

## **CONTROL THE GREEN PEACH APHID, *Myzus persicae* (SULZER) INFESTING CHRYSANTHEMUM PLANTS UNDER GREENHOUSE**

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### **ABSTRACT**

Insecticides; Malathion, Vertimek, Chloropyrifos, Deltanete, Ekatim and Bifenthrin and two oils; Jojoba oil and Royal-oil at the recommended rates of application were evaluated for controlling the green peach aphid, *Myzus persicae* (Sulzer) infesting *Chrysanthemum indicum* L. cv. White wonder growing in pots under plastic greenhouse conditions in 2012 and 2013. Treatments were applied 2 times in 2012 and 3 times in 2013 seasons to induce a perfect control of the aphids and protect the plants for longer periods. Vertimek was the most effective insecticide, recording the highest reduction percentages in 2012 after 35 days and in 2013 after 41 days post-initial application (98.71 and 97.7%, respectively). In 2012, Jojoba oil was the least tested aphicides recording reduction percentages 91.5% after 35 days of application while in 2013 Royal oil was the least one representing with reduction percentages 90.1% after 41 days. All compounds were differed significantly than control and not exhibited any phytotoxicity on leaves and flowering blooms.

### **INTRODUCTION**

Aphids have become increasingly important pests in greenhouse ornamental crops during the last few years. As aphids feed, honeydew is extracted and promoting the growth of black sooty mold, which reduces photosynthesis and aesthetic value of the crop. Feeding on young foliage can cause serious leaf distortion and prevention of growth. Aphids are also known to transmit several plant viruses making it imperative to control population (Dik *et al.*, 2004).

The green peach aphid, *Myzus persicae* (Sulzer) is one of ten economically important pests attacking chrysanthemum plants under greenhouse conditions. Aphid population can cause several damage and reduced flower quality. Effective control of these pests has proven to be extremely difficult, so the infested plants could reach to the consumers (Raymond, 2003).

The purpose of this work was to evaluate the efficacy of several conventional aphicides for controlling the green peach aphid.

### **MATERIALS AND METHODS**

Monitoring studies of the green peach aphid, *Myzus persicae* (Sulzer) on the chrysanthemum ornamental plants, *Chrysanthemum indicum* L. cv. White wonder were conducted in a private plastic greenhouse 7.5 X 20.6 m at Giza Governorate. Two-efficacy tests were carried out in 2012 and 2013 using young infested plants growing in 14 cm diameter plastic pots with a soil

mixture of 3 parts peatmoss and 1 part sand on raised benches (Poe, 1970). Treatments were applied to 3 plants in one pot and replicated in 10 pots.

The aphicides used and their rates of application per feddan; Malathion 57% EC at 1 Liter, Vertimek 1.8% EC at 0.185 liter, Chloropyrifos 60% EC at 0.750 liter, Deltanete 40% EC at 0.4 Liter, Ekatin 25% at 0.5 liter, Bifenthrin 10% EC at 0.2 liter, Jojoba oil 1.5% EC at 1.5 liter and Royal oil 1.5% EC at 1.5 liter. Treatments were arranged in a randomized block design.

Sample size was a number of alive aphids found on one pot. All treatments were applied first on March 20, when aphids had begun to colonize the plants (Hamlen, 1977). In the first season 2012, the second application was given after 14 days. In 2013, we added third application after 28 days from the first one to develop the experiment. Counts of aphid were recorded at first immediately before treatment and 1, 7, 14, 21, 28 and 35 days after treatment. In the second season added, record at 41 days after treatment was added.

An ordinary hand sprayer of 20 liters capacity with a bent down Nozzle was used. Normal agricultural practices for greenhouse chrysanthemum (fertilization, irrigation, light intensity pinching, photoperiod and temperature) were carried out regularly (Raymond, 2003).

The data was subjected to analysis of variance (ANOVA) and the means were compared by L.S.D. test at 0.05 and 0.01 levels (Stell & Torrie, 1980). The reduction in population density of aphids due to insecticidal treatment was calculated according to equation of Henderson and Tilton (1955).

## **RESULTS AND DISCUSSION**

In 2012, data in Table (1) show the effectiveness of experimented aphicides on population density and reduction percentages of the green peach aphid, *Myzus persicae* (Sulzer) infesting chrysanthemum ornamental plants, *Chrysanthemum indicum* L. cv. White wonder under greenhouse conditions.

The first spray of Malathion, Vertimek, Chloropyrifos, Deltanete, Ekatin and Bifenthrin insecticides (in 2012) effectively reduced populations of *M. persicae* after 1 day post-treatment to 0.8, 0.0, 0.0, 0.0, 5.3 and 6.3 respectively, whereas reduction percentages were 98.9, 100, 100, 100, 92 and 90%, respectively. The oils (Jojoba and Royal) reduced the population to 12.5 and 13.5, respectively. The corresponding reduction percentages were 80.3 and 81.0%, respectively.

The population suppression was continued for all treatments after the second application post 14 days from the first application.

With regard to the mean number of aphids at 35 days post first treatment, the compounds could be arranged in the following ascending order: Vertimek, Chloropyrifos, Malathion, Deltanete, Bifenthrin, Royal oil, Ekatin and Jojoba oil the corresponding values were 2.5, 4.8, 5.7, 8.0, 8.8, 10.4, 10.5 and 15.8 and the corresponding reduction percentages were 98.7, 97.5, 97.2, 96.1, 95.2, 94.8, 94.7 and 91.5, respectively.



From the above-mentioned data, Vertimek proved itself to be the most effective aphicides and Jojoba oil was the least one. All compounds recorded significant differences between them and control.

No phytotoxicity was observed for any of the tested compounds on leaves or on flowering blooms.

Bethke *et al.* (1989) and Sharma *et al.* (2000) found that, triazonphos, deltamethrin, malathion, imidacloprid, endosulfan, chloropyrifos, nicotine sulfate, permethrin and bifenthrin were generally effective against *M. persicae* on chrysanthemum in greenhouse. The recommended chemicals for controlling aphids infesting chrysanthemum in the greenhouses are organophosphate, carbamate, pyrethroids, chlorinated hydrocarbon, botanical soap and oils and others (Smith, 2000).

The work was repeated in 2013 with three sprays, the second one after 14 days and the third after 28 days and another record of aphid population was added after 41 days show the residual effect until the beginning of flowering.

The results of these test was shown in Table (2). A good control of *M. persicae* lasting about 6 weeks was obtained with three applications. The tested aphicides on the base of mean numbers of aphids after 41 days post-initial application could be arranged in a ascending order as follows: Vertimek, Malathion, Chloropyrifos, Bifenthrin, Jojoba oil, Ekatina, Deltanete and Royal oil and the corresponding values were 6, 7, 11, 13.5, 14.8, 23, 24 and 25.3, respectively. The percentages of reduction were 97.7, 97.0, 95.0, 94.0, 93.8, 91.0, 90.4 and 90.1, respectively. From these results Vertimek still the most effective insecticide while Royal oil was the least one. (Smith, 2000) said that recommended dose of the synthetic pyrethroids decamethrin, which it was effective against aphides on chrysanthemum in the greenhouse, which were low enough not to cause residues hazardous to mammals.

The conclusion of these two testes was collected in the Fig. (1). It could be concluded that the percentages of general effect of the tested insecticides which treated *M. persicae*. In the two seasons 2012 and 2013, which show that the aphicides could be arranged in 2012 in ascending order according to general effect as follow : Vertimek, Malathion, Chloropyrifos, Deltanete, Ekatina, Bifenthrin, Royal oil and Jojoba oil which values were ( 98.18%, 97.56%, 97.55%, 97.26%, 92.73%, 91.44%, 87.42% and 85.41%), respectively. In 2013, the aphicides could be arranged in ascending order according to general effect as follow: Vertimek, Malathion, Ekatina, Chloropyrifos, Bifenthrin, Deltanete, Jojoba oil and Royal oil. Which values were (96.55%, 96.10%, 93.19%, 90.97%, 89.59%, 88.95%, 88.0% and 87.74%), respectively. Vertimek was the most efficient insecticides (98.18%) and Jojoba oil was the least effective (85.41%) in 2012, and also Vertimek was the most efficient insecticides (96.55%) in 2013 while Royal oil was the least effective one (87.74%), Webb and Smith (1973) suggested that, dichlorvos and sulfotep were effective against *Myzus persicae* (Sulzer) on six cultivators of chrysanthemum.

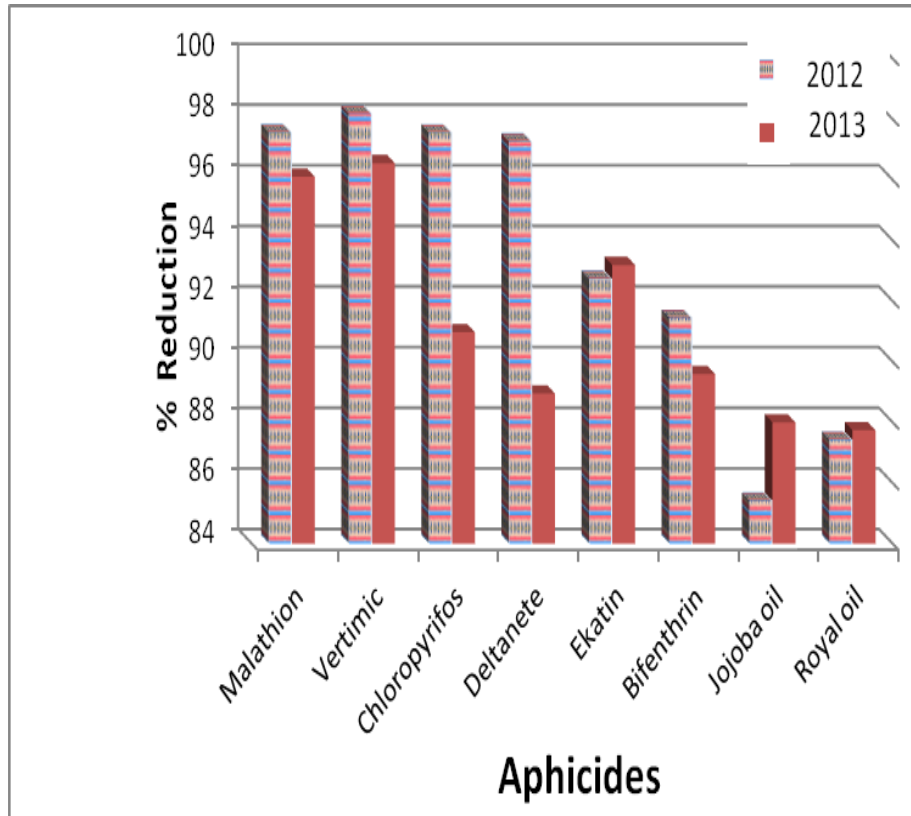


Fig. (1): Reduction percentage of the green peach aphid, *Myzus persicae* ( Sulzer ) infesting Chrysanthemum as influenced by the tested pesticides during 2012 and 2013 according to general effect .



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**مكافحة من الخوخ الأخضر علي نبات الزينة الكريزانتيمم داخل الصوب الزراعية**  
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تم تقييم بعض المبيدات الحشرية الموصي بها (الملاثيون والفيرتيميك و الكلوروبيروفوس والدلتانات والأيكاتين والبيفنثرين وكذلك بعض الزيوت مثل زيت الجوجوبا وزيت رويال علي حشرة من الخوخ الأخضر وذلك علي نبات الزينة الكريزانتيمم. أجريت التجربة داخل صوبة بلاستيكية لمدة عامين ٢٠١٢، ٢٠١٣ وتم رش المبيدات مرتين في السنة الأولى وثلاث مرات في السنة الثانية. وذلك للحصول علي نتائج أكثر فعالية ولتستمر النباتات بدون حشرات أطول مدة حتي تبدأ في الإزهار. وأظهرت النتائج أن جميع المبيدات والزيوت تختلف معنويا عن المقارنة وكانت أكثر المبيدات فعالية هو مبيد الفيرتيميك في عامي الدراسة. كما اظهرت الدراسة أن الزيوت لها تأثير فعال في مكافحة حشرة المن ولم يظهر للمركبات أي تأثير سام علي النباتات من حيث شكل ولون الأوراق وعدد الأزهار وشكلها وهما الجزء الإقتصادي في نبات الكريزانتيمم.





**Table (1): Numbers of aphids/plant and reduction percentages of the green peach aphid, *Myzus persicae* (Sulzer) infesting chrysanthemum as influenced by the tested pesticides (season 2012).**

Compound	Rate of application	No. of aphids /plant (pre-treatment)	Post-treatment periods (in days)						Mean of residual effect%	General effect%
			1 (initial effect%)	7	14	21	28	35		
Malathion	1 Lit/feddان	43.3	(0.8) 98.9	(0.0) 100	(15.0) 86.0	(0.0) 100	(0.1) 97.9	(5.7) 97.2	96.22	97.56
Vertimek	0.185 lit/feddان	42.8	(0.0) 100	(0.1) 99.8	(18.0) 83.4	(0.0) 100	(0.2) 99.9	(2.5) 98.7	96.36	98.18
Chloropyrifos	0.750 lit/feddان	41.8	(0.0) 100	(2.0) 98.0	(2.0) 81.1	(0.0) 100	(0.2) 99.9	(4.8) 97.5	95.30	97.55
Deltanete	0.4 lit/feddان	43.8	(0.0) 100	(5.0) 95.0	(23.5) 79.0	(2.2) 98.5	(5.5) 96.0	(8.0) 96.1	96.52	97.26
Ekatın	0.5 lit/feddان	42.7	(5.3) 92.0	(8.5) 91.0	(12.4) 89.0	(2.5) 98.0	(8.0) 94.6	(10.5) 94.7	93.46	92.73
Bifenthrin	0.2 lit/feddان	39.1	(6.3) 90.0	(3.8) 95.5	(20.5) 79.0	(2.4) 98.0	(4.5) 96.7	(8.8) 95.2	92.88	91.44
Jojoba oil	1.5 lit/feddان	39.5	(12.5) 80.3	(8.3) 90.3	(22.8) 77.0	(4.5) 96.6	(3.8) 97.2	(15.8) 91.5	90.52	85.41
Royal oil	1.5 lit/feddان	43.2	(13.5) 81.0	(8.5) 91.0	(10.6) 90.3	(5.6) 96.1	(4.5) 97.0	(10.4) 94.8	93.82	87.42
Control	-	40.4	65.0	87.9	102.4	135	140.4	188	119.8	-

LSD<sub>0.05</sub> Insecticides : 5.73  
LSD<sub>0.01</sub> Insecticides : 8.23

LSD<sub>0.05</sub> Days : 4.63  
LSD<sub>0.01</sub> Days : 7.26

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Table (2): Numbers of aphids/plant and reduction percentages of the green peach aphid, *Myzus persicae* (Sulzer) infesting chrysanthemum as influenced by the tested pesticides (season 2013).

Compound	Rate of application	No. of aphids /plant (pre-treatment)	Post-treatment periods (in days)							Mean of residual effect%	General effect%
			1 (initial effect%)	7	14	21	28	35	41		
Malathion	1 Lit/feddan	68.0	(3.2) 97.0	(5.0) 96.8	(20.0) 89.0	(1.0) 99.4	(19.0) 89.0	(0.0) 100	(7.0) 97.0	95.20	96.10
Vertimek	0.185 lit/feddan	69.5	(0.0) 100	(2.0) 87.4	(18.5) 89.6	(1.0) 99.0	(23.0) 86.6	(4.0) 98.3	(6.0) 97.7	93.10	96.55
Chloropyrifos	0.750 lit/feddan	58.5	(1.0) 88.0	(3.5) 97.4	(17.8) 87.5	(1.0) 99.3	(22.5) 84.4	(0.0) 100	(11.0) 95.0	93.93	90.97
Deltanete	0.4 lit/feddan	67.0	(0.0) 100	(6.8) 96.0	(13.5) 92.0	(0.0) 100	(14.3) 91.0	(0.0) 100	(24.0) 90.4	94.90	88.95
Ekatin	0.5 lit/feddan	66.0	(6.8) 92.5	(9.8) 93.5	(16.5) 90.3	(0.0) 100	(18.5) 89.0	(1.0) 99.5	(23.0) 91.0	93.88	93.19
Bifenthrin	0.2 lit/feddan	55.8	(10.0) 87.0	(4.6) 96.0	(25.0) 83.0	(2.5) 98.2	(21.0) 84.7	(5.2) 97.2	(13.5) 94.0	92.18	89.59
Jojoba oil	1.5 lit/feddan	64.0	(14.5) 83.5	(9.8) 93.0	(28.0) 83.0	(3.9) 97.7	(16.8) 89.4	(3.8) 98.2	(14.8) 93.8	92.51	88.00
Royal oil	1.5 lit/feddan	68.5	(15.5) 83.0	(10.0) 94.0	(22.5) 87.2	(4.3) 98.0	(18.0) 89.3	(8.5) 96.3	(25.3) 90.1	92.48	87.74
Control	-	65.0	89.0	149	167	165	160	215	243	169.7	-

LSD<sub>0.05</sub> Insecticides : 5.31

LSD<sub>0.01</sub> Insecticides : 7.63

LSD<sub>0.05</sub> Days : 3.77

LSD<sub>0.01</sub> Days : 5.71