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BIOLOGICAL CHARACTERSTICS OF THE TWO COCCINELLID PREDATORS *Cydonia vicina nilotica* Muls. AND *Cydonia vicina isis* Cr. (COLEOPTERA: COCCINELLIDAE) REARED ON ARTIFICIAL DIETS AND NATURAL PREY UNDER CONSTANT TEMPERATURE.

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ABSTRACT

Laboratory experiments were carried out in the Insectary of the Economic Entomology Department Faculty of Agriculture Mansoura University in the incubators under constant temperature of 26±1^{o}C and 70±5 % R.H. to investigate some biological characteristics of the two predators *Cydonia vicina nilotica* Muls and *Cydonia vicina isis* Cr. when reared on artificial diets and natural prey *Aphis gossypii* Glover during 2012 year. The results revealed that the larval duration period was longer for the larvae of the two coccinellid predators reared on the three artificial diets compared with that reared on *A. gossypii*. The data showed that the average longevity of *C. vicina nilotica* females were 47.7±4.18; 50.64±4.42 and 53.03±4.96 days while the average of deposited eggs per predator female were 342±5.11; 599.44±6.85 and 655.18±8.75 eggs when fed on AD1 ; AD2 and AD3 respectively . The average longevity of *C. vicina isis* females were 45.82±3.6; 50.59±3.82 and 52.61±4.17 days while the average of deposited eggs per predator female were 410.86±5.62; 632.46±9.37 and 695.78±12.67eggs when fed on AD1 ; AD2 and AD3 respectively. The longevity period of *C. vicina nilotica* female was 51.8±4.16 days and the number of deposited eggs per predator female averaged 680.95±9.84 eggs, while the longevity period of *C. vicina isis* female was 50.51±3.65 days and the number of deposited eggs per predator female averaged 718.56±10.75 eggs when the two coccinellid predator reared on *A.gossypii*. As conclusion also the AD3 was the best for rearing the two coccinellid predators. The statistical analysis showed significant difference in the fecundity of the two coccinelled predators which reared on the two artificial diets AD1; AD2 and the females which reared on *A. gossypii*, while the results cleared that non-significant between the AD3 and the females fed on natural prey *A. gossypii*. The results of this experiment assured the possibility of rearing these two predators successfully on artificial diets.

Keywords: *Cydonia vicina nilotica* Muls. *Cydonia vicina isis* Cr*., Aphis gossypii* Glover Biology, Artificial diets.

INTRODUCTION

In recent years much interest has been given to biological control of harmful pests especially by predators and parasitoid insects. However, the success these biological control agents necessitate their presence in sufficient numbers when required. These obstacles can be only avoided by their rearing on artificial diets under controlled conditions. *C. vicina isis* and *C. vicina nilotica* playing an important role as biological control agents in regulating the population density of some insect pests especially aphids (Ghanim and El-Adl, 1983, Ghanim and El-Adl 1987 and Mohamed, 2001).

Mass-rearing of predaceous coccinellids on natural preys is not easy, because the preys can be collected during a part of the season together when obstacles facing the preys in both space and man power. Therefore attempts have been made to avoid these difficult by rearing coccinellid predatory insects on artificial diets more than on live preys. A major problem in the rearing of the coccinellid predatory insect's species is the diet formation. The two approaches (holodic or miridic) are known for developing artificial diets for insects. The holodic diets are based on preparing a mixture of defined chemicals. This has been achieved with only a few insects, as the demands of the insects on its food are very complex and are not yet completely understood. Not only the diet must contain all necessary nutrients, but also the food must have the correct mechanical properties to facilitate its intake. The meridic diets based on preparing artificial diets by mixing different natural substances are such as honey, yest, royal jelly, which is rich in most of the necessary nutrients, including carbohydrates, proteins, essential aminoacids, minerals, lipids and sterols. Numerous entomologists have made several attempts to rear predacious coccinelllids on artificial diets prepared by using Holidic, or Meridic diets (Smirnoff, 1958; Okada, 1970; Hukusima and Takeda, 1975; Chen and Qin, 1982; Chen *et al*. 1989; Henders, *et al.* 1992; Hattingh and Saways 1993; Abdel-Salam1995; Sun and Fang 1999; Muhammad, and Saqib 2010 and Bahy El-Din 2013). The present investigation has been outlined to study the biological aspects of the two coccinellid predators *C. vicina nilotica* and *C. vicina isis* when reared on artificial diets and natural prey under constant temperature.

MATERIALS AND METHODS

Laboratory experiments were carried out in the Insectary of the Economic Entomology Department Faculty of Agriculture Mansoura University in the incubators under constant temperature of 26±1^{o}C and 70±5 % R.H., to investigate some biological characteristics of the two predators coccinellid *Cydonia vicina nilotica* Muls and *Cydonia vicina isis* Cr. when reared on artificial diets and natural prey *Aphis gossypii* Glover during 2012 year. To obtain a culture from the two coccinellid predators a large numbers of the adult stage were collected from vegetable crops during March 2012 and transferred to the laboratory. Twenty newly hatched first instar larvae of each predator were introduced singly into in Petri dishes (10 cm diameters) and divided to four groups each group consisted of 20 larvae were use as a replicate three groups of them reared on the three artificial diets and one fed on the natural prey *A. gossypii*.

Reared on artificial diets

Starting from the first larval instar of each predator the artificial diets were used as food, the components of the three artificial diets are given in Table (1,2 and 3). Each larval instar was reared in a Petri-dish (10 cm in diameter) replicate with a filter paper in the bottom and on a piece of the AD was placed on one side of the dish and a piece of cotton soaked with water on the other side. Each predator was replicated twenty times. The artificial diets and the piece of cotton were changed weekly. The Petri-dish was

examined daily and the duration of the developmental stages were recorded. The duration period of pupal stage and mortality for each predator were calculated. For rearing the adult stage of each coccinellid beetles. The same technique was carried out, and copule (male and female) was replicated ten times. The life span of both sexes and fecundity of females were recorded and calculated.

Table (1): Composition of the prepared artificial diet (AD1) for rearing the coccinellid predator *C. vicina nilotica* and *C. vicina isis*

	Ingredients	Amount in %
1	Dried milk	17.8
2	Pollen grains	5.6
3	Dry powdered aphids	8.5
4	Yeast (powdered)	1.5
5	Sucrose (powdered)	55.8
6	Royal jelly (capsules powdered)	5.5
7	Multi-vitamins and minerals	3.6
8	Stereptophenicol	1.7
	Total	100

Table(2):Composition of the prepared artificial diet (AD2) for rearing the coccinellid predator *C. vicina nilotica* and *C. vicina isis*.

	Ingredients	Amount in %
1	Dried fish	18.5
2	Pollen grains	4.15
3	Dry powdered aphids	8.75
4	Dry powdered drone of honeybees	2.08
5	Yeast (powdered)	2.97
6	Sucrose (powdered)	54.96
7	Royal jelly (capsules)	4.15
8	Multi-vitamins and minerals	2.94
9	Stereptophenicol	1.5
	Total	100

Table(3):Composition of the prepared artificial diet (AD3) for rearing the coccinellid predator *C. vicina nilotica a* and *C. vicina isis*

	Ingredients	Amount in %
1	Dried yolk of eggs	10.5
2	Dried fish	10.5
3	Pollen grains	2.5
4	Dry powdered aphids	5.5
5	Dry powdered of drone honeybees	3.5
6	Yeast (powdered)	2.5
7	Sucrose (powdered)	53.7
8	Royal jelly (capsules)	5.0
9	Multi-vitamins and minerals	4.5
10	Stereptophenicol	1.8
	Total	100

Reared on the *A. gossypii*

At the same time, the same biological characters were also secured for the two predators reared on natural prey *A. gossypii* as a control. Newly hatched larvae from each two predators were introduced singly, into Petri-dishes of the same in the diameters. The bottom of each dish was covered with a filter paper to facilitate the predator larval movement. A known number from different stages of *A. gossypii* was introduced daily at into each dish. A small plant leaflet was replaced daily in each Petri-dish as food for the aphids. The devoured aphid individuals were reduced daily. The mean number of predated aphids by each predator larval instars was calculated. From the emerged adults, ten sexed individuals of each predator were introduced singly into Petri-dishes. The technique of rearing the adult stages was the same of the larval stage. After copulation took place (after four days), the two sexed were separated and kept singly in the dishes. The total number of aphids individuals consumed by a male or female and the total number of eggs laid per each predator female were estimated. The daily average of food consumption during thr longevity of each predator stage was also calculated.

C: Data analysis

Data for the developmental time and average of consumption per larval stage longevity, fecundity and consumption rate of the predator *C. vicina nilotica* and *C. vicina isis* when reared on artificial diets and *A. gossypii* and were subject for one way analysis of variance (Anova) and the means were separated using Dancan's Multiple Rang Test (Cohrot Software 2004).

RESULTS AND DISCUSSION

A: Reared on artificial diets

A.1. *Cydonia vicina nilotica*

The data represented in (Tables 4&5) showed that the results of certain biological characters of *C. vicina nilotica* when fed on the three artificial diets. It can be seen from these Tables that the duration of the larval stage lasted 24.52±3.5 ; 19.98±2.4 and 17.35±2.1 days as an average when fed on AD1, AD2 and AD3 respectively, The pupal stage maintained 6.85±1.7; 6.17±1.5 and 5.96±1.42 days. The mortality reached 28.37; 24.55 and 21.15% when this predator fed on AD1, AD2 and AD3 respectively (Table 4). The results in Table 4 revealed that the AD3 was better for rearing *C. vicina nilotica* because the larval instar developed successfully and the larval duration period was shorter than the duration of the larvae fed on other diets. The average longevity and fecundity of *C. vicina nilotica* females were (47.7±4.18 days; 342±5.11 eggs), (50.64 ±4.42 days; 599.44±6.85 eggs) and (53.03±4.96 days; 655.18±8.75 eggs) when reared on AD1, AD2 and AD3 respectively (Table 5) while the average longevity of males were 32.10±2.47; 36.25±2.54 and 38.96±2.95 days when fed on the three artificial diets previously mentioned. The data in this table revealed that the AD3 was highly efficient for rearing *C. vicina nilotica* and deposited larger number of eggs. These results agree with those of Ghanim and El-Adl (1996, 1997) and Ghanim *et al*. 2000).

2- *Cydonia vicina isis*

The results in Table 6&7 revealed that the duration of the larval stage lasted 25.74±3.65; 20.63±2.75 and 18.14±2.17 days as an average when fed on AD1, AD2 and AD3 respectively, the pupal stage maintained 6.96±2.1; 6.42±1.7 and 6.11±1.54 days. The mortality reached 26.86; 23.75 and 20.4% when this predator fed on AD1, AD2 and AD3 respectively (Table 6). The results in (Table 6) showed that the AD3 was best for rearing *C. vicina isis* because the larval stage developed successfully and the larval duration period was shorter than the duration of the larvae fed on other diets. The average longevity and fecundity of *C. vicina isis* females were (45.82±3.6 days; 410.86±5.62 eggs), (50.59±3.82 days; 632.46±9.37 eggs) and (52.61±4.17 days; 695.78±12.67eggs) when reared on AD1, AD2 and AD3 respectively (Table 7), while the average longevity of males were 31.85±2.8; 37.61±2.96 and 39.67±3.15 days when fed on the three artificial diets previously mentioned. The data in this Table revealed that the AD3 was highly efficient in rearing *C. vicina isis* and deposited larger number of eggs.

B: Reared on *A. gossypii*

1- *Cydonia vicina nilotica*

Immature stages

Data represented in Table (8) showed that the duration period, food consumption and mortality percentages of the larval stage of the coccinellid predator *C. vicina nilotica* when reared on *A. gossypii*. It can be seen from this table that, the duration period of the larval stage averaged 15.23±1.35 days. The average of the total consumption during the four larval instars was 62.57±1.85, 50.65±1.52, 140.64±2.5 and 360.78±5.89 individuals respectively. Meanwhile, the results revealed that, the average of the total consumption per larva was 614.64±10.44 individuals. The percentages of feeding capacity for each of the four larval instars of this predator were 10.18, 8.24, 22.88 and 58.7 % respectively. Therefore, it is obvious that, the third and fourth larval instar of this predator represent together 81.58 % or backbone in the predation activity. The percentages of the mortality were 8.65, 6.42, 4.51 and 1.2 % during the four larval instars respectively. The duration period of pupal stage was 5.8±0.95 days.

Table(8):Duration period of immature stages predaceous efficiency and percentage of mortality of *C. vicina nilotica* reared on *A. gossypii* under constant temperature of 26±1 C° and 70±5% relative humidity.

A:Larval stage	Duration in days	Daily average consumption	Average of total consumption	% of feeding capacity	% of Mortality
1 st instar	4.36±0.74	14.35	62.57±1.85	10.18	8.65
2 nd instar	1.65±0.42	30.70	50.65±1.52	8.24	6.42
3 rd instar	3.85±0.64	36.53	140.64±2.5	22.88	4.51
4 th instar	5.37±0.96	67.18	360.78±5.89	58.7	1.2
Total	15.23±1.35	40.36	614.64±10.44	100	20.78
B: Pupal stage	5.8±0.95				

Adult stage

1: Predator female

The predator female fed on a total average of 1649.64±22.75 individuals, with a daily rate of 31.85 individuals during the longevity period of 51.8±4.16 days as seen in (Table 9). The average of the pre-oviposition period was 5.5±0.79 days. The predator female consumed during this period 354.8±6.5 individuals with a daily rate of 64.51 individuals. The predator female consumed during the ovipasition period on an average of 1050.17±15.85 individuals, this period lasted an average of 26.54±2.96 days with a daily rate of 39.57 individuals. The number of deposited eggs per predator female averaged 680.95±9.84 eggs with a daily rate 25.66 eggs per day. During the post-oviposition period, the predator female consumed 244.67±4.4 individuals this period lasted an average of 19.76±1.6 days with a daily rate of 12.38 individuals.

2: Predator male

During its longevity, was lasted for an average of 37.84±2.65 days (Table 9). The predator male consumed a total average of 1096.5±19.65 individuals with daily rate of 28.97 individuals.

Table (9): Longevity, food consumption and fecundity of *C. vicina nilotica* adults reared on *A. gossypii* under constant temperature of 26±1 C° and 70±5% relative humidity.

Adult stage	Period in days	Daily average consumption	Average of total consumption	No. of eggs	
				Daily	Total
A : Female					
Pre-oviposition	5.5±0.79	64.51	354.8±6.5		
Oviposition	26.54±2.96	39.57	1050.17±15.85	25.66	680.95±
Post-oviposition	19.76±1.6	12.38	244.67±4.4		9.84
Longevity	51.8±4.16	31.85	1649.64±22.75		
B : Male					
Longevity	37.84±2.65	28.97	1096.5±19.65		

1- *Cydonia vicina isis*

Immature stages

Data represented in (Table 10) showed that the duration period, food consumption and mortality percentages of the larval stage of the coccinellid predator *C. vicina isis* when reared on *A. gossypii*. It can be seen from this table that, the duration period of the larval stage averaged 15.89±1.8 days. The average of the total consumption during the four larval instars was 74.56±1.92, 56.86±1.2, 155.97±6.85 and 390.77±1.96 individual respectively. Meanwhile, the results revealed that, the average of the total consumption per larva was 678.16±15.82 individuals. The percentages of feeding capacity for each of the four larval instars of this predator were 11.0, 8.38, 23.0 and 57.62 % respectively. Therefore, it is obvious that, the third and fourth larval instar of this predator represent together 80.62 % or backbone in the predation activity. The percentages of the mortality were 8.96, 5.7, 3.6 and 1.1 % during the four larval instars respectively.

Table(10):Duration period of immature stages predaceous efficiency and percentage of mortality of *C. vicina isis* reared on *A. gossypii* under constant temperature of 26±1 C^{o} and 70±5% relative humidity.

A: Larval stage	Duration in days	Daily average consumption	Average of total consumption	% of feeding capacity	% of Mortality
1 st instar	4.48±082	16.64	74.56±1.92	11.0	8.96
2 nd instar	1.8±0.5	31.59	56.86±1.2	8.38	5.7
3 rd instar	4.1±0.75	38.04	155.97±6.85	23.0	3.6
4 th instar	5.51±1.1	70.92	390.77±1.96	57.62	1.1
Total	15.89±1.8	42.68	678.16±15.82	100	19.36
B:Pupal stage	5.6±0.9				

Adult stage

1: Predator female

The predator female fed on a total average of 1807.39±25.67 individuals, with a daily rate of 35.78 individuals during the longevity period of 50.51±3.65 days as seen in (Table 11). The average of the pre-oviposition period was 5.76±0.85 days. The predator female consumed during this period 390.65±7.56 individuals with a daily rate of 67.82 individuals. The predator female consumed during the ovipasition period on an average of 1120.3±18.2 individuals, this period lasted an average of 25.9±2.6 days with a daily rate of 43.25 individuals. The number of deposited eggs per predator female averaged 718.56±10.75 eggs with a daily rate 27.74 eggs per day. During the post-oviposition period, the predator female consumed 296.44±5.2 individuals this period lasted an average of 18.85±1.4 days with a daily rate of 15.73individuals.

2: Predator male

During its longevity, was lasted for an average of 38.75±2.96 day's (Table 11). The predator male consumed a total average of 1220.6±23.7 individuals with daily rate of 31.5 individuals.

Table (11): Longevity, food consumption and fecundity of *C. vicina isis* adult reared on the *A. gossypii* under constant temperature of 26±1 C° and 70±5% relative humidity.

Adult stage	Period in days	Daily average consumption	Average of total consumption	No. of eggs	
				Daily	Total
A : Female					
Pre-oviposition	5.76±0.85	67.82	390.65±7.56		
Oviposition	25.9±2.6	43.25	1120.3±18.2	27.74	718.56±10.75
Post-oviposition	18.85±1.4	15.73	296.44±5.2		
Longevity	50.51±3.65	35.78	1807.39±25.67		
B : Male					
Longevity	38.75±2.96	31.5	1220.6±23.7		

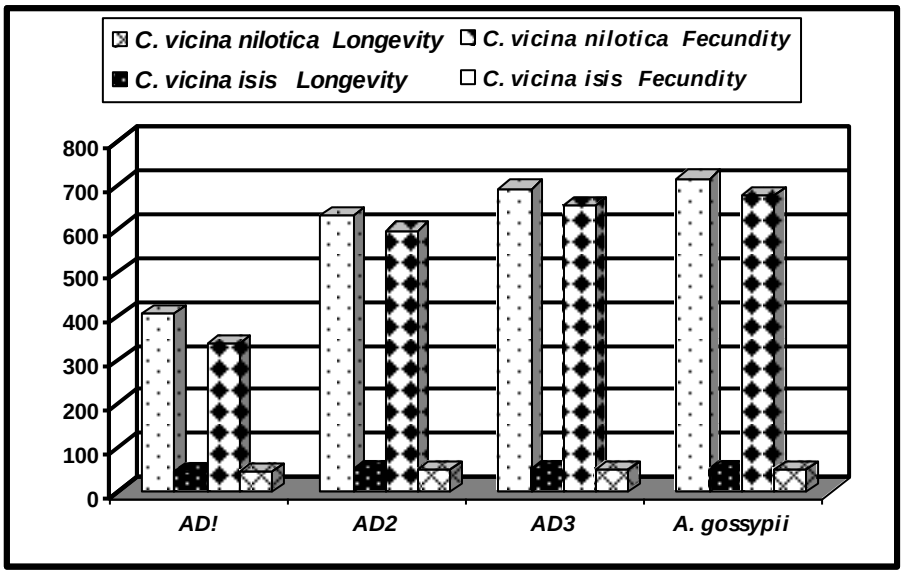
Data represented in (Table 12 and Figure 1) showed that the Longevity and fecundity of *C. vicina nilotica* and *C. vicina isis* adult reared on artificial diets and natural prey *A. gossypii*. The data revealed that the average longevity and fecundity of *C. vicina nilotica* 47.7±4.18; 50.64±4.42 and 53.03±4.96 days while the average of fecundity were 342±5.11; 599.44±6.85 and 655.18±8.75 eggs in AD1 ; AD2 and AD3 respectively . The average longevity and fecundity of *C. vicina isis* were 45.82±3.6; 50.59±3.82 and 52.61±4.17 days while the average of fecundity were 410.86±5.62; 632.46±9.37 and 695.78±12.67eggs in AD1; AD2 and AD3 respectively. It can be noted that the AD3 the best for rearing this predator because the female laid eggs equal with that reared on *A. gossypii*.

The statistical analysis showed significant difference in the fecundity of the female between the two artificial diets AD1; AD2 and the female which reared on *A. gossypii*, while the results cleared that non-significant between the AD3 and the female fed on *A. gossypii*. As conclusion the larval duration period was longer for the larvae of the two coccinellid predators reared on the three artificial diets compared with that reared on *A. gossypii*, also the AD3 was the best for rearing the two coccinellid predators.

Table(12): Longevity and fecundity of *C. vicina nilotica* and *C. vicina isis* adult reared on artificial diets and *A. gossypii* under constant temperature of 26±1 C° and 70±5% relative humidity.

Predator / Food types	*C. vicina nilotica*		*C. vicina isis*	
	Longevity	Fecundity	Longevity	Fecundity
AD1	47.7±4.18b	342±5.11c	45.82±3.6b	410.86±5.62c
AD2	50.64±4.42a	599.44±6.85b	50.59±3.82a	632.46±9.37b
AD3	53.03±4.96a	655.18±8.75a	52.61±4.17a	695.78±12.67a
A. gossypii	51.8±4.16a	680.95±9.84a	50.51±3.65a	718.56±10.75a

Mean followed by the same letters in a column for each period are not significantly differences at 0.05level of probability (Dancan's Multiple Range Test).



Figure(1)Longevity and fecundity of *C. vicina nilotica* and *C. vicina isis* adult reared on three artificial diets and *A. gossypii* under constant temperature of 26±1 C^{o} and 70±5% relative humidity.

The results of this experiment assured the possibility of rearing these two predators successfully on artificial diets. Although the insects reared on these diets have longer larval, pupal periods and the female deposited less egg than those reared on natural preys (Kariluoto, 1980; Hattingh and Samways, 1993 ; Ghanim and El-Adl, 1996&1997 and Ghanim *et al.* 2000). The data revealed that the AD3was the best for rearing of *C. vicina nilotica* and *C. vicina isis* because the larval instars developed successfully ; the larval duration was shorter and percentage of the mortality was lower than the larvae fed on the other artificial diets. Although the female of these predators deposited equal eggs with the comparing female reared on *A. gossypii*. But of these predator insects as applied biological control agents possible, as the rearing on artificial diets grantee the best method for obtaining these predators at the proper time of reaching in sufficient number and that makes the insect control specialists cross over the main obstacles facing them in the used these predators in the applied control.

REFERENCES

Abdel-Salam A. H. (1995). The biotic factors: Evaluation of their performance under natural conditions in cotton plantations. Ph. D. Thesis, Fac, of Agric., Mansoura Univ., PP. 175.

Bahy El-Din, I. A. (2013). Biological control of aphids by utilization of some coccinellid species. Ph. D. Thesis. Fac. Mosh. Agric. Benha Univ., Pp.156.

Chen, Z. H. and J. Qin (1982). The nutritional role of water content in the artificial diets of *Coccinella septempunctata* L. Acta Entomologica Sinica, 25: 141-146.

Chen Z. H. : J. Qin and C. L. Chen (1989). Effects of altering composition of artificial diets on the larval growth and development of *Coccinella septempunctata* L. Acta Entomologica Sinica, , 23:385-392.

CoHort Software. (2004). CoStat. Www. cohort. Com. Monterey, California, USA.

Ghanim, A. A.; Hala A. El-Serafi and M. A. El-Adl (2000). Development of artificial diets for the rearing of coccinellid predatory insects. J. Agric. Sci. Mansoura Univ., 25(12): 8197-8203.

Ghanim, A. A. and M. A. El-Adl (1997). Evaluation of some artificial diets for mass rearing certain coccinellid predatory insects 1st Nat. Conf. of Applied Using of Natural Enemies for Ccntrolling Insect and Mite Pests, Mansoura , 4-5 March, PP. 191-198.

Ghanim, A. A. and M. A. El-Adl (1996). Mass rearing of certain coccinellid predatory insects on artificial diet prepared on the bases of mixing holodic and meridic methods. J. Agric. Sci. Mansoura Univ.,21(9):3341-3349.

Ghanim, A. A. and M. A. El-Adl (1987). Evaluation of predation activity and fecundity of the coccinellids, *Cydonia(=Chilomenes) vicina isis* Cr. ; *Cydonia(=Chilomenes) vicina nilotica* Muls. and *Coccinella undecimpunctata* L. in Mansoura Region, Egypt. J. Agric. Sci. Mansoura Univ, 12(4):933-1000.

Ghanim, A. A. and M. A. El-Adl (1983). Aphids infesting wheat and the effect of their predators in suppressing its population in the field at Mansoura, district, Egypt. J. Agric. Sci. Mansoura Univ, 8(4):958-968.

Hattingh, V and M. J. Saways (1993). Evaluation of ertificial diets and two species of natural prey as laboratory food for *Chilocorus* sp. Entomologia Experimentalis et Applicata, 69(1):13-20.

Henders , R. C. M. G. Hill and P. J. Wigley (1992). Freeze-dried artificial diets for three species of Chilocorus Ladybirds. New Zealand Entomologist, Vol. 15: 83- 87

Hukusima, S and S. Takeda (1975). Artificial diets for larvae of *Harmonia axyridis* Pallas (Coleopter: Coccinellidae), an insect predator of aphids and scale insects. Res. Bell. Fac. Agr. Gifu University, 38:49-53.

Kariluoto, K. T. (1980). Survival and fecundity of Adalia bipunctata L. (Col: Coccinellidae) and other predatory insect species on an artificial dits and natural prey. Ann. Ent. Fenn., 46:101-106.

Mohamed, N. E. (2001). Mass-rearing of certain predatory insects on artificial diets for controlling some insects infesting vegetable crops. Ph. D. Thesis, Fac, of Agric., Mansoura Univ., PP. 93.

Muhammad, S. and S. M. Saqib (2010). Rearing of Predatory Seven Spotted Ladybird Beetle *Coccinella septempunctata* L. (Coleoptera: Coccinellidae) on Natural and Artificial Diets Under Laboratory Conditions. Pakistan J. Zool., vol. 42(1) pp. 47-51.

الخصائص البيولوجية لمفترسى أبو العيد السمنى *Cydonia vicina nilotica* Muls و أبو العيد الأسود *Cydonia vicina isis* Cr. رتبة غمدية الأجنحة عائلة أبو العيد عند تربيتهما على بيئات صناعية و فريسة طبيعية تحت درجة حرارة ثابتة .

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اجريت تجارب معملية في معمل تربية الحشرات قسم الحشرات الاقتصادية كلية الزراعة جامعة المنصورة تحت درجة حرارة ثابتة من 26 ± 1 ^{o}C و 70 ± 5 ٪ RH لدراسة بعض الخصائص البيولوجية للمفترس أبو العيد السمنى *Cydonia vicina nilotica* Muls و أبو العيد الإسود *Cydonia vicina isis* Cr. عند تربيتهما على البيئات الصناعية و منّ القطن *Aphis gossypii* Glover خلال عام 2012 . ولقد أظهرت النتائج المتحصل عليها أن فترة الطور اليرقى كانت أطول لمفترسى أبو العيد السمنى و أبو العيد الاسود عند تربيتهما على البيئات الصناعية الثلاثة المختبرة بالمقارنة بالتربية على منّ القطن كعائل طبيعى. كما أظهرت النتائج أن متوسط فترة حياة الإناث و متوسط ما وضعته الانثى الواحدة للمفترس أبو العيد السمنى 4.18±47.7 , 4.42±50.64 و 4.96±53.03 يوما بينما كان متوسط متوسط ما وضعته الانثى الواحدة لهذا النوع 5.11±342 , 6.85±599.44 و 8.75±655.18 بيضه عند التربية على البيئات الصناعية الثلاثة المختبرة AD1 ؛ AD2 و AD3 على التوالي . كما أوضحت النتائج أن متوسط عمر الإناث للنوع أبو العيد الإسود 3.6±45.82 , 3.82±50.59 و 4.17±52.61 يوما بينما كان متوسط عدد البيض الذى وضعتة الأنثى الواحدة هو 5.62±410.86 , 9.37±632.46 و 12.67±695.78 بيضة عند التربية على البيئات الثلاث AD1 ؛ AD2 و AD3 على التوالي, أما فى حالة تربية أبو العيد السمنى على منّ القطن فكانت مدة الطور الكامل للأنثى هو 51.8 ± 4.16 يوما وجملة ما وضعته الانثى من البيض هو 680.95 ± 9.84 بيضة , أما بالنسبة لأبو العيد الاسود فكان مدة الطور الكامل للإناث هو 50.51 ± 3.65 يوما ومتوسط ما وضعته الأنثى الواحدة من البيض 718.56 ± 10.75 بيضة و لقد أكدت النتائج أن البيئة الصناعية الثالثة AD3 هى الافضل لتربية مفترسى أبو العيد السمنى و الاسود و أظهرت نتائج التحليل الإحصائي وجود اختلافات معنوية بالنسبة لعدد البيض الذى تم وضعه للاناث عند التغذية على البيئة AD1؛ AD2 و الإناث التى تمت تربيتها على منّ القطن بينما أكدت نتائج التحليل الاحصائى عدم وجود اختلافات معنوية بين كمية البيض التى وضعتها الإناث لمفترسى أبو العيد التى تمت تربيتهما على البيئة الصناعية الثالثة AD3 و الإناث التى تمت تربتيتها على منّ القطن و لذلك فان البيئة الصناعية الثالثة AD3 تصلح للتربية المكثفة لهذين المفترسين.

قام بتحكيم البحث

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Table (4): Duration period of *C. vicina nilotica* immature stages and percentage of their mortality when reared on the three artificial diets under laboratory conditions.

Artificial diets	Lraval stage					Pupal stage	% of mortality
	1st instar	2nd instar	3rd instar	4th instar	Total in days		
AD 1	6.79±1.82	3.75±1.1	5.62±1.3	8.36±1.96	24.52±3.5	6.85±1.7	28.37
AD 2	5.8±1.2	2.35±0.9	4.85±1.12	6.98±1.8	19.98±2.4	6.17±1.5	24.55
AD 3	4.98±0.96	1.96±0.64	4.45±0.93	5.96±1.48	17.35±2.1	5.96±1.42	21.15

Table (5): Longevity and fecundity of *C. vicina nilotica* adults reared on the three artificial diets under laboratory conditions.

Artificial diets	Female					Male longevity
	Pre-oviposition	Oviposition	Post-oviposition	Longevity	Fecundity	
AD 1	7.96±1.05	21.89±2.63	17.85±1.43	47.7±4.18	342±5.11	32.10±2.47
AD 2	6.50±0.92	24.94±2.86	19.20±1.62	50.64±4.42	599.44±6.85	36.25±2.54
AD 3	5.82±0.89	27.1±4.15	20.11±1.5	53.03±4.96	655.18±8.75	38.96±2.95

Table (6): Duration period of *C. vicina isis* immature stages and percentage of their mortality when reared on the three artificial diets under laboratory conditions.

Artificial diets	Lraval stage					Pupal stage	% of mortality
	1st instar	2nd instar	3rd instar	4th instar	Total in days		
AD 1	6.98±1.3	3.86±0.95	5.93±1.4	8.97±2.63	25.74±3.65	6.96±2.1	26.86
AD 2	5.93±0.96	2.6±0.63	4.85±1.3	7.25±1.8	20.63±2.75	6.42±1.7	23.75
AD 3	5.32±1.15	2.1±0.74	4.3±1.1	6.42±1.72	18.14±2.17	6.11±1.54	20.4

Table (7): Longevity and fecundity of *C. vicina isis* adults reared on the three artificial diets under laboratory conditions.

Artificial diets	Female					Male longevity
	Pre-oviposition	Oviposition	Post-oviposition	Longevity	Fecundity	
AD 1	8.57±1.2	20.48±2.51	16.77±1.3	45.82±3.6	410.86±5.62	31.85±2.8
AD 2	6.8±0.98	25.1±2.96	18.69±1.52	50.59±3.82	632.46±9.37	37.61±2.96
AD 3	6.1±0.92	26.2±3.54	20.31±1.6	52.61±4.17	695.78±12.67	39.67±3.15

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