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Study the Effect of Treated Schefflera Plants by Triacontanol Hormone (TRIA) on The Infestation by *Macrosiphum euphorbiae* Under Glasshouses Conditions

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ABSTRACT

Experiments were carried out to study the effect of treated schefflera plants *Schefflera arboricola* fam: Araliaceae by triacontanol hormone (TRIA) in different concentrations on the infestation by *Macrosiphum euphorbiae* under glasshouses conditions.

Experiments were done in two locations International Garden, Cairo Governorate and El-Orman Garden, Giza Governorate throughout 2017 season under glasshouses conditions. Three treatments (concentrations) of triacontanol hormone were done in both two locations, small concentration (35ppm), medium concentration (50ppm) and high concentration (65ppm), beside fourth treatment which did not treat with any hormone (control). The infestation by *Macrosiphum euphorbiae* in both two locations was the same trend. But Schefflera plants which treated with small and medium concentration of (TRIA) (35ppm, 50ppm) respectively were lower infestation by *Macrosiphum euphorbiae* comparing to control. On the other hand Schefflera plants which treated with high concentration of (TRIA) (65ppm) were higher infestation by the same insect comparing to control. Also, experiments were done to study the effect of different concentrations of (TRIA) on the morphological and physiological adjectives of treated Schefflera plants. Small and medium concentrations of (TRIA) improved morphological and physiological adjectives of treated Schefflera plants. On the other hand, the high concentration of (TRIA) jaeal morphological and physiological adjectives of Schefflera plants worse than control.

INTRODUCTION

Schefflera plants consider one of the importance, beautiful and famous pots plants and ornamental plants all over the world. Which used for interior decoration purposes (indoor plants). Also, in more times it is used as one of the external decoration plants (outdoor plants) with notice don't directly exposur to sunlight. Also, Schefflera plant is one of the most permanent green leafy plants, characterized by bright green leaves, which reproduce through the peripheral part. Jamal and Reema (1999) found that *Schefflera arboricola* was an important house plant which is greatly affected by low light levels typical in many houses. Acclimatization of Schefflera to low light levels during production is an important step to get good quality plants. Also, sometimes and some countries such as China, Japan and Veitnam use Schefflera plants for medicinal purposes besides its essential purposes for decoration wherever extract glycosides and other compounds from its leaves

which used to medicine some diseases such as liver diseases. Junichi and Yasuko (1989) in Japan reported that *Schefflera octophylla* fam. Araliaceae has been used in Chinese and Vietnamese folk medicine as an anti-pyretic, anti-inflammatory, analgesic, tonic and as a drug for the treatment of liver disease. Sung, T.V. *et al.* (1991) in China found three triterpene glycosides were isolated from leaves of *Schefflera octophylla* used for the treatment of some diseases. Chizuko Maeda *et al.* (1994) in Vietnam found twelve triterpene glycosides were isolated from the bark of *Schefflera octophylla* of Vietnamese origin.

Schefflera plants infested by many insects such as *Macrosiphum euphorbia* fam: Aphididae which consider one of the most important insects which infested *Schefflera* plants. Gabriel Labanowski in Poland (2005) reported that aphids were common and harmful pests occurring on pots plants and cut flowers in glasshouses, its studied carried out on ornamental plants in glasshouses and plastic tunnels and confirmed 31 aphid species were identified and their hosts plants included *Macrosiphum euphorbia* fam: Aphididae which infested *Schefflera arboricola*.

Triacontanol hormone (TRIA) considers one of the famous, important and more growth regulators hormones. There are more studies which show the important role of this hormone for growth regulators plants. And its role for change morphological and physiological plant adjectives when used by many concentrations. Srivastava and Srikant (1990) in India studied effect of triacontanol hormone on photosynthesis, alkaloid, and other parameters in *Papaver somniferum* L. and studied the influence of different foliar application of triacontanol hormone (TRIA) on growth, co₂ exchange rate, total chlorophyll, plant height and weight and fresh and dry weight of the leaves and shoots. This study was carried out in glasshouse conditions. In this study we studied the effect of treated *Schefflera* plants, *Schefflera arboricola* by triacontanol hormone (TRIA) in different concentrations on the infestation by *Macrosiphum euphorbia* in two locations, International Garden, Cairo governorate an El-Orman Garden, Giza governorate during 2017 season under glasshouses conditions. Also, we studied the effect of treated *Schefflera* plants by different concentrations of triacontanol hormone (TRIA) on some important morphological and physiological adjectives of treated *Schefflera* plants.

MATERIALS AND METHODS

The present investigation includes the effect of treated *Schefflera* plants *Schefflera arboricola* with different concentrations of triacontanol hormone (TRIA) on the infestation by *Macrosiphum euphorbia* during 2017 season in two locations International Garden, Cairo Governorate and El-Orman Garden, Giza Governorate. Also, this study includes the effect of different concentrations of (TRIA) on the morphological and physiological adjectives of treated *Schefflera* plants.

Experimental Design:

This study was conducted on *Schefflera* plants *Schefflera arboricola* in two locations International Garden, Cairo Governorate and El-Orman Garden, Giza Governorate during 2017 season. Plants were cultivated in both the two locations in the same time in a timely manner for the cultivation of *Schefflera* plants in December. In the two locations, we used 60 peripheral parts in every garden divided into four treatments each treatment contain 15 peripheral parts (reflects). First treatment we immersion 15 peripheral part in the low concentration of (TRIA) 35ppm for the period 24 hour before cultivated. The second treatment, we immersion 15 peripheral part in medium concentration of (TRIA) 50ppm for the period 24 hour before cultivated. In the third treatment we immersion 15 peripheral part in the high concentration of (TRIA)

60ppm for period 24 hour before cultivated. Lastly, the fourth treatment we did not immersion peripheral parts in any hormone before cultivated this treatment used as the control. These peripheral parts cultivated under glasshouses conditions in the two parks. Every garden contains four plots, the plot for each treatment in the same area, The area of each plot was 3x5m, this area was completely isolated in the two parks,. Then it was conducted all agricultural operations in a manner quite similar in the two parks. The normal and recommended agricultural practices were applied, also no chemical control against insects was used during the whole experimental period.

After three weeks for cultivated and with the first leaves of the plant began to appear, an artificial infestation with *Macrosiphum euphorbiae* was done at the same time in the two parks. It is proven accurate observations of the infestation by aphid numbers in all plants biweekly. Directly counting was done biweekly during the seasons in the two parks all over all plants.

Weather Factors:

Effects of weather factors on the population of *Macrosiphum euphorbiae*, daily mean temperature (D.M.T.) and daily mean relative humidity (D.M. R.H.) were studies. Records of the weather factors of Cairo and Giza Governorates were obtained from the Central Laboratory for Agriculture Meteorology, Agricultural Research Center, Ministry of Agriculture. The daily records of each weather factor were grouped into biweekly averages according to the sampling dates. These averages were assumed to represent the field experimental records at sampling times.

Laboratory Design:

Laboratory studies carried out to show the effect of treated Schefflera plants with triacontanol hormone (TRIA) in different concentrations on the important morphological adjectives of treated Schefflera plants such as root length (cm), shoot length (cm) and plant height (cm) and comparing these adjectives with control plants which did not treat with any hormone. Also, these laboratory experiments carried out to show the effect of treated Schefflera plants with triacontanol hormone (TRIA) in different concentrations on the important physiological adjectives of treated Schefflera plants such as determine protein (mg/g), total sugar (mg/g), starch (mg/g), amino acids (mg/g) and total phenols (mg/g). And comparing these adjectives with control plants which did not treat with any hormone.

These laboratory experiments on the morphological and physiological adjectives of treated Schefflera plants carried out in the two locations at the same time. And extract the mean results for all treatments.

Statistical analysis:

In these experiments, effect of treated Schefflera plants with different concentrations of (TRIA) on the infestation by *Macrosiphum euphorbiae*, also effect of treated Schefflera plants with different concentrations of (TRIA) on the morphological and physiological adjectives were subjected to analysis of variance (ANOVA) and the means were compared by L.S.D. test at 0.05 level, using SAS program (SAS Institute, 1988).

RESULTS AND DISCUSSION

These experiments were carried out in two locations during 2017 season at International Garden, Cairo governorate and EL-Orman Garden, Giza governorate on Schefflera plants var. *Schefflera arboricola*.

International Garden, Cairo Governorate:

Data tabulated in Table (1) show the population fluctuation of *Macrosiphum euphorbiae* at International Garden, Cairo Governorate indicated by half monthly

count during 2017 season on the ornamental plant *Schefflera arboricola* in the control and the three treatments (concentrations) of triacontanol hormone 35 ppm, 50ppm and 65ppm, respectively.

Table (1): Half-monthly count of aphids *Macrosiphum euphorbia* infesting *Schefflera arboricola* in International Garden, Cairo governorate during 2017 season.

Date	35 ppm	50 ppm	65 ppm	Control	Temp.	Hum. %
1/ 1/ 2017	7	12	17	15	13.5	82
15 /1/ 2017	9	15	19	17	15.3	76
1 /2 /2017	11	16	21	18	16.4	73
15 /2 /2017	12	18	24	20	18.5	74
1 /3 /2017	14	20	25	22	20.3	72
15 /3/ 2017	17	22	29	25	17.4	67
1 /4 /2017	19	24	32	27	18.6	63
15 /4/ 2017	20	27	35	30	23.4	57
1/ 5/ 2017	23	29	38	32	25.6	52
15 /5 /2017	25	30	43	35	25.8	48
1 /6 /2017	20	25	34	32	27.3	49
15/ 6/ 2017	14	21	30	27	28.4	45
1 /7 /2017	10	17	23	22	27.6	50
15 /7 /2017	8	13	18	17	28.9	54
1 /8 /2017	5	9	15	12	29.7	59
15 /8/017	3	6	12	9	31.5	55
1 /9 /2017	7	9	13	11	29.6	54
15 /9/2017	9	11	15	13	27.4	55
1 /10 /2017	11	13	17	15	26.8	56
15/10/2017	13	15	18	16	23.5	57
1 /11/ 2017	15	16	19	17	21.3	58
15/11/2017	16	17	20	19	20.4	60
1/12 / 2017	17	18	22	20	17.8	65
15/12/2017	19	20	25	23	15.3	67
Total	324	419	564	494	-	-
Mean	13.5	17.5	23.5	20.6	-	-
F0.05				356.75		
LSD				1.85		

Means within columns bearing different subscripts are significantly different (P< 0.05)

Data show that the population of *Macrosiphum euphorbia* in both control and the three treatments (concentrations) of triacontanol hormone was the same trend, increase gradually from the beginning of the season in January and reach to the highest numbers in the period from March to May. And the population began to decrease from June to August, lastly, the population began to increase again from September to the end of season in December.

But the level of the infestation (which indicated by numbers of aphid insects per leaf) was different completely between the control and the three treatments. Whereas the mean number of aphid in control was (20.6 aphid/leaf) it was (13.5 aphid/leaf) in the first treatment, the low concentration of triaconanol hormone 35ppm. And (17.5 aphid/leaf) in the second treatment, the medium concentration of triacontanol hormone 50ppm. And (23.2 aphid/leaf) in the third treatment, the high concentration of triacontanol hormone 65ppm.

This data refers to that the infestation by *Macrosiphum euphorbia* on *Schefflera arboricola* was lower in the first and second treatment (low and medium concentration of triacontanol hormone 35ppm, 50ppm respectively) comparing to control. On the other hand the infestation in case of high level of triacontanol hormone 65ppm. was higher than the control. This result seems from the mean

number of insect *Macrosiphum euphorbiae* which infested Schefflera plants (aphid/leaf) which show clearly from figure (1).

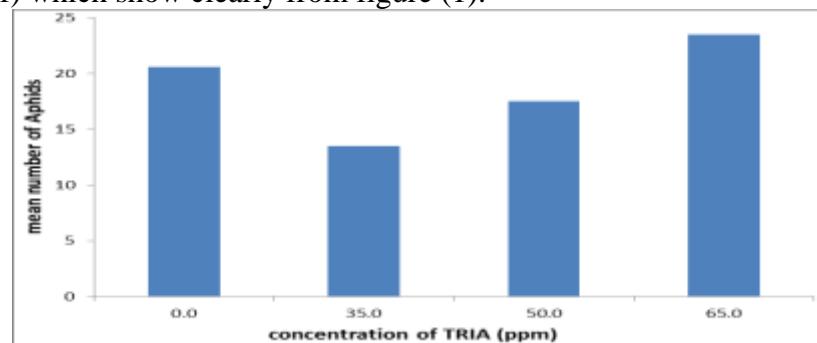


Fig. 1: Mean numbers of aphids/leaf in different concentrations of triacontanol hormone (TRIA) in Cairo Governorate during 2017 season

El-Orman Garden, Giza Governorate:

Data tabulated in Table (2) show the population fluctuation of *Macrosiphum euphorbiae* at El-Orman Garden, Giza governorate indicated by half monthly count during 2017 season on the ornamental plant *Schefflera arboricola* in the control and the three treatments (concentrations) of triacontanol hormone 35 ppm, 50ppm and 65ppm, respectively.

Table (2): Half-monthly count of aphids *Macrosiphum euphorbiae* infesting *Schefflera arboricola* in El-Orman Garden, Giza governorate during 2017 season.

Date	35 ppm	50 ppm	65 ppm	Control	Temp.	Hum. %
1/ 1/ 2017	9	13	19	17	15.3	85
15 /1/ 2017	11	15	21	19	16.4	79
1 / 2 / 2017	13	17	23	21	18.3	75
15 / 2 / 2017	15	19	25	23	19.4	77
1 / 3 / 2017	16	21	27	25	21.6	74
15 / 3 / 2017	18	23	30	27	19.7	70
1 / 4 / 2017	20	25	32	29	20.5	65
15 / 4 / 2017	21	28	35	32	24.8	60
1 / 5 / 2017	24	30	37	34	26.4	55
15 / 5 / 2017	27	32	40	37	26.9	50
1 / 6 / 2017	23	27	37	34	28.5	52
15/ 6/ 2017	18	23	33	29	30.2	47
1 / 7 / 2017	13	19	27	25	28.5	52
15 / 7 / 2017	9	13	23	20	29.4	56
1 / 8 / 2017	6	10	18	16	30.8	60
15 / 8 / 2017	4	8	13	11	32.7	57
1 / 9 / 2017	9	12	16	12	30.4	55
15 / 9 / 2017	11	14	18	14	29.6	56
1 / 10 / 2017	14	16	20	17	27.9	58
15 / 10 / 2017	17	18	22	19	25.3	59
1 / 11 / 2017	19	20	23	21	23.2	60
15 / 11 / 2017	20	21	25	23	22.5	62
1 / 12 / 2017	22	24	26	25	19.7	67
15 / 12 / 2017	24	25	29	27	17.4	70
Total	383	473	619	557	-	-
Mean	15.9	19.7	25.8	23.2	-	-
F0.05				468.86		
LSD				1.96		

Means within columns bearing different subscripts are significantly different ($P < 0.05$)

Data show that the population of *Macrosiphum euphorbiae* in both control and the three treatments (concentrations) of triacontanol hormone was the same trend, increase gradually from the beginning of the season in January and reach to the highest numbers in the period from March to May. And the population began to decrease from June to August, lastly the population began to increase again from September to the end of the season in December.

But the level of the infestation (which indicated by numbers of aphid insects per leaf) was different completely between the control and the three treatments. Whereas the mean number of aphid in control was (22.2 aphid/ leaf) it was (15.9 aphid/leaf) in the first treatment, the low concentration of triaconanol hormone 35ppm. And (19.2 aphid/leaf) in the second treatment, the medium concentration of triacontanol hormone 50ppm. And (25.8 aphid/leaf) in the third treatment, the high concentration of Triacontanol hormone 65ppm.

As the same in the International Garden, Cairo Governorate this data refers to that the infestation by *Macrosiphum euphorbiae* on *Schefflera arboricola* was lower in the first and second treatment (low and medium concentration of triacontanol hormone 35ppm, 50ppm respectively) comparing to control. On the other hand the infestation in case of high level of triacontanol hormone 65ppm. was higher than the control. And these results show clearly from figure (2).

But as all the infestation in El-Orman Garden was higher than in International Garden, this appears clearly from the mean number of aphid/leaf in the control and the three treatments (concentrations) of triacontanol hormone.

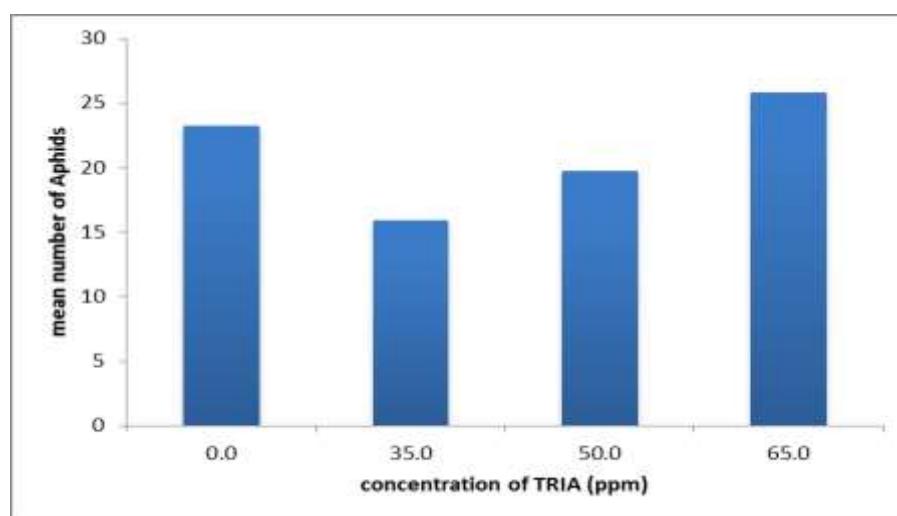


Fig.2:Mean numbers of aphids/leaf in different concentrations of triacontanol hormone (TRIA) in Giza Governorate during 2017 season.

We can report an important result from the last experiments which that when we treat the plants with the low concentration of triacontanol hormone lead too low infestation with aphid comparing to control. And when we treat the same plants with medium concentration of the same hormone lead also to low infestation with aphid comparing to control, (but high infestation comparing to the low concentration of hormone). Lastly, when we treat the plants with the high concentration of tricontanol hormone lead to high infestation with aphid insects comparing to control.

So, we can recommend that treat plants with low or medium concentration of triacontanol hormone (TRIA) to decrease the infestation with insects. And we can use this hormone in the programs of Integrated Pest Management (I.P.M).This result

agrees with Heba, M. H. (2013) in Egypt who reported that the plants (*Zea mays*) which treatment with low concentration of triacontanol hormone (35 ppm.) was low infestation with *Euprepocnemis plorans* comparing to control. And the plants which treated with high concentration of the same hormone (50 ppm.) were high infestation with the same insect comparing to control. Also, Gupta *et al.* (2009) reported the role of TRIA (triacontanol hormone) in pest control and reported that plants were treated with lower concentrations of (TRIA) were less infestation with insects than control plants. Singh and Bhattacharya (2001) recorded an efficient role of TRIA in reduction of survivorship and developmental parameters of larvae of *Spilarctia oblique* Walker upon feeding on diets containing TRIA, Referring to insecticidal activity of TRIA. From all the last, it was suggested the incorporation of TRIA in the Integrated Pest Management (I.P.M) modules for pest control.

Effect of Triacontanol Hormone (TRIA) on the Morphological and Physiological Characterizes of Schefflera Plants:

Data tabulated in table (3) show the effect of treated Schefflera plants, *Schefflera arboricola* with triacontanol hormone (TRIA) in different concentrations on the important morphological and physiological characterizes of these plants.

As all, when we treated Schefflera plants with small concentration of (TRIA) 35ppm this improved morphological adjectives of treated plants such as (root length, shoot length and plant height) and physiological adjectives such as (protein, total sugars, starch, amino acids and total phenols) comparing to control.

Table (3): Effect of triacontanol hormone (TRIA) on the morphological and physiological characterizes of Schefflera plants:

Adjective	35ppm	50ppm	65ppm	Control
Root length (cm)	18.34 a	17.86 a	13.67 b	15.36 a
Shoot length (cm)	24.25 a	22.45 b	18.98 a	20.43 b
Plant height (cm)	42.59 a	40.31 a	32.65 a	35.79 a
Protein (mg/g)	1.79 a	1.58 b	1.25 a	1.47 a
Total sugars (mg/g)	52.84 b	48.35 a	32.46 a	45.73 a
Strach (mg/g)	49.65 a	38.46 b	33.78 b	35.86 a
Amino acids (mg/g)	5.13 a	4.63 a	2.67 a	3.75 b
Total phenol (mg/g)	14.65 a	11.64 b	7.35 a	9.86 a

Means within columns bearing different subscripts are significantly different (P< 0.05)

And when we treated Schefflera plants with medium concentration of (TRIA) 50ppm this also improved morphological and physiological adjectives of treated plants comparing to control, but less than the plants which treated with small concentration of (TRIA).

On the other hand when we treated Schefflera plants with high concentration of (TRIA) 65ppm. morphological and physiological adjectives of treated plants were worse than comparing to control.

As all when we treated Schefflera plants with small or medium concentrations of (TRIA) this improved morphological and physiological adjectives of treated plants and lead to low infestation with insect *Macrosiphum euphorbiae*. On the other hand when we treated Schefflera plants with the high concentration of (TRIA), this effect on morphological and physiological adjectives of treated plants and lead to high infestation of *Macrosiphum euphorbiae*.

These results agreement with those obtained by Kumaravelu G. *et al.* (2000) in India who reported that the morphological adjectives (root length, shoot length,

plant height and other morphological adjectives) and physiological adjectives (protein, total sugars, starch, total phenol and other physiological adjectives) were improved when we treated plants with small and medium concentrations of triacontanol hormone (TRIA) and became better than control. And these adjectives were worse than control when we treated plants with high concentration of (TRIA), Shukla, A. *et al.* (1992) in Netherlands studied effect of triacontanol (TRIA) at lower concentrations on growth, plant hormones and artemisinin yield in *Artemisia annua* L. and found when treated plants with (TRIA) produced a statistically significant positive effect on artemisinin level as well as on plant height, leaf and herbage yield , but these adjectives decreased when treated plants with higher concentrations of (TRIA). Also these results in agreements with those obtained by Eriksen, A. B. *et al.* (1981) in Oslo (Nerweg) who reported that when treated tomato and maize plants with triacontanol (TRIA) caused a significant increase in the dry weight of the tomato plants, leaf area and dry weight measurements of tomato leaves at different stages of development. And Richard, N. K. and Stanley, K. R. (1981) in Michigan – United States reported that triacontanol (TRIA) increased fresh and dry weight and total reducible nitrogen (total N) of rice (*Oryza sativa* L.) seedlings.

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ARABIC SUMMARY

دراسة تأثير معاملة نباتات الشففيرا بهرمون ترائي أكونتanol (TRIA) على درجة الإصابة بحشرة من الإفوريبيا تحت ظروف الصوب الزجاجية

أشرف صلاح امام و جميلة عبد الرحمن محمد هيكل و عفاف محمد صالح الروبي
معهد بحوث وقاية النباتات - مركز البحوث الزراعية - الدقى - الجيزة - مصر

الهدف من إجراء الدراسة هو معرفة تأثير معاملة نباتات الزينة (الشففيرا) صنف *Schefflera arboricola* بهرمون ترائي أكونتanol بمختلفة على درجة الإصابة بحشرة من الإفوريبيا *Macrosiphum euphorbiae*.
أجريت التجربة في الحديقة الدولية بمحافظة القاهرة و حديقة الأورمان بمحافظة الجيزة خلال عام ٢٠١٧
توصلت النتائج المتحصل عليها إلى تباين متوسط تعداد حشرات المحن التي تصيب نباتات الشففيرا وذلك تبعاً لتركيز هرمون ترائي أكونتanol الذي تم معاملة نباتات الشففيرا به . حيث كانت نباتات الشففيرا التي عولمت بتركيز منخفض من هرمون ترائي أكونتanol (٣٥ جزء في المليون) كانت أقل في متوسط الإصابة بحشرة المحن مقارنة بالكتنرول . كذلك النباتات التي عولمت بتركيز متوسط من الهرمون (٥٠ جزء في المليون) كانت أقل في متوسط الإصابة بحشرة المحن مقارنة بالكتنرول ولكن بدرجة إصابة أعلى من النباتات التي عولمت بتركيز منخفض . وأخيراً فإن النباتات التي عولمت بتركيز مرتفع من الهرمون (٦٥ جزء في المليون) كانت أعلى في متوسط الإصابة بحشرة المحن مقارنة بالكتنرول . تشابهت تلك النتائج في كل من موقع الدراسة وإن كانت متوسطات الإصابة بالحشرة بصفة عامة في حديقة الأورمان بمحافظة الجيزة أعلى منها نسبياً في الحديقة القاهرة .

أيضاً تم دراسة تأثير معاملة نباتات الشففيرا بتركيزات مختلفة من هرمون ترائي أكونتanol على أهم الصفات المورفولوجية وكذلك الفسيولوجية للنباتات المعاملة . حيث يتضح من إجراء القياسات المورفولوجية لكلا من النباتات المعاملة بالهرمون وكذلك الكتنرول أن استخدام جرعات منخفضة أو متوسطة من الهرمون أدى إلى تحسن الصفات المورفولوجية للنباتات المعاملة مقارنة بالكتنرول مثل طول المجموع الجنزري ، طول المجموع الخضرى وأيضاً الارتفاع الكلى للنبات . على النقيض فإن استخدام هرمون ترائي أكونتanol بتركيز مرتفع أدى إلى انخفاض مستوى الصفات المورفولوجية السابقة ذكرها للنباتات المعاملة مقارنة بالكتنرول .

كذلك تم دراسة تأثير معاملة نباتات الشففيرا بتركيزات مختلفة من هرمون الترائي أكونتanol على أهم الصفات الفسيولوجية للنباتات المعاملة بالهرمون ومقارنتها بالكتنرول واتضح من إجراء التحاليل الفسيولوجية للنباتات المعاملة بالهرمون وكذلك الكتنرول أن استخدام هرمون الترائي أكونتanol بتركيز منخفض أو متوسط أدى إلى تحسن في الصفات الفسيولوجية للنباتات المعاملة مثل مستوى البروتين ، إجمالي السكريات ، محتوى النشا ، الأحماض الأمينية و أيضاً إجمالي الفينولات . على النقيض فإن استخدام هرمون ترائي أكونتanol بتركيز مرتفع أدى إلى انخفاض مستوى الصفات الفسيولوجية السابقة ذكرها للنباتات المعاملة بالهرمون وذلك بالمقارنة بالكتنرول (النباتات التي لم يتم معاملتها بأى هرمون على الإطلاق) وبالربط بين النتائج السابقة المتحصل عليها سواء من التجارب الحقانية أو المعملية يمكن إيجاز مايلي: أنه عند معاملة النباتات بتركيز منخفض من هرمون ترائي أكونتanol (٣٥ جزء في المليون) يؤدى إلى تحسن في الصفات المورفولوجية وأيضاً الفسيولوجية للنباتات المعاملة مقارنة بالكتنرول مما يؤدى وبالتالي إلى انخفاض درجة الإصابة بحشرة المحن في النباتات المعاملة مقارنة بالكتنرول وعند معاملة النباتات بتركيز متوسط من الهرمون (٥٠ جزء في المليون) يؤدى أيضاً إلى تحسن في الصفات المورفولوجية وكذلك الفسيولوجية للنباتات المعاملة عن الكتنرول ولكن بدرجة أقل من استخدام التركيز المنخفض للهرمون مما أدى أيضاً إلى انخفاض في درجة الإصابة بالحشرة في النباتات المعاملة مقارنة بالكتنرول . ولكن عند معاملة النباتات بتركيز مرتفع من الهرمون (٦٥ جزء في المليون) أدى إلى انخفاض في مستوى الصفات المورفولوجية وكذلك الفسيولوجية للنباتات المعاملة مقارنة بالكتنرول مما أدى إلى زيادة درجة الإصابة بالحشرة في النباتات المعاملة مقارنة بالكتنرول .

ونستخلص من هذه الدراسة أنه يمكن التوصية باستخدام هرمون ترائي أكونتanol ليس فقط كمحفز لنمو النباتات وتحسين صفاتها المورفولوجية والفسيولوجية وإنما يمكن كذلك إدراجه في برامج المكافحة المتكاملة للحشرات (I.P.M) وذلك بالجرعات الموصى بها في هذه الدراسة .