that the integration of the use of Joker pesticide with the Syrian variety showed an effective effect in maintaining the population density of pesticides. Pesticides for application in the field with good pesticide coverage in the field and pesticides is an indispensable and pioneering field [17] and [6].

Table 3: The effect of the interaction between the three factors (pesticide × spray × period) on the population density of the adult fly.

pesticide rate	Population density of adult *Bemisia tabaci* insects / 10 papers							pesticide
	A day after the second spray			A day after the first spray			Before spray	
	7	3	1	7	3	1		
33.83	38.21	29.32	39.98	35.65	30.87	28.98	54.12	shees
7.043	6.76	3.76	2.76	21	4.77	3.21	53.81	joker
46.09	38.54	37.54	23.87	66.43	62.76	47.43	53.82	Harvs
	27.83	23.54	22.20	41.02	32.8	26.54	53.91	the average
3.82	24.52			33.45			L.S. D%5	
	6.38							
days (7) after 24.37		day (3) after 36.91			day (1) after 25.68		period rate	
2.29							L.S.D%5	

Effect of Cultivars and Pesticides on *Bemisia tabaci* Nymph Population Density

It was shown in Table No. (4) that there were significant differences in the effect of varieties on the population density of *Bemisia tabaci* nymphs if it reached the lowest index in the Syrian variety, which amounted to (28.75) nymphs / 16 cm^2, which differed. Notably in the Dutch and French varieties, this totaled 40.77 and 39.95 nymphs. / 16 cm 2 each, respectively, and the lowest population density was with Joker with a total of (33.39) nymphs / 16 cm^2, which differed significantly from Shay's insecticide and Harvs which amounted to 36.39 and 39.69). nymphs / 16 cm^2, respectively, and the lowest population density of nymphs was recorded in the Syrian cultivar treated with the three pesticides, which totaled (29.43), 27.26 and 29.57) nymphs / 16 cm^2, respectively, which differ from the rest of the treatments. Except for the treatment of the Joker with the French variety.

Table 4: Effect of categories and chemical pesticides on the population density for *Bemisia tabaci* nymphs

The average	Population density of *Bemisia tabaci* nymphs / 16 cm^2			Category
	Pesticide			
	Harvs	Joker	Shees	
40.77	44.54	38.43	39.35	Dutch
28.75	29.57	27.26	29.43	Syrian
39.95	44.98	34.5	40.39	French
	39.69	33.39	36.39	The average
2.81	1.93			L.S.D%5
7.8				

The results in table No. (5) showed that there were statistically substantial differences in the effect of periods on the population density of nymphs, which reached its highest levels from the seventh day of the

application of the pesticide, which amounted to (21.19) nymphs / 16 cm 2, which differed significantly from the period after (1 and 3) days which totaled 8.06. and (17.08) nymphs/16 cm2, respectively, and the lowest population density of nymphs after the second spray was (9.81) nymphs/16 cm2 compared to before the first spray and spray, which totaled 48.53) and (21.07 nymphs) / 16 cm 2 respectively, and the lowest population density was recorded by treatment with Joker after the second spray after 1, 3 and (7 days of spraying, which amounted to 8.66), (4.88 and 3.88) nymphs / 16 cm 2 for each of respectively, which differed significantly from the rest of the treatments except for the harvest of pesticides after the second spraying after the seventh day of spraying, and it is possible that the reason for the fact that the Syrian variety is less densely populated is the different characteristics of the real plant that it possesses [18] and [5], scientific facts prove that all plants show defensive reactions after being damaged by the pest.

Characteristics of the plant located with the texture and size of plant parts, wavelengths reflected from the plant surface, the presence of some secondary compounds such as oils, reasonable concentrations of the nutritional content of the plant such as sugars and the presence of glandular hairs, the rate of secretion of waxy substance or the rate of cork formation in seedlings, the hardness of the shell and the presence of hair or fluff The insect makes it more likely to infect or move away from this plant [10] and [6], with the difference in the leaf area and the hairs present the less the leaf surface plays an important role in the *Bemisia tabaci* 's preference for the plant, as it is of great importance in protecting the laying of eggs and nymphs [19].

Table 5: The effect of the interaction between the three factors (pesticide × spray × period) on the population density of nymphs of the fly.

pesticide average	Population density of *Bemisia tabaci* nymphs / 16 cm^2							Pesticide
	A day after the second spray			A day after the first spray			Before spray	
	7	3	1	7	3	1		
16.45	9.33	11.77	9.66	21.22	22.44	24.33	48.26	Shees
10.51	3.88	4.88	8.66	17.44	12.22	16	49.71	joker
19.38	6.88	11.66	21.66	23.88	28.33	23.88	51.43	Harvs
	6.69	9.43	13.32	20.84	20.99	21.40	48.53	The average
1.83	9.81			21.07			L.S.D%5	
	5.23							
a day (7) after 21.19		a day (3) after 17.08		A day (1) after8.06			period rate	
2.54							L.S.D%5	

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تأثير أصناف الخيار وبعض المبيدات الكيميائية في الكثافة السكانية للذبابة البيضاء *Bemisia tabaci*

ضفاف راضي مهدي

قسم علوم الحياة ، كلية العلوم ، جامعة تكريت ، تكريت ، العراق

الملخص

نفذت هذه الدراسة لتقييم حساسية ثلاثة أصناف من خيار الماء (السوري , الهولندي , الفرنسي) وكفاءة ثلاثة مبيدات حشرية ، جوكر, هارفست , شيس، ضد ذبابة التبغ البيضاء *Bemisa tabaci* في منطقة الحويجة – محافظة كركوك خلال الموسم الخريفي آب - كانون الاول 2020, وأشارت النتائج الى ان الصنف السوري اكثر الأصناف مقاومة لحشرة الذبابة البيضاء ، اذ خفضت الكثافة السكانية للحشرة الى 32.40 حشرة بالغة / 10ورقة و 28.75 حورية16/سم^2 مقارنة بالصنفين الفرنسي والهولندي 44.85 و 44.38 حشرة بالغة 10 /ورقة و 40.77 و 39.95 حورية 16 / سم^{2}على التوالي , أما بالنسبة لتأثير المبيدات في الحشرة ، فقد بينت النتائج ان المبيد جوكر كان الاكفأ في خفض الكثافة السكانية للحشرة والبالغ معدله 32.61 حشرة بالغة 10 /ورقة و 33.39 حورية 16 / سم^2 مقارنة مع المبيدين شيس وهارفس والبالغ معدل الكثافة السكانية للحشرة فيهما 41.3 و 47.72حشرة بالغة 10 /ورقة و 36.39 و 39.69 حورية 6 سم^2 ، كما سجلت اقل كثافة سكانية للحشرة في الصنف السوري المعامل بالمبيد جوكر والبالغ/ معدلها 24.54 حشرة بالغة 10 /ورقة و 27.26 حورية 16 / سم^2 , وجميع المبيدات أعطت افضل كفاءة لها في خفض الكثافة السكانية للبالغات بعد يوم من الرش وبعد ذلك بدأت كفاءتها بالانخفاض بعد اليوم الثالث والسابع من الرش، في حين سجلت اقل كثافة سكانية للحوريات بعد اليوم السابع من الرش بالمبيدات , وبلغت اقل كثافة سكانية 24.52 بالغة 10 /ورقه و 9.81 حورية 16 / سم ^{2} بعد الرشة الثانية للمبيدات مقارنة بفترة ما قبل الرش والرشة الاولى والبالغ معدل كثافتها السكانية 53.91 و 33.45 بالغة 10 / ورقة و 48.53 و 21.07 حورية 16 / سم^2 على التوالي ، وتميز مبيد جوكر بخفض الكثافة السكانية للبالغات بعد 1 و 3 يوم لكل من الرشة الأولى والبالغ معدلها وبعد 1 و 3 يوم من الرش والتي بلغت 3.21 و 4.77 و 2.76 و 3.76 حشرة/ 10 ورقة على التوالي, وللحوريات يوم من الرش والبالغة 8.66 و 4.88 و 3.88 حورية 16 /سم ^{2} لكل منها على التوالي.