

## THE IMPACT OF CHEMICAL AND BIOLOGICAL CONTROL FOR COMMON BEAN PESTS, *TETRANYCHUS URTICAE* & *T. CUCURBITACEARUM*

WAHBA, B.S.

*Plant Protection Research Institute, ARC, Dokki, Giza, Egypt.*

(Manuscript received 1<sup>st</sup> February 2015)

### **Abstract**

Field studies were carried out to determine the effect of two pesticides, Ortus & Kanemite and also two predacious mites released, *Phytoseiulus persimilis* (Athias-Henriot) and *Amblyseius gossypii* (El-Badry) against the phytophagous mites, *Tetranychus urticae* Koch, and *T. cucurbitacearum* (Sayed) which attack common beans, paulista variety in Horticultural Research Station in Al Kanater El-Khairiya, Qualiobeya Governorate throughout 2012 and 2013 seasons. The application of the acaricide, Kanemite shown better than the other, ortus to reduce the population density of the spider mite, *T. urticae*, eggs and mobile stages throughout two seasons, 2012 and 2013 by occurrence higher reduction percent to eggs and mobil stages. This result led to having green pods yield higher for kanemite treatment than ortus treatment in the previous mentioned seasons. The application of acaricides, kanemite and ortus contributed better effect than check to control two species of spider mites. The predators were released by bean leaflets harboring the predator individuals. The predator, *P. persimilis* had a higher effect comparing to the second predator, *A. gossypii*. This is reversed on the yield by occurrence green pods yield higher for the treatment, *P. persimilis* than the other treatment, *A. gossypii* throughout 2012 and 2013 seasons.

The release of *P. persimilis* and *A. gossypii* revealed better effect than the check to the phytophagous mites, *Tetranychus urticae* Koch, and *T. cucurbitacearum* (Sayed).

**Key words:** bean-paulista-acaricides-ortus-kanemite-predator mites-*P. persimilis*-*A. gossypii*-phytophagous mites- *Tetranychus urticae* - *T. cucurbitacearum*.

### **INTRODUCTION**

Bean, *Phaseolus vulgaris* L. is one of the important vegetable legume crops cultivated in Egypt which consume as dry seeds or vegetable pods throughout the local market and exportation. These plants are infested difficult pest to manage on bean. This mite become a major problem because of the excessive use of

pesticides, these kill not only two spotted spider mite, *T. urticae*, but also making environmental pollution. Pesticides use results in the development of strains of that are highly resistant to almost all classes of pesticides. In addition, chemical control of is highly restricted in Egypt because of increasing cancer over pesticides residues on fruits which are consumed fresh without removal of the skin. So we must using it in suitable time and limited doses. Fortunately, the predator mite, *phytoseiulus persimilis* A.-H, is now available for control of on bean in Egypt. Port and Scopes (1981) showed that small numbers of *p. persimilis* could control TSM on strawberries in walk – in plastic tunnels in Southern England. However, it was necessity to reduce over wintering populations of *T. urticae* by introducing predators in Autumn. Cross (1984) showed that introductions of predatory mites in March or early April at rate of one mite per plant were consistently successful. Batlaglia et al (1990) studied the biological control to two spotted spider mite, *T. urticae* by *p. persimilis* on strawberry in green house in Metapontum area of Italy in 1988-1989. Different predator mite species were released by several authors to control this pest on certain plants instead of acaricides as reported by ( Manjunantha et al. 1999, Mallik et al. 1999, Heikal & Fawzy 2003, Abdalla et al. 2003 and Fawzy et al. 2006).

The present study was conducted the effectiveness of releasing predator mites, *Phytoseiulus persimilis* and *Amblyseius gossypii* as biological control and acaricides, Kanemite and Ortus as chemical control to suppress the population of the phytophagous mites, *T. urticae* and *T. cucurbitacearum* on bean.

## MATERIALS AND METHODS

Seeds of bean, Paulista variety were planted on the 1<sup>st</sup> of March in two successive years 2012 and 2013 in the Horticultural Research Station at Kanater El- Khairiya, Qualiobeya Governorate.

An area of about 97.2 m<sup>2</sup> was divided into three replicates for each treatment and each replicate consisted of two lines with 3 m<sup>2</sup> long and 0.6 m wide. Sampling of 10 leaflet per plot were randomly picked and placed directly into paper bags and transferred to the laboratory for examination. The pests and their eggs were recorded after 45 and 50 days of planting for chemical and biocontrol treatments when the foliage of plants became suitable. The applied chemical control treatments (acaricides) were

- 1- Kanemite 15 SC at the rate 100 ml /100 L water.
- 2- Ortus super at the rate 50 cm<sup>3</sup> / 100 L water.

These compounds were applied at low volume sprays at the rate of 100 L. of spray solution per feddan and done once on April 15<sup>th</sup> and 13<sup>th</sup> For two seasons respectively. samples for examination of the spider mites eggs and mobile stages were taken just before acaricide application and after one, three, five, seven, ten and fourteen days from application. Each sample consisted of ten leaflet from each replicate, and thirty leaflet for each treatment. Each leaflet was inspected on their upper and lower surface.

Individuals of the two predators were obtained from their mass rearing on spider mites *T. urticae* Koch on bean plants *Phaseolus vulgaris* (L.) in a laboratory of the Plant Protection Research Institute. The predator individuals were released on April 19<sup>th</sup> and 20<sup>th</sup> for the two seasons respectively when each plant host of 5 – 7 true leaves. The predator release was carried out with bean leaflet harboring the predator 10 – 12 individuals per leaflet. Randomized samples of 10 bean leaflets per replicate were investigated just before the predator release to record the number of movable stages of *T. urticae* and *T. cucurbitacearum* as precount, while post counts were undertaken weekly until the harvest.

Percentage of reduction in mite population for each Acaricides and predators were calculated according to Henderson and Tilton equation (1955)

### **Statistical analysis**

Statistical analysis for ANOVA was carried out by using SAS 9.3.1 portable. Whereas the means were compared through LSD tests, least significant differences at p: 0.05 level.

## **RESULTS AND DISCUSSION**

Table (1&3) shown the application of acaricides, ortus and kanemite In the first year of study, they referred to the reduction percentage which were highly effect after 24 hour on two spotted spider mites, *Tetranychus urticae* and *T. cucurbitacearum*, egg and mobil stages when they infested bean plants, paulista variety compared with control by recording 95.71, 93.94, 99.46 and 99.66% reduction to *T. urticae* and *T. cucurbitacearum*, eggs respectively by the acaricides, Ortus and Kanemite respectively and 98.75, 98.23, 97.91 and 96.81% reduction to mobile stages of the same two species of Acarine resp. by the previous mentioned of two Acaricides respectively. After a period of time the reduction percent decreased gradually to reach after fourteen days 73.20, 72.56, 85.87 and 81.935% reduction to *T. urticae* and *T. cucurbitacearum*, eggs respectively by treatments, Ortus and Kanemite respectively and 80.90, 82.27, 94.34 and 91.32% reduction to *T. urticae* and *T. cucurbitacearum*

and GILSTRAP(1986),they recorded that *P.persimilis* and *Amblyseius californicus* when fed on Tetanychid, *oligonychus pratensis* led to reduce to pest densities to 60% and 28% resp.

Data tabulated in table (7&9) show the same trend of reduction percent by phytoseiid mite, *p.persimilis* to the phytophagous mite, *T.cucurbitacearum*,egg & motel stages and were higher than the other, *A.gossypii* ; whereas, recorded 46.57 and 33.77% reduction to eggs in 2012 and 2013 seasons resp. and 70.68&69.30% reduction to motel stages throughout the same seasons resp. while the reduction percent to *T.cucurbitacearum*,eggs and motil by *A.gossypii* were 17.57 and 33.76% reduction to eggs and 16.83 and 64.73% reduction to motel in the same mentioned seasons resp.

### **The effect on the yield**

Data in table (10) revealed the means of green pod yields resultant from planting bean,paulista variety in the first March and released by two phytoseiid mite, *p.persimilis* and *A.gossypii* throughout 2012-2013 seasons.Treatment, *p.persimilis* recorded the highest weight of green pods 425.00 and 555.00 kg/fed. In two seasons respectively being significantly higher than check in two season seasons resp.

Treatment,*A.gossypii* revealed less weight of green pods 343.33 and 468.33 kg/fed. Being insignificantly lower than the previous treatment and higher the other treatment (check).

Check is the lowest weight and recorded 253.33 and 335.00 kg/fed.of green pods throughout the same seasons resp. being significantly lower than the remaining treatments except for their related to treatment,*A.gossypii* insignificant lower during second season only.

## **CONCLUSION**

The present study aimed to reach suitable control programs for controlling the important sap-sucking pests infesting bean plants(*Tetranychus urticae* Koch, and *T.cucurbitacearum* Sayed) by using chemical and biological control which planting on March,1<sup>st</sup> throughout 2012 and 2013 seasons in Horticultrual Research Station in Al Kanater El- Khairiya, Qualiobeya Governorate. acaricide,Kanemite related to the best application to reduce the population density of the pests and give high yield of green pods compared with control. Also, phytoseiid mite, *p.persimilis* when released on April,19<sup>th</sup> and 20<sup>th</sup> during the previous two seasons demonstrated high effect on populations of the pests and give high yield of green pods.

Table 1. The reduction percent of the two acaricides on the population density of *T.urticae* and *T.Cucurbitacearum* infesting bean plant during 2012.

| inspections  | <i>T.urticae</i> |       |  |          |       |  | <i>T.Cucurbitacearum</i> |       |  |          |       |  |
|--------------|------------------|-------|--|----------|-------|--|--------------------------|-------|--|----------|-------|--|
|              | Ortus            |       |  | Kanemite |       |  | Ortus                    |       |  | Kanemite |       |  |
|              | Egg              | Mob.  |  | Egg      | Mob.  |  | Egg                      | Mob.  |  | Egg      | Mob.  |  |
| After day    | 95.71            | 98.75 |  | 93.94    | 98.23 |  | 99.46                    | 97.91 |  | 99.66    | 96.81 |  |
| After 3 day  | 86.52            | 85.75 |  | 85.99    | 91.33 |  | 99.29                    | 96.62 |  | 99.48    | 91.78 |  |
| After 5 day  | 84.25            | 79.07 |  | 83.20    | 86.63 |  | 94.86                    | 94.55 |  | 94.08    | 90.75 |  |
| After 7 day  | 77.74            | 77.66 |  | 82.52    | 77.47 |  | 92.48                    | 93.49 |  | 89.57    | 90.06 |  |
| After 10 day | 76.38            | 76.63 |  | 76.97    | 72.85 |  | 88.28                    | 92.06 |  | 86.13    | 89.74 |  |
| After 14 day | 73.20            | 67.53 |  | 72.56    | 67.08 |  | 85.87                    | 91.39 |  | 81.93    | 88.80 |  |
| Mean         | 82.30            | 80.90 |  | 82.53    | 82.27 |  | 93.37                    | 94.34 |  | 91.81    | 91.32 |  |
| L.S.D.       | 10.07            | 14.39 |  | 10.07    | 14.39 |  | 8.32                     | 3.49  |  | 8.32     | 3.49  |  |

Table 2. The reduction percent of the two acaricides on the population density of *T.urticae* and *T.Cucurbitacearum* infesting bean plant during 2013 .

| inspections  | <i>T.urticae</i> |       |  |          |       |  | <i>T.Cucurbitacearum</i> |       |  |          |       |  |
|--------------|------------------|-------|--|----------|-------|--|--------------------------|-------|--|----------|-------|--|
|              | Ortus            |       |  | Kanemite |       |  | Ortus                    |       |  | Kanemite |       |  |
|              | Egg              | Mob.  |  | Egg      | Mob.  |  | Egg                      | Mob.  |  | Egg      | Mob.  |  |
| After day    | 97.13            | 95.05 |  | 97.36    | 95.30 |  | 81.55                    | 75.13 |  | 82.70    | 73.54 |  |
| After 3 day  | 90.21            | 93.95 |  | 93.99    | 95.01 |  | 80.33                    | 68.32 |  | 81.90    | 62.55 |  |
| After 5 day  | 89.82            | 92.26 |  | 92.58    | 94.64 |  | 76.92                    | 66.06 |  | 80.67    | 58.54 |  |
| After 7 day  | 86.84            | 91.42 |  | 91.48    | 91.69 |  | 75.60                    | 65.78 |  | 75.22    | 57.35 |  |
| After 10 day | 80.83            | 84.23 |  | 85.69    | 89.32 |  | 71.77                    | 64.25 |  | 64.29    | 56.12 |  |
| After 14 day | 76.07            | 82.84 |  | 75.83    | 82.79 |  | 62.42                    | 63.76 |  | 59.14    | 55.94 |  |
| Mean         | 86.82            | 89.96 |  | 89.49    | 91.46 |  | 74.77                    | 67.22 |  | 73.99    | 60.67 |  |
| L.S.D.       | 9.75             | 6.43  |  | 9.75     | 6.43  |  | 11.09                    | 7.23  |  | 11.09    | 7.23  |  |

Table 3. The effect of the two acaricides on the population density of *T.urticae* and *T.cucurbitacearum* infesting bean plant in 2012

| inspections | <i>T.urticae</i> |      |          |      |         |       | <i>T.cucurbitacearum</i> |      |          |      |         |      |
|-------------|------------------|------|----------|------|---------|-------|--------------------------|------|----------|------|---------|------|
|             | Ortus            |      | Kanemite |      | Control |       | Ortus                    |      | Kanemite |      | Control |      |
|             | Egg              | Mob. | Egg      | Mob. | Egg     | Mob.  | Egg                      | Mob. | Egg      | Mob. | Egg     | Mob. |
| 15-أبريل    | 19.93            | 8.00 | 16.33    | 8.69 | 12.43   | 8.50  | 7.80                     | 1.63 | 8.27     | 1.60 | 6.80    | 1.23 |
| 20-أبريل    | 1.00             | 0.13 | 1.13     | 0.20 | 14.20   | 11.07 | 0.06                     | 0.06 | 0.04     | 0.90 | 9.73    | 2.17 |
| 22-أبريل    | 3.37             | 1.77 | 2.87     | 1.17 | 15.59   | 13.20 | 0.90                     | 0.13 | 0.07     | 0.31 | 11.07   | 2.90 |
| 24-أبريل    | 5.00             | 3.17 | 4.37     | 2.20 | 19.80   | 16.09 | 0.90                     | 0.33 | 1.10     | 0.55 | 15.27   | 4.57 |
| 26-أبريل    | 6.87             | 3.47 | 5.07     | 3.80 | 22.08   | 16.50 | 1.70                     | 0.50 | 2.50     | 0.75 | 19.70   | 5.80 |
| 29-أبريل    | 10.30            | 3.97 | 8.23     | 5.01 | 27.20   | 18.05 | 3.37                     | 0.67 | 4.23     | 0.85 | 25.07   | 6.37 |
| 03-مايو     | 12.43            | 6.60 | 10.43    | 7.27 | 28.93   | 21.60 | 5.01                     | 0.90 | 6.79     | 1.15 | 30.90   | 7.89 |
| Mean        | 8.41             | 3.87 | 6.92     | 4.05 | 20.03   | 15.00 | 2.82                     | 0.60 | 3.29     | 0.87 | 16.93   | 4.42 |
| L.S.D.      | 6.78             | 3.93 | 6.78     | 3.93 | 6.78    | 3.93  | 6.33                     | 1.63 | 6.33     | 1.63 | 6.33    | 1.63 |

Table 4. The effect of the two acaroids on the population density of *T.urticae* and *T.cucurbitacearum* infesting bean plant in 2013

| inspections | <i>T.urticae</i> |       |          |       |         |       | <i>T.cucurbitacearum</i> |      |          |      |         |      |
|-------------|------------------|-------|----------|-------|---------|-------|--------------------------|------|----------|------|---------|------|
|             | Ortus            |       | Kanemite |       | Control |       | Ortus                    |      | Kanemite |      | Control |      |
|             | Egg              | Mob.  | Egg      | Mob.  | Egg     | Mob.  | Egg                      | Mob. | Egg      | Mob. | Egg     | Mob. |
| 13-أبريل    | 5.77             | 17.87 | 6.27     | 10.77 | 4.67    | 5.38  | 3.10                     | 0.50 | 3.47     | 0.47 | 2.03    | 0.22 |
| 21-أبريل    | 0.17             | 1.17  | 0.17     | 0.67  | 4.80    | 7.12  | 0.60                     | 0.13 | 0.63     | 0.13 | 2.13    | 0.23 |
| 23-أبريل    | 0.75             | 1.60  | 0.50     | 0.82  | 6.20    | 8.33  | 0.67                     | 0.18 | 0.69     | 0.20 | 2.23    | 0.25 |
| 25-أبريل    | 0.97             | 2.15  | 0.76     | 0.95  | 7.63    | 8.85  | 0.80                     | 0.27 | 0.75     | 0.31 | 2.27    | 0.35 |
| 27-أبريل    | 1.28             | 2.57  | 0.90     | 1.50  | 7.87    | 9.02  | 0.95                     | 0.35 | 1.08     | 0.41 | 2.55    | 0.45 |
| 30-أبريل    | 1.90             | 4.90  | 1.54     | 2.02  | 8.02    | 9.45  | 1.25                     | 0.39 | 1.77     | 0.45 | 2.90    | 0.48 |
| 04-مايو     | 2.67             | 5.74  | 2.93     | 3.47  | 9.03    | 10.07 | 1.75                     | 0.42 | 2.13     | 0.48 | 3.05    | 0.51 |
| Mean        | 1.93             | 5.14  | 1.87     | 2.88  | 6.89    | 8.32  | 1.30                     | 0.32 | 1.50     | 0.35 | 2.45    | 0.36 |
| L.S.D.      | 2.15             | 4.58  | 2.15     | 4.58  | 2.15    | 4.58  | 0.92                     | 0.15 | 0.92     | 0.15 | 0.92    | 0.15 |

Table 5. The effect of acaricides on the green pod crops of bean plant during 2012&amp;2013

|      | weight of green pods/fed. |        |         |  | weight of green pods/fed. |        |         |  |
|------|---------------------------|--------|---------|--|---------------------------|--------|---------|--|
|      | <i>The first season</i>   |        |         |  | <i>The sound season</i>   |        |         |  |
|      | Kanemite                  | Ortus  | control |  | Kanemite                  | Ortus  | control |  |
|      | 560.00                    | 490.00 | 120.00  |  | 590.00                    | 550.00 | 150.00  |  |
|      | 650.00                    | 600.00 | 200.00  |  | 690.00                    | 645.00 | 230.00  |  |
|      | 590.00                    | 555.00 | 160.00  |  | 625.00                    | 590.00 | 175.00  |  |
| Mean | 600.00                    | 548.33 | 160.00  |  | 635.00                    | 595.00 | 185.00  |  |
| LSD. |                           | 94.83  |         |  |                           | 112.18 |         |  |

Table 6. The effect of *P. persimilis* and *A. Gossypii* on the population density of *T. urticae* infesting bean plants through 2012 season .

| inspections | <i>P. persimilis</i> |            |            |            | <i>A. gossypii</i> |            |            |            | Control           |            |
|-------------|----------------------|------------|------------|------------|--------------------|------------|------------|------------|-------------------|------------|
|             | <i>T. urticae</i>    |            |            |            | <i>T. urticae</i>  |            |            |            | <i>T. urticae</i> |            |
|             | Egg                  | reduction% | Individual | reduction% | Egg                | reduction% | Individual | reduction% | Egg               | Individual |
| 19- أبريل   | 0.5                  | -          | 0.52       |            | 0.45               |            | 0.33       |            | 0.30              | 0.50       |
| 25- أبريل   | 0.79                 | 21         | 0.45       | 33         | 0.80               | 47         | 0.47       | 46         | 1.00              | 0.65       |
| 02- مايو    | 1.1                  | 56         | 0.49       | 48         | 1.05               | 53         | 0.25       | 58         | 1.5               | 0.90       |
| 09- مايو    | 2.01                 | 57         | 0.97       | 63         | 1.88               | 55         | 0.63       | 63         | 2.80              | 2.55       |
| 16- مايو    | 4.23                 | 79         | 2.33       | 77         | 7.65               | 57         | 1.67       | 74         | 11.90             | 9.83       |
| 23- مايو    | 7.43                 | 71         | 2.57       | 86         | 12.13              | 48         | 11.93      | 16         | 15.53             | 21.63      |
| 30- مايو    | 12.40                | 61         | 14.17      | 42         | 15.50              | 45         | 14.17      | 9          | 18.87             | 23.47      |
| Mean        | 4.07                 | 57.50      | 3.07       | 58.17      | 5.64               | 50.83      | 4.21       | 44.33      | 7.41              | 8.50       |
| L.S.D.      | 7.06                 | 18.68      | 8.32       | 30.5       | 7.06               | 18.68      | 8.32       | 30.5       | 7.06              | 8.32       |

Table 7. The effect of *P. persimilis* and *A. Gossypii* on the population density of *T. cucurbitacearum* infesting bean plants through 2012 season .

| inspections | <i>P. persimilis</i>      |            |            |            | <i>A. gossypii</i>        |            |            |            | Control                   |            |
|-------------|---------------------------|------------|------------|------------|---------------------------|------------|------------|------------|---------------------------|------------|
|             | <i>T. cucurbitacearum</i> |            |            |            | <i>T. cucurbitacearum</i> |            |            |            | <i>T. cucurbitacearum</i> |            |
|             | Egg                       | reduction% | Individual | reduction% | Egg                       | reduction% | Individual | reduction% | Egg                       | Individual |
| 19- أبريل   | 2.03                      |            | 0.47       |            | 2.00                      |            | 0.38       |            | 2.10                      | 0.53       |
| 25- أبريل   | 2.67                      | 30.95      | 0.63       | 26.76      | 3.40                      | 10.75      | 0.61       | 12.29      | 4.00                      | 0.97       |
| 02- مايو    | 1.97                      | 52.93      | 0.13       | 88.46      | 3.13                      | 24.1       | 0.75       | 17.63      | 4.33                      | 1.27       |
| 09- مايو    | 1.27                      | 81.57      | 0.21       | 88.16      | 4.73                      | 30.34      | 1.05       | 26.78      | 7.13                      | 2.00       |
| 16- مايو    | 3.77                      | 50.82      | 1.37       | 78.63      | 6.35                      | 15.92      | 4.05       | 21.87      | 7.93                      | 7.23       |
| 23- مايو    | 7.13                      | 35.69      | 2.93       | 73.71      | 9.55                      | 12.58      | 7.75       | 14.01      | 11.47                     | 12.57      |
| 30- مايو    | 13.67                     | 27.48      | 3.85       | 68.38      | 16.53                     | 10.99      | 9.02       | 8.37       | 19.50                     | 13.73      |
| Mean        | 4.64                      | 46.57      | 1.37       | 70.68      | 6.53                      | 17.45      | 3.37       | 16.83      | 8.07                      | 5.47       |
| L.S.D.      | 5.81                      | 19.57      | 4.5        | 21.73      | 5.81                      | 19.57      | 4.5        | 21.73      | 5.81                      | 4.5        |

Table 8. The effect of *P. persimilis* and *A. Gossypii* on the population density of *T. urticae* infesting bean plants through 2013 season .

| inspections | <i>P. persimilis</i> |            |            |            | <i>A. gossypii</i> |            |            |            | Control           |            |
|-------------|----------------------|------------|------------|------------|--------------------|------------|------------|------------|-------------------|------------|
|             | <i>T. urticae</i>    |            |            |            | <i>T. urticae</i>  |            |            |            | <i>T. urticae</i> |            |
|             | Egg                  | reduction% | Individual | reduction% | Egg                | reduction% | Individual | reduction% | Egg               | Individual |
| 20- أبريل   | 4.93                 |            | 1.73       |            | 4.50               |            | 1.73       |            | 4.67              | 1.37       |
| 27- أبريل   | 3.83                 | 41.42      | 1.10       | 71.9       | 2.77               | 53.63      | 1.83       | 53.25      | 6.20              | 3.10       |
| 03- مايو    | 2.17                 | 73.06      | 0.90       | 78.6       | 2.40               | 67.36      | 1.23       | 70.75      | 7.63              | 3.33       |
| 10- مايو    | 1.77                 | 78.45      | 2.17       | 59.08      | 4.50               | 39.97      | 2.03       | 61.72      | 7.78              | 4.20       |
| 17- مايو    | 7.07                 | 35.6       | 3.75       | 38.77      | 6.77               | 32.44      | 3.67       | 40.08      | 10.40             | 4.85       |
| 24- مايو    | 9.27                 | 27.01      | 7.56       | 33.99      | 9.50               | 18.05      | 8.13       | 29.02      | 12.03             | 9.07       |
| Mean        | 4.84                 | 51.11      | 2.87       | 56.47      | 5.07               | 42.29      | 3.10       | 50.96      | 8.12              | 4.32       |
| L.S.D.      | 3.4                  | 30.90      | 3.17       | 26.62      | 3.4                | 30.90      | 3.17       | 26.62      | 3.4               | 3.17       |

Table 9. The effect of *P. persimilis* and *A. Gossypii* on the population density of *T. cucurbitacearum* infesting bean plants through 2013 season .

| inspections | <i>P. persimilis</i>      |            |            |            | <i>A. gossypii</i>        |            |            |            | Control                   |            |
|-------------|---------------------------|------------|------------|------------|---------------------------|------------|------------|------------|---------------------------|------------|
|             | <i>T. cucurbitacearum</i> |            |            |            | <i>T. cucurbitacearum</i> |            |            |            | <i>T. cucurbitacearum</i> |            |
|             | Egg                       | reduction% | Individual | reduction% | Egg                       | reduction% | Individual | reduction% | Egg                       | Individual |
| 20- أبريل   | 1.85                      | -          | 0.27       | -          | 1.63                      | -          | 0.24       | -          | 2.13                      | 0.15       |
| 27- أبريل   | 1.73                      | 10.68      | 0.26       | 48.41      | 1.43                      | 16.2       | 0.21       | 53.13      | 2.23                      | 0.28       |
| 03- مايو    | 1.73                      | 30.51      | 0.22       | 65.08      | 1.68                      | 32.9       | 0.25       | 55.36      | 2.27                      | 0.35       |
| 10- مايو    | 0.51                      | 75.84      | 0.07       | 89.49      | 0.56                      | 69.89      | 0.03       | 94.93      | 2.43                      | 0.37       |
| 17- مايو    | 2.03                      | 43.41      | 0.29       | 61.64      | 1.91                      | 39.57      | 0.25       | 62.8       | 4.13                      | 0.42       |
| 24- مايو    | 3.50                      | 8.42       | 0.33       | 60.99      | 3.07                      | 10.25      | 0.32       | 57.45      | 4.47                      | 0.47       |
| Mean        | 1.89                      | 33.77      | 0.24       | 69.30      | 1.71                      | 33.76      | 0.22       | 64.73      | 2.94                      | 0.34       |
| Mean        | 1.17                      | 37.36      | 0.12       | 25.04      | 1.17                      | 37.36      | 0.12       | 25.04      | 1.17                      | 0.12       |

Table 10. The effect of the predaceous mites on the green pod crops of bean plant during 2012&amp; 2013

|      | weight of green pods/fed. |                      |         |  | weight of green pods/fed. |                      |         |  |
|------|---------------------------|----------------------|---------|--|---------------------------|----------------------|---------|--|
|      | <i>The first season</i>   |                      |         |  | <i>The second season</i>  |                      |         |  |
|      | <i>A. gossypii</i>        | <i>P. persimilis</i> | control |  | <i>A. gossypii</i>        | <i>P. persimilis</i> | control |  |
|      | 290.00                    | 350.00               | 210.00  |  | 410.00                    | 490.00               | 290.00  |  |
|      | 400.00                    | 500.00               | 300.00  |  | 520.00                    | 625.00               | 375.00  |  |
|      | 340.00                    | 425.00               | 250.00  |  | 475.00                    | 550.00               | 340.00  |  |
| Mean | 343.33                    | 425.00               | 253.33  |  | 468.33                    | 555.00               | 335.00  |  |
| LSD. |                           | 119.27               |         |  |                           | 93.18                |         |  |

## REFERENCES

1. ADEL A. ABOU EL-ELA. 2014. Efficacy of five Acaricides against two spotted spider mite *T. urticae* Koch and their side effects on some natural enemies. *J. Basic & Appl. Zoology*. 67(1) 2014,pp.13-18.
2. FATMA S. ALI AND M.M. EL-SAYED ET AL. 2003. Release of the two predatory mites, *Phytoseiulus plumifer* (C. & F.) and *Amblyseius swirskii* (Athias–Henriot) against two citrus acarine pests. *Bull. Ent. Soc. Egypt*, Vol. 80 : 133-146.
3. PICKETT C.H., F.E. GISTRAP. 1986. predation of oligonychus pratensis by *P.persimilis* and *Amblyseius californicus* under control laboratory condations. *Entomophaga* 31,issue 2 ip 205-212.
4. CROSS, J.V. 1984. Biological contol of two spotted *Tetranychus urticae* Koch by *phytoseiulus persimilis* on strawberries grown in "walk-in" tunnel and a simplified method of spider mite population assessment.plant pathol. 33: 417-423.
5. FAWZY, M.M., K.M. EL-SAIDAE AND M.M. ELERKSOUSY. 2006. Evaluation of the predaceous mite, *Phytoseiulus persimilis* (A.- H.) release on peach and almond trees at North Sinai Governorate to control the two spider mites, *T. urticae*. *J.Agric. Res.* 84 (6) : 1811 -1817.
6. FAWZY, M.M., MONA S. EL-GHOBASHI AND N. ABDEL – WAHED. 2006. Biological Control of the two spotted spider mites, *T. urticae*. (Koch) by the phytoseiid mite, *Phytoseiulus persimilis* (A.- H.) in cantaloupe field in Sharkia Governorate (Acari : Tetranychidae). *Egypt. J. Agric. Res.* 84(2) : 655 -362.
7. HEIKAL, I.H. AND M.M. FAWZY. 2003. A preliminary study of biological control of *T. urticae* ( Acari : Phytoseiidae & Tetranychidae). *Egypt. J. Agric. Res.* 81 (1) : 93 -100
8. MANJUNANTHA, M. S.G. HANCHINAL AND S.V. KULKARNI. 1999. : Mass multiplication of predatory mites *Amblyseius ovalis* ( Phytoseiidae) and field release against yellow mites and thrips on Chilli. *J Acarl.* 14 ( 1 & 2 ) : 16 – 21.
9. MALLIK, B., R. VAIDYA AND M.H. KUMAR. 1999. Mass production of the predator, *Amblyseius longspinosus* ( Acari : Phytoseiidae) *J Acarl.* 15 ( 1 & 2 ) : 15 – 17.
10. PORT,C.M. AND N.E.A. 1981. Biological control by predator mite (*Phytoseiulus persimilis* Athias–Henriot) to red spider mite (*Tetranychus urticae* Koch) infesting strawberry in walk-in plastic tunnels. *Plant pathology* 30:95-99.

تأثير مكافحة الكيماوية والحيوية لآفتى الفاصوليا  
*Tetranychus urticae* & *T. cucurbitacearum*

باسم صبرى وهبه

معهد بحوث وقاية النباتات - مركز البحوث الزراعيه - الدقى - الجيزة

أظهرت النتائج الحقلية نوعين من المبيدات الاكاروسية Kanemite & Ortus وكذلك أطلق نوعين من المفترسات الاكاروسية

*Phytoseiulus persimilis* (Athias-Henriot) and *Amblyseius gossypii* (El-Badry) على

الكاروسات النباتية العنكبوت الاحمر ذات البقعتين *Tetranychus urticae* Koch, and *T. cucurbitacearum* (Sayed) التى تصيب نباتات الفاصوليا- صنف بوليسنا بمحطة بحوث القناطر الخيرية - محافظة القيلوبية خلال عامى ٢٠١٢-٢٠١٣.

أظهر المبيد Kanemite أفضل من Ortus فى ارتفاع معدل الخفض للعنكبوت الاحمر لطور البيض من ٨٢.٣ الى ٨٢.٥٣% والاطوار المتحركة من ٨٠.٩ الى ٨٢.٢٧% خلال عام ٢٠١٢، من ٨٦.٨٢ الى ٨٩.٤٩% لطور البيض، من ٨٩.٩٦ الى ٩١.٤٦% للاطوار المتحركة خلال عام ٢٠١٣. وبهذه النتيجة ادت الى زيادة محصول القرون الخضراء لمعاملة Kanemite عن معاملة Ortus خلال الموسمين السابق ذكرهم.

كما ارتبط كل من معاملى المبيدات الاكاروسية بتاثير افضل من الكنترول (check) فى نقص اعداد الافة وزيادة المحصول.

اطلاق المفترسات الاكاروسية تم بواسطة وريقات نباتات الفاصوليا وارتبط المفترس الاكاروسى *Phytoseiulus persimilis* بتاثير اعلى من المفترس الاخر *Amblyseius gossypii* فى ارتفاع معدل الخفض لجمهور الافة من ٥٠.٨٣، ٤٤، ٣٣% لطورى البيض والاطوار المتحركة على الترتيب الى ٥٧.٥، ٥٨.١٧% لنفس الطورين على الترتيب خلال عام ٢٠١٢، من ٤٢.٢٩، ٥٠.٩٦% لطورى البيض والاطوار المتحركة على الترتيب الى ٥١.١١، ٥٦.٤٧% لنفس الطورين على الترتيب خلال عام ٢٠١٣. والتى انعكست على محصول القرون الخضراء بالزيادة لمعاملة المفترس الاول عن معاملة المفترس الاخير.

أظهر إطلاق المفترسات الاكاروسية السابقة الذكر تأثير افضل من الكنترول على كل من العنكبوت الاحمر بنوعية.