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Performance of Certain Predators in Controling *Aphis craccivora koch* and *Myzus persicae* (Sluzer). on Broad Bean Plants

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ABSTRACT

The current investigation was performed to assess the effectiveness of predators as biocontrol agent against *Aphis craccivora* and *Myzus persicae* on broad bean field. *Aphis craccivora* had three peaks of abundance during the fourth week of December, first week of February and March of 2020-202 season (632, 901 and 671 individuals / 25 leaves). While it had two peaks during the second week of January and February of 2021/2022 (914 and 1085individuals/25 leaves). Meanwhile, *M. persicae* had two peaks of abundance (498 and 542 individuals/25 leaves) in 2020-21 and three peaks (689, 608 and 434 individuals/25 leaves) in 2021-22. The common predators caught in the broad bean fields were: *Coccinella undecimpunctata* L., *Chrysoperla carnea* Steph., *Cydonia vicina isis* (Muls.), *Scymnus* sp., *Metasyrphus corollae* F. and *Orius* sp. These predators recorded two peaks (50 and 52 predators/ 25 leaves) during the first season, and three peaks during the second season (40, 44 and 39 predators / 25 leaves) on broad bean. Biology of *C. carnea* on *Aphis craccivora* and *Myzus persicae* were examined at 26 ± 1°C and 70 ± 5% R.H. The total developmental time of *C. carnea* (egg hatching to adult exclusion) was 18.59 ± 0.43 and 23.54 ± 0.55 days when fed on *A. craccivora* and *M. persicae*, respectively. The mean number of eggs per *C. carnea* female was 345.83 ± 5.11 and 489.0 ± 6.58 eggs females fed on *A. craccivora* and *M. persicae* during their larval stage, respectively.

Keywords: *Aphis craccivora, M. persicae,* aphid predators.

INTRODUCTION

Aphids are one of the most important piercing-sucking pests in greenhouse and open fields worldwide (Ragab *et al.,* 2002, Saleh *et al.,* 2009 and Saleh *et al.,* 2017a). Damage caused by aphids take place directly due to feeding on plant-sap, or indirectly by transmitting several virus diseases to the host plants. (Ghatwary, 2000; Ali, 2008; Murati *et al.,* 2013; Zawrah *et al.,* 2020).

The green peach aphid, *Myzus persicae* (Sulzer) and *Aphis craccivora* Koch are a crucial pest of a several varieties of plants (Joe and Jyoti, 2013). The role of predators against *Aphis craccivora* and *M. persica* have drawn the attention of many investigators in Egypt (Saleh, 2008;Ali, 2008; Jabbar *et al.,* 2020 and Saleh *et al.,* 2020). Biological control which include effective predators and microorganisms and microbial products can be employed as an alternative to chemical control (El-Gendy 2009,Mahfouz and Abou El-Ela, 2011 and Saleh *et al.,* 2020). The relationships between aphids and their natural enemies have drawn the attention of many investigators in Egypt (El-Maghraby, 1993; Ali, 2008; Ali *et al.,* 2020 and Saleh *et al.,* 2020). Biology of *C. carnea* on *A. gossypii* and *M. persicae* revealed that the larval duration of *C. carnea* was the longest when fed on *M. persicae* (Meannan *et al.,* 1997).Meanwhile, it was 26.16 ± 0.56 and 24.42 ± 0.29 days when fed on *A. gossypii* and *Hyalopterus. pruni* respectively (Saleh and Ali, 2012 and Saleh *et al.,* 2017b). Therefore the aim of this work is to study the seasonal abundance of aphid species and their predators in 2020-21 and 2021-22 seasons and to study some biological aspects of *C. carnea* when reared on two preys *A. craccivora* and *M. persicae.*

MATERIALS AND METHODS

1. Survey and relative abundance of aphids and their predators in broad bean plants:

The current trials were conducted to investigate seasonal abundance of *A. craccivora*, *M. persicae* and their associated predators in Kafr-Saqr district, Sharkia Governorate during the two seasons (2020 -2021 and 2021-2022) on broad bean plants. Kafr-Saqr district, Sharkia Governorate lies at latitude 30° 47' 36.096"N and longitude 31° 37' 32.700E. at an altitude of 8m. above sea level. The cultivated area was one feddan that cultivated with broad bean during two successive seasons. The planting date was in the 1st of October in both seasons. Investigations were continued till the third week of April in the two seasons. Sampling taking place after three weeks from planting date until before the harvesting time. Weekly samples of 25 leaves was chosen randomly from broad bean plants. The leaves were kept in paper bags,transferred to the laboratory and the aphid numbers were counted using microscope binocular. The predators were directly counted in the field on 25 leaves. This area received all normal recommended agricultural practices except chemical pesticides.

2. Biology of *C. carnea* on *A. craccivora* and *M. persicae*:

Experiments were carried out at the laboratory of plant protection, Sharkia branch at 26 ± 1°C and 70 ± 5.0 % R.H.

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Newly hatched larvae of *C.carnea* were isolated in a Petri–dish (10 cm. diameter) with a filter paper on its bottom. Twenty replicates form *C. carnea* were reared on *A. craccivora* and *M. persicae*. Know surplus numbers of prey species were offered and the devoured individuals were replaced daily. Attacked prey individuals were counted and recorded daily throughout the periods of the larval instars.

Adults (females and males) were placed in glass chimney cage. Each chimney cage was placed on 9 cm diameter Petri dish. A piece of filter paper was placed at the bottom of the Petri dishes, and the upper open end of glass chimney was covered with black muslin cloth and was tightened with rubber band. The adult diets were provided inside the glass chimney with the help of small paper strips. Each strip being drilled at three points from water + honey-bee + dry yeast (6+3+1) was offered as adult food to make pits for holding drops of diet. The diets were provided with the interval of 24 hours. Each chimney was provided with a piece of cotton soaked in distilled water placed at the top of glass chimney, over muslin cloth, to maintain moisture. Laid eggs on the walls of chimney and muslin cloth were harvested daily.

Statistical analysis

Data were analyzed using SAS package 8.2 v (SAS Institute 2003). Obtained data were analyzed using one-way ANOVA using Tukey' HSD.

RESULTS AND DISCUSSION

1. Survey of aphid and predator species inhibiting broad bean plants:

broad bean plants are subjected to be attack by two aphid species, *A. craccivora* and *M. persicae* . The insect predators found associated with these aphids were *Coccinella undecimpunctata* L, *Cydonia vicina isis* Muls. and *Scymuns* sp. (Coleoptera, Coccinellidae), *Chrysoperla c.* (Neuroptera, Chrysopidae), *Metasyrphus corollae* F. (Diptera, Syrphidae) and *Orius* sp. (Hemiptera, Anthocoridae). These results are in accordance with the findings of Abdel - samad (1996), Ali *et al.* (2013) and Jabbar *et al.* (2020)..

Relative abundance of aphids :

Result given in Table (1) exhibit clearly, that the relative abundance of *A. craccivora* was the highest, which recorded 66.69 and 63.89% of the total number of aphids during 2020-21, whereasthat of *M. persicae* was 33.31 and 36.11% of the total number of aphids during 2021-22 season.

Predators associated with *A. craccivora* and *M. persicae*:

Table (1) shows that the relative abundance of the evelven-spotted ladybird, *C. undecimpunctata* was the highest and represented 29.58 and 32.93 % followed by *C. Carnea* (22.29 and 23.90 %), then *C. vicina isis* (15.78 and 14.39 %) and (12.43 and 12.20 %) for *Scymunus* sp. While *M. corollae* represented 12.23 and 9.27 %, and *Orius* sp. showed 7.69 and 7.31 % from the total number of insect predators during both seasons of 2020-21 and 2021-22 (Table1).

Table 1. Total yearly numbers of aphid and its associated predators on broad bean plants .

Insect	2020-21		2021-22	
	Total No.	% %	Total No.	% %
pests:				
1-*A. craccivora*	7583	66.69	7999	63.89
2-*M .persicae*	3788	33.31	4520	36.11
Total	2188	100	1767	100
predators:				
1-C.undecimpunctata	150	29.58	135	32.93
2-Chrysoperla carne	113	22.29	98	23.90
3- Cydonia vicina isis	80	15.78	59	14.39
4-Scymunus sp.	63	12.43	50	12.20
5-Metasyrphus corollae	62	12.23	38	9.27
6- *Orius* sp.	39	7.69	30	7.31
Total	507	100	410	100

Seasonal abundance of *A. craccivora* and *M. persicae* infesting broad bean plants:

a. Population of *Aphis craccivora:*

The gained data in Table (2) showed that infestation of aphids started on the fourth week of December (17 individuals / 25 leaves), it was increased quickly to record three peaks of activity by the population of *A. craccivora* in the fourth week of December and first week of February and March (632 ,901 and 671 individuals / 25 leaves), respectively in season 2020-21. In 2021-22 season, *A. craccivora* was appeared on broad bean plants in the 4th week of December (15.0 individuals/25 leaves) and recorded two peaks of activity during 2nd week of January and February (914 and 1085 individuals/25 leaves), respectively Table (3). The general mean numbers of *A. craccivora* during the two seasons were 7583.0 and 7999.0 individuals/25 leaves, respectively (Table 1).

b. Population of *Myzus persicae*:

In 2020-21season, the data illustrated in Table (2) showed that infestation of aphids started on the first week of December (19.0 individuals/25 leaves), it was increased sharply to record two peaks of activity by (498 and 542 individuals/25 leaves) during the third week of January and second week of February, separately.

Meanwhile, in 2021-22 season, *M. persicae* had three peaks were found in the third week of January, second week of February and first week of March (689,608 and 434 predators /25 leaves), respectively Table (3). The general mean numbers of *M. persicae* during the two seasons were 3788.0 and 4520 individuals/25 leaves, respectively (Table1).

Seasonal abundance of predators associated with *A. craccivora* and *M.persicae* infesting broad bean plants:

a) *Coccinella undecimpunctata:*

The obtained data are summarized in Table. (2) showed that *C. undecimpunctata* begun to appear on broad bean plants in 3rd week of December (2 individuals/25 leaves). Two peaks of activity were noted in the fourth week of January and first week of March (21 and 17 individuals/25 leaves), in 2020-21 season.

In the second season 2021-22, the number of *C. undecimpunctata* take place in the 3rd week of December (3 individuals/25 leaves) its enlarged to record three peaks of activity (7, 19 and 12 individuals/25 leaves) in the second week of January, first week of February and second week of March, respectively, Table (3).

b) *Chrysoperla carnea*

Tables (2&3) showed that *C. Carnea* were occurred on broad bean plants in the 2nd and 3rd week of December by (2 and 3 individuals/ 25 leaves) during two seasons of 2020-21 and 2021-22, correspondingly and recorded two peaks of activity during two seasons (10 and17 individuals/25 leaves) in the third week of January and February in 2020-21season Fig.1 and (15 and 10 individuals/25 leaves), in the first and fourth week of March in 2021-22 season Table (3).

c) *Cydonia vicinia isis*

Data presented in Table (2) showed that *C. vicinia isis* was appeared in the 3rd week of December in both season and recorded one peak of activity (11 individuals/25 leaves) in the fourth week of January during 2020-21 season. In 2021-22 season recorded two peaks of activity (9 and 8 individuals /25 leaves) in the first week of February and second week of March, respectively, Table (3).

d) *Scymuns* sp.

Data presented in Table (2) showed that Scymuns sp. was appeared in the 4th week of December and recorded two peaks of activity (8 and 7 individuals/25 leaves) in the third week of January and fourth week of February, respectively, during 2020-21 season.

In 2021-22 season was appeared in 1st week of January and documented three peaks of activity (5,9 and 8 individuals /25 leaves) in the fourth week of January, first week of March and fourth week of March serially, Table (3).

Metasyrphus corollae :

Table (2) showed that *M. corollae* individuals were appeared in the 3rd week of December and recorded two peaks of activity (7 and 9 individuals/25 leaves) in the fourth week of January and second week of March, consecutively, during 2020-21 season.

In 2021-22 season was appeared in 4th week of December and recorded one peak of activity (8 individuals /25 leaves) in the firth week of March, Table (3).

e) *Orius* sp.

Data presented in Table (2) exhibited that Orius sp. was appeared in the 1st week of January and recorded two peaks of activity (7 and 6 individuals/25 leaves) in the first week of February and 3rd week of March, successively, during 2020-21 season. However, in 2021-22 season was appeared in 1st week of January and recorded one peak of activity (8 individuals /25 leaves) in the fourth week of March, respectively, Table (3).

Regarding predators on broad bean, two peaks were found in the fourth weeks of January and third week of February (50 and 52 predators/ 25 leaves) during the first season 2020-21 Table (2). Meanwhile, three peaks were found in the first week of February, first and fourth week of March (40, 44 and 39 predators / 25 leaves), respectively in 2021-22 season Table (3).

These results are in agree with Nicoli et al., (1994), who noticed the most abundant coccinellid on watermelon, accounting for 61.2% of the total number of aphidophagous coccinellids in 1992 and 87.5% in 1993. In the same trained agree with Al-Allan et al. (2004) stated that, the aphidophagous coccinellids were of particular importance and usually play an important natural role in regulating and /or suppressing the populations of their potential preys principally aphid species. Boraei et al. (2005) found that, chrysopid and coccinellid beetles were among the common predators in most Egyptian field crops. However, Barakat, 2018 and Ali et al., 2020 in Egypt, observed the predators, Ch. Carnea , C. septumpunctata and Metasyrphus corollae associated with pests infesting potato plants. This percentage in the range of value described by previous studies by Kan et al. (2012) in Pakistan, reported that Myzus persicae on potato crop having minimum adverse effects on ladybird beetle and syrphidfly. The population means of ladybird beetles per 10 plants showed significant effect ($p<0.05$) for potato varieties (3.1 on Desiree and 3.6 on Kuroda).

Table 2. Seasonal abundance of predators associated with two aphid species infesting broad bean plants during season 2020/2021

Samplinge date	Aphid species		Predators							Temp.	RH%
	A. craccivora	*M. persicae*	*C.undecim punctata*	*C. carnea*	*C.vicina isis*	*Scymunus* sp.	*Orius* sp.	*M. corllae*	Total predators		
Nov. 4th	17	0	0	0	0	0	0	0	0	20.75	49.25
Dec 1st	120	19	0	0	0	0	0	0	0	18.85	62.16
2nd	161	81	2	0	0	0	0	0	2	17.28	51.04
3rd	285	139	4	2	0	0	0	3	6	15.2	61.73
4th	632	184	5	3	2	3	0	2	15	15.01	51.09
Jun. 1st	375	209	7	5	3	1	3	4	23	12.58	55.37
2nd	794	276	4	4	5	4	2	3	22	13.13	62.77
3rd	687	498	12	10	4	8	3	2	39	14.47	62.1
4th	496	205	21	5	11	4	2	7	50	13.33	56.04
Feb, 1st	901	296	14	7	6	5	7	3	42	15.64	53.8
2nd	665	542	16	11	7	3	2	2	41	14.21	56.37
3rd	494	278	15	17	9	4	1	6	52	15.01	68.87
4th	296	217	11	12	6	7	3	5	44	16.32	61.3
March. 1st	671	283	17	8	10	2	1	6	44	17.62	49.75
2nd	340	197	8	7	5	5	2	9	36	17.52	71.5
3rd	283	152	5	6	4	3	6	4	28	16.05	59.34
4th	141	128	7	5	2	5	3	3	25	20.28	42.19
April1st	82	51	2	7	2	7	2	2	22	21.55	44.27
2nd	37	29	0	4	4	2	1	1	12	18.77	55.28
3rd	6	4	0	0	0	0	1	0	1	21.45	52.05
Total	7583	3788	150	113	80	63	62	39	507		
%	66.69	33.31	29.58	22.29	15.78	12.43	12.23	7.69	100		

Table 3. Seasonal abundance of predators associated with two aphid species infesting broad bean plants during season 2021/2022

Samplinge date	Aphid species		Predators							Temp.	RH%
	A. craccivora	*M. persicae*	*C.undecim punctata*	*C. carnea*	*C.vicina isis*	*Scymunus* sp.	*Orius* sp	*M. corllae*	Total predators		
Nov. 4th	15	4	0	0	0	0	0	0	0	17.98	66.77
Dec 1st	31	18	0	0	0	0	0	0	0	18.418	44.5
2nd	85	57	0	0	0	0	0	0	0	19.04	40.75
3rd	115	94	3	0	0	0	0	0	3	16.68	71.91
4th	324	186	5	2	0	0	0	1	8	15.55	75.32
Jun. 1st	509	267	2	5	0	1	0	1	9	17.52	88.96
2nd	914	318	7	6	4	2	1	2	22	17.78	73.82
3rd	542	689	4	4	3	1	2	3	17	14.37	56.07
4th	493	297	13	5	2	5	1	1	27	14.7	61.19
Feb, 1st	716	314	19	7	9	2	1	2	40	17.25	67.01
2nd	1085	608	9	8	4	4	2	3	30	17.9	64.67
3rd	761	287	15	5	6	3	1	2	32	13.14	66.66
4th	518	184	13	9	5	2	2	1	32	15.87	74.39
March. 1st	487	434	8	15	3	9	1	8	44	16.03	65.46
2nd	593	221	12	7	8	4	3	4	38	19.19	52.79
3rd	356	254	7	6	4	2	2	3	24	19.83	57.98
4th	217	108	6	10	3	8	8	4	39	18.33	49.63
April1st	104	86	5	6	2	3	3	2	21	20.43	44.48
2nd	83	58	3	2	4	4	2	1	16	18.18	52.38
3rd	51	36	4	1	2	0	1	0	8	25.73	41.87
4th	0	0	0	0	0	0	0	0	0	24.01	47.42
Total	7999	4520	135	98	59	50	30	38	410		
%	63.89	36.11	32.93	23.9	14.39	12.2	7.31	9.27	100		

2.Biology *C. carnea* on *A. craccivora* and *M. persicae* under laboratory condition:

Developmental time and feeding capacity

Data in Table (4) showed that incubation period of *C. carnea* was 3.24 ± 0.14, 3.86days *C. carnea* fed on *A. craccivora* and *M. persicae* during larval instars at means of 26 ±1°C and 70 ± 5.0 R.H%. the first larval instars were 3.13 ± 0.04 and 4.19± 0.31 days, consumed18.19 ± 1.05 and 32.49 ± 2.87, the second larval instars were 3.05± 0.18 and3.78± 0.27 days, consumed 54.21± 2.78 and 75.16 ± 2.79 individuals, while the third larval instars were 3.03 ± 0.05 and 4.08 ± 0.32 days, consumed 83.10 ±1.77 and 96.33 ±1.12 individuals. The total developmental time last 9.21± 0.20 and 12.04± 0.82 days Table (4). The total consumption rate per *C. carnea* larva were 155.50±1.24, and 204.39±1.04 of the same preys respectively Table (5). Pupal stage takes 6.14 ± 0.44and 7.64 ± 0.34 days. Mortality percentage was 13.33 and 18.0 %. The total developmental time form egg hatching to adult eclosion were 18.59± 0.43 and 23.54±0.55 days for *C. carnea* when fed on *A. craccivora* and *M. persicae* Table (4). These findings agree with that of El-Maghraby *et al.* (2008) found that the total developmental period of *Ch. carnea* was 19.38 ± 0.23 days by rearing on *H. pruni* infested peach trees under 28-29°C and 62±5%R.H.

Table 4. Mean duration (Mean ± SE) of the developmental stages of *C. carnea* reared on *A. craccivora* or *M. persicae* under controlled conditions

prey species	Incubation period (days)	larval instars(days)				pupal stage (days)	Total of Immature stage (days)	mortalty %
		1st	2nd	3rd	Larval stage (days)			
A.craccivora	3.24±0.14	3.13±0.04	3.05±0.18	3.03±0.05	9.21±0.20	6.14±0.44	18.59±0.43	13.33±2.03
M. persicae	3.86±0.11	4.19±0.31	3.78±0..27	4.08±0..32	12.04±0.82	7.64±0.34	23.54±0.55	18.0±1.73
F	*	*	NS	*	*	NS	**	ns
LSD55	0.4959	0.6113	0.893	0.9031	2.334	1.564	1.951	7.404

** , * , and NS indicate significant differences at the 0.001, 0.05 level, and insignificant differences, respectively

Table 5. Mean number of consumed (Mean±SE) form different aphid species during larval instars of *C. carnea* under control conditions

prey species	larval instars			Total of Mean± SD
	1st	2nd	3rd	
A.craccivora	18.19±1.05	54.12±2.78	83.10±1.77	155.50±1.24
M. persicae	32.48±2.87	75.16±2.79	96.73±1.12	204.39±1.04
F	**	**	**	**
LSD	8.462	10.936	5.816	4.487

** indicate significant differences at the 0.001 level.

This is consistent with the study done by Saleh and Ali (2012) showed the total consumption rate per *C. carnea* larva from the aphid species were 172.54 ± 6.24 and 623.18 ± 41.80 when reared on *H. pruni* and *A. gossypii* individuals respectively. The average number of aphid consumption rate per *C. carnea* larva was also significantly different. There was a significant difference in longevity among females, longevity

On the other hand Saleh *et al.*,(2017b)The total developmental time form egg hatching to adult eclosion were 21.2±1.67, 20.6±1.28 and 23.8±1.36 days for *C. carnea* when fed on *S. cerelella*, *E. kuehniella* and *A. gossypii*. The total consumption rate per *C. carnea* larva were 632.93±50.26, 444.08±34.40 and 367.31±50.28 of the same preys respectively

Longevity and fecundity of adult stage

Data in Table (6) showed that the mean female longevity of *C. carnea* were significantly longer when larve fed on *M. persicae* 42.58 ± 1.98days than when reared on *A. craccivora* 33.83 ± 3.25days . Also the mean male longevity of predator was insignificantly longer when fed on *M. persicae* 38.77 ± 1.63 than when reared on *A. craccivora* 30.76 ± 0.89 days. The highest numbers of egg (489.0 eggs) were obtained when larva fed on *M. persicae* followed by *A. craccivora* 354.83 eggs Table (6).

Meanwhile, Saleh *et al*.,(2017b) showed that Mean number of eggs pre *C. carnea* female was 184.5±23.36,237.9±25.61 and 316±21.88 eggs on the last preys respectively. These findings agree with that of **Saleh and Ali (2012)** mentioned that the average number of deposited eggs per *C. carnea* female was 327.73± 31.19 and 459.43± 24.57 eggs when *C. carnea* females fed on *A. gossypii* and *H. pruni* during larval instars, respectively. The statistical analysis showed that the aphid species have a highly significant on the female fecundity.

Table 6. Longevity (Mean+-SE) and fecundity of predator C. carnea adults when reared on different types of food under laboratory conditions (26ºc±1 and 70% ±5 R.H%)

prey species	Female longevity				Male longevity	Female fecundity	
	Pre-oviposition	oviposition	Post-oviposition	Total		Daily	Total
A.craccivora	6.18±0.34	19.83±0.22	7.82±0.35	33.83±3.25	30.76±0.89	10.49±0.22	354.83±5.11
M. persicae	9.18±0.57	23.40±0.98	11.18±0.58	42.58±1.98	38.77±1.63	11.52±0.41	489.0±6.58
F	*	*	**	*	*	NS	**
LSD	1.837	2.786	1.895	6.007	5.121	1.285	23.1

****, *, and NS indicate significant differences at the 0.001, 0.05 level, and insignificant differences, respectively.**

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أداء بعض المفترسات في مكافحة من اللوبيا *A. craccivora* ومن الخوخ الاخضر *M. persicae* علي نباتات الفول البلدي

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الملخص

أجريت تجارب حقليه بمنطقة كفر صقر – محافظة الشرقيه خلال موسمي 2020-21 و2021-22 لتقييم فاعلية بعض المفترسات كعنصر من عناصر المكافحة البيولوجية لمن اللوبيا ومن الخوخ الاخضر في حقول الفول البلدي . أوضحت النتائج وجود ثلاث قمم لمن اللوبيا خلال موسم الدراسة الاول في الاسبوع الرابع من ديسمبر والأسبوع الاول من فبراير ومارس (632و 901 و 671 فرد من /25 ورقة)بينما وجد قمتين في موسم الدراسة الثاني في الاسبوع الثاني من من يناير وفبراير(914 و 1015 فرد من /25 ورقة).وكان لمن الخوخ الاخضر قمتين في (498 و 542 فرد من /25 ورقة) خلال موسم 2020-21 وثلاث قمم (689و 608 و 434 فرد من /25 ورقة) خلال موسم 2021-22 . تم حصر المفترسات الشائعه في حقول القول البلدي وهي أبو العيد ذو أحدي عشر نقطة وأسد المن وابو العيد الاسود وأبوالعيد الاسكمنس وحشرة السيرفس وبقة الاوريس. وكان للمفترسات قمتين (50 و 52 مفترس /25 ورقة) خلال موسم الدراسة الاول بينما وجد ثلاث قمم (40 و 44و 39 مفترس /25 ورقة) خلال موسم 2021-22. اجريت دراسة معملية لدراسة بعض الخصائص البيولوجية لمفترس أسد المن عند درجة حرارة ثابته (26 ± 2 ورطوبة نسبية 70 ± 5 %). أوضحت النتائج أن فترة النمو من فقس البيض حتي خروج الحشرة الكاملة 18.59 ± 0.43 و 23.54 ± 0.55 يوما عند تربيته علي من اللوبيا ومن الخوخ علي. وكان متوسط عدد البيض الي تضعه أنثي أسد المن 354.83 ±5.11 و 489.0 ± 489 ± 6.58 بيض عند تغذيتها في طور اليرقة علي من اللوبيا ومن الخوخ علي التوالي

الكلمات الداله : من اللوبيا - من الخوخ الاخضر - المفترسات .