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INFLUENCE OF DIFFERENT CONSTANT TEMPERATURE DEGREES AND HOST PLANTS ON CERTAIN BIOLOGICAL ASPECTS OF THE MELON LADYBIRD BEETLE *Epilachna chrysomelina* (F.) (COLEOPTERA: COCCINELLIDAE)

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ABSTRACT

Laboratory experiments were carried out in the insectory of Economic Entomology Department,Faculty of Agriculture, Mansoura University, under three constant temperature 24±1, 28±1and 32±1°C and 60.0±5% R.H.

The total duration of the immature stages were the shortest (28.3± 2.7 days) when the insect pest reared under constant temperature of 32±1°C followed by (37.4 ± 2.6 days) at 28 ±1°C and the longest period was recorded at 24± 1°C and represented by (41.9 ± 2.8 days) with highly significant differences.

The highest percentages of hatchability, the survival of larval stage , pupal stage as well as the total immature stages were recorded when the insect reread at 28± 1°C and represented by 95.0 , 88.4 , 97,6 and 82% , respectively. On the other hand , the lowest percentages were 87.0 , 78.2 , 95.7 and 65% for hatching , the survival of larval stage, pupal stage and the total immature stages at 24± 1°C , respectively.

The ovipositional periods (pre – oviposition period , oviposition period and inter - oviposition period) as well as the female and male longevity were the shortest when the melon ladybird beetle reared at 32±1°C followed by 28±1 °C and 24±1°C while , the fecundity (average number of eggs / female) were the highest at 28±1 °C and represented by 743.0 ± 25.8 eggs / female and the lowest fecundity at 24±1°C and represented by 570.7 ± 28.6 eggs / female with highly significant differences.

The total duration of the immature stages were the shortest (37.4± 2.6 days) when the insect pest reared on snake cucumber followed by (39.0 ± 3.5 days) on squash, (39.5± 2.7 days) and watermelon and the longest periods were recorded on cucumber and represented by (40.9 ± 2.4 days) .Highly significant differences were recorded between the total duration of the immature stages reared at different host plants.

The highest percentages of hatchability, the survival of larval stage , pupal stage as well as the total immature stages were recorded when the insect reread on snake cucumber and represented by 95.0 , 88.4 , 97,6 and 82% , respectively. On the other hand , the lowest percentage were 89.0 , 72.1 , 93.7 and 60% for hatching , the survival of larval stage , pupal stage and the total immature stages on cucumber , respectively.

The ovipositional periods (pre – oviposition period , oviposition period and inter - oviposition period) as well as the female and male longevity were the shortest when the melon ladybird beetle reared on snake cucumber followed by squash ,watermelon, and cucumber .While, the fecundity Were the highest on snake cucumber and represented by 743.0 ± 25.8 eggs / female and the lowest fecundity on cucumber and represented by 275.5 ± 19.8 eggs / female with highly significant differences according to the different host plants.

INTRODUCTION

The melon ladybird beetle, *Epilachna chrysomelina* F.(coleoptera: coccinellidae) is considered a serious pest of cucurbit plants in Egypt (Bohlen and freidel, 1979, Gameel 2004 and Gameel and Abdel-Gaid 2007and Sayed and Gameel 2008) and is widely distributed (Ghabn, 1951, El-Saeady,1978, Ali and El- Saeady,1986 and Abdel-Moniem *et al*.,2004). Both larvae and adults cause great damage in a short time. Its feeding habits are phytophagous and injurious. It feeds on leaves, flowers and fruits of their host plants, belonging mainly to the family cucurbitaceae. The damage to the leaves reduces the vegetative production of the host-plant, but sometimes flours or even fruits are also destroyed. Leaves are skolotonized by feeding on the epiderm of one side, whereas that of the other side remains intact. Badly damaged leaves shrive and dry up. (Ali and El-saeady 1981 and 1986). Temperature and host plant are considered to be exogenous factors affecting insect development. Certain biological aspects of *E. chrysomelina* as has been studied in the present work were evidently influenced by these factors. (Ali and El-saeady 1981) .

Temperature and host plants are considered among the most important factors influencing the insect development. The effect of these factors on development, fecundity and the percentage of insect survival on different species were studied (Chen *et al*.,1989 on *Epilachna Vigintioctopunctata* (Fab); Elden (1991) on *Epilachna Varivestis* ; El- Abdin and Siraglnour (1991) on *Epilachna elaterii* (Rossi); Fan *et al*., (1992) on *E. Varivestis* ;patel and purohit (2000) on *E. Vigintioctopunctata* and Takeuchi *et al*., (2008) on *Epilachna admirabilis* .

The present study aimed to throw the light on the influence of different constant temperature degrees as well as the different host plants on certain biological aspects of the melon lady bird beetle.

MATERIALS AND METHODS

*** Influence of different constant temperature degrees:-**

Laboratory experiments were carried out in the Insectary of Economic Entomology Department , Faculty of Agriculture , Mansoura University under three constant temperature 24±1, 28±1and 32±1 °C.

To obtain a culture from the melon ladybird beetle *E. chrysomelina* F., a large number of the insect pest in the pupal stage were collected from snake cucumber and transferred to the laboratory until emergence to the adults. Newly emerged females and males kept in Petri dishes (9-cm diameter) and provided with a fresh leaves of snake cucumber until mating and female egg-laying. Newly deposited eggs were divided into three groups. Each group of the egg was kept in Petri dishes (9-cm diameter) at one of the following constant temperature degrees 24±1, 28±1and 32±1 °C as well as 60.0±5.0% R.H. and photoperiod 14:10 (L:D) and monitored until hatching . The hatched larvae were reared individually in Petri dishes (9-cm diameter) in the incubator under the three constant temperatures 24±1, 28±1and 32±1 °C

and provided with a fresh leaves of snake cucumber daily. Each larva was considered as a replicate (20 replicates for each constant temperature). A piece of filters paper was placed on the bottom of each dish to provide a walking surface for the larvae.

The duration of the immature stages (eggs , larvae , pupae) of the insect were recorded and calculated as well as the survival from eggs to adult eclosion were calculated under the three constant temperature degrees.

To determine the ovipositional periods, adult longevity for females and males, fecundity and fecundity rate of the melon ladybird beetle in relation to different temperatures, newly emerged adults were paired in Petri dishes (9-cm diameter) . Each pair was provided with a fresh leaves of snake cucumber. Ten pairs considered as a replicates for each constant temperature degree. Statistical analysis was carried out by using one way ANOVA.

*** Influence of different host plants:-**

Experiments were carried out in the Insectary under three constant temperature 28±1°C and 60.0±5.0% R.H. and photoperiod 14:10 (L:D) .To obtain a culture from the melon ladybird beetle *E. chrysomelina*, a large numbers of the insect pest in the pupal stage were collected from cucurbit vegetables as squash, cucumber, snake cucumber and watermelon and transferred to the laboratory until emergence to the adults. Newly emerged females and males kept in Petri dishes (9cm diameter) and provided with a fresh leaves of cucurbit vegetables until mating and female egg-laying. Newly deposited eggs were divided into four groups. Each group was kept in Petri dishes (9-cm diameter) until hatching. The hatched larvae were reared individually in Petri dishes (9-cm diameter) in the incubator. Each larva was considered as a replicate (20 replicates for each treatment). Each treatment was provided with a fresh leaves of cucurbit as squash, cucumber, snake cucumber and watermelon as a different host plants. A piece of filters paper was placed on the bottom of each dish to provide a walking surface for the larvae.

The duration of the immature stages (eggs , larvae , pupae) , the survival percentage as well as the ovipositional periods , adult longevity for females and males , fecundity and fecundity rate for different host plants were calculated as previously mentioned in influence of different constant temperature degrees.

RESULTS AND DISCUSSION

Influence of different constant temperature degrees:-

Data illustrated in Table (1) showed the influence of different constant temperature degrees 24±1, 28±1and 32±1°C on the immature stages (incubation period, the larval stage and the pupal stage) of the melon ladybird beetle *E. chrysomelina* reared on snake cucumber.

It can be noticed that , at 32±1°C , the incubation period (5.6 ± 0.8) , the larval stage (15.6 ± 1.8) and the pupal stage (6.1± 0.6 days) were the shortest followed by 28± 1°C and represented by (6.6 ± 0.9 , 20.3 ± 2.2 , 10.5

± 0.6 days) and the constant temperature 24± 1°C was the longest and represented by (7.1 ± 0.9 , 23.0 ± 1.6 , and 11.8 ± 0.8 days) for incubation period , larval stage and pupal stage , respectively .

As a conclusion , data arranged in Table (1) indicated that , the total duration of the immature stages was the shortest (28.3± 2.7 days) when the insect pest reared under constant temperature 32±1°C followed by (37.4 ± 2.6 days) at 28 ±1°C and the longest periods were recorded at 24± 1°C and represented by (41.9 ± 2.8 days) . Highly significant differences were recorded between the incubation period , larval stage or pupal stage at different temperature treatments . Similar observations were reported by Ali and El-Saeady (1981) and Chen *et al* (1989).

Table (1): Influence of different constant temperature degrees on the immature stages of *E. chrysomelina* reared on snake cucumber.

Biological aspects		Temperature		
		24ºC±1	28 ºC±1	32 ºC±1
Incubation period		7.1±0.9a	6.6±0.9 ab	5.6±0.8 b
Larval stage	1st instar	6.2±0.6 a	5.6±0.8 a	4.3±0.5 b
	2nd instar	6.0±0.7 a	4.5±0.5 b	3.7±0.8 b
	3rdinstar	5.1±0.6 a	4.8±0.9 a	4.4±0.6 a
	4th instar	5.7±0.9 a	5.4±0.6 a	4.2±0.6 b
	Total	23.0±1.6 a	20.3±2.2 b	15.6±1.8 c
Pupal stage	Pre-pupa	3.9±0.8 a	3.1±0.3 ab	2.4±0.6 b
	Pupa	7.9±0.8 a	7.4±0.7 a	3.7±0.8 b
	Total	11.8±0.8 a	10.5±0.6 b	6.1±0.6 c
Egg – Adult		41.9±2.8 a	37.4±2.6 b	28.3±2.7 c

***In the horizontal rows, the means followed by the same latters are not significantly different at 1% level of probability (one way ANOVA).**

Data arranged in Table (2) indicated that, the percentage of hatchability was the highest 95.0% at 28 ±1°C followed by 93.0% at 32±1°C and the lowest 87.0%
at 24± 1°C.

The survival percentages of larval instars and pupal stage were the highest at 28 ±1°C and represented by 95.8 , 96.7 , 97.7 , 97.7 and 97.6% for 1st ,2nd , 3rd , 4th larval instars and pupal stage , respectively. Meanwhile the lowest survival percentages were recorded when the insect reared at 24± 1°C and represented by 92.0, 93.8, 94.7, 95.8 and 95.7% for the four larval instars and pupal stage , respectively.

As a conclusion , data represented in Table (2) indicated that , the highest percentages of hatchability , the survival of larval stage , pupal stage as well as the total immature stages were recorded when the insect reread at 28± 1°C and represented by 95.0 , 88.4 , 97,6 and 82% , respectively. On the other hand , the lowest percentage were 87.0 , 78.2 , 95.7 and 65% for hatching , the survival of larval stage , pupal stage and the total immature stages at 24± 1°C , respectively. These results are in agreement with those of Fan *et al* (1992).

Table (2): Influence of different constant tempreture degrees on the survival percentages of *E. chrysomelina* reared on snake cucumber

Biological Aspects		Temperature		
		24ºC±1	28 ºC ±1	32 ºC ±1
Hatchability%		87.0	95.0	93.0
Larval stage	1st instar	92.0	95.8	94.6
	2nd instar	93.8	96.7	95.5
	3rd instar	94.7	97.7	96.4
	4th instar	95.8	97.7	96.3
	Total	78.2	88.4	83.9
Pupal Stage		95.7	97.6	97.4
Total immature stages		65%	82%	76%

Data represented in Table (3) showed the effect of different constant temperature degrees 24±1, 28±1 and 32±1°C on the ovipositional periods , adult longevity for females and males as well as fecundity and fecundity rate of the melon ladybird beetle *E. chrysomelina* reared on snake cucumber. It can be noticed that , pre – oviposition period , oviposition period , inter - oviposition period , female longevity and male longevity were the shortest when the insect were reared at 32±1°C and represented by 2.5 ± 0.6 , 18.4 ± 2.7 , 3.8 ± .06 , 24.7 ± 3.7 and 19.8 ± 2.7 days , respectively . On the other hand, these periods were the shortest when the insect reared at 24±1°C and represented by 5.5 ± 1.6, 32.6 ± 3.7, 9.5 ± 1.5, 47.6 ± 4.6 , 40.5 ± 3.9 days ,respectively . Moreover , the fecundity of the insect female (the average number of eggs / female) were the highest (743.0 ± 25.8 eggs/ female) were recorded at 28± 1°C followed by (690.0 ± 33.7 eggs/ female) at 32±1°C and the lowest fecundity (570.7 ± 28.6 eggs/ female) were recorded when the insect reared at 24±1°C , while the fecundity rate were the highest 38.3 ± 2.3 eggs/ female / day at 32±1°C followed by 29.7 ± 1.6 eggs/ female / day at 28± 1°C and 17.8 ± 1.7 eggs/ female / day when the insect reared at 24±1°C .

Table (**3**): **Influence of different constant temperature degrees on the ovi position period, adult longevity and the fecundity of *E. chrysomelina* reared on snake cucumber.**

Biological Aspects		Temperature		
		24ºC±1	28 ºC±1	32 ºC±1
Pre-ovi position period		5.5±1.6 a	3.3±0.7 b	2.5±0.6 b
Oviposition period		32.6±3.7 a	25.7±2.9 b	18.4±2.7 c
Inter oviposition period		9.5±1.5 a	5.4±0.8 b	3.8±0.6 c
Adult Longevity	Female	47.6±4.6 a	34.4±3.8 b	24.7±3.7 c
	Male	40.5±3.9 a	29.5±2.6 b	19.8±2.7 c
Fecundity		570.7±28.6 c	743±25.8 a	690±33.7 b
Fecundity Rate		17.8±1.7 c	29.7±1.6 b	38.3±2.3 a

***In the horizontal rows, the means followed by the same letters are not significantly different at 1% level of probability (one way ANOVA).**

It can be concluded that, the ovipositional periods (pre – oviposition period , oviposition period and inter - oviposition period) as well as the female and male longevity were the shortest when the melon ladybird beetle

reared at 32±1°C followed by 28±1 °C and 24±1°C. while , the fecundity (average number of eggs / female) were the highest at 28±1 °C and represented by 743.0 ± 25.8 eggs / female and the lowest fecundity at 24±1°C and represented by 570.7 ± 28.6 eggs / female .

Statistical analysis revealed that, a highly significant differences were recorded between these biological aspects at different temperature treatments. these results are in agreement with those of El-Abdin and Siragelnour(1991).

*** Influence of different host plants:-**

Data illustrated in Table (4) showed the influence of different host plants as squash, cucumber , snake cucumber and watermelon on the immature stages of the melon ladybird beetle *E. chrysomelina* reared under laboratory condition (28°C and 60.0 ± 5.0% R.H)

It can be noticed that , at snake cucumber , the larval stage (20.3 ± 2.2) and the pupal stage (10.5± 0.6 days) were the shortest followed by squash and represented by (21.8 ± 1.7 and 11.1 ± 0.5 days) , watermelon (22.0 ± 2.3 and 11.0 ± 0.7) and the longest period on cucumber and represented by (23.2 ± 2.6 , and 11.7 ± 0.7 days) for larval stage and pupal stage , respectively .

As a conclusion , data arranged in Table (4) indicated that , the total duration of the immature stages were the shortest (37.4± 2.6 days) when the insect pest reared on snake cucumber followed by (39.0 ± 3.5 days) on squash , watermelon (39.5± 2.7 days) and the longest periods were recorded on cucumber and represented by (40.9 ± 2.4 days) . Highly significant differences were recorded between the total duration of the immature stages reared at different host plants . The obtained data are in agreement with those of Ali and El-saedy (1981) and (1986).

Table (4) : Influence of different host plants on the immature stages of *E.chrysomelina* reared under laboratory condition (28c° and 60± 5%R.H)

Biological Aspects		Squash	Cucumber	Snake cucumber	Watermelon
Incubation period		6.3±0.5 a	6.7±0.89 a	6.6±0.63 a	6.5±0.55 a
Larval Stage	1st instar	5.8±0.9 a	5.9±0.7 a	5.6±0.8 a	5.8±0.4 a
	2nd instar	4.6±0.6 b	5.6±0.6 a	4.5±0.5 b	5.3±0.7 a
	3rd instar	5±0.4 ab	5.9±0.5 a	4.4±0.9 b	5.5±0.6 a
	4th instar	6.4±0.56 a	5.8±0.7 a	5.1±0.6 a	5.4±0.4 a
	Total	21.8±1.7 a	23.2±2.6 a	20.3±2.2 b	22±2.3 a
Pupal Stage	Pre-pupa	3.2±0.8 a	3.4±0.4 a	3.1±0.3	3.3±0.7 a
	pupa	7.9±0.5 a	8.3±0.8 a	7.4±0.7a	7.7±0.8 a
	Total	11.1±0.5 ab	11.7±0.7a	10.5±0.6 b	11.0±0.7 ab
Egg - Adult		39.0±3.5 b	40.9±2.4 a	37.4±2.6 c	39.5±2.7 b

***In the horizontal rows, the means followed by the same latters are not significantly different at 1% level of probability (one way ANOVA).**

Data arranged in Table (5) indicated that , the percentage of hatchability was the highest 95.0% on snake cucumber followed by 93.0% on squash followed by 91.5% on watermelon and the lowest 89.0% on cucumber .

The survival percentages of larval instars and pupal stage were the highest on snake cucumber and represented by 95.8, 96.7, 97.7, 97.6 and 97.6% for 1st, 2nd, 3rd, 4th larval instars and pupal stage, respectively. Meanwhile the lowest survival percentages were recorded when the insect reared on cucumber and represented by 89.8, 91.2, 93.2, 92.6 and 93.7% for the four larval instars and pupal stage , respectively.

As a conclusion , data represented in Table (5) indicated that , the highest percentages of hatchability , the survival of larval stage , pupal stage as well as the total immature stages were recorded when the insect reread on snake cucumber and represented by 95.0 , 88.4 , 97,6 and 82% , respectively. On the other hand , the lowest percentages were 89.0 , 72.1 , 93.7 and 60% for hatchability , the survival of larval stage , pupal stage and the total immature stages on cucumber , respectively.

Table (5): Influence of different host plants on the survival percentages of *E.chrysomelina* reared under laboratory condition (28°C and 60± 5 % R.H)

Biological Aspects		Cucurbit Hosts			
		Squash	Cucumber	Snake Cucumber	Watermelon
Hatchability %		93.0	89.0	95.0	91.5
Larval stage	1st instar	93.5	89.8	95.8	92.3
	2nd instar	94.2	91.2	96.7	93.1
	3rd instar	96.3	93.2	97.7	94.9
	4th instar	96.2	92.6	97.6	93.2
	Total	81.7	72.1	88.4	76.1
Pupal Stage		96.5	93.7	97.6	95.6
Total immature stages		73%	60%	82%	67.5%

Data represented in Table (6) showed the influence of different host plant on the ovipositional periods , adult longevity for females and males as well as fecundity and fecundity rate of the melon ladybird beetle *E. chrysomelina* reared under laboratory condition (28 °C and 60.0 ± 5.0%R.H). It can be noticed that, pre – oviposition period , oviposition period , inter - oviposition period , female and male longevity were the shortest when the insect were reared on snake cucumber and represented by 3.3 ± 0.7 , 25.7 ± 2.9 , 5.4 ± 0. 6, 33.4 ± 3.8 and 29.5 ± 2.6 days, respectively. On the other hand, these periods were the longest when the insect reared on cucumber and represented by 8.5 ± 0.7, 18.3 ± 1.8, 9.5 ± 0.7, 36.3 ± 3.2 and 30.5 ± 2.2 days, respectively. Moreover , the fecundity of the insect female were the highest (743.0 ± 25.8 eggs/ female) were recorded on snake cucumber followed by (428.6 ± 24.7 eggs/ female) on squash , (350.8 ±18.9 eggs/ female) on water melon and the lowest fecundity (275.5 ± 19.8 eggs/ female) were recorded when the insect reared on cucumber , while the fecundity rate were the highest 29.7 ± 1.6 eggs/ female / day on snake cucumber followed by 20.02 ± 1.8 eggs/ female / day on squash and 17.9 ± 1.5 eggs/ female / day when the insect reared on watermelon and the lowest rate 15.1 ± 1.4 eggs/ female / day on cucumber.

It can be concluded that , the ovipositional periods (pre – oviposition period , oviposition period and inter - oviposition period) as well as the female and male longevity were the shortest when the melon ladybird beetle reared on snake cucumber followed by squash ,watermelon and cucumber . while , the fecundity were the highest on snake cucumber and represented by 743.0 ± 25.8 eggs / female and the lowest fecundity on cucumber and represented by 275.5 ± 19.8 eggs / female .

Statistical analysis revealed that, a highly significant differences were recorded between these biological aspects at different host plant treatments . these results are in agreement with those of Ali and El-Saeady 1981 and 1986 and Patel and Purohit 2000.

Table (6): Influence of different host plants on the ovi position period, adult longevity and the fecundity of *E. chrysomelina* reared under laboratory condition (28c° and60± 5%R.H).

Biological Aspects		Cucurbit Hosts			
		Squash	Cucumber	Snake cucumber	Watermelon
Pre- ovi position period		5.2±0.63 c	8.5±0.7 a	3.3±0.7 d	7.3±0.8 b
Ovi position period		21.4±2.1 b	18.3±1.8 d	25.7±2.9 a	19.6±2.4 c
Inter ovi position period		7.5±0.6 b	9.5±0.7 a	5.4±0.6 c	8.3±0.7 b
Adult longevity	Female	34.1±3.9 c	36.3±3.2 a	33.4±3.8 c	35.2±3.7 b
	Male	27.3±1.9 c	30.5±2.2 a	29.5±2.6 b	29.1±2.1 b
Fecundity		428.6±24.7 b	275.5±19.8 d	743±25.8 a	350.8±18.9 c
Fecundity Rate		20.02±1.8 b	15.05±1.4 d	29.7±1.6 a	17.9±1.5 c

***In the horizontal rows, the means followed by the same letters are not significantly different at 1% level of probability (one way ANOVA).**

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تأثير درجات الحرارة والعوائل النباتية المختلفة على بعض الخصائص البيولوجية لحشرة خنفساء القثاء

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أجريت هذه التجارب المعملية لحشرة خنفساء القثاء فى مربى الحشرات التابع لقسم الحشرات الاقتصادية –كلية الزراعة –جامعة المنصورة في حضانات تحت الظروف المعملية على ثلاث درجات حرارة مختلفة هي ٢٤+١ ، ٢٨+١ ، ٣٢+١م ورطوبة نسبيه ٦٠± ٥%.

وقد أوضحت النتائج أنة عند تربية الحشرة على درجة حرارة ٣٢±١ م كانت اقصر فترة للأطوار الغير الكاملة (٢٨.٣±٢.٧يوم) ثم (٣٧.٤±٢.٦يوم)على درجة حرارة ٢٨ م بينما استغرقت أطول فترة عندما تم تربية الحشرة على درجة حرارة ٢٤ م (٤١.٩± ٢.٨يوم) وكذلك بفروق عالية المعنوية.

وجد أن أعلى نسبة مئوية لفقس البيض ، ونسبة البقاء لطور اليرقة والعذراء ومجموع الأطوار غير الكاملة ثم الحصول عليها عندما تربية الحشرة على درجة حرارة ٢٨ م بنسبة (٩٥% ،٨٨.٤%،٩٧.٦%،٨٢%) على التوالى . ومن جهة اخى تم الحصول على اقل نسبة عندما تم تربية الحشرة على درجة حرارة ٢٤ م بنسبة (٨٧% ،٧٨.٢% ،٩٥.٧%، ٦٥%)على التوالى .

وقد أظهرت النتائج أيضا أنه تم الحصول على أقصر فترات ما قبل وضع البيض ووضع البيض وفترة مابين وضع البيض للإناث وطول فترة حياة الذكوروالاناث عندما تم تربية الحشرة على ٣٢ م يليها ٢٨ م ثم ٢٤ م . بينما تم الحصول على أعلى (خصوبة الحشرة) على درجة حرارة ٢٨ م (٧٤٣± ٢٥.٨بيضة/ أنثى) . وأقل خصوبة تم الحصول عليها عندما تم تربية الحشرة على درجة حرارة ٢٤م (٥٧٠.٧± ٢٨.٦ بيضة/ أنثى) وذلك بفروق عالية المعنوية.

قد أظهرت النتائج أن مجموع فترات الأطوار غير الكاملة كانت أقصر (٣٧.٤± ٢.٦ يوم) عندما تم تربية الحشرة على القثاء يليها (٣٩± ٣.٥يوم) على الكوسة، (٣٩.٥± ٢.٧يوم)على البطيخ و أطول فترة عندما تم تربية الحشرة على الخيار(٤٠.٩± ٢.٤يوم). وقد سجلت النتائج فروق عالية المعنوية للأطوار غير الكاملة عند التربية على عوائل مختلفة.

أوضحت النتائج أيضا أن أعلى نسبة لفقس البيض ونسبة البقاء لطور اليرقة والعذراء ومجموع الأطوارغير الكاملة كانت عندما تم تربية الحشرة على القثاء (٩٥% ،٨٨.٤%، ٩٧.٦%، ٨٢%) على التوالى. ومن جهة اخرى أقل نسبة كانت على الخيار (٨٩%، ٧٢.١% ،٩٣.٧% ،٦٠%) على التوالى.

أظهرت النتائج أن فترة ماقبل وضع البيض وفترة البيض وفترة مابين وضع البيض للاناث وطول فترة حياة الذكورو الاناث بلغت اقصرفتراتها عندما تم تربية الحشرة على القثاء يتبعها الكوسة والبطيخ ثم الخيار.

بينما أعلى معدل خصوبة للأنثى تم الحصول علية عندما تربية الحشرة على القثاء وهى (٧٤٣± ٢٥.٨ بيضة/ أنثى) وأقل خصوبة (٢٧٥.٥± ١٩.٨ بيضة/ أنثى) كان على الخياروذلك بفروق عالية المعنوية طبقا للعوائل المختلفة.

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