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EFFECT OF SOME INSECTICIDES DELTAMETHRIN, (CPY) CLORPYROPHOS (COP) AND DEMSISA EXTRACT (*Ambrosia maritima*) FAM: COMPOSITAE ON CERTAIN BIOLOGICAL ASPECTS OF ALIVE INSECTS OF *Pectinophora gossypiella* (SANUD.) AND *Earias insulana* (BOISD.)

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ABSTRACT:

Laboratory studies were conducted under controlled conditions 26 ± 1 °C & 75±5 % RH, to evaluate biological effects of the LC_{50}'s and the of two different groups of chemical insecticides Deltamethrin (Decis 2.5 % Tablets), Chlorpyrifos (Dursban 48% EC) and the plant extract of Demsisa (*Ambrosia maritima*) on the newly hatched larvae of susceptible strains of *Pectinophora gossypiella* (Saund.) and *Earias insulana*, (Boisd.).

The results indicated that the LC_{50}'s values among the treated larvae of *P. gossypiella* were (3.9 ppm, 60 ppm and 5%) while were (0.97 ppm, 15 ppm and 2.5%) on the larvae of *E. insulana* which were treated with Deltamethrin, Chlorpyrifos and Demsisa respectively. Moreover, these treatments increased the larval and pupal periods per day while decreased the longevity of females . In addition, each treatment affected some other biological characters such as percent of pupation, the hatchability & fecundity percent per female .

In general, mathematically speaking, there is high significant differences between the adult emergence percentages of *P. gossypiella* of the three tested compounds and control.

On the other hand in case of *E. insulana*, there is no significant differences between the adult emergence percentages of the three tested compounds, but only between them and control one could be detected.

Key words:- *P.gossypiellga, E.insulana* plant extract Demsisa (*Ambrosia maritima*), chemical insecticides Decis (Deltamethrin) and Dursban (Chlorpyrifos), biological aspects.

INTRODUCTION

Cotton like other field crop are liable to attack by several species of insect pests during it's growing season . In Egypt, bollworms: the pink bollworm (PBW) *P. gossypiellga* (Saund.), the spiny bollworm, (SBW) *Earias insulana*

(Boisd.), are considered the most destructive pests infesting cotton bolls causing usually severe damage resulting in high loss in both quantity and quality of cotton yield (Jangra and Jaglan, 1995 and Khidr *at al*, 1996).In Egypt, these two pests cause about 25-30% loss in cotton yield .

Different groups of insecticides are recommended to control cotton bollworms, *P. gossypiellga* and *E. insulana* such as chlorpyrifos (Dursban 48% EC) Deltamethrin (decis 2.5 % Tablets) and plant extract Demsisa (*Ambrosia maretama)*. These insecticide were investigated by many investigators, i. e. Mahar *et al.* (1987), Mourad *et al* (1991), Brar *et el* (1999) and Samuthiravelu *et al.* (1990). and Elham '(2000), Osman (1999).

The present study aims to investigate the toxicity of different materials on mortality and certain biological aspects of *Pectinophora gossipiella* (Saund.) and *Earias insulana* (Boisd.)

MATERIALS AND METHODS

1-Experimental insects:

The newly hatched larvae of (PBW) *P. gossypiella* (Saund.)and (SBW) *E. insulana* (Boisd.) used in this study were obtained from laboratory colony of bollworm research department, Plant Protection Research Institute of Agric. Res Center. The insect wee reared for many generations away from any contamination with the insecticides. The artificial diet used for maintaining the insect cultures was described by Rashad and Ammar (1985).

Materials used

A- Deltamethrin (Decis):

Chemical name: (S)- 8-cyano-m-Phenoxyphenyl (1R,3R)-3-methyl -3-(2, 2 dibromoethenyl) -2,2-dimethylcyclopropanecarboxylate

B- Chlorpyrifos (Dursban):

Chemical name: *O,O*-diethyl *O*-(3,5,6-trichloro-2-pyridinyl) phosphorothioate

C - plant extract:

Ambrosia maritima (Demsisa)

Fam: Compositae

Active ingredient: Sesquiterpene-lactones consists of Demcin & Ambrosin (Picman, *et al.*, 1986)

Preparation of the plant extract:-

The tested plant was washed with water more than one once and dried under laboratory condition, then grounded in an electric mill and sieved through 0.5mm sieve.

Samples as plant powder (100g) were blended in 70 % aqueous ethanol and kept in dark container for 24 h. The mixture of the dried plant material and the solvent was stirred for 30 minute using a magnetic stirrer

The crude extract was filtered using filter paper with anhydrous sodium sulfate and evaporated under reduced pressure using a rotary evaporator. The formed concentrated extract was stored in a flask, and maintained in a as a stock solution with in the refrigerator for the tests

Treating newly hatched larvae of PBW or SBW larvae by the plant extract:

Serial of aqueous concentrations were prepared using the stock of extraction to estimating the LC_{50}, which was tested against neonate larvae of pink and spiny bollworms The kidney beans diet mentioned by Rashad & Ammar (1985) was prepared into pitry dishes (9 cm) at rate of 17.5 gm diet/pitry were prepared into glass pitry dishes The tested concentration of Ambrosia was spread by atomizer on the upper surface of diet Water was added to the untreated pitry dishes as control All the pitry dishes were left for one hour to allow drying, then individual neonate larvae of either pink or spiny bollworms were placed into each pitry dishes using fine hair brush The LC_{50} of *Ambrosia maritima* is 5% & 2.5% of PBW & SBW respectively

Treating newly hatched larvae of PBW or SBW by both insecticides:-

LC_{50} concentrations from Deltamethrin or Chlorpyrifos were spread into pitry dishes (9 cm) and water was added to untreated ones as control All the pitry were left uncapped for an hour to allow drying Fifty individuals of newly hatched larvae and Thirty of SBW were placed into each pitry dish by using fine brush The LC_{50} of Deltamethrin was 3 9ppm for PBW&.97ppm for SPW in this respect chlorpyrifos recorded 60ppm & 15ppm

All the pitry dishes treated by Deltamethrin, Chlorpyrifos and Demsisa were kept at 26 ± 1 °C & and 75-80% RH in an incubator. After sex hours of treatment the dead and alive larvae was counted and larval mortality were estimated for the three tested compounds and control

Alive newly hatched larvae of pink bollworm or spiny bollworm were transferred single into tube contained 2 gm artificial diet by a fine camel hair brush and then plugged with a piece of cotton wool The tubes were incubated at 26 ± 1 °C & 75±5 %RH, in the incubator and inspected daily until pupation .Pupae were removed from the tubes and placed in clean tubes till adult emergence

Percentage of larval mortality calculated, larval duration, pupation percentage, pupal duration and % adult emergence Also, the failure of moth's emergence from pupae and number of malformed moths were estimated

The newly emerged moths of treatment were sexed and paired for mating and kept in glass chimney (cage), the upper and lower surfaces of each were covered with muslin and tightly secured by rubber bands Moths were fed on sucrose solution 10% by providing each cage with soaked piece of cotton wool

The cages were examined daily until the death of moths The number of eggs laid per female were counted every two days on the upper and lower covers,

then kept in a clean glass jar and incubated under the same conditions till hatching . fecundity (eggs number/female) and fertility (hatchability in %) were calculated . Also pre-oviposition, oviposition and post-oviposition as well as longevity of adult were estimated for each pair. Also pre-oviposition, oviposition and post-oviposition as well as longevity of adult were estimated for each pair.

RESULTS AND DISCUSSION

Larval mortality percentage:-

The analysis of variance for the data given in Tables (1 & 2) showed a significant effect between untreated and the three tested materials for pink and spiny bollworm .A slight difference on mortality percentages were obviously appeared between the three compounds for the two pests . The mortality percentages were 54.0 %, 58.5 % and 59.0 % for PBW and 52.0 %, 49.5 % and 51.25 % by SBW when treated by Dimsisa Deltamethrin and chlorpyrifos, respectively . This data indicated that the mortality of PBW was highly affected by all tested compounds than the larval mortality of than SBW.

Larval duration:-

Data in Table (1 & 2) showed generally that the three materials (Deltamethrin, Chlorpyrifosand Plant extract) significantly influenced average of developmental period of the pink and spiny bollworms larvae compared with control. The larval duration was 16.5±0.1, 17.2 ±0.101, 17.0 ±0.368 days and 16.0±0.168 days for pink bollworm. While it was 14.6±0.0726, 14.4±0.151, 14.3±.089and 13.9±0.147 day for spiny bollworm, treated as newly hatched larvae with LC_{50} of plant extract, Deltamethrin and, Chlorpyrifos and control, respectively.

This data indicated that, the newly hatched larvae treated with the three materials prolonged the larval duration for *E.insulana* than control by 4.5, 3.33 and 2.9 % respectively.

Pupation percentage: -

It is clearly shown from the results in Tables (1&2) that the three tested materials significantly affected pupation of PBW &SBW in oppose to the untreated check. The Pupation percentage in PBW was 46.0, 41.5 and 41.0% & 100% while it was 48.0, 51.5 and 48.75% &100% for SBW, by the treatments of Demsisa, Deltamethrin, Chlorpyrifos and control respectively .

This data indicated that the pink boll worm was highly susceptible to the three tested materials than the spiny boll worm .

Pupal period:-

Data in Table (1 & 2) show the pupal period average, which affected with the three tested compounds. From the data it could be seen a significant difference between pupal period of resulted pupae from the treated neonate and the untreated larvae in both PBW & SBW compared with untreated. This period were 8.5, 8.2, 8.5 & 7.4 days for PBW and were 8.847, 8.803, 8.806 and 8.12

days for SBW when newly hatched larvae treated with Plant extract, Deltamethrin, Chlorpyrifos & control respectively This result indicated that the three compounds prolonged pupal period of PBW than control from (9.6 to 12.5%) i. e by about one day

Pupal weight:-

Date in Table (1&2) showed that all tested materials reduced the significantly pupal weight of pink and spiny bollworm. The pupal weights was 18.99, 18.67 20.48 and 20.68 m.g in average for pink bollworm and were 40.40, 42.47, 43.93 and 45.48 for the spiny bollworm when newly hatched larvae treated with plant extract or with Deltamethrin, Chlorpyrifos and control, respectively. This reduction estimated was1% to 9.8 % for PBW and 3.4 by % to 11.2 for SBW. This data indicated that, by the pupal weight of SBW was highly affected with the three compounds tested than the PBW

Adult emergence:-

Statistical analysis of data in Tables (1 & 2) cleared that there is a significant difference between the average of adult emergence under the three treatments (Plant extract and other two insecticides) and the untreated. The percentages by the three treatments in the case of pink bollworm were 93.27, 98.60 and 93.25% by Demsisa plant extract, Deltamethrin and Chlorpyrifos respectively The differences among these three treatments were not statistically significant.

In case of spiny bollworm, the percentages of adult emergence recorded as seen in Table (2) were 91.48, 93.01 and 93.16% Demsisa plant extract, Deltamethrin and Chlorpyrifos respectively, when compared by untreated one (100%). Mathematically speaking, there is no significant difference between the adult emergence percentages of the three tested insecticides could be found, but only between them and the percentages of untreated one could be detected

Oviposition period of emerged females.

Table (3 & 4) summarize data of Pre - oviposition, oviposition and post oviposition, total number of deposited eggs (fecundity) and the total number of hatching larvae from the laid eggs (fertility) for three compounds tested against PBW & SBW using (Lc_{50}) concentration in comparison to the untreated (check). The averages of Pre–oviposition periods of PBW were 2.3±0.105, 2.4±0.112,1.95±0.531 and 2.8 ±0.193 days for Deltamethrin, chlorpyrifos and control respectively. It is clearly evident that there is a significant difference in this period between the tested compounds & the control while, no significant found between plant extract and chlorpyrifos treatments

In case of *E.insulana* Table (4) show that Chlorpyrifos prolonged the pre- oviposition period and showed the highest mean by 3.5 ± 0.115days. In addition *Ambrosia* extract & Deltamethrin had no effect on the pre – oviposition period. The averages were 2.15 ±0.109, 2.7± 0.147& 2.4 ± 0.133 for Ambrosia, Deltamethrin & Control respectively

Table (1): Biological data about *P. gossypiella* (Saund.) treated as newly hatched larvae with different compounds at 26 ± 1 °C & 26 ± 1 °C &75±5R.H.

Treatments and Concentration LC_{50}	% Larval mortality	Larval duration (days) mean ± (SE)	Pupation in%	Pupal period (days) Mean ± (SE)	Pupal weight mean ± (SE)	Adult emergence in %
Plant Extract 5%	54.00 ^{b}	16.51 ±0.10 ^{c}	46.00 ^{b}	8.5 ±0.06 ^{a}	18.99 ±0.002 ^{b}	93.27 ^{b}
Delata-Methrin 3.9ppm	58.50 ^{b}	17.158 ±0.101 ^{a}	41.50 ^{b}	8.23 ±0.0941 ^{b}	18.67 ±0.257 ^{b}	98.6 ^{a}
Clorpyrifos 60 ppm	59.00b	17.011 ±0.368 ^{b}	41.00 ^{b}	8.48 0.0989 ^{a}	20.48 ±0.295 ^{a}	93.25 ^{b}
Control	0a	16.040 ±0.168 ^{c}	100 ^{a}	7.44 ±0.1013 ^{c}	20.68 ±0.595 ^{a}	100 ^{a}
LSD	5.318	0.320	5.318	0.2198	0.7211	6.0189
Probability	0.000***	0.000 **	0.000***	0.000***	0.000***	0.0006***
F	275.93	27.243	275.93	14.506	10.037	12.04

Means in columns followed by the same letters did not differ significantly

Table (2): Biological data about SBW *E. insulana* (Boisd.) treated as newly hatched larvae with different compounds at 26 ± 1 C° & 75±5 R.H.

Treatments and Concentration LC_{50}	% Larval mortality	Larval duration (days) mean ± (SE)	Pupation in%	Pupal period (days) Mean ± (SE)	Pupal weight mean ± (SE)	Adult emergence in %
Plant Extract 5%	52.00 ^{b}	14.61 ±0.0726 ^{a}	48.00 ^{b}	8.847 ±0.0715 ^{a}	40.404 ±0.627 ^{c}	91.48 ^{b}
Delata-Methrin 3.9ppm	49.5 ^{b}	14.44 ±0.1508 ^{ab}	51.5 ^{b}	8.803 ±0.097 ^{a}	42.475 ±0.0007 ^{b}	93.015 ^{b}
Clorpyrifos 60 ppm	51.25 ^{b}	14.37 ±0.089 ^{b}	48.75 ^{b}	8.806 ±0.06 ^{b}	43.935 ±0.001 ^{ab}	93.16 ^{b}
Control	0.00 ^{a}	13.96 ±0.1469 ^{c}	100 ^{a}	8.12 ±0.133 ^{b}	45.48 ±0.0012 ^{a}	100 ^{a}
LSD	3.35	0.2257	3.35	0.1995	1.832	4.747
Probability	0.000	0.007	0.000	0.000	0.004	0.0535ns
F	566.39	5.9334	566.39	10.815	6.3631	3.400

Means in columns followed by the same letters did not differ significantly

Ovipostion period:-

The present data in table (3) showed that treating newly hatched larvae with the three compounds (Plant extract, Delta methren and chlorpyrifos) Caused a highly significant reduction in Ovipostion periods of PBW than in control. The

average of Ovipostion periods were 17 7±1.01,18.7±1.66 and 16.5±1.322& 20.4 ±0.852 days by the three compounds and control, respectively. In case of *E.insulana* data in Table (4) show that no significant difference appeared between the three tested compounds, but the tested compounds shortened the oviposition period than in control *Ambrosia* treatment showed the lowest mean 14.85± 1.89, 15.35 ±1.25 and 15.65±1.28days respectively followed by Deltamethrin and chlorpyrifos. In contrast, the control one recorded the longest period with mean of 19.9±0.883 days

From the present results we can be concluded that the oviposition period was highly influenced by both tested pesticides and plant extract.

Statistical analysis of variance recorded in Tables (3&4) showed that the post- oviposition period had affected by the different tested compounds.

Female fecundity:-

The presented data in Tables (3 & 4) indicated that no significant differences between the all three tested compounds and control with the refrema to the number of the laid eggs The mean number of deposited eggs were 255.6±10.645, 296.3±18.41 and 256.1 ±37.43 egg / female of PBW adult when treated as newly hatched larvae with Plant extract, Deltamethren and chlorpyrifos, respectively in comparison to control 333.2±5.245 eggs / female. In this respect the means of laid eggs / female of SBW were 18.56±2.23, 31.2±2.0 and 28.4±2.26 and 65.2±3.03 eggs / female by plant extract, Deltamethrin, chlorpyrifos and control respectively

These results indicated that the three compounds caused reduction in of deposited eggs by 23.0, 11.05 and 23.11 % than control when the newly hatched larvae PBW adult treated by (LC_{50}) of Plant extract. Deltamethren and Chlorpyrifos respectively While in the case of SBW adult the reduction estimated were 71.54, 54.15 and 36.45 % than control. These results indicated that the *E.insulana* is higher in susceptibility to effect of the three tested compounds than *P gossypiella*.

Adult longevity:-

longevity of male:-

Tables (3&4) showed that all tested insecticides shortened the male longevity of PBW adult than in control. These periods were recorded as 19.4±1.18, 20.7±1.56 and 16.9±.1.50 & 22.40 ±1.30 days respectively

Also, when SBW treated with the three compounds (Deltamethrin, Chlorpyrifos and Plant extract), The treatment caused a gradual shorting of male longevity. This period recorded 17.8 ±1.03, 15.1±1.39 and 20.2 ±1.33 days respectively compared with 21.1±1.68 days for control

2-longevity of female:-

The results in Table (3) showed the ♀ longevity periods of *P gossypiella*.

Table (3): The mean periods of Pre-Ovipostion, Ovipostion, Post Ovipostion, Longevity of *P. gossypiella* (Saund.) and their Fecundity and hatchability under treatments of LC_{50} of three different compounds at 26 ± 1 C° &75±5R.H.

Treatments and Concen-tration LC_{50}	Pre-Ovipostion period (days)	Ovipostion period (in days) ±(S.D)	Post-Ovipostion period (days)	Longevity (in days)		Mean no of eggs /♀	Hatch-ability in(%)
				♀	♂		
Plant Extract 5%	2.3 ±0.105b	17.7 ±1.014bc	3.35 ±0.752ab	22.9 ±1.53b	19.4 ±1.18b	255.6 ±10.65a	78.78a
Delata-Methrin 3.9ppm	2.4 ±0.112ab	18.7 ±1.66ab	3.35 ±0.76ab	24.2 ±1.90b	20.7 ±1.56ab	296.3 ±18.41a	82.65a
Clorpyrifos 60 ppm	1.95 ±0.53b	16.5 ±1.32c	2.6 ±0.600b	21.1 ±1.28b	16.9 ±1.50c	256.1 ±37.43a	84.84a
Control	2.8 ±0.193a	20.4 ±0.852a	5.466 ±0.44a	2 9.1 ±1.19a	22.53 ±1.30a	333.2 ±5.245a	94.17b
LSD	0.484	2.263	2.465	2.412	2.412	70.051	63.96
Probability	0.021 *	0.0281*	0.165ns	0.035*	0.004**	0.529ns	0.424ns
F	4.911	4.447	2.047	4.0808	8.1029	0.779	1.011

Means in columns followed by the same letters did not differ significantly

Table (4): The mean periods of Pre-Ovipostion, Ovipostion, Post Ovipostion, Longevity of *E. insulana* (Boisd.) and their fecundity and hatchability under treatments of LC_{50} of three different compounds at 26 ± 1 °C & 75±5R.H.

Treatments and Concen-tration LC_{50}	Pre-Ovipostion period (days)	Ovipostion period (in days) ±(S.D)	Post-Ovipostion period (days)	Longevity (in days)		Mean no of eggs /♀	Hatch-ability in (%)
				♀	♂		
Plant Extract 2.5%	2.15 ±0.109b	14.85 ±1.89b	3.8 ±0. 526a	17.8 ±1.03b	19.4 ±1.18b	18.56 ±2.23c	88.2c
Delata-Methrin 0. 97ppm	2.7 ±0.147b	15.35 ±1.25b	1.9 ±0.423ab	15.1 ±1.39b	20.7 ±1.56b	31.2 ±2.0b	91.5b
Clorpyrifos ppm15	3.5 ±0.115a	15.6 5±1.28b	1.0 ±0.223b	20.2 ±1.33a	20.9 ±1.33b	28.4 ±2.26b	90.68b
Control	2.4 ±0.133b	19.93 ±0.887a	2.4 ±0.762ab	21.1 ±1.68 a	24.7 ±1.36a	65.2 ±3.035a	92.015a
LSD	0.368	2.829	2.343	2.651	2.672	7.311	6.526
Probability	0.0002***	0.074*	0.121ns	0.0068**	0.05*	0.000***	0.000***
F	16.787	6.793	2.343	6.97	7.60	6.6	66.15

Means in columns followed by the same letters did not differ significantly

No significant difference could be recorded when the first in star larvae fed on diet treated by plant extract and chlorpyrifos the periods of female longevity were 22.9±1.53, 21.1±1.28 respectively and 29.1±1.19 days for control

Also, result indicated that the females emerged from neonate larvae treated by Deltamethrin, had long, period it was 24.2 ± 1.9 (the period increased by 7.44% days than control).

In addition, Deltamethrin did not differ significantly from the other two compounds and control. These results are similar to those obtained by (Elham, 2000) and Osman (1999) they recorded that the same plant extract of *A. maritime* decreased the adult longevity of *E.insulana* and *A. ipsilon* treated as larvae with (Lc_{50}) value using a contact method.

On the contrary Shukla *et, al* (1997) found that the adult longevity of *E.vittella* did not differ significantly among the treatment of the plant leaves, *Azadirac .indca, O. bbsilicum, E rostrata* sativum and control

In case SBW, the obtained data in Table (4) showed that there is no significant difference between female longevity periods by using used (Lc_{50}) concentration of all compounds. But there is significant difference between the three compounds and control The averaged longevity period were 19.4±1.18, 20.7 ±1.55 and 20.1 ±1.33 when the newly hatched larvae of SBW fed on diet treated by Plant extract, Deltamethrin and Chlorpyrifos), respectively compared by 24.7 ±1.36 days for control. From these resents results we conclude that the three tested compounds cause reduction in PBW, female longevity period by 15.4 %to 21.46% days than control

These results are similar to those obtained by (Elham, 2000) and Osman (1999) they recorded that *A. maritime* decreased the adult longevity of *E.insulana* and *A. ipsilon* treated as larvae with (Lc_{50}) value using a contact method

On the contrary Shukla *et, al* (1997) found that adult longevity of *E.vittella* did not differ significantly among the treatment of the plant leaves, *A.indca, O. bbsilicum, E. rostrata* sativum and control

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تأثير الجرعة القاتلة ل % 50 من مبيدى الدلتاميثرين والكلوربيروفوس ومستخلص الدمسيسة على العديد من العمليات الحيوية في دودتي اللوز القرنفلية والشوكية

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** معهد بحوث وقاية النباتات ؛ الدقي – جيزة

تمت الدراسة المعملية تحت ظروف ثابتة من درجة حرارة 1 ± 26 م % 5±75 رطوبة نسبية لتقيم تأثير مستخلص نبات الدمسيسة (الأمبروزيا ماريتيما) ومبيد بيروثرويد (الدلتاميثرين) ومبيد فسفوري (الكلوربيروفوس) على العمر اليرقى الأول لدودتي اللوز القرنفلية والشوكية حيث أوضحت النتائج المتحصل عليها أن التركيز القاتل ل % 50 من اليرقات بعد 6ساعات من المعاملة كانت 60 ppm & 3.9 %, 5 % للثلاثة مبيدات على الترتيب لدودة اللوز القرنفلية فى حين كان 15 ppm &0.97 %, 2.5 % للثلاثة مبيدات على الترتيب لدودة اللوز الشوكية على التوالي .

كما تمت دراسة تأثير هذه المركبات على بيولجية كلتا الحشرتين حيث أظهرت النتائج ما يلي:-

١- **العمر اليرقى:**-سببت المركبات المستخدمة أطالة فترة العمر اليرقى في كلتا الحشرتين وكان ترتيبهم تنازليا طبقا لمتوسط طول العمر اليرقى كما يلي (المستخلص والدلتا ميثرين والكلوربيروفوس والكنترول) لدودة اللوز القرنفلية في حين كان الترتيب (المستخلص والدلتا ميثرين والكلوربيروفوس والكنترول) لدودة اللوز الشوكية وأن كانت الفروقات بسيطة جدا بالمقارنة بالتأثير على دودة اللوز القرنفلية

٢- **العذارى:**- رتبت النسبة المئوية للتعذير تنازليا (الكنترول والمستخلص والدلتاميثرين والكلوربيروفوس) لدودة اللوز القرنفلية في حين كانت)لكنترول والدلتا ميثرين والكلوروبيروفوس والمستخلص (لدودة اللوز الشوكية

٣- **وزن العذارى** -:رتبت العذارى حسب متوسط وزنها تنازليا كما يلي)الكنترول والكلوربيروفوس والمستخلص والدلتا ميثرين (لدودة اللوز القرنفلية في حين رتبت)الكنترول والكلوربيروفوس والدلتا ميثرين والمستخلص (لدودة اللوز الشوكية

٤- **فترة حياة الفراشات:**-أظهرت النتائج وجود نقص ملحوظ في طول عمر الفراشات الناتجة من جميع المعاملات عن الكنترول وقد رتبت تنازليا كما يلي)لكنترول والدلتا ميثرين والمستخلص والكلوروبيروفوس (لدودة اللوز القرنفلية في حين رتبت)الكنترول والدلتا ميثرين والكلوروبيروفوس والمستخلص (لدودة اللوز الشوكية

٥- **وضع البيض:**- أظهرت النتائج أنة ليس هناك تأثيرا معنويا إحصائيا على دودة اللوز القرنفلية في كمية وضع البيض لكل حشرة بين جميع المعاملات في حين أظهرت اختلافا معنويا بين المركبات والكنترول في دودة اللور الشوكية وأن كان هناك بالنسبة للحشرتين ميل لنقص كمية البيض /حشرة من الوجهة البيولجية بعيدا عن الناحية الإحصائية.