# POPULATION DYNAMICS AND CONTROL OF CERTAIN PESTS INFESTING GREEN BEAN (*PHASEOLUS VULGARIS*) AT QALUBIYA GOVERNORATE, EGYPT

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***Abstract***

This investigation was carried out at Qalubiya Governorate during two successive seasons 2011 & 2012 to study population dynamics of *Bemisia tabaci* (Genn.), *Liriomyza trifolii* (Burg.) and *Tetrenchys urticae* (Koch) on Green bean (*Phaseolus vulgaris*), and to evaluate the efficiency of five control agents (Agromec gold 1.8 EC, Actellic 50% EC, Achook 0.15, KZ OIL 95% E.C and KZ OIL + Match) when the population densities of these pest were high. The seasonal abundance of *B. tabaci* and *L. trifolii* were higher during second season 2012 than that recorded during the first season 2011 with mean number of 262.7 and 247.0 / 10 leaves and 196 and 159 larvae / 10 leaves, respectively. The mean number of *T. urticae* showed that the population density in the first season was higher than second season with mean number of 96.4 and 65.2 eggs/ 10 leaves and 95.4 and 65.9 movable stage), respectively. On the other hand *B. tabaci*, *L. trifolii* and *T. urticae* had two peaks during this period. Minimum and Maximum temperatures were showed significant negative effects on *B. tabaci* (egg and nymph) during two seasons. The relative humidity had only significant positive effect on *L. trifolii* and movable stages of *T. urticae* at the second season. Minimum and Maximum temperature had significant negative effects on egg of *T. urticae* at the second season only, The most efficient control agents after general mean of 14 days of spraying was KZ OIL + Match the mortality percentages were 78.7, 81.08 and 81.80% nymph of *B. tabaci*, larvae *L. trifolii* and movable stages *T. urticae*, respectively. on the other hand, the least potent were Agromec gold 1.8 EC on nymph *B. tabaci* 50.85%, Actellic 50%EC on larvae *L. trifolii* 60.13% and Achook 0.15 on movable stages *T. urticae* 65.12%.

**Key Words:** Population fluctuations, *Bemisia tabaci* (Genn.), *Liriomyza trifolii* (Burg), *Tetranychus urticae* (Koch), peaks, Green bean (*Phaseolus vulgaris*) L., Control agents, Minimum temperature, Maximum temperature, Relative humidity.

## INTRODUCTION

Green bean (*Phaseolus vulgaris*) is one of the most popular vegetable crops in Egypt which cultivated in more than 60,000 feddan for local consumption the export purposes to West Europe (M.A.G.L.R., 2011). Egypt is considered to be the first among the countries which cultivate it. Green bean is a high nutritive food containing 6.2% protein, 0.2% fat and 63% carbohydrate with a moisture content of about 90%

(http://world-population.net/food/ar/2170). In addition to the mature dry seed, fresh pods are often consumed as vegetable and the rest of the plants used as animal fodder. The green bean *Phaseolus vulgaris* L. is liable to be attacked by several pests. Many insects belonging to the different orders, Lepidoptera, Diptera, Hemiptera, Homoptera and Thysanura as well as mit pests Tetranychidae attack green bean (Awadalla *et al*., 1991, Berlinger, 1986, Schuster *et al*., 1996, Cohen and Berlinger, 1986, Schuster and Everett, 1983, Parrella, 1987, Abd El-Gawwad, 2008, Parrella *et al*., 1985 and Saleh, 2011).

This study aimed to evaluate the population fluctuation of certain pests infesting green bean (*Phaseolus vulgaris*)., number and duration of seasonal field generations, the combined effects of principle climatic factors on pests and the efficiency of control agents on green bean pests.

## MATERIALS AND METHODS

Experiments were conducted in the experimental Research Station, Qaha, Qalubiya governorate, in two successive autumn seasons 2011 and 2012. The variety "Bronco" green bean (*Phaseolus vulgaris*), was sown in 15$^{th}$ of September and left until 5$^{th}$ of december. An area of about 175 m² approximately dividend into 4 replicates to study population dynamics of these pests. Inspection was started 18 days after sowing. Sample of 10 leaves/ replicate were collected randomly at early morning each weekly untill the harvest. Numbers of insect stages and egg & movable stages of spider mite were counted kept in paper bag and transferred to the laboratory to examine and count the number of each investigated pest. The total numbers were registered and the mean were calculated number and duration of seasonal field generations of different pests on green bean were also calculated. To study the effect of Maximum temperature, Minimum temp. and Mean relative humidity (R.H %) on population dynamics of these pests, the simple correlation (r) and the partial regression (b) were calculated between each of the above mentioned factors (Xs) and the weekly mean numbers of these pests.

To study the efficacy of the tested insecticides on the population of pests infesting green bean plants, the area of this experiment was about 1200 m², divided into 18 plots (each treatment replicated 3 times) for 5 insecticides (Table 1).Treatments of green bean var. Bronco, arranged in a randomized complete block design. A Knapsack sprayer (10 litter) was used, and filled with that prepared concentration just before each treatment. Spraying started when the infestation reached more than 5 % in the plant leaves, Green bean plants was treated on 10$^{th}$

October. Inspection of plants was carried out before spraying (zero time) and after 1, 3, 5, 7, 10 and 14 days after application. The mortality percentages were calculated according to the equation of Henderson and Tilton (1955).

Table 1. Insecticides used against pests on green bean plants at Qaha - Qalubiya governorate.

| Trade Name | Common Name | Rate / L Water |
|---|---|---|
| Agromec gold 1.8 EC | Abamectin | 30 cm³/100L |
| Actellic 50% EC | Pirimiphos methyl | 350 cm³/ 100L |
| Achook 0.15 | Azadirchtin | 750 cm³/ F |
| KZ OIL 95% E.C | crude oil E.C | 1.5 L /100L |
| KZ OIL + Match | crude oil E.C + Lufenuron | 1.5 L/100L+160 cm³/ F |

## RESULTS AND DISCUSSION

**1. Population fluctuations of certain pests infesting green bean (*Phaseations vulgaris* L.)**.

**1.1*. Bemisia tabaci***

Data in Table 2, 3 revealed that the activity period of *B. tabaci* egg on autumn plantation during first season was expressed by two peaks, the lower one was 97 egg/ 10 leaves on 17th, October and the higher peak was 162 egg /10 leaves on 28th, November. In the second season, two peaks also were recorded. The lower peak was 66 egg /10 leaves on 24th, October and the higher one was 107 egg /10 leaves on 28th, November. The activity period of *B. tabaci* nymphs during first season was expressed by two peaks on 17th, October and 21st, November (182 and 191 nymph /10 leaves), respectively. The same trend was obtained during second season, the higher peak was 312 nymph /10 leaves on 28th, November and the lowest one was 213 nymph /10 leaves on 24th, October. In general *B. tabaci* had two generation during this period on green bean plant.

**1.2. *Liriomyza trifolii***

Data in Table 2, 3 revealed that the population of *L. trifolii* was higher during the second season than the first season, with mean number of 196 and 159 larvae / 10 leaves, respectively. In the first season, the population density recorded two peaks on 17th, October and the 14t November with mean number of 232 and 172 larvae / 10 leaves, respectively. In the second season, the larval population density of *L. trifolii* had also two peaks, the 1st peak on the 2nd week of October (256 larvae/ 10 leaves) and the second one was 270 larvae/ 10 leaves on 1st week of November.

**1.3. Tetrenchys urticae**

Data in Table 2, 3 revealed that the activity period of *T. urticae* eggs on autumn plantation during first season had two peaks, the 1st peak on 3rd, October (77 eggs/ 10 leaves) and the 2nd peak on 21st, November (392 egg /10 leaves). In the second season, the population recorded also two peaks. The lower pea 98 egg /10 leaves on 7th, November and the higher peak had 113 egg /10 leaves on 5th, December. Concerning the activity period of *T. urticae* movable stage, the first season had two peaks on 3rd, October (206 nymph /10 leaves) and (211 nymph /10 leaves) on 5th, December. The same trend was obtained during second season, the lower peak had 111 individuals /10 leaves on 24th, October and the higher one was 183 nymph /10 leaves on 28th, November.

These results are in agreement with those obtained by EI-Sayed *et al.* (1991) who indicated that bean leaves showed high rate of infestation with *B. tabaci* immature stages in all plantations (early summer, summer and winter). They also mentioned that periods of high infestation rates were in August and September for summer plantation, October and November for winter plantation and July and August for the early summer plantation. Also El-Khayat *et al.* (1994) estimated the relative population density of *B. tabaci* stages on leaves of summer and winter vegetable crops at two locations in Qalubiya Governorate (Moshtohor and, El-Kanater El-Khaireia). In winter crops the heaviest infestation levels were detected during November, followed by December, then the rates of infestation dropped sharply during January and February, due mainly to the sharp decrease in temperature. Concerning the whole average of infestation rate, it appeared much higher on leaves of winter crops than summer ones.in addition, Abd EI-Gawwad (2004) showed that the population density of *T. urticae* was the main Tetranychidae mite infesting common bean leaves. The first appearance of this mite occurred at the first count during September. The population increased until reaching its peak during the end of October or during November. Shalaby (2004) indicated that the total *L. trifolii* larvae population reached its maximum on November 28th during the first season 2002 on common bean plants. The total larvae population achieved its maximum on November 20th during the second season 2003. The numbers of larvae and mines of *L. trifolii* were higher in the first season than the second one, however the population abundance followed the same trend at both seasons indicating that lower part of common bean plants showed higher infestation rate of *Liriomyza*, followed by the middle and the upper part, which harbored the least population level. Again, Abd El-Gawwad (2008) indicated that the mean number of *L. trifolii* (larval and pupal stages) population on common bean plants reached its maximum on 1st week of April during

the two seasons (2005 and 2006) in the summer plantation, while during nili plantation in 2005/2006 season, it reached its maximum level on 4th week of October and during season 2006/2007 the maximum level occurred on 2nd week of December.

**II- The combined effect of some weather factors:**

**2. 1 *Bemisia tabaci***

Statistical analysis for the effects of the three selected weather factors on the population dynamics of *B. tabaci* eggs and nymphs during both seasons at Qalubiya Governorate are given in Table (4).These results revealed significant negative effects of minimum and maximum temperature on the seasonal fluctuations of *B. tabaci* eggs throughout both season where "r" values were -0.69 and -0.66 during 2011, and were -0.82 and -0.86 during 2012 for the two factors, respectively. While the mean percentages of relative humidity had insignificant positive effect in both seasons where "r" values = 0.47 and 0.47, respectively. The combined effect (E.V) of these ecological factors on *B. tabaci* eggs showed that these factors were responsible as a group for 58 % and 78 % effects on the population dynamics of *B. tabaci* eggs throughout both seasons, respectively.

Also the effect of these factors both minimum and maximum temperature showed significant negative effects on the seasonal fluctuations of *B. tabaci* nymphs throughout both seasons where "r" values were -0.61 and -0.61 during 2011, also "r" values were -0.71 and -0.77 during 2012 for the two factors, respectively. While the mean percentages of relative humidity had insignificant positive effect in both season where "r" values= 0.38 and 0.33, respectively. The percentage of the explained variances (E.V) for three selected ecological factors during both seasons were 49 % and 74 % effects on the population dynamics of *B. tabaci* nymphs for the both seasons, respectively.

**2.2. *Liriomyza trifolii***

Statistical analysis for the effects of the three selected weather factors on the population dynamics of *L. trifolii* during 2011 and 2012 seasons were given in Table (4). These results revealed that minimum and maximum temperature had insignificant positive effects on seasonal fluctuation of larvae during first season 2011 where "r" values were 0.13 and 0.21, respectively. While in second season the minimum temperature had insignificant positive effects ("r" value was 0.04) but maximum temperature had insignificant negative effects ("r" value was -0.28). The mean percentage of relative humidity had insignificant negative effects where, "r" value was -0.31 in first season but in second season had significant positive effects on seasonal fluctuation of larvae where "r" value was 0.66. The percentage of explained variances (E.V) for the three selected ecological factors during both seasons were 22 % and 51

% effects on the population dynamics of larvae of *L. trifolii* for the both seasons, respectively.

**2.3 *Tetrenchys urticae***

Statistical analysis for the effects of the three selected weather factors on the population dynamics of *T. urticae* during 2011 and 2012 seasons were given in Table (4). These results revealed that minimum, maximum temp. had insignificant negative effects on seasonal fluctuation of *T. urticae* egg where "r" value were -0.51, -0.55 during 2011, but in the second season showed significant negative effects where "r" value were -0.66 and -0.74 for the two factors, respectively. While the mean percentages of relative humidity had insignificant positive effect in both seasons where "r" values = 0.35 and 0.53, respectively. The combined effect (E.V) of these ecological factors on *T. urticae* eggs showed that these factors were responsible as a group for 36 % and 57 % effects on the population dynamics of *T. urticae* eggs throughout both seasons, respectively.

Also the effect of these factors both minimum and maximum temperature showed insignificant negative effects on the seasonal fluctuations of *T. urticae* movable stage in the first season where "r" values were -0.44 and -0.50 during 2011, but in the second season showed insignificant negative effects of minimum temp. Factor ("r" values was -0.50) but maximum temperature had significant negative effect ("r" values was -0.66). While the mean percentages of relative humidity had significant positive effect in first season where "r" values = 0.63 and the second season showed insignificant positive "r" values = 0.43. The percentage of explained variances (E.V) for the three selected ecological factors during the both seasons were 49 % and 52 % effects on the population dynamics of *T. urticae* nymphs for the both seasons, respectively.

These results are in agreement with those obtained by Younes *et al.* (2001) who detectedsignificant negative correlation between the tested weather factors. Saradhi and Patnaik (2004) mentioned that Correlation studies of the serpentine*, L. trifolii* revealed that diurnal temperature variation was negatively correlated. Jesus *et al.* (2009) observed a negative and non significant linear correlation between average temperatures of whitefly number.

**3- The efficiency of control agents on green bean pests:**

3. 1 ***Bemisia tabaci***

Comparing the mean reduction percentages in population of *B. tabaci* nymph after applications of five compounds it is clear that the five control agents can be arranged in descending orders as follows: KZ OIL + Match, Actellic 50%EC, KZ OIL

95% EC, Achook 0.15 and Agromec gold 1.8 EC, with mean reduction of 78.70, 77.83, 71.53, 65.48 and 50.85.for the five agents, respectively. (Table 5)

According to the mean, percentage of reduction in *B. tabaci* counts after treatment, the compounds significantly into could be divided four groups (F. value = 13.39 and L.S.D = 9.19%.

### 3.2. *Liriomyza trifolii*

According to mean percentage of reduction in population of *L. trifolii* larvae, it is clears that the KZ OIL + Match was the most potent one as mean of reduction was 81.08 %followed by KZ OIL 95% EC (73.06%), Achook 0.15 (69.76%), Agromec gold 1.8 EC (69.53%) and the least potent one was Actellic 50%EC (60.13%).was the least potent one. (Table 6)

The tested compounds could be significantly divided into four groups. According to the percentage of reduction in *L. trifolii* larvae (F. value = 7.65 and L.S.D = 8.04%).

### 3.3 *Tetrenchys urticae*

According to the percentage of reduction in *T. urticae* data in Table 7 indicated significant differences between the five compounds where F. value = 10.52 and L.S.D = 8.33%. These compounds could be divided two groups. The first group contained on Agromec gold 1.8 EC, KZ OIL + Match and KZ OIL 95% EC showing highly mortality 86.39, 81.80 and 80.33%, respectively. The second group contained on Actellic 50%EC and Achook 0.15 showing moderate effect 68.39 and 65.12%, respectively. (Table 7)

These results are in agreement with those obtained by Omar and Faris (2000) who found that, Reldan was the most effective one in controlling leaf miner population and resulting in the highest quality and quantity of green yield of *P. vulgaris* followed by vertemic and Neemazal compounds. Soliman *et al.* (2007) indicated that mixture of vertimec and super-misrona mineral oil exhibited the highest reduction (91.4%) followed by vertimec (87.5%), mineral oil (72.9%), on spider mites population. Abbassy *et al.* (2009) mentioned that Super Misrona oil gave 71.73 percent of reduction of infestation against the adult stages of T. urticae.

Table 2. Weekly mean numbers of pests and certain ecological factors on green bean var. Bronco at Qalubiya Governorate during autumn season 2011.

| [RH%] | Temp. | | *T. urticae* | | *L. trifolii* | *B. tabaci* | | Date |
|---|---|---|---|---|---|---|---|---|
| | Min | Max | immature | egg | | nymph | egg | |
| 71.3 | 17.5 | 24.3 | 206 | 77 | 136 | 144 | 27 | 03/10 |
| 72.0 | 15.5 | 23.0 | 19 | 12 | 139 | 149 | 33 | 10/10 |
| 65.9 | 15.8 | 24.3 | 0 | 0 | 232 | 182 | 97 | 17/10 |
| 70.4 | 15.2 | 21.3 | 0 | 0 | 164 | 171 | 40 | 24/10 |
| 76.4 | 13.2 | 19.6 | 37 | 16 | 143 | 177 | 36 | 31/10 |
| 73.6 | 10.8 | 17.6 | 12 | 77 | 135 | 136 | 55 | 07/11 |
| 81.0 | 9.5 | 16.7 | 103 | 199 | 172 | 183 | 112 | 14/11 |
| 76.1 | 10.2 | 15.3 | 177 | 392 | 166 | 191 | 161 | 21/11 |
| 81.6 | 8.6 | 14.3 | 189 | 118 | 129 | 162 | 162 | 28/11 |
| 86.6 | 7.8 | 13.6 | 211 | 73 | 169 | 156 | 96 | 05/12 |
| 754.85 | 124.03 | 190.1 | 954 | 964 | 1585 | 1651 | 819 | Total |
| 75.48 | 12.40 | 19.01 | 95 | 96.4 | 159 | 165.1 | 81.9 | Mean |

Table 3. Weekly mean numbers of pests and certain ecological factors on green bean var. Bronco at Qalubiya Governorate during autumn season 2012.

| [RH%] | Temp. | | *T. urticae* | | *L. trifolii* | B. tabaci | | Date |
|---|---|---|---|---|---|---|---|---|
| | Min | Max | immature | egg | | nymph | egg | |
| 70.71 | 32.51 | 16.47 | 0 | 0 | 150 | 110 | 19 | 03/10 |
| 72.71 | 31.35 | 16.62 | 0 | 0 | 256 | 196 | 33 | 10/10 |
| 72.57 | 31.35 | 17.74 | 0 | 0 | 180 | 189 | 32 | 17/10 |
| 77.86 | 31.28 | 17.92 | 111 | 90 | 180 | 213 | 66 | 24/10 |
| 75.43 | 28.62 | 13.96 | 98 | 88 | 214 | 199 | 53 | 31/10 |
| 86.71 | 28.63 | 17.49 | 50 | 98 | 270 | 127 | 34 | 07/11 |
| 86.00 | 27.65 | 15.30 | 23 | 15 | 178 | 199 | 50 | 14/11 |
| 79.00 | 25.89 | 10.63 | 154 | 109 | 187 | 262 | 81 | 21/11 |
| 85.57 | 23.28 | 11.43 | 183 | 119 | 175 | 312 | 107 | 28/11 |
| 79.57 | 25.34 | 8.93 | 40 | 133 | 173 | 248 | 97 | 05/12 |
| 786.14 | 285.9 | 146.49 | 659 | 652 | 1963 | 2055 | 572 | Total |
| 78.61 | 28.59 | 14.64 | 65.9 | 65.2 | 196 | 205.5 | 57.2 | Mean |

Table 4. Simple correlation and partial regression values of the three main weather factors on some pests and corresponding percentages of explained variance on autumn green bean plants at Qalubiya Governorate during 2011 and 2012 season.

| 2012 | | | | | 2011 | | | | | Variables | Pests stage |
|---|---|---|---|---|---|---|---|---|---|---|---|
| E.V% | Regression coefficient | | Correlation | | E.V% | Regression coefficient | | Correlation | | | |
| | P | b | p | r | | p | b | p | r | | |
| 78% | 0.87 | -0.91 | 0.003 | -0.82 | 58% | 0.02 | -10.47 | 0.02 | -0.69 | Min. temp. | *B.tabaci* ( Egg) |
| | 0.31 | -0.87 | 0001 | -0.86 | | 0.03 | -7.88 | 0.03 | -0.66 | Max. temp. | |
| | 0.70 | -0.94 | 0.16 | 0.47 | | .897 | 0.13 | 0.17 | 0.47 | RH% | |
| 74% | 0.31 | 13.95 | 0.02 | -0.71 | 49% | 0.05 | -11.24 | 0.05 | -0.61 | Min. temp. | *B.tabaci* (Nymph) |
| | 0.07 | -39.60 | 0.008 | -0.77 | | 0.05 | -8.72 | 0.05 | -0.60 | Max. temp. | |
| | 0.13 | -8.94 | 0.35 | 0.33 | | 0.2 | 3.93 | 0.27 | 0.38 | RH% | |
| 51% | 0.94 | -0.41 | 0.89 | 0.04 | 22% | 0.71 | 1.15 | 0.71 | 0.13 | Min. temp. | *liriomyza trafolii* (larva) |
| | 0.73 | 2.71 | 0.4 | -0.28 | | 0.54 | 1.53 | 0.54 | 0.21 | Max. temp. | |
| | 0.22 | 3.01 | 0.03 | 0.66 | | 0.38 | -1.52 | 0.38 | -0.31 | RH% | |
| 57% | 0.61 | -7.91 | 0.03 | -0.66 | 36% | 0.13 | -17.87 | 0.13 | -0.51 | Min. temp. | *Tetrenchys urticae* (Egg) |
| | 0.92 | -2.14 | 0.01 | -0.74 | | 0.09 | -15.48 | 0.09 | -0.55 | Max. temp. | |
| | 0.64 | 2.99 | 0.11 | 0.53 | | 0.31 | 6.90 | 0.31 | 0.35 | RH% | |
| 52% | 0.37 | 18.36 | 0.14 | -0.50 | 49 | 0.19 | -11.82 | 0.19 | -0.44 | Min. temp. | *Tetrenchys urticae* (movable stages) |
| | 0.19 | -4.37 | 0.03 | -0.66 | | 0.13 | -10.70 | 0.13 | -0.50 | Max. temp. | |
| | 0.41 | -6.96 | 0.20 | 0.43 | | 0.04 | 9.47 | 0.04 | 0.63 | RH% | |

Table 5. efficiency of five control-agents against *B. tabaci* nymphs on green bean plants at Qalubiya Governorate on autumn 2012.

| Average % | Residual effect treatments | | | | | Initial Kill | No. larvae Per Treatments | Treatments |
|---|---|---|---|---|---|---|---|---|
| | 14 Days | 10 Days | 7 Days | 5 Days | 3 Days | After 24 hours | | |
| 50.850c | 78.4 | 65.7 | 36.6 | 45.8 | 45.7 | 32.9 | 278 | Agromec gold 1.8 EC |
| 77.833a | 100.0 | 96.0 | 87.7 | 86.3 | 61.7 | 35.3 | 150 | Actellic 50% EC |
| 65.483b | 90.4 | 73.0 | 66.5 | 62.5 | 52.1 | 48.4 | 110 | Achook 0.15 |
| 71.533ab | 93.0 | 88.3 | 76.5 | 67.3 | 56.6 | 47.5 | 90 | KZ OIL 95% E.C |
| 78.700a | 98.6 | 92.8 | 72.4 | 80.0 | 76.3 | 52.1 | 100 | KZ OIL + Match |
| -- | -- | -- | -- | -- | -- | -- | 116 | Control |

F =13.39 ** L.S.D. = 9.19%

Table 6. efficiency of five control-agents against *L. trifolii* larvae on green bean plants at Qalubiya Governorate on autumn 2012.

F = 7.65 ** L.S.D. = 8.04%

| Average % | Residual effect treatments | | | | | Initial Kill | No. larvae Per Treatments | Treatments |
|---|---|---|---|---|---|---|---|---|
| | 14 Days | 10 Days | 7 Days | 5 Days | 3 Days | After 24 hours | | |
| 69.533b | 85.0 | 82.8 | 76.7 | 59.5 | 54.6 | 58.6 | 113 | Agromec gold 1.8 EC |
| 60.133c | 57.6 | 79.2 | 72.9 | 59.2 | 47.7 | 44.2 | 108 | Actellic 50% EC |
| 69.767b | 74.3 | 77.4 | 73.0 | 70.1 | 66.9 | 56.9 | 119 | Achook 0.15 |
| 73.067ab | 93.1 | 90.9 | 83.8 | 67.4 | 55.0 | 48.2 | 99 | KZ OIL 95% E.C |
| 81.083a | 100.0 | 100.0 | 85.7 | 72.4 | 65.2 | 63.2 | 123 | KZ OIL + Match |
| -- | -- | -- | -- | -- | -- | -- | 190 | Control |

Table 7. efficiency of five control-agents against *T. urticae* movable stage on green bean plants at Qalubiya Governorate on autumn 2012.

| Average % | Residual effect treatments | | | | | Initial Kill | No. larvae Per Treatments | Treatments |
|---|---|---|---|---|---|---|---|---|
| | 14 Days | 10 Days | 7 Days | 5 Days | 3 Days | After 24 hours | | |
| 86.392a | 97.5 | 96.5 | 94.2 | 87.8 | 73.1 | 69.3 | 272 | Agromec gold 1.8 EC |
| 68.393b | 86.7 | 89.5 | 68.4 | 62.4 | 51.4 | 51.8 | 260 | Actellic 50% EC |
| 65.123b | 78.9 | 82.4 | 75.3 | 70.9 | 57.6 | 25.6 | 262 | Achook 0.15 |
| 80.326a | 96.8 | 82.8 | 80.5 | 87.7 | 72.8 | 61.4 | 269 | KZ OIL 95% E.C |
| 81.802a | 96.0 | 91.6 | 86.5 | 77.4 | 71.7 | 67.6 | 259 | KZ OIL + Match |
| -- | -- | -- | -- | -- | -- | -- | 250 | control |

F =10.52** L.S.D. = 8.33%

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# ديناميكية التعداد ومكافحة بعض الآفات التى تصيب الفاصوليا (*Phaseolus vulgaris*) فى محافظة القليوبية ، مصر

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أجريت هذة الدراسة فى محافظة القليوبية خلال موسمى ٢٠١١-٢٠١٢) ولذلك لدراسة تقلبات التعداد لكل من الذبابة البيضاء- صانعات الانفاق- العنكبوت الاحمر على الفاصوليا وتم إجراء تجربة حقلية لدراسة تأثير فاعلية خمسة مبيدات اجريميك جولد- اكتيليك- أشوك- زيت معدنى- وخلط زيت معدنى + ماتش و ذلك عندما كانت تعداد هذة الآفات عالى.

أوضحت النتائج ان تعداد ذبابة البيضاء و صانعات الانفاق فى الموسم الثانى ٢٠١٢ اكبر من الموسم الاول ٢٠١١ وذلك بمتوسط تعداد (٢٦٧ – ٢٤٧ / ١٠ ورقات) و (١٩٦ و ١٥٩ يرقة/ ١٠ ورقات) على التوالى، بينما بالنسبة للعنكبوت الاحمر وجد انها كان اعلى تعداد فى الموسم الاول بالنسبة لموسم الثانى وذلك بمتوسط تعداد (٩٦.٤ – ٦٥.٢ بيضة/ ١٠ ورقات) و ( ٩٥.٤ – ٦٥.٩ اكاروس / ١٠ ورقات) على التوالى، وبجانب ذلك سجلت كل من الذبابة البيضاء و صانعات الانفاق و العنكبوت الاحمر قمتين نشاط على مدار الموسم.

اما بالنسبة لتاثير العوامل الجوية درجة الحرارة العظمى و درجة الحرارة الصغرى كانت العلاقة معنوية سالبة وذلك مع الذبابة البيضاء ( بيض- حوريات) خلال الموسمين، اما بالنسبة لمتوسط الرطوبة وجد انها كانت معنوية موجبة مع صانعات الانفاق و الاطوارالمتحركة للعنكبوت الاحمر فى الموسم الثانى فقط اما بالنسبة لدرجة الحرارة العظمى والصغرى وجد انها معنوية سالبة مع بيض العنكبوت الاحمر وذلك فى الموسم الثانى فقط.

وبالنسبة لتقييم كفاءة الخمسة مركبات تحت الدراسة على نبات الفاصوليا كانت اعلى تاثير الرش فى المكافحة بعد متوسط ١٤ يوم هو خلط زيت المعدنى+ ماتش واعطت متوسط نسبة خفض ٧٨.٧ ، ٨١.٠٨، ٨١.٨٠ وذلك بالنسبة لذبابة البيضاء و صانعات الانفاق والاطوار المتحركة للعنكبوت الاحمرعلى التوالى. ووجد ان اقل تاثير كان لمركب اجريميك جولد ٥٠.٨٥ لحويات الذبابة البيضاء، اكتيليك ٦٠.١٣ على صانعات الانفاق، اشوك ٦٥.١٢ على الافراد المتحركة للعنكبوت الاحمر.