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Effect of Different Prey on Biological Aspects , Fecundity and Life Table Parameters of the Predatory Mite ,*Cheletomorpha lepidopterorum* Shaw (Acari:Actinidida:Cheyletidae)

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ABSTRACT

The biology of Cheyletid mite, *Cheletomorpha lepidopterorum* (Acari: Cheyletidae) on three different immature stages of two acarid mites, the seed wheat mite ,*Goheria wahabeii* El-Naggar,Taha& Hoda and the storage grain mite, *Blomia tropicalis* Bronswijk and also the Tetranychid Brown wheat mite, *Petrobia latens* (Muller) was conducted at 20 □C and 60% R.H in the laboratory. Acarid mites used as faclitious food for mass rearing this predator. *Ch. lepidopterorum* showed a higher fertility 97 egg on immature stages of *G. wahabeii* as food than on other tested preys. Predator has a high predation capacity when fed on immature stages of *P. latens* ; *B. tropicalis* and *G.wahabeii* ,respectively. Food consumption during predator total immatures averaged (25.2 ; 35.1 and 70 prey) for predator male and (50 ; 71.6 and 103 prey) for predator female when fed on immature stages of aforementioned prey, respectively; while, during life span predators consumed (154.7; 166.1 and 265.5 prey) for male and(200; 242 and 342 prey) for female on the same preys, respectively. Life table parameters showed that the highest intrinsic rate of natural increase (r_m) was reached as 0.206 when fed on immature stages of *G. wahabeii* which considered as the optimal prey for this mite. Lower r_m value as 0.177was obtained when fed on immature stages of *P. laten*. Time for population doubling was determined as(3.93, 3.34 and 3.42) at different studied prey, respectively. The results indicate the possibility of using some Acaridida species; *B. tropicalis* and *G.wahabeii* for the mass-rearing of Cheyletid mite, *Ch. lepidopetrorium* potentially fostering wider use as biocontrol agents for Astigmatid and Phytophagous mites. Complementary studies for that species, as other factors could influence the suitability of these prey as food sources.

Keywords: *Cheletomorpha lepidopterorum, Goheria wahabeii ,Blomia tropicalis, Petrobia latens*

INTRODUCTION

Egypt's main food crop is wheat, *Triticum aestivum* L. It is stored in different countries to assure a continous supply throughout the year; however longer storage periods make it vulnerable to deterioration. A large range of factors are responsible for the deterioration of the quality and nutrient content of wheat. Among these factors, Acarine pests are of great importance and exploit many environments and habitats and can be present in large numbers in stored wheat (Palyvos *et al.* 2008).

The infestation of wheat grains by mite pests results in deterioration of grain quantity and quality. In the initial stages, the damage is restricted to the wheat embryo, leading to a negligible reduction in grain weight (Zachvatkin 1941); however the seeds lose their viability as a result (Bashir *et al.* 2009) and Mahmood *et al*. 2012) and contamination of the space between grains with dead bodies and exuvia.

In addition, mites spread mycotoxin producing fungi throughout the storage area (Hubert *et al*., 2003) and are responsible for health problems in grain handlers (Yadav *et al.*, 2006) and(Dunn *et al*., 2008).

Numerous individuals of *Goheria wahabeii* El-Naggar,Taha& Hoda were found in wheat (seeds,straw, hay and grains). It´s feeding mainly on the germ part of the grains causing both qualitative and quantitative losses especially when stored in moist and high temperature, Mesbah *et al.,*2016.

Blomia tropicalis Bronswijk a Storage mite, was earlier found predominantly in agricultural environments. *B. tropicalis* is a notable mite species in many parts of the world although *B. tropicalis* can cause human allergic reactions (Colloff, 2009).The mite *B. tropicalis* has significant prevalence worldwide in cereal and cereal-based foods consumed in the Nile Delta, Egypt, (Hussein and Elawamy,2015) .

The brown wheat mite, *Petrobia latens* Muller is a pest of small grains in most parts of the world, but may also damage crops. The mites feed only on leaves, which results in leaf yellowing and mottling, in unhealthy grain formation and in wilting and dying of plants. *P. latens* is a vector of wheat yellow streak mosaic virus, which has been reported to cause yield losses in excess of 30%. In addition, the mite may sometimes be a nuisance in houses, (Vidya and Bhatia1983).

Thus, we conclude that, *Ch. lepidopterorum* is an oligophagous predator of Acari ,particularly *G. wahabeii* ; *B. tropicalis* and Tetranychidae , *P. latens.* Acarid mites used as faclitious food for mass rearing Predator, *Ch.lepidopterorum*. and Predator should be used in the control of mite pests from wheat crop. The results from the current study would help us to gain a better insight into the efficiency and practical application techniques of a predator in biological control programs of Astigmatid and Phytophagous mites. According to the findings, *Ch. lepidopterorum* could be a benificial biocontrol agent in both greenhouses and field.

MATERIALS AND METHODS

Stock colonies of *Cheletomorpha lepidopetrorium* (Shaw):-

Cheyletid mites were established two months before the beginning of the tests and kept in colonies feeding on a mixture of different immature stages of

Tyrophagus putrescentiae Schrank (Acaridida: Acaridae) which reproduced on dry yeast granules.

Reproduction of *Ch. lepidopetrorium* on Acarid mite*, T.putrescentiae* taken for rearing on cages filled with a layer of mixture of (Cement:Clay:Charcoal) with percent of (6:3:1) filled on the bottom of cages to depth of 0.5 cm. Its bottom was scratched by using aneedle to make convexo-concaved areas used as shelters and was suitable sites for predator mite rearing and laying eggs (*Zaher et al.* 1981) and (Hassan *et al*., 2014). Water drops was added when needed .The experiment was investigated twice daily.

Species evaluated as prey in this study: immature stages of three different preys

1-The seed wheat mite **,***Goheria wahabeii* El-Naggar, Taha &Hoda (Acaridida:Labidophoridae)

2- The storage grain mite*, Blomia tropicalis* Bronswijk (Acaridida:Glycyphagidae)

3- The Phytophagous Brown wheat mite, *Petrobia latens* Muller (Actinidida:Tetranychidae).

Pure culture of the two Acaridida mites *G.wahabeii* and *B. tropicalis*: To make a pure culture , using plastic block (5 × 5 × 1.5 cm) each one contained a small rearing circular chamber (1.2 × 0.5 cm), the bottom of each chamber was covered with mixture of plaster Paris (Cement:clay: charcoal) and the top covered with small slide glass. Ten adults (female and male) are sufficient to make pure culture were placed in rearing chamber and provided with food (a mixture of 50% of yeast and 50% of wheat germ.), with adding few drops of water by searching needle as source of humidity and then placed on an incubator then investigated twice daily, with adding a few pieces of different food types, Mesbah *et al.,2016*. Biological aspects recorded daily. Immatures of acarid mites were supplied to predator mite when needed and counted to calculate food consumption.

Pure culture of Tetranychid mite, *P. latens* : reared at 25°c on fresh mulberry leaves (*Mores alba* L.). Each leaf was put on apad of cotton saturated with water as a source of moisture and to prevent mite escaping.

Reproduction of *Ch. lepidopetrorium* on *P. latens*: Pure culture was initiated by transferring males and females of mite species using a fine hair brush to fresh discs of mulberry leaves in Petri dishes (10 cm in diameter). Each leaf was put on apad of cotton saturated with water as a source of moisture and to prevent mite escaping. The rearing stocks were conducted in an incubator under 25±2°C and 70±5% relative humidity. Immatures of phytophagous mite were supplied to predator mite when needed and Biological aspects recorded daily.

Statistical analysis: Obtained data were statistically analyzed according to the standered procedure for (ANOVA) Two-way analysis of variance and mean comparison using LSD and were conducted using SAS statistical software (SAS Institute, 2010) and life-table-parameters of Ch.*lepidopetorirum* were followed the formula of (Birch 1948), and Basic computer program of (Abou Setta *et al*., 1986).

RESULTS AND DISCUSSION

The following is an account of the results obtained on biological aspects of the predatory mite, *Cheletomorpha lepidopetrorum* (Shaw) under laboratory conditions of 20±2°c and 60±5% R.H as affected by food variation. The predator females were found to be passed through one larval and two nymphal stages (protonymph and deutonymph) before reaching adult stage while predator males passed through one nymphal stage, (Taha *et al.,* 1988);(El-Enany *et al*.,1992);(El-Naggar *et al*.,2006)and(Yassin *et al*., 2008).

The Cheyletids show aconsiderable variation in their feeding habits, including acarid as well as, tetranychid mites ,(Hassan *et al* .,2014) and (Carrillo *et al*., 2012) and tenuipalpid mites (Mesbah and Omar 2014) .

Egg deposition and hatching: Mating is essential for egg production. Females deposited their eggs singly or in scattered pattern and covered it by anetwork of fine webs and this in agreement of (Hassan 1976) ; (El-Enany *et al*.,1992) and (El-Naggar *et al*.,2006). Unmated females could oviposited but their eggs failed for hatching.

Incubation period: As shown in Table (1), the incubation period of Cheyletid mite *Ch. lepidopetrorum* was greatly affected by different preys. The incubation period was long when it fed on immature stages of labidophorid mite, *G.wahabeii* averaged 2.65 day for the predator female while it was short when predator fed on Glycyphagid mite, *B.tropicalis* averaged 2.18 day. Thus, both astigmatid mites, *B. tropicalis* and *G. wahabeii* could be suitable prey for mass-rearing of *Ch. lepidopetrorium.*

Life cycle: It could be observed that the duration of life cycle was highly affected by the type of food employed. This total period average (11.5 , 10.13 and 9.85 days) for male and (15.53, 13.15 and 12.85 days) for female when *Ch. lepidopetrorum* reared on the three tested prey, respectively As shown in Table (1&2).

Adult longevity: As shown in Table (1) The predator female longevity lasted (21.58 , 18.9 and 19.83 days) changed to (17.6 , 16 and 15.7 days) for male when it fed on three tested preys, respectively.

Predator female fecundity:- :Fecundity was significantly affected by introduced prey**.** Therefore, the pre-oviposition, oviposition and post-oviposition periods were obviously affected by prey type, where as immature stages of labidophorid mite, *G.wahabeii* was the most favorable prey for female oviposition period of the predatory mite as it averaged (15.5 days) with the highest reproduction rate (97 eggs). On the contrary , immature stages of phytophagous mite, *P.latens* resulted in the least number of female deposited eggs as it was (79.3 eggs) ,Table (3).

Table 1. Mean developmental times in days of The Predatory mite, *Cheletomorpha lepidopetrorium* female when reared on three different prey at 20±2^{O}C and 60±5% R.H:-

Developmental stages		Immature stages of *Petrobia lateens*	*Blomia tropicalis*	*Goheria wahabeii*	L.S.D	F-Test	Probability
Incubation period		2.53 [a] ±0.28	2.18 [b] ±0.33	2.65 [a] ±0.24	0.263	7.40	0.0027
Larva	A.	3.55 [a] ±0.33	2.2 [c] ±0.42	2.75 [b] ±0.26	0.316	38.88	0.0001
	Q.	0.95 [c] ±0.20	1.6 [a] ±0.27	1.25 [b] ±0.29	0.234	16.33	0.0001
Protonymph	A.	2.48 [b] ±0.38	3.15 [a] ±0.29	2.23 [b] ±0.38	0.325	18.25	0.0001
	Q.	1.28 [a] ±0.25	1.20 [b] ±0.39	0.98 [b] ±0.30	0.291	2.43	0.1074
Deutonymph	A.	3.28 [a] ±0.49	2.48 [b] ±0.22	2.0 [c] ±0.01	0.285	42.91	0.0001
	Q.	1.48 [a] ±0.25	0.35 [c] ±0.17	1.0 [b] ±0.01	0.161	103.6	0.0001
Total immatures		13 [a] ±0.92	10.97 [b] ±0.90	10.2 [c] ±0.45	0.723	33.63	0.0001
Life cycle		15.53 [a] ±0.99	13.15 [b] ±1.00	12.85 [b] ±0.46	0.784	29.39	0.0001
Adult longevity		21.58 [a] ±1.41	18.9 [b] ±0.99	19.83 [b] ±0.66	0.978	16.25	0.0001
Generation period		18.1 [a] ±1.12	15.85 [b] ±1.04	14.48 [c] ±0.61	0.873±	35.94	0.0001
Life span		37.1 [a] ±1.62	32.05 [b] ±1.38	32.68 [b] ±1.08	1.264	39.92	0.0001

A.= Active stage, Q.= Quiescent stage

Means followed by the same letter in the same raw are not significantly different at the 0.05 level.

Table 2. Mean developmental times in days of The Predatory mite *Cheletomorpha lepidopetrorium* male when reared on three different prey at 20±2^{O}C and 60±5% R.H.

Developmental stages		Immature stages of *Petrobia lateens*	*Blomia tropicalis*	*Goheria wahabeii*	L.S.D	F-Test	Probability
Incubation period		1.98 [a] ±0.34	1.65 [b] ±0.24	1.55 [b] ±0.23	0.253	6.48	0.0001
Larva	A.	2.93 [a] ±0.31	3 [a] ±0.01	2.98 [a] ±0.32	0.238	0.22	0.0001
	Q.	1.6 [a] ±0.27	1.23 [b] ±0.36	1.25 [b] ±0.29	0.283	4.60	0.0001
Protonymph	A.	3.65 [a] ±0.24	2.7 [b] ±0.26	2.75 [b] ±0.20	0.216	51.45	0.0001
	Q.	1.35 [a] ±0.17	1.55 [a] ±0.23	1.33 [a] ±0.35	0.242	2.18	0.0001
Total immature		9.53 [a] ±0.69	8.48 [b] ±0.64	8.3 [b] ±0.52	0.571	11.3	0.0001
Life cycle		11.5 [a] ±0.80	10.13 [b] ±0.73	9.85 [b] ±0.61	0.659	15.15	0.0001
Adult longevity		17.6 [a] ±0.97	16 [b] ±0.01	15.7 [b] ±0.95	0.717	17.07	0.0001
Life span		29.1 [a] ±1.04	26.13 [b] ±0.73	25.6 [b] ±1.16	0.909	6.95	0.0001

A.= Active stage, Q.= Quiescent stage

Means followed by the same letter in the same raw are not significantly different at the 0.05 level.

Table 3. Mean longevity and fecundity of The Predatory mite *Cheletomorpha lepidopetrorium* female when reared on three different preys at 20±2^{O}C and 60±5% R.H.

Developmental stages	Immature stages of *Petrobia lateens*	*Blomia tropicalis*	*Goheria wahabeii*	L.S.D	F-Test	Probability
Pre-oviposition	2.53 [a] ±0.28	2.7 [a] ±0.20	1.63 [b] ±0.32	0.246	46.36	0.0001
Oviposition	14.7 [b] ±0.95	12.4 [c] ±0.97	15.5 [a] ±0.53	0.769	36.81	0.0001
Post-oviposition	4.35 [a] ±0.75	3.8 [b] ±0.56	2.7 [c] ±0.26	0.514	22.49	0.0001
Fecundity	79.3 [c] ±3.53	88.9 [b] ±4.56	97 [a] ±1.41	3.144	66.87	0.0001
Daily rate	5.42 [c] ±0.39	7.21 [a] ±0.60	6.27 [b] ±0.24	0.399	42.23	0.0001

Means followed by the same letter in the same raw are not significantly different at the 0.05 level.

Food consumption:

The number of consumed prey was differed according to types of food and stage of introduced prey, Table (4).To investigate the suitability of various prey. The male and female of the predatory mite, *Ch. lepidopetrorum* have a high predation capacity when fed on , immature stages of phytophagous mite, *P.latens* ; storage mite, *B. tropicalis* and seed wheat mite, *G.wahabeii* ,respectively. Food consumption during its total immatures averaged (25.2 ; 35.1 and 70 prey) for predator male and (50 ; 71.6 and 103 prey) for predator female when fed on immature stages of aforementioned prey, respectively; while, during life span were (154.7; 166.1 and 265.5 prey) for male and(200;242 and 342 prey) for female on the same prey, respectively.

Table 4. Prey Consumption of The Predatory mite, *Cheletomorpha lepidopetrorium* female and male when fed on different prey at 20±2^{O}C and 60±5% R.H.

Developmental stages		No. of immature stages devoured by predator *Petrobia lateens*	*Blomia tropicalis*	*Goheria wahabeii*	L.S.D	F-Test	Probability
Larva	♂	11.6 [c] ±0.97	15.1±0.74	20 [a] ±2.36	1.467	75.94	0.0001
	♀	15.3 [c] ±1.16	19.1 [b] ±0.88	25 [a] ±2.36	1.4669	93.48	0.0001
Protonymph	♂	13.6 [c] ±0.52	20 [b] ±2.36	50 [a] ±4.71	2.806	403.99	0.0001
	♀	17.2 [c] ±1.03	23.9 [b] ±1.1	36.5 [a] ±2.42	1.5088	355.15	0.0001
Deutonymph	♂♀	17.5 [c] ±2.79	28.6 [b] ±1.26	41.5 [a] ±3.37	2.418	207.86	0.0001
Total immature	♂	25.2 [c] ±1.03	35.1 [b] ±0.74	70 [a] ±5.77	3.132	475.48	0.0001
	♀	50 [c] ±2.58	71.6 [b] ±1.89	103 [a] ±3.49	2.512	947.47	0.0001
Adult longevity	♂	129.5 [c] ±3.69	13.1 [b] ±8.76	195.5 [a] ±7.62	6.452	287.14	0.0001
	♀	150 [c] ±2.45	171.2 [b] ±10.4	239 [a] ±7.75	6.983	373.19	0.0001
Life span	♂	154.7 [c] ±4.27	166.1 [b] ±8.77	265.5 [a] ±8.32	6.793	677.87	0.0001
	♀	200 [c] ±4.83	242 [b] ±11.51	342 [a] ±10.33	8.582	606.64	0.0001

Means followed by the same letter in the same raw are not significantly different at the 0.05 level.

Life table parameters

The mean generation time (T) of *Cheletomorpha lepidopetrorum* (Shaw) was significantly affected by the type of prey (Table 5). Life table parameters were as follow, (T as 20.99;17.79 and18.31days); net reproductive rate (R_o) (40.91 ; 40.01 and43.38) per

generation; intrinsic rate of natural increase (r_m as 0.177 ; 0.203 and 0.206); finite rate of increase(λ) averaged (1.193 ,1.230 and 1.229) and gross reproductive rate (GRR) (52.08 ; 51.77 and 59.7) and doubling time (DT) values (3.93 ; 3.34 and 3.42) days when females reared on different types of prey. (Table 5), respectively.

Table 5. Life Table Parameters of *Cheletomorpha lepidopetrorum* females at three different types of prey at 20± 2°C and 60 ±5 % R.H.

Parameters Prey species	*Petrobia lateens*	*Blomia tropicalis*	*Goheria wahabeii*
Mean generation time (T_c) [a]	20.99	17.79	18.31
Doubling time (DT) [a]	3.93	3.34	3.42
Net reproductive rate (R_o) [b]	40.91	40.01	43.38
Intrinsic rate of increase (r_m) [c]	0.177	0.203	0.206
Finite rate of increase (λ)	1.193	1.230	1.229
Gross reproduction rate (GRR)	52.08	51.77	59.7

[a] Days [b] per generation and [c] Individuals/female/ day

We investigated the effects of introduced prey such as two different Astigmatid mites , *B. tropicalis ; G. wahabeii* and the tetranychid mite *P. latens* on the biology , predation capacity and mass rearing of Cheyletid mite, *Ch. lepidopterorum*.

Similar results were obtained by (El-Naggar *et al*.,2006) reared the cheyletid mite, *Ch. lepidopterorum* on nymphal stages of astigmatid mite, *Tyrphagus putrescentiae* Schrank at three different temperatures (15, 25 and 35 °C) and 65 + 5 % R. H. in the laboratory. The tested temperatures showed a noticeable effect on the individually development of predator and the temperature 15°C was the suitable for predator fertility and food consumption. Also, (Yassin *et al*., 2008) reared *Ch. lepidopterorum* on immature stages of different mite prey belonging to suborder Actinidida (*T. putrescentiae* Schrank, *Lepidoglyphus destructor* Schrank, *Rhizoglyphus echinopus* (F.&R.) and *Caloglyphus betae* Attiah) at different temperatures 20, 25 and 30°C and 70 % R.H. and *Ch. lepidopterorum* showed a higher fertility and lived longer on *T. putrescentiae* as food than on other diets.

To the best of our knowledge, little previous study has been made concerning the predation of *Ch. lepidopterorum*. Therefore, we could not compare the results with previous published studies. However, there are numerous investigations on other cheyletids and phytoseiids.

These results are in agreement with, (Cebolla *et al*.,2009) evaluated the prey range of the predatory mite *Cheyletus malaccensis* Oudemans on the basis of its population growth on various prey species occurring in stored grain habitats (*Acarus siro* Linnaeus, *Aleuroglyphus ovatus* Tropeau, *Caloglyphus redickorzevi* Zachvatkin, *L. destructor* Schrank or *T. putrescentiae* Schrank under laboratory conditions. (Çakmak and Çobanoglu 2012) collected females and nymphs of Cheyletid mite *Cheletomimus bakeri* Ehara from the colony of *Tetranychus cinnabarinus* Boisduval (Acari: Tetranychidae) in the rearing room.

(Barbosa and Moraes 2015) evaluated the potential of Astigmatid species, *Blomia tropicalis* Bronswijk and the tetranychid mite, *Tetranychus urtice* Koch as food sources for five phytoseiids.

In conclusion, the results of the present study indicate the possibility of using some Acaridida species as facilities food for the mass-rearing of Cheyletid Predators and *Cheletomorpha lepidopetrorium* potentially fostering wider use of these biological control agents. Complementary studies for that species, as other factors could influence the suitability of these prey as food sources.

REFERENCES

Abou-Setta M. M.; R.W. Sorrell and C.C. Childers (1986):Life 48: A BASIC computer program to calculate life table parameters for an insect or mite species. Florida Entomologist, 69(4): 690-697. species. Acarologia, 35(4): 345-351.

Barbosa M. F.C. and G. J. Moraes (2015):Evaluation of Astigmatid mites as factitious food for rearing four predaceous phytoseiid mites (Acari: Astigmatina; Phytoseiidae). Biological Control. 91: 22–26.

Bashir MH; M. Ashfaq ; M Afzal; A Khaliq (2009): Estimation of losses of wheat during storage at farmer's stores due to mite pests from Tehsil Toba Tek Singh. Int J Agric Appl Sci 1: 39–42.

Birch, L.C. (1948):The intrinsic rate of natural increase of an insect population. J. Anim. Ecol., 17: 15-26.

Çakmak I. and S. Çobanoglu (2012):*Cheletomimus bakeri* (Ehara, 1962) (Acari: Cheyletidae),a New Record for the Turkish Fauna. Türk. Entomol. Bült., 2012, 2 (1): 49-52.

Carrillo D. F. J.H; J.C Rodrigues and J.A. Pena (2012):A review of the natural enemies of the red palm mite, *Raoiella indica* (Acari: Tenuipalpidae). Experimental and Applied Acarology . 57:347-360

Cebolla R; S. Pekár; J. Hubert(2009):Prey range of the predatory mite *Cheyletus malaccensis* (Acari: Cheyletidae) and its efficacy in the control of seven stored-product pests. Biolog. Control 50:1–6.

Colloff M.J. (2009): Dust Mites. CSIRO Publ, Melbourne. XVI,583 pp.

Dunn JA; B. B. Thind; C. Danks, J. Chambers (2008): Rapid method for the detection of storage mites in cereals: feasibility of an ELISA based approach. Bull Entomol Res 98: 207–213.

El-Enany M.A ; M.A Yousef and S.I. Abdel Rahman (1992):Effect of temperature on the biology of *Cheletomorpha lepidopterorum* (Shaw). J.Agric. Res.,70(3):741-751.

El-Naggar M. E; Z.E Abd-Al-Aal,; Z.M El-Bashier and Amira E. Mesbah (2006):Effect of temperature on the biology of predator mite, *Cheletomorpha lepidopterorum* (Shaw) Acari: Cheyletidae .Egypt.J.Agric.Res.,84(2):421-427.

Hassan M.F (1976):Studies on some Prostigmatid Predators. M.Sc. Thesis. Fac. Agric., Cairo Univ.

Hassan M.F; M.E. El-Naggar; Amira E. Mesbah and Rania A. El-Nahas (2014): Biological Aspects and Life Table Parameters of Cheletogenes ornatus (Canestrini &Fanzago) (Acari: Cheyletidae) When Fed on Different Types of Food and temperatures. Jornal of Egyptian Society of Acarology. Vol,(8)No,(2): 31-35.

Hussein A. H. and W. Elawamy (2015): Quantitation of Blomia tropicalis Allergen Blo t 5 in Cereal and Cereal-Based Foods Consumed in the Nile Delta, Egypt .Am. J. Trop. Med. Hyg. 93(1): 194–197

Hubert DA; P. Tornero ; Y. Belkhadir ; P. Krishna ; A. Takahashi; K. Shirasu ; J. L. Dangl **(**2003) :Cytosolic HSP90 associates with and modulates the Arabidopsis RPM1 disease resistance protein. EMBO J 22**:** 5679–5689.

Mahmood SU; M. H. Bashir ;M. Afzal ; M Ashfaq (2012): Evaluation of germination losses caused by mites in seeds of Maize and Mung from farmer's holdings in Tehsil Toba Tek Singh. Pak J Zool 44: 117–121.

Mesbah Amira E. and Omar, N.A. (2014):Predator-prey preferences and Life-Table-Parameters of *Cheletogens ornatus* (Canestrini&Fanzago) to red palm mite *Raoiella indica* Hirst and date-scale-insect *Parlatoria blanchardii* (Targ.) (Acari: Cheyletidae: Tenuipalpidae). Journal of Egyptian Society of Acarology.8(1):19-23.

Mesbah Amira E; Z. M.A. El-Basheir and M. E. El-Naggar (2016):Effect of food types and temperatures on development ,fecundity of the stored grain mite , Goheria wahabeii (El-Naggar,Taha&Hoda) (Acari: Acaridida: labidophoridae). Bulletin Ent.Soc.Egypt, 93:233-242.

Palyvos, N. E.; N. G. Emmanouel and C.J. Saitanis (2008):Mites associated with stored products in Greece. (Exp. Appl. Acarol., 44 : 213-226).

Taha ,H.A. ; M. E. El-Naggar ;G.A. Ibrahim and S.M. Soliman (1988): Biological studies on two acarina predators of the grain mite, *Caloglyphus rhizoglyphoides*. Agric.Res.Review ,bb (1):137-144.

SAS Institute. (2010). SAS Statistics and Graphics Guide, Release 9.1. SAS Institute, Cary, North Carolina,275l3, USA.

Vidya, S.S. and S.K. Bhatia (1983):Reduction in yield of some barley varieties due to brown wheat mite infestation. Indian Journal of Entomology. 45: 190-193.

Yadav AE; B. L. Morgan; M.S. Vyszenski-Moher ; D.L. Arlian (2006):Prevalence of serum IgE to storage mites in Southwestern Ohio population. Ann Allergy Asthma Immunol 96: 356–362.

Yassin E.M.A., G.M.E. Sallam and S.A Ibrahim (2008):Studies on the feeding, reproduction and development of Cheletomorpha lepidopterorum (Shaw) (Prostigmata: Cheyletidae) on various food sources. IOBC/wprs Bulletin, Vol. 40:53-62.

Zaher M.A.; A.E.A. Yousef and M. M. Kandil (1981): Effect of food on the biology of Cheletogenes ornatus (C.&F.) [Acari: Prostigmata: Cheyletidae]. Acarologia, 22,4; 361–366.

تـأثير أنـوع مختلفـة مـن الفـرائس علـى المظـاهر البيولوجيـة والخـصوبة وجـداول الحيـاة للمفتـرس الكليتـدى *Cheletomorpha lepidopterorum* Shaw(Acari:Actinidida:Cheyletidae)

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الدراسات البيولوجية للمفترس الكليتدى *Cheletomorpha lepidopterorum* Shaw على نوعين مختلفين من الحلم عديم الثغر التنفسى (حلم تقاوى القمح *Goheria wahabeii* وحلم الحبوب المخزونة *Blomia tropicalis*) والحلم النباتى التغذية التابع لعائلة Tetranchidae و الذى يعرف بحلم القمح البنى *Petrobia latens* معمليا عند درجة حرارة ٢٠م ورطوبة نسبية ٦٠%.أثبت استخدام الأكاروسات عديمة الثغر التنفسى محل الدراسة فاعلية وكفاءة لسرعة نمو و الأكثار الكمى للمفترس الكليتدى .أعطى المفترس الكليتدى أعلى خصوبة للبيض ٩٧ بيضة عند التغذية على حلم تقاوى القمح *G. wahabeii* التى كانت أفضل فريسة للمفترس فكان أعلى معدل استهلاك المفترس للفرائس خلال الأطوار الغير كاملة (٥٠-٧١.٦-١٠٣فريسة) لأناث المفترس و (٢.٢٥-١-٣٥.٧٠ فريسة) لذكور المفترس بينما كان أعلى معدل استهلاك الفرائس خلال فترة حياة الأنثى (٢٠٠ - ٢٤٢-٣٤٢) فريسة وكانت (٢.١٥٤- ١٦٦-٢٦٥.٥) خلا فترة حياة الذكر عند التغذية على الفرائس الثلاثة محل الدراسة على التوالى. عند دراسة جداول حياة المفترس الكليتدى كانت أعلى معدل زيادة ذاتى لأنثى المفترس(٠.٢٠٦) عند التغذية على حلم تقاوى القمح *G. wahabeii* والذى يعتبر الغذاء الأنسب للمفترس بينما أعطى الحلم النباتى *P. latens* أقل معدل زيادة ذاتى(٠.١٧٧) وكان معدل التضاعف للأناث (٣.٩٣ -٣.٣٤ -٣.٤٢) على التوالى. أوضحت النتائج أمكانية استخدام الأكاروسات عديمة الثغر التنفسى (*G. wahabeii*و *B. tropicalis*) للأكثار الكمى للمفترس الكليتدى لمكافحة الأكاروسات الضارة بالنبات التى تصيب محصول القمح.