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Evaluation of the efficiency of color traps and some insecticides in the population density of green peach *Myzus persicae* Sulzer on tomato plant

ABSTRACT

This study aims to study the population density of the Peach Aphid *Myzus persicae* Sulzer and compared the efficiency of color traps with some insecticides Acetampride (ACelan 20% SL), Imidacloprid (Confidor 20% SL), Thiamethoxam (Actara 25 WG) and cold aqueous extract of *Azadirachta indica* seeds and *Ricinus communis* seeds in the insect control, The study was conducted in the Ishaqi city, Salahedin Governorate famous which known the cultivation of tomato *Solanum lycopersicum*. The highest average of insects caught during May 2020 was 85.42 adult/plant, while the lowest insects reached 12.50 adult/plant during March 2020 in the first site while the highest average of insects caught during May reached 86.21 adult/plant, while the lowest rate was 22.35 adult/plant during the March in the second site This study show that the yellow color more attractive colors than white and red and shows that the red color less attractive colors. The highest mortality rate of acetampride was 92.3% after 24 h of treatment, while the highest mortality rate of thiamethoxam and amidacloprid was 85.65% and 55.52%, respectively, after 24 h of treatment. The results showed the effect of cold water extracts on mortality of *M. persicae* Sulzer was 67.42% for the *A. indica* seeds, while the mortality rate was 78.59% for the *R. communis*, after 24 h, highest mortality rate of acetampride was 87.1% after 72 h of treatment, while highest mortality of thiamethoxam and amidacloprid was 71.3% and 49.2%, respectively, after 72 h of treatment. The results showed the effect of cold water extracts on mortality of *M. persicae* Sulzer, causes a mortality rate of 45.23% for the cold water extra of *A. indica*, while the mortality rate was 58.46% for the cold water extracts of castor plant *R. communis* after 72 h of treatment.

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INTRODUCTION

Tomato is characterized by its many varieties, mostly seed, and is infected by insects, which make up 80% of the arthropods almost (Almanshawi and Awsat, 2015). Insects with other pests play a negative and significant role in agricultural production, and experts in plant protection at FAO have estimated the losses caused by these pests by one-third of global production of crops both in the fields and in storage (Hosny and Mahmoud, 1997). Insects are one of the most densely populated species on the planet, accounting for 50% of the number of living organisms and 72% of the total number of animals living on the planet (Zarjis and Mohammed, 2005). Insect pests either lend leaves, roots, dig inside branches, or make tunnels between the two, or feed on the fruits leading to

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the decomposition and death or feed by sucking juice (Fernandez *et al.*, 2017). Aphids feed on the tissues of modern plants, forming honeydew, but at a lower rate than other types of aphids that reduce the growth rate of the plant and thus affect the value of the total yield of the crop. Yellow spots can be seen on the surface of the leaves. Aphids secrete honeydew, which has severe damage, as the Sooty mold grows on the surface of plant leaves, clogging the respiratory stomata, which reduces the regularity of the plants' physiological processes, which results in stunting of the affected plant and leaf curl and wilting (Capinera,2001). The eggs are small, elongated or oval in shape, yellow or green in color, which then turn black. They are 0.6 mm long and 0.3 mm wide and are attached to trees throughout the winter ,nymphs are small in size that start green and quickly turn yellow. They grow and become wingless females called the Stem mother or Fundatrices, who reproduce as parthenogenic(Capinera, 2001), feed the nymphs and adults absorb the juice of plant leaves, leading to the emergence of yellow spots become silver because of the lack of chlorophyll, and then dried leaves (Blackman and Eastop,2017). *M. persicae* can reproduce sexually on the tomato plant, and the sex ratio changes in the field during the season, where the ratio tends to favor females. The use of four plant extracts belonging to different plants works to reduce directly or indirectly without leaving a harmful effect on the plant (Ramzan *et al.*,2016). The use of sticky traps reduced the numbers of eggs and nymph Ibrahim,2017). Pesticides have a high impact due to their high solubility in water (Van toor et al 2016). Th present research aims to study the numerical density of green peach aphids *M .persicae* Sulzer compared the efficiency of insecticides (Acetampride (ACelan 20%) SL, Imidacloprid (Confidor 20% SL), Tiamethoxam (Actara 25 WG) and cold aqueous extract of *Azadirachta indica* seeds and *Ricinus communis* seeds) on tomato plant during season 2020 using the spray method.

MATERIALS AND METHODS

PREPERAING OF THE EXTRACTS

The seeds of the *Azadirachta indica* and *Ricinus communis* were purchased from the local market the samples were diagnosed in the lawn of the Faculty of Science, Tikrit University, according (Herbarium, 1984) method preparing aqueous extracts we take 20 grams of the dry weight of the seeds which taken after grinding and each was placed in a 100 ml glass jar containing 30 ml of distilled water and then mixing the material with an electric mixer for 15 minutes and leaving the solution for 30 minutes after which it was filtered by a piece of tulle to separate the large impurities.The filtrate was transferred to the Hera centrifuge at a speed of 1000 rpm/minute for 15 minutes to precipitate the lesser phytoplankton and obtain a clear plant extract. The filtrate was taken and evaporated with a rotary evaporator at a temperature of 40 ° C then the filtrate was dried in an electric oven between 40-50 ° C for the purpose of obtaining the dry raw material at a weight of 8 g take 20 g of dry raw material from each extract separately and dissolve in 100 ml distilled water to obtain a concentration . Then prepare the concentrations (2.5, 5, and 7. 5 mg / ml) (Mitscher *et al*,1977) , use water for control. The results were statistically analyzed according to the Randomized Complete Block Design and the results were compared using the DMRT Duncan's Multiple Range Test at 0.05 probability level (Ibramim, 2017).

Filed carried out in two areas were selected from Al-Ishaqi in Salahedin governorate which is famous for tomato plant. The experiment started at the beginning of March 2020 and continued for three months. The green peach aphids *M .persicae* was diagnosed based on the insect's diagnostic characteristics. An area of 40 x 100 m² was chosen for the purpose of the study, with an area of 4 x 5 m² defined for each side of the four fields in addition to the middle of the field, and samples were taken from the four sides of each field in addition to the filed middle teaching of five plants for each side in addition to a plant in the middle, sticky traps yellow, white and red color was used to take weekly readings to estimate the numerical density of green peach aphids. Samples

are taken at the time of insect activity, which is usually in the early morning hours, and counting is done directly in the field by magnifying eye lens insecticides Acetampride (ACelan 20%) SL, Imidacloprid (Confidor 20% SL), Tiamethoxam (Actara 25 WG) were obtained from local markets, and used a 100-liter sprinkler intended for field use. plants were sprayed using a spray method that distributes pesticides evenly to leaves of plants, account was done after (24,72) h of the numerical density. The mortality rate was then found by the Abbot, (1920).. All agricultural operations such as fertilization, regular irrigation was carried out during the study period.

RESULTS AND DISCUSSION

1.3 Average number of the green peach aphid *M. persicae* in the first site.

In the first site the numerical density of green peach aphid *M. persicae*, noting that it increased with the progress of the season and the highest average numerical density reached 85.42 adult/plant in the month of May, while the lowest average numerical density reached 12.50 adult/plant in March. The reason of the increase in numerical density with a time of the year was due to the increase in the branches, the limitation of growth, the higher of the temperature levels that these insects depend on for their feeding, and the continuous rise in temperature is one of the important factors that affect insect reproduction. There are significant differences in the average number of insects caught in the container and the three colors used in this study where it is noted that the yellow color most attractive followed by white and the color red color sticky traps. Statistical analysis showed that there were significant differences in the numerical density between months, according to the Duncan's test as will as the statistical analysis also showed that there were significant differences in the numerical density between the adhesive traps according to the Duncan's test.

2.3. Average number of the green peach aphid *M. persicae* in the second site.

In the second site the numerical density of green peach aphid, noting that it increased with the progress of the season and the highest average numerical density reached 86.2 adult/plant in the month of May, while the lowest average numerical density reached 22.35 adult/plant in March. The reason for the increase in numerical density with a time of the year it is due to the increase in the branches, the limitation of growth, the higher of the temperature levels that these insects depend on for their feeding, and the continuous rise in temperature is one of the important factors that affect insect reproduction. There are significant differences in the average number of insects caught by the sticky color traps and the three colors used in this study where it is noted that the yellow color most attractive followed by red and then Red and then white. Statistical analysis showed that there were significant differences in the numerical density between months, according to the Duncan's test as will as the statistical analysis also showed that there were significant differences in the numerical density between the adhesive traps according to the Duncan's test this study agree with (Ibramim,2017) that the yellow color most attractive colors of are the green peach aphide *Myzus persicae* Sulzer when comparing the yellow color with the color.

Table1 .The average number of insects for the the *M .persicae* in the first and second site.

Site	Color	Months			Interference	Average
		March	April	May		
The First	Red	12.50 c	28.12 b	83.2 a	41.21 B	45.31
	White	17.23 c	26.34 b	67.1 a	36.84 B	
	Yellow	24.12 b	65.91 a	85.42 a	57.86 A	
Average		17.93 C	39.85 B	78.57 A	45.31 B	
The Second	Red	22.35c	37.14 b	86.25 a	48.11 B	45.31
	White	23.24 c	34.18 b	77.54 a	44.8 B	
	Yellow	34.76 b	68.11 a	87.38 a	63.41 A	
Average		26.77 C	46.47 B	83.70 A	52.31 B	

*Similar letters in one row mean no significant differences.

*The large similar letters in the one column indicated no significant differences.

3.3 The effect of insecticides on the *M .persicae* sulzer after 24 h treatment.

All pesticides used caused the mortality rate of the *M .persicae* Sulzer after 24 hours of treatment, where acetamide recorded the highest mortality rate of 92.3%, while the insecticides thiamethoxam, imidacloprid recorded the mortality rate of 86.65%, 55.52%, respectively, after 24 hours of treatment. The results showed the effect of cold water extracts on mortality the *M .persicae* Sulzer after 24 hours, where the killing rate was 67.42% for the *A .indica* while the mortality rate was 78.59% for the castor plant *R.communis* figure (1). Statistical analysis showed that there were significant differences between the treatments, as the acetamide was more effective than the rest of the pesticides after 24 hours of treatment because of the ability of the insecticides to dissolve in water, imidacloprid was the least affected due to its low solubility in the water.

Fig 1. The effect of pesticides on the *M .persicae* Sulzer after 24 h treatment

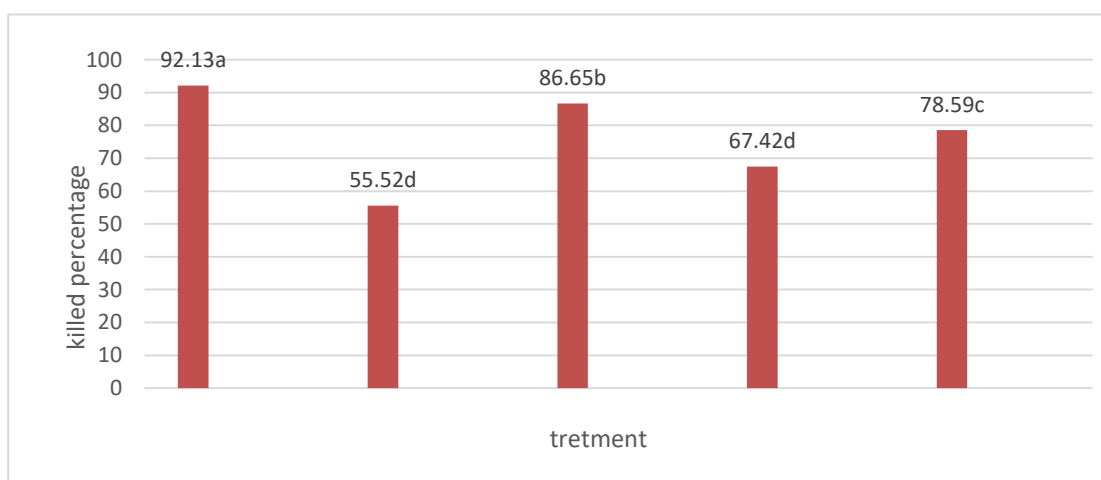


Fig 1. The effect of insecticides on the *M .persicae* Sulzer after 24 h treatment

All pesticides used cause the mortality rate of the *M .persicae* Sulzer after 72 h of treatment, where acetamide recorded the highest mortality rate of 87.1%, while insecticides

thiamethoxam, imidacloprid recorded a mortality rate of 71.3%, 49.2%, respectively, after 72 of treatment. The results showed the effect of cold water extracts on mortality the of *M .persicae* Sulzer after 72 , where the mortality rate was 45.23% for the *A .indica*, while the mortality rate was 58.46% for the castor plant *R .communis*, it appears that the mortality rates increase with increasing on the duration of treatment on one hand and with increasing concentrations used, on the other hand, Statistical analysis showed that there were significant differences between the treatments, as the acetampride was more effective than the rest of the pesticides after 24 h of treatment because of the ability of the pesticide to dissolve in water, while the amide clonidine was the least affected due to its low solubility in the water (Al-Jabri,1984) , and is distributed in all parts of the plant it as a spray (Abboud, 2018).

These results agree with (Van toor *et al.*,2016) that acetampride had asignificant effect on green peach aphids *M .persicae*. The results also showed that the effect of the pesticide decreased after 48 h of treatment .These results agree with (Wang and Zeng, 2017) that amidclopride had effect on green peach aphids *M .persicae*. These results agree with (Nadeem *et al.*,2018) concluding that acetampride, amidacloprid showed different mortality rates of on green peach aphide *M .persicae*. The results indicated that there was asignificant effect of the time in increasing or decreasing the mortality rate, as the mortality rate was high after 24 h and decreased after 72 h of treatment, and these results agree with (Amjad *et al.*,2016) that the time factor has an impact on the mortality rate.

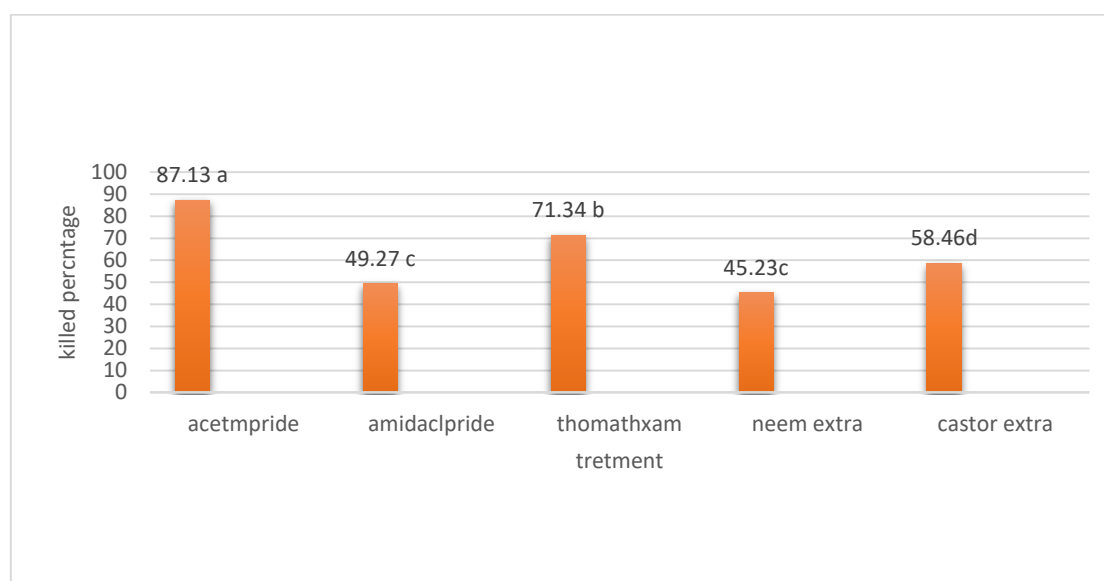


Figure 2. The effect of on the insecticides *M .persicae* Sulzer after 72h treatment .

CONCLUSIONS

The study demonstrated the efficiency of the aqueous extracts of *A .indica* and *R .communis* seeds in controlling the green peach aphids *M .persicae* on tomato plant *S. lycopersicum* compared to the chemical insecticides (Acetampride (ACelan 20%) SL, Imidacloprid (Confidor 20% SL), Tiamethoxam (Actara 25 WG) that also showed their efficiency in the control. Therefore, the aqueous extracts of *A .indica* and *R .communis* seeds can be used in controlling green peach aphids *M .persicae*.

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تقييم كفاءة المصائد اللونية وبعض المبيدات في الكثافة العددية لحشرة من الخوخ الأخضر *Myzus persicae* Sulzer على نبات الطماطة.

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الخلاصة:

تهدف هذه الدراسة إلى دراسة الكثافة العددية للمن الأخضر *Myzus persicae* Sulzer (Phididae:Hemiptera) ومقارنة كفاءة المبيدات الكيميائية، Acetampride (ACelan 20% SL), Imidacloprid (Confidor 20% SL), Tiamethoxam (Actara 25 WG) والمستخلص المائي البارد لبذور *Azadirachta indica* و *Ricinus communis* في السيطرة على البالغات. أجريت الدراسة في مدينة الإسحافي بمحافظة صلاح الدين لموقعين تشتهر بزراعة الطماطة *Solanum lycopersicum* خلال الموسم الزراعي 2020 أعلى معدل تم اصطيادها خلال شهر مايس بلغ 85.42 حشرة بالغة/ نبات بينما بلغ أدنى معدل حشرات 12.50 بالغة / نبات خلال شهر مارس في الموقع الأول بينما بلغ أعلى معدل للحشرات التي تم اصطيادها خلال شهر مايو 86.21 حشرة بالغة / نبات. أقل معدل كان 22.35 بالغة / نبات خلال شهر آذار في الموقع الثاني هذه الدراسة تبين أن اللون الأصفر أكثر جاذبية من الأبيض والأحمر ويظهر أن اللون الأحمر أقل جاذبية. تسببت أعلى نسبة قتل بلغت 92.3%، لمبيد Acetmpride بينما سجلت المبيدات thiomethoxam، imidacloprid معدل قتل بلغ 85.65% و 55.52% على التوالي بعد 24 ساعة من المعاملة. أظهرت النتائج تأثير مستخلصات الماء البارد أعلى قتل للمن الأخضر *M. persicae* sulzer بعد 24 ساعة، حيث بلغ 67.42% لبذور *Azadirachta indica* بينما كان معدل القتل 78.59% لبذور *Ricinus communis* بعد 24 ساعة من المعاملة. سجل الأسيتامبرايد أعلى معدل قتل بلغ 87.1% بعد 72 ساعة من المعاملة، بينما سجلت مبيدات الآفات ثيوميثوكسام، واميدالكلوبريد معدل قتل 71.3%، 49.2% على التوالي بعد 72 ساعة من المعاملة. أظهرت النتائج تأثير مستخلصات الماء البارد على قتل نبات *M. persicae* Sulzer بعد 72 ساعة، حيث كان معدل القتل 45.23% لمستخلص المياه الباردة من النيم *A. indica*، بينما كان معدل القتل 58.46% لمستخلص المياه الباردة لبذور *R. communis* بعد 72 ساعة من المعاملة.

Keywords: *Myzus persicae*, *Azadirachta indica*, *Ricinus communis*. Thiamethoxam, Acetmprid.