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EFFECT OF SALSELIC ACID, POTASSIUM SULPHAT, BORIC ACID AND ASCOBEIN ON MOVING STAGES OF *Tetranychus Urticae* KOCH INFESTING SOYBEAN PLANTS AND ITS YIELD

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ABSTRACT

The soybean plants were fertilized with two methods chemical and bio fertilizers and each method soybean plants were sprayed with Vertimec, Salicylic A.; Potassium sulfate (K_2SO_4); Boric acid and Ascobein to reduce the mobile stages of *T. urticae* and determined the yield in two successive seasons (2013 and 2014). In the first season (2013), soybean plants was fertilized with the chemical fertilizers; the results indicated that Salicylic A. with five concentrations (50, 100, 150, 250 & 300 mg/L),Potassium sulfate with two concentration (5 & 10 mg/L), Boric acid with three concentrations (0.8, 1.2 and 1.6 mg/L) and Ascobein 0. 25% reduced the population of the mobile stages of *T. urticae* comparing with the recommended compound (Vertimec).Statistical analysis of 2013 season showed highly significant differences between the tested natural compounds and seed yield/Feddan. In the second experiment, soybean plants was fertilized with bio and chemical fertilizers; the results indicated that Salicylic A. with five concentrations, Potassium sulfate with two concentration, Boric acid with three concentrations and Ascobein reduced the population of *T. urticae* comparing with the recommended compound (Vertimec). Statistical analysis of 2013 season show highly significant differences between the tested natural compounds also between the seed yield/Feddan. It was found when spraying with natural compounds reduce the loss of yield especially high concentrations of these compounds and recommended compound (Vertimic).Results also indicated that soybean infestation with the mobile stages of *T. urticae* higher in case chemical fertilization experiments compared with bio fertilization experiments.In the second season (2014) the similar results compared with those obtained in first season (2013).

Keywords: Soybean, Vertimec, Salicylic A.; K_2SO_4; Boric acid and Ascobein, *T. urticea*, chemical fertilizers and bio fertilizers.

INTRODUCTION

NPK and microelements effects of plants: Nitrogen which promotes vegetative growth and green coloration of foliage; Phosphorus plays a major role in root growth, photosynthesis, respiration, energy storage, cell division and maturation; Potassium is important in flower and fruit growth, a plant metabolism, protein synthesis and chlorophyll development (Yagoub*et al*.,. 2012). Soybean,*Glycine max* (L.) is a major legume crop in tropical and subtropical areas all over the world, it received a great attention because it's value as an animal feed crop and for its edible and industrialises. Its meal is the protein choice for livestock and poultry producers' worldwide(Mohamed *et al.*, 2007).In Egypt, soybean is considered one of the relatively new crops introduced into Egyptian agriculture, which contributes to reducing the shortage in oil production

and to reduce the gap for the protein and oil. So, all efforts are being exerted to improve and increase its **seed yield** and quality, among these planting the best cultivar with suitable plant density and distribution (Seadh and Abido, 2013).The soybean meal is rich in minerals, particularly calcium, phosphorus and iron also has good content of the vitamins, thiamins, riboflavin and niacin (Tiamigu and Idowu, 2001). The oil is rich in essential **fatty acid**s and devoid of cholesterol and also increasingly being used for biodiesel (Acikgoz*et al*., 2009). Soybean crop attacked by many insects such as spider mites, aphids, cotton leaf worm, and many other pests (Chaudhary, 2003).The two-spotted mite, *T. urticae*Koch is an important one in a global distribution. Its phytophagous nature, high reproductive potential and short life cycle rapid resistance development to many acaricides often after a few applications. On the other hand, the great reliance on chemical pesticides had its serious drawbacks, manifested in resistance problems and high residue levels in food products (fruits, vegetables, grains and seeds) that may hinder its marketing (Gamal*et al.,* 2007).It is well known that inoculation of legumes (soybean) with both rhizobia and phosphate dissolving bacteria and phosphate fertilization as well as foliar application with some micronutrients increases plant growth, yield and yield components(Mehasen and El- Ghozoli, 2003). In a study ,corn plants were treated with Phosphorin & Rhizobactrin as biofertilizers and sprayed with six selected foliar nutrients, i.e. Polymex; Greenzit SP100, Greenzit NPK, Potasin-F, Copper sulphate and Ascorbic acid; in mono-, bi-, and/or tri-sequential applications. The obtained results in general, spraying the biofertilized corn plants in both sowing dates with the tested foliar nutrients, significantly decreased the rate of the stem borers infestation than the untreated plants of control.,Ascorbic acid and Copper sulphate achieved considerable success in reducing borers infestation than the untreated plants of control, Mesbah*, et al.* (2002).

The aim of the present work studying the effect of salselic acid, potassium sulphat, foliar fertilizers and boric acid on moving stages of *T. urticae* infesting soybean plants at Benysweif Governorate when soybean plants were fertilizated with two methods; chemical fertilizers and bio fertilizers and its yield.

MATERIALS AND MEHODS

Field spraying:

Two field experiments were conducted at Beny sweif Governorate, E*gy*pt during the two growing summer seasons of 20013 and 2014.The experiments were designed in randomized complete block design with four replications. The 11 concentrations of four materials as follows :Vertimec 1.8 (40cm³/100LW); Salicylic A. with five concentrations (50,100, 150, 250 &300 mg); K2SO4 with two concentration (5 & 10 mg/L); Boric acid with three concentrations (0.8, 1.2 and 1.6 mg/L.), Ascobein 0.25% and control treatment (water).

These experiments included the following treatments:

Soy Bean: Cultivar Giza 35 acquired from Agricultural Research Center, Egypt.

Biofertilizers : Seeds were coated with rhizobia (*Rhizobium leguminosarum*), Rhizobactrein & Phosphorein inoculums before planting using 40% Arabic gum as sticker . biofertilizer production unit of Egyptian Agricultural Ministry.

Chemical Fertiliers(NPK) were incorporated into the soil according to Agricultural Ministry recommended rate.

Salicylic acid. It is chemically related to aspirin (acetylsalicylic acid) .

Boric acid naturally occurring mineral ,_stomach poison, for insect , causes death in 3-10 days ,used indoors against cockroaches, ants, silverfish, termites, fleas, some weevils and beetles .low mammalian toxicity.

Ascobin, it is a formulationof mixture from Ascorbic and citric acids .

Statistical analysis:

The percent reduction of infestation was statistically calculated according to the equation of (Henderson and Tilton 1955), the data were subjected to analysis of variance (ANOVA) and the means were compared by L.S.D. test at 0.05 level, using SAS programme(SAS Institute, 1988).

RESULTS AND DISCUSSION

The soybean plants were fertilized with two methods; chemical fertilization and bio fertilization and each method was sprayed with 12 concentration of four materials: Vertimec 1.8 (40 cm^3/100 L); Salicylic A. with five concentrations (50, 100, 150, 250 & 300 mg/L); K2SO4 with two concentration (5 & 10 mg/L); Boric acid with three concentrations (0.8, 1.2 and 1.6 mg/L.), Ascobein 0.25% against the mobile stages of *T. urticae* and determined the yield in each fertilization method in both seasons (2013 and 2014).

First season (2013):

Chemical fertilization:

In the first season (2013), the chemical fertilization was conducted and the average pre-spraying counts of the mobile stages of *T. urticae* were 103.3-128.7/10 leaves (Table 1).

Results in Table (1) indicated that post spraying counts the mobile stages of *T. urticae* reached to 47.4, 41.7, 30.4, 27.7 and 28.2 individuals/10 soybean leaves and the reduction percentage reached to 76.5, 78.8, 84.1, 86.1 and 88.0%, when sprayed with Salicylic A. with its five concentrations (50, 100, 150, 250 & 300 mg/L), respectively . When sprayed with potassium sulfate (K_2SO_4) with two concentrations (5 & 10 mg/L) the numbers of the mobile stages of *T. urticae* were 35.7 and 29.3 individuals/10 soybean , respectively, with reduction percentages reached to 83.8 and 86.7%, respectively.

1

On the other hand, post spraying count the mobile stages reached to 38.5, 28.8 and 25.6 individuals/10 soybean leaves when sprayed with three concentrations (0.8, 1.2 and 1.6 mg/L.) of Boric acid, respectively, and the reduction percentage reached to 77.4, 84.6 and 86.9%, respectively, whereas, in case of Ascobein o.25% cause the mean number of the mobile stages reached 25.6 individuals/10 soybean and the reduction percentage reached to 76.6%.when comparison between the previous 11 concentrations and the recommended compound (Vertimec) it was found the post spraying count after spraying reached 9.2 individuals/10 soybean leaves of the mobile stages and reduction percentage was 95.2%.

Salicylic acid is a phenolic compound and natural constituent of plant. Salicylic acid occurs naturally within many plants and may have evolved as a defense against insects when an insect or disease attacks plants, certain chemical compounds become more abundant within the plant. The compounds produced may cause resistance themselves or be chemical messengers that signal the plant to produce other compounds, which defend the plant from that disease or make it less palatable to insects. Salicylic acid is one such compound (Raskin, 1992).

Statistical analysis in (Table 1) for season 2013 in chemical fertilization experiment show highly significant differences between the tested natural compounds and its concentrations and recommended compound (Vertimic) on the mobile stages of *T. urticae* (F = 31.81, L.S.D. 0.05 = 2.78).

When comparison between spraying with the tested natural compounds with different concentrations and seed yield/Feddan it was found when spraying with natural compounds reduce the loss of yield especially high concentrations of these compounds and recommended compound (Vertimec) comparing with control (Table, 1).

Statistical analysis in (Table 1) for season2013 in chemical fertilization experiment show highly significant differences between seed yield/Feddan and spraying with natural compounds (F = 19.06, L.S.D. 0.05 = 64.21).

Bio fertilization:

In the first season (2013), the bio fertilization was conducted and the average pre-spraying counts of the mobile stages of *T. urticae* were 77.0-103.3/10 leaves (Table 2).

Results in Table (2) indicated that post spraying count the mobile stages of *T. urticae* reached to 55.0, 46.0,44.1, 32.1 and 27.3 individuals/10 soybean leaves when spraying with the five concentrations (50, 100, 150, 250 & 300 mg/L), of Salicylic A. respectively, and the reduction percentage reached to 66.4, 71.7, 74.5, 82.8 and 84.8%, respectively. When spraying potassium sulfate (K_2SO_4) with two concentrations (5 & 10 mg/L) reduced the population of the mobile stages of *T. urticae* to 30.8 and 27.3 individuals/10 soybean , respectively, and the reduction percentages reached to 83.0 and 84.6%, respectively.

2

On the other hand, post spraying counts the mobile stages reached to 29.0, 22.9 and 22.2 individuals/10 soybean leaves when spraying with three concentrations (0.8, 1.2 and 1.6 mg/L.) of Boric acid, respectively, and the reduction percentages reached to 82.1, 85.5 and 86.4%, respectively, whereas, in case of Ascobein 0.25% cause the mean number of the mobile stages reached 29.9 individuals/10 soybean leaves and the reduction percentage reached to 79.1%.when comparison between the previous 11 concentrations and the recommended compound (Vertimec) which recorded at the post spraying count after spraying 13.5 individuals/10 soybean leaves of the mobile stages with 91.1% .reduction .

Optimum utilization of fertilizers can play a vital role in pests controlling and increasing seed yield per unit area in combination with other common practices in field experiment results indicated that aphids species have been found to flourish more on plants that were grown in soils without potassium. Similarly, it was found that, displayed a smaller multiplication in soil that managed with potassium nutrient (Sarwar *et. al.,* 2011). Biofertlizers treatments attributed to high capacity of rhizobia to nitrogen fixation and increasing the plant growth promoting substances, which produced by mycorrhiza. Due to different activities of both biofertlizers strains (rhizobia and mycorrhiza), increased the polyphenols compounds, which help to protect faba bean from high infestation of *A. fabae* Nabil 1 E. El-Wakeil and Talaat N. El-Sebai(2007).

Statistical analysis in (Table 2) for year 2013 in bio fertilization experiment show highly significant differences between the tested natural compounds and its concentrations and recommended compound (Vertimec) on the mobile stages of *T. urticea* (F = 32.58, L.S.D. 0.05 = 3.70).

When comparison between spraying with the tested natural compounds with different concentrations and seed yield/Feddan it was found when spraying with natural compounds reduce the loss of yield especially high concentrations of these compounds and recommended compound (Vertimec) comparing with control (Table, 2).

Statistical analysis in (Table 2) for season2013 in bio fertilization experiment show highly significant differences between seed yield/Feddan and spraying with natural compounds (F = 23.52, L.S.D. 0.05 = 79.06).

Results also indicated that soybean infestation with the mobile stages of *T. urticea*higher in case chemical fertilization experiments compared with bio fertilization experiments (Tables, 1 & 2).

Our results are agree with those obtained by Sureka and Rao (2001) they reported that application of vermicompost at 7.5t/ha was more effective in bringing down aphid population on okra. The artificial fertilizer used, NPK contains nitrogen which promoted better vegetative growth of the plants. Application of artificial fertilizer had more significant effects on both vegetative and reproductive growth of okra plant than poultry manure. The pests were attracted onto the NPK-treated plots due to the better growth of plants which supported their survival and reproduction. This

resulted in plots treated with NPK prone to higher pest infestation than the manure-treated plots.

Second season (2014):

Chemical fertilization:

In the second season (2014), the chemical fertilization was conducted and the average pre-spraying counts of the mobile stages of *T. urticae* were 108.6-134.9/10 leaves (Table 3).

Results in Table (3) indicated that post spraying count the mobile stages of *T. urticae* reached to 56.8, 53.8, 35.7, 29.6 and 27.3 individuals/10 soybean leaves when spraying Salicylic A. with five concentrations (50, 100, 150, 250 & 300 mg/L), respectively, and the reduction percentage reached to 74.1, 78.2, 82.9, 86.4 and 89.0%, respectively. When spraying potassium sulfate (K_2SO_4) with two concentration (5 & 10 mg/L) reduce the population of the mobile stages of *T. urticea*to 52.1 and 40.8individuals/10 soybean, respectively, and the reduction percentage reached to 80.3 and 84.4%, respectively. On the other hand, post spraying count the mobile stages reached to 57.9, 44.5 and 44.4 individuals/10 soybean leaves when spraying with three concentrations (0.8, 1.2 and 1.6 mg/L.) of Boric acid, respectively, and the reduction percentage reached to 74.0, 79.1 and 82.1%, respectively, whereas, in case of Ascobein 25%cause the mean number of the mobile stages reached 59.2 individuals/10 soybean and the reduction percentage reached to 78.5%.when comparison between the previous 11 concentrations and the recommended compound (Vertimec) it was found the post spraying count after spraying reached 15.4individuals/10 soybean leaves of the mobile stages and reduction percentage was 93.1%.

Statistical analysis in (Table 3) for season2014 in chemical fertilization experiment show highly significant differences between the tested natural compounds and its concentrations and recommended compound (Vertimec) on the mobile stages of *T. urticae* (F = 54.57, L.S.D. 0.05 = 4.11).

When comparison between spraying with the tested natural compounds with different concentrations and seed yield/Feddan it was found when spraying with natural compounds reduce the loss of yield especially high concentrations of these compounds and recommended compound (Vertimec) comparing with control (Table, 1).

Statistical analysis in (Table 3) for season2014 in chemical fertilization experiment show highly significant differences between seed yield/Feddan and spraying with natural compounds (F = 36.44, L.S.D. 0.05 = 86.61).

Bio fertilization:

In the second season (2014), the bio fertilization was conducted and the average pre-spraying counts of the mobile stages of *T. urticae* were 81.8-121.2/10 leaves (Table 4).

3

4

Results in Table (4) indicated that post spraying count the mobile stages of *T. urticae* reached to 55.6, 46.8, 34.6, 32.8 and 36.6 individuals/10 soybean leaves when spraying Salicylic A. with five concentrations (50, 100, 150, 250 & 300 mg/L), respectively, and the reduction percentage reached to 69.0, 74.1, 79.1, 81.5 and 83.6%, respectively. When spraying potassium sulfate (K_2SO_4) with two concentration (5 & 10 mg/L) reduce the population of the mobile stages of *T. urticae* to 38.7 and 33.0 individuals/10 soybean, respectively, and the reduction percentage reached to 81.1 and 82.9%, respectively. On the other hand, post spraying count the mobile stages reached to 50.2, 39.3 and 30.0 individuals/10 soybean leaves when spraying with three concentrations (0.8, 1.2 and 1.6 mg/L.) of Boric acid, respectively, and the reduction percentage reached to 73.9, 78.0 and 82.6%, respectively, whereas, in case of Ascobein 25% cause the mean number of the mobile stages reached 34.5 individuals/10 soybean and the reduction percentage reached to 79.1%. When comparison between the previous 11 concentrations and the recommended compound (Vertimec) it was found the post spraying count after spraying reached 13.2 individuals/10 soybean leaves of the mobile stages and reduction percentage was 93.3%.

Statistical analysis in (Table 4) for season2014 in bio fertilization experiment show highly significant differences between the tested natural compounds and its concentrations and recommended compound (Vertimec) on the mobile stages of *T. urticae* (F = 49.34, L.S.D. 0.05 = 6.77).

When comparison between spraying with the tested natural compounds with different concentrations and seed yield/Feddan it was found when spraying with natural compounds reduce the loss of yield especially high concentrations of these compounds and recommended compound (Vertimec) comparing with control (Table, 4).

Statistical analysis in (Table 4) for season2014 in bio fertilization experiment show highly significant differences between seed yield/Feddan and spraying with natural compounds (F = 48.78, L.S.D. 0.05 = 19.94).

Results also indicated that soybean infestation with the mobile stages of *T. urticae* higher in case chemical fertilization experiments compared with bio fertilization experiments (Tables, 3 & 4).

The results of the study indicated that the use of bio fertilizers as soil fertilization generally reduced the incidence of attack by the two spotted spider mites (TSSM) .It was less than the plots fertilized with chemical fertilizes . The attack by sucking pests such as the two spotted spider mites cause soy bean plants to be weak and resulting in stunted growth and reduction in yield. Low level of mites infestation in the plots fertilized by bio fertilizes than plots fertilized by chemical NPK ,this result due to that bio fertilizers behave as slow release fertilizers and take some time for supply the plants with demand nutrients while chemical fertilizers is active and fast mineral supplying source especially nitrogen which more attractive to mite and insects .The nitrogen content of leaves

also influences the mite reproduction rate. Excessive nitrogen conditions favors spider mite out breaks.

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تأثير حمض السلسيليك وكبريتات البوتاسيوم وحمض البوريك والأسكوبين علي الأطوار المتحركة للعنكبوت الأحمر الذى يصيب نباتات فول الصويا مع حساب كمية المحصول

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تم دراسة تأثير كل من التسميد الكيماوي والتسميد العضوي وكذلك الرش بإستخدام حمض السلسيليك وكبريتات البوتاسيوم وحمض البوريك علي العنكبوت الأحمر الذي يصيب نباتات فول الصويا مع حساب المحصول خلال موسمي 2013-2014 علي الترتيب. أثبتت النتائج أنه في الموسم الأول (2013) وفي حالة تجربة التسميد الكيماوي: وجد أن حمض السلسيليك بخمسة تركيزات (50, 100, 150, 250 & 300 mg/L)، وكبريتات البوتاسيوم بتركيزين (5 & 10 mg/L) ، وحمض البوريك بثلاث تركيزات (0.8, 1.2 and 1.6 mg/L)والأسكوبين بتركيز واحد 25% سببت نسبة خفض مرضيه في تعداد الأطوار المتحركة للعنكبوت الأحمر التي تصيب نباتات فول الصويا مقارنة بالمركب الموصي به (فيرتميك). أوضح التحليل الإحصائي للنتائج وجود فروق معنوية عالية بين المركبات المختبرة مقارنة بالمركب الموصي به (فيرتميك) كذلك وجود فروق معنوية عالية في المحصول عند إستخدام المركبات الطبيعية السابقة في حالة التسميد بالأسمدة الكيماوية. بينما في حالة تجربة التسميد العضوي: وجد أن حمض السلسيليك بثلاث تركيزات، وكبريتات البوتاسيوم بتركيزين، وحمض البوريك بثلاث تركيزات والأسكوبين بتركيز واحد أعطي نتائج مرضية في خفض تعداد الأطوار المتحركة للعنكبوت الأحمر التي تصيب نباتات فول الصويا مقارنة بالمركب الموصي به (فيرتميك). أوضح التحليل الإحصائي للنتائج وجود فروق معنوية عالية بين المركبات المختبرة مقارنة بالمركب الموصي به (فيرتميك) كذلك وجود فروق معنوية عالية في المحصول عند إستخدام المركبات الطبيعية السابقة في حالة التسميد بالأسمدة العضوية. كما أوضحت النتائج أن نسبة الإصابة في التسميد الكيماوي أعلي من نسبة الإصابة في تجربة التسميد العضوي خلال موسمي العمل (2013 و 2014). نفس النتائج تقر يبا تم التحصل عليها في الموسم الثاني (2014) مقارنة بالموسم الأول (2013).

Table (1): Mean numbers and %reduction of the mobile stages of *Tetranycusurticae*/10 leaves infesting soybean, *Glycine max* (L.) plants after spraying with different natural compounds and fertilized by chemical fertilizers during the 1st season 2013 at Benysweif Governorate.

Compound	Rate of applic.	Mean No. mite/10 leaves	Post-treatment counts (in days)					Mean	Seed yield/ Feddan (kg)
			One day	7 days	14 days	21 days	28 days		
Chemical fertilizers									
Vertimec	1.8%	105.7	14.0 (89.6)	10.7 (93.4)	9.7 (96.4)	7.7 (97.7)	4.0 (98.9)	9.2 (95.2)	2389.6
Salicylic A.	50 mg	107.0	65.0 (52.1)	52.0 (68.4)	60.3 (77.8)	32.0 (90.9)	27.7 (93.1)	47.4 (76.5)	1851.2
Salicylic A	100 mg	105.0	60.0 (54.9)	49.0 (69.7)	41.7 (84.3)	33.0 (91.6)	25.0 (93.6)	41.7 (78.8)	1640.2
Salicylic A	150 mg	104.0	43.3 (67.2)	38.0 (76.3)	33.7 (87.2)	19.7 (94.2)	17.3 (95.6)	30.4 (84.1)	2243.4
Salicylic A	250 mg	106.7	35.7 (73.6)	36.0 (78.1)	31.0 (88.5)	20.0 (94.3)	15.7 (96.1)	27.7 (86.1)	2258.9
Salicylic A	300 mg	116.7	30.3 (79.5)	36.7 (79.6)	31.7 (89.3)	23.0 (95.0)	19.3 (96.7)	28.2 (88.0)	2265.5
K2SO4	5 mg/L.	123.3	55.3 (64.6)	43.7 (77.0)	46.7 (85.1)	19.7 (95.1)	13.3 (97.1)	35.7 (83.8)	1927.2
K2SO4	10 mg/L.	128.7	52.0 (68.1)	40.7 (79.5)	24.0 (92.6)	17.0 (96.0)	13.0 (97.3)	29.3 (86.7)	2428.6
Boric acid	0.8 mg/L.	102.0	69.7 (46.1)	62.0 (60.5)	25.0 (90.3)	18.7 (94.4)	17.0 (95.6)	38.5 (77.4)	1952.1
Boric acid	1.2 mg/L.	110.0	49.0 (64.9)	45.0 (73.4)	22.0 (92.1)	16.0 (95.6)	12.0 (97.1)	28.8 (84.6)	2319.7
Boric acid	1.6 mg/L.	116.0	42.3 (71.3)	43.3 (75.7)	21.0 (92.9)	12.3 (96.8)	9.3 (97.9)	25.6 (86.9)	2466.5
Ascobein	0.25%	115.0	71.0 (51.3)	55.3 (68.8)	50.7 (82.6)	40.3 (89.3)	38.7 (91.0)	51.2 (76.6)	2098.3
Control	-	103.3	131.0	159.0	262.0	338.0	387.0	255.4	1155.9
F value	-	-	-	-	-	-	-	31.81***	19.06***
$LSD_{0.05}$	-	-	-	-	-	-	-	2.78	64.21

Table (2): Mean numbers and %reduction of the mobile stages of *Tetranycusurticae*/10 leaves infesting soybean, *Glycine max* (L.) plants after spraying with different natural compounds and fertilized by bio fertilizers during the 1st season 2013 at Benysweif Governorate.

Compound	Rate of applic.	Mean No. mite/10 leaves	Post-treatment counts (in days)					Mean	Seed yield/ Feddan (kg)
			One day	7 days	14 days	21 days	28 days		
Bio fertilizers									
Vertimec	1.8%	77.0	14.3 (85.4)	17.0 (85.6)	12.7 (93.5)	18.7 (92.6)	5.0 (98.3)	13.5 (91.1)	2403.5
Salicylic A.	50 mg	84.0	65.3 (38.7)	62.3 (51.8)	63.3 (70.3)	49.0 (82.2)	35.3 (88.8)	55.0 (66.4)	2559.0
Salicylic A	100 mg	86.0	59.7 (45.3)	59.0 (55.4)	42.7 (80.4)	35.3 (87.5)	33.3 (89.7)	46.0 (71.7)	2570.4
Salicylic A	150 mg	87.3	66.3 (49.2)	49.3 (63.3)	43.3 (80.4)	35.7 (87.5)	25.7 (92.1)	44.1 (74.5)	2785.3
Salicylic A	250 mg	96.7	40.3 (67.1)	36.0 (75.8)	33.3 (86.4)	26.7 (91.6)	24.3 (93.3)	32.1 (82.8)	2669.4
Salicylic A	300 mg	94.3	35.3 (70.5)	32.0 (78.0)	28.7 (88.0)	22.0 (92.9)	18.3 (94.8)	27.3 (84.8)	2842.0
K2SO4	5 mg/L.	103.0	49.0 (62.5)	42.0 (73.5)	32.0 (87.8)	17.0 (95.0)	14.0 (96.4)	30.8 (83.0)	2355.9
K2SO4	10 mg/L.	101.0	43.3 (66.2)	38.3 (75.4)	29.7 (88.4)	14.3 (95.7)	10.7 (97.2)	27.3 (84.6)	2606.3
Boric acid	0.8 mg/L.	93.0	45.3 (61.6)	41.7 (70.9)	36.3 (84.6)	11.7 (96.2)	10.0 (97.1)	29.0 (82.1)	2509.4
Boric acid	1.2 mg/L.	90.0	36.3 (68.2)	30.0 (78.3)	29.0 (87.3)	10.0 (96.6)	9.3 (97.2)	22.9 (85.5)	2743.5
Boric acid	1.6 mg/L.	86.7	30.7 (72.1)	29.7 (80.0)	24.7 (88.8)	15.0 (94.7)	11.0 (96.6)	22.2 (86.4)	2921.1
Ascobein	0.25%	77.7	40.7 (58.7)	38.7 (67.6)	34.3 (82.6)	22.0 (91.3)	14.0 (95.2)	29.9 (79.1)	2737.3
Control	-	103.3	131.0	159.0	262.0	338.0	387.0	255.4	1155.9
F value	-	-	-	-	-	-	-	32.58***	23.52**
$LSD_{0.05}$	-	-	-	-	-	-	-	3.70	79.06

Table (3): Mean numbers and %reduction of the mobile stages of *Tetranycus urticae*/10 leaves infesting soybean, *Glycine max* (L.) plants after spraying with different natural compounds and fertilized by chemical fertilizers during the 2nd season 2014 at Benysweif Governorate.

Compound	Rate of applic.	Mean No. mite/10 leaves	Post-treatment counts (in days)					Mean	Seed yield/ Feddan (kg)
			One day	7 days	14 days	21 days	28 days		
Chemical fertilizers									
Vertimec	1.8%	111.5	12.0 (93.1)	11.0 (94.2)	16.3 (93.3)	28.7 (88.4)	9.0 (96.7)	15.4 (93.1)	2667.5
Salicylic A.	50 mg	109.1	71.0 (58.7)	65.0 (65.2)	68.0 (71.5)	40.7 (86.7)	39.3 (88.3)	56.8 (74.1)	1924.0
Salicylic A	100 mg	121.4	74.3 (61.2)	74.9 (68.8)	51.8 (80.1)	37.1 (89.1)	31.0 (91.7)	53.8 (78.2)	2199.5
Salicylic A	150 mg	108.6	59.7 (65.1)	41.8 (77.5)	35.0 (85.3)	22.3 (92.7)	19.7 (94.1)	35.7 (82.9)	2588.9
Salicylic A	250 mg	111.8	45.7 (74.1)	38.0 (80.2)	25.0 (89.8)	21.4 (93.2)	17.7 (94.9)	29.6 (86.4)	2106.0
Salicylic A	300 mg	122.4	36.3 (81.2)	30.1 (85.7)	27.1 (90.0)	21.4 (93.8)	21.7 (94.3)	27.3 (89.0)	2364.0
K2SO4	5 mg/L.	131.7	65.9 (68.3)	61.0 (73.0)	57.0 (80.2)	41.0 (88.9)	35.8 (91.2)	52.1 (80.3)	2045.5
K2SO4	10 mg/L.	129.1	52.0 (74.4)	47.7 (78.4)	39.0 (86.2)	35.4 (90.3)	29.9 (92.5)	40.8 (84.4)	2368.1
Boric acid	0.8 mg/L.	111.7	79.7 (54.7)	68.1 (64.4)	55.4 (77.3)	49.1 (84.4)	37.0 (89.3)	57.9 (74.0)	2104.3
Boric acid	1.2 mg/L.	108.6	68.7 (59.9)	53.0 (71.5)	38.9 (83.6)	33.0 (89.2)	28.9 (91.4)	44.5 (79.1)	2234.3
Boric acid	**1.6 mg/L.**	124.5	63.0 (67.9)	51.7 (75.8)	41.5 (84.8)	37.4 (89.3)	28.4 (92.6)	44.4 (82.1)	**2603.0**
Ascobein	**25%**	134.9	74.0 (65.2)	64.3 (72.2)	59.7 (79.8)	55.0 (85.5)	43.0 (89.7)	59.2 (78.5)	**2250.6**
Control	-	121.2	191.0	207.7	265.0	341.0	374.0	275.7	1278.4
F value	-	-	-	-	-	-	-	54.57***	36.44***
$LSD_{0.05}$	-	-	-	-	-	-	-	4.11	86.61

J. Plant Prot. and Path., Mansoura Univ., Vol.6 (4): 649 - 662, 2015

Table (4):Mean numbers and %reduction of the mobile stages of *Tetranycusurticae*/10 leaves infesting soybean, *Glycine max* (L.) plants after spraying with different natural compounds and fertilized by bio fertilizers during the 2nd season 2014 at Benysweif Governorate.

Compound	Rate of applic.	Mean No. mite/10 leaves	Post-treatment counts (in days)					Mean	Seed yield/ Feddan (kg)
			One day	7 days	14 days	21 days	28 days		
Bio fertilizers									
Vertimec	1.8%	94.1	12.0 (91.9)	10.0 (93.8)	12.7 (92.1)	15.0 (94.3)	16.2 (94.4)	13.2 (93.3)	2826.3
Salicylic A.	50 mg	88.7	67.3 (51.9)	66.0 (56.6)	60.7 (68.7)	47.7 (80.9)	36.3 (86.7)	55.6 (69.0)	2518.3
Salicylic A	100 mg	91.2	58.7 (59.2)	58.7 (62.4)	58.0 (70.9)	34.0 (86.8)	24.7 (91.2)	46.8 (74.1)	2781.4
Salicylic A	150 mg	84.5	50.0 (62.5)	42.0 (71.0)	38.0 (79.4)	26.0 (89.1)	17.0 (93.5)	34.6 (79.1)	2923.3
Salicylic A	250 mg	87.9	46.0 (68.1)	38.3 (74.6)	34.7 (82.0)	26.3 (89.4)	18.6 (93.2)	32.8 (81.5)	2629.3
Salicylic A	300 mg	111.7	50.7 (71.2)	41.0 (78.6)	37.3 (84.7)	31.7 (89.9)	22.3 (93.5)	36.6 (83.6)	3075.1
K2SO4	5 mg/L.	105.4	59.0 (64.5)	52.7 (70.8)	31.3 (86.4)	29.7 (90.0)	20.7 (93.6)	38.7 (81.1)	2255.2
K2SO4	10 mg/L.	99.7	52.0 (66.9)	44.0 (74.2)	27.0 (87.6)	22.1 (92.1)	20.1 (93.5)	33.0 (82.9	2925.4
Boric acid	0.8 mg/L.	95.8	68.0 (55.0)	54.7 (66.7)	52.1 (75.1)	43.7 (83.8)	32.3 (89.1)	50.2 (73.9)	2583.2
Boric acid	1.2 mg/L.	87.9	54.0 (61.0)	36.7 (75.6)	42.3 (78.0)	36.0 (85.4)	27.3 (89.9)	39.3 (78.0)	2875.5
Boric acid	1.6 mg/L.	87.8	48.0 (65.3)	33.1 (78.0)	28.0 (85.4)	22.0 (91.1)	19.0 (93.0)	30.0 (82.6)	3444.2
Ascobein	25%	81.8	46.0 (64.3)	35.0 (75.0)	36.0 (79.9)	31.0 (86.5)	24.7 (90.0)	34.5 (79.1)	2991.7
Control	-	121.2	191.0	207.7	265.0	341.0	374.0	275.7	1278.4
F value	-	-	-	-	-	-	-	49.34***	48.78***
$LSD_{0.05}$	-	-	-	-	-	-	-	6.77	19.94

J. Plant Prot. and Path., Mansoura Univ., Vol.6 (4): 649 - 662, 2015