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EFFECT OF DIFFERENT HOST PLANTS INFESTED WITH *Aphis gossypii* (GLOVER) ON THE BIOLOGICAL PARAMETERS OF *Chrysemosa jeanneli* (NAVÁS) (NEUROPTERA: CHRYSOPIDAE) A NEWLY RECORDED LACEWING SPECIES IN EGYPT

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ABSTRACT

The lacewing chrysopid species, *Chrysemosa jeanneli* (Navás, 1914) (Neuroptera: Chrysopidae) was recorded as a new species in Egypt. Specimens were identified and authenticated by the Natural History Museum (NHM) in London, UK. Laboratory studies were conducted at the Plant Protection Department, Faculty of Agriculture, Zagazig University, under controlled conditions (26 ± 1°C, 65 ± 5% RH) to evaluate the effects of three host plants (mango, navel orange, and mandarin trees) infested with *Aphis gossypii* (Glover) on the biological parameters of *C. jeanneli*. Results revealed that the shortest and longest total larval durations of *C. jeanneli* (14.36 ± 0.31 and 16.29 ± 0.29 days) occurred when larvae were reared on *A. gossypii* infesting mango and navel orange trees, respectively. The longest and shortest developmental periods were observed when larvae were reared on *A. gossypii*-infested mango (26.86 ± 0.36 days) and mandarin trees (25.00 ± 0.46 days). Total aphid consumption during the larval stage varied significantly among host plants, with larvae consuming 739.78 ± 16.03, 601.27 ± 4.15, and 370.14 ± 7.96 aphids on mango, navel orange, and mandarin trees, respectively.

Mean adult emergence rates were 92.86, 77.78, and 83.33 %, with sex ratios of 66.67, 57.14, and 62.00 % for mango, navel orange, and mandarin trees. The highest mean fecundity (390.63 ± 12.26 eggs) and longest female longevity (35.88 ± 1.03 days) were recorded for lacewings reared on *A. gossypii* from mango trees. Biochemical analysis indicated a direct relationship between the fecundity, fertility, and hatchability of *C. jeanneli* and the total protein and carbohydrate content of *A. gossypii* across host plants.

***Keywords*:** *Chrysemosa jeanneli*, newly recorded, *Aphis gossypii*, biological parameter, predation efficacy, biochemical analysis.

INTRODUCTION

Chrysopid species (Neuroptera: Chrysopidae), including *Chrysopa, Chrysoperla, Chrysemosa, Mallada, Nothochrysa and Paleochrysopa spp.,* are globally distributed predators known for their high predation efficacy **(Balasubramani and Swamiappan, 1994; Trouve *et al*., 2012; Youssif, 2015; Youssif *et al*., 2021).** Many lacewings (commonly termed "aphid lions") are commercially reared on natural prey or artificial diets and released in agricultural fields or greenhouses as eggs or larvae, serving as effective biological control agents against aphid species **(Hassan, 1975; Hassan and Hagen, 1978; Youssif, 2015).**

Chrysemosa jeanneli **(Navás, 1914)** (Neuroptera: Chrysopidae) is a small lacewing species (wingspan ~20 mm) characterized by a gray body and wings, with distinctive black spot on the mid-hind margin of each wing that align when the wings are closed. This species is widespread in agricultural areas, gardens, and native vegetation and is frequently observed on flowering trees **(Mike *et al*., 2004).** The larval stage of *C. jeanneli* is predatory, feeding on aphids, mealybugs, thrips, whiteflies, jassids, mites, and scale insects **(Youssif *et al*., 2014)**. Larvae exhibit camouflage behavior by attaching sucked-out prey exoskeletons to their bodies. Adults likely feed on pollen, aphid honeydew, and nectar.

Chrysemosa jeanneli has recently been recorded in Egypt for the first time associated with *Aphis gossypii* (Glover) on mango trees and *Hyalopterus pruni* (Geoffroy) on apricot trees, as documented by the Natural History Museum (NHM), London (Environmental Dispersal Map No. 134). According to NHM records **(British Museum, 2013)**, its geographical distribution in Africa includes South Africa, Namibia, Tanzania, Botswana, Eswatini (formerly Swaziland), and Kenya.

This study aims to evaluate the effects of three host plants (mango, navel orange, and mandarin trees) infested with *A. gossypii* on the biological parameters of *C. jeanneli*. These parameters include immature development time, mortality rates, predation efficacy, cocooning success, adult emergence rates, sex ratio, fecundity, fertility, and hatchability under laboratory conditions. Additionally, the relationship between the total protein and carbohydrate content of *A. gossypii* on different host plants and the reproductive performance (fecundity, fertility, hatchability) of *C. jeanneli* is investigated.

MATERIALS AND METHODS

Specimens of aphid lion species were sent to the Natural History Museum (British Museum) for taxonomic identification. These were authenticated by Prof. Dr. Hannah Cornish, Research Entomologist in the Systematic Entomology Department (Communications and Taxonomic Services Unit), Natural History Museum (British Museum), UK.

The rearing of *Chrysemosa jeanneli* (Navás) (Neuroptera: Chrysopidae), a newly recorded lacewing species in Egypt, on *Aphis gossypii* (Glover) infesting three host plants (mango, *Mangifera indica* L.; navel orange, *Citrus siensis* L.; and mandarin, *Citrus reticulatus* L.) was conducted under controlled laboratory conditions (26 ± 1°C, 65 ± 5% RH) at the Department of Plant Protection, Faculty of Agriculture, Zagazig University, Egypt.

Adult *C. jeanneli* specimens were collected from *A. gossypii*-infested navel orange, mango, and mandarin trees at El-Khattara district, Sharkia Governorate, Egypt. Sexed adult pairs were confined in chimney cages (16 cm height, 6.5 cm top diameter, 7.5 cm bottom diameter) positioned atop clean Petri dishes (8 cm diameter). A piece of filter paper was placed at the base of each Petri dish, and the open top of the chimney cage was covered with black muslin cloth. Adults were fed an artificial diet (yeast, honey, and pollen at a 2:1:1 ratio) every 24 hours. A water-saturated cotton ball was placed atop the muslin cloth to maintain humidity. Eggs were collected daily.

Forty-five newly deposited *C. jeanneli* eggs (< 24 hours old) were individually placed in plastic containers (8 × 2.5 cm) until hatching. Newly hatched larvae were fed *A. gossypii* from mango, navel orange, or mandarin leaves, with 15 replicates per treatment. Approximately 25 *A. gossypii* individuals were provided daily to each larva, and devoured aphids were replaced. Prey quantities were increased as larvae aged. Daily predation rates (number of aphids consumed), larval mortality percentages, feeding capacity, larval duration, cocooning success, total developmental period, adult emergence rates, and sex ratios were recorded. Newly emerged *C. jeanneli* adults (one female-male pair) were confined in glass chimney cages as described above and provided with the same artificial diet. The effects of *A. gossypii*, reared on the three host plants during the lacewing larval stage were evaluated by documenting the following parameters: number of eggs deposited, egg fertility, hatchability, incubation period, pre-oviposition, oviposition, post-oviposition periods, and adult longevity.

Biochemical analysis of *A. gossypii* (prey) was performed to quantify carbohydrate and protein content, following the methods reported in detail by Abd-Allah (1998). Samples were processed by ALTRA Laboratory. Treatment means and variances were statistically analyzed using ANOVA (F-test) via COSTAT software.

RESULTS AND DISCUSSION

Larvae of *Chrysemosa jeanneli* were reared on *Aphis gossypii* colonized on mango, navel orange, and mandarin trees to evaluate the effect of different host plants infested with aphid on biological parameters of the tested predator.

1- **Effect of host plants infested with *Aphis gossypii* (Glover) on immature stage durations of *Chrysemosa jeanneli*.**

Larvae of *Chrysemosa jeanneli* were reared on *Aphis gossypii* colonizing mango, navel orange and mandarin trees to evaluate the impact of aphid-infested host plants on the predator's biological parameters. The durations of immature stages of *C. jeanneli* are summarized in **Table (1).** The egg incubation period varied significantly among treatments. Eggs deposited by *C. jeanneli* females incubated for 2.93 ± 0.15, 3.53 ± 0.19, and 2.87 ± 0.17 days when larvae were reared on *A. gossypii* from mango, navel orange, and mandarin trees, respectively **(Table 1).** These results align with previous studies on related species. For instance, **El-Maghraby *et al*. (2008)** reported an incubation period of 2.76 ± 0.35 days for *Chrysoperla carnea* eggs when larvae were fed *A. gossypii* from mandarin trees. Similarly, **Sattar *et al*. (2011)** observed an incubation period of 2.25 days for lacewing eggs reared on aphids, while **Saleh *et al*. (2017)** documented a slightly longer period of 3.17 days for *C. carnea* feeding on *A. gossypii*. The minor variations across studies may reflect differences in prey nutritional quality, environmental conditions, or species-specific responses.

The chrysopid, *C. jeanneli* had three larval instars, the 2nd larval instar was characterized by special activity: moving the head from side to side when it moves **(Plate 1)**. Also, data presented in **Table (1)** indicate that the mean duration of the 1st larval instar of *C. jeanneli* differed significantly depending on the host plant of its prey, *A. gossypii*. Larvae reared on *A. gossypii* from mango, navel orange, and mandarin trees exhibited instar durations of 3.57 ± 0.14, 4.15 ± 0.15, and 3.71 ± 0.13 days, respectively. Statistical analysis revealed significant differences between larvae fed aphids from navel orange trees and those reared on aphids from mango or mandarin trees. These findings align with previous studies on related species. For example, **El-Maghraby *et al*. (2008)** reported 1st instar durations of 4.03 ± 0.17, 4.14 ± 0.12, and 4.03 ± 0.10 days for *C. carnea* larvae reared on *A. gossypii* from mango, mandarin,

Table 1: Immature stage durations (in days) of *C. jeanneli* reared on *A. gossypii* colonizing mango, navel orange and mandarin trees.

Biological parameters	*Aphis gossypii* on			F value	L.S.D. 0.05
	Mango trees Mean ±SE.	Navel orange trees Mean ±SE.	Mandarin trees Mean ±SE.		
Incubation period days)	2.93 ± 0.15 b	3.53 ± 0.19 a	2.87 ± 0.17 b	**4.616***	**0.488**
Larval stage					
1st instar	3.57 ± 0.14 b	4.15 ± 0.15 a	3.71 ± 0.13 b	**4.686***	**0.406**
2nd instar	5.21 ± 0.15 a	4.50 ± 0.15 b	3.85 ± 0.19 c	**17.439****	**0.498**
3rd instar	7.50 ± 0.14 a	5.82 ± 0.23 b	7.00 ± 0.25 a	**16.384****	**0.640**
Total larval stage	16.29± 0.29 a	14.36 ± 0.31 b	14.54 ± 0.35 b	**11.648****	**0.977**
Pupal stage	7.57 ± 0.23	7.33 ± 0.50	7.85 ± 0.14	**0.728 ns**	**1.061**
Total developmental period	26.86± 0.36 a	25.11 ± 0.59 b	25.00 ± 0.46 b	**5.758****	**1.485**

- NS refered that the variances among treatments (host plants) are not significant.
-*and ** refered that the variances among treatments (host plants) are significant and highly significant at 0.05and 0.01 level of probability.

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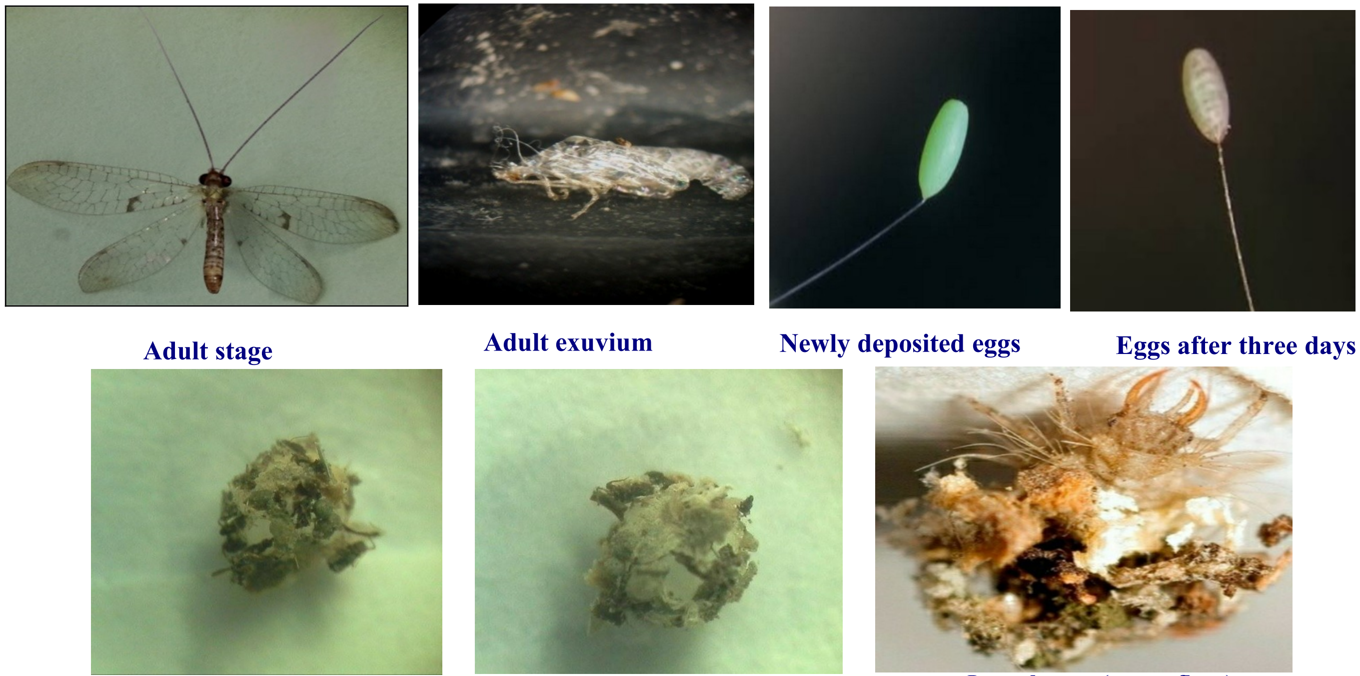

Plate 1: Different stages of *Chrysemosa jeanneli* (Navás).

and navel orange trees, respectively. The mean duration of the 2nd larval instar of *C. jeanneli* was 5.21 ± 0.15, 4.50 ± 0.15, and 3.85 ± 0.19 days when larvae were fed *A. gossypii* from mango, navel orange, and mandarin trees, respectively. Statistical analysis indicated highly significant differences between means. **El-Maghraby *et al.* (2008)** documented 2nd instar durations of 3.03 ± 0.01, 4.61 ± 0.13, and 5.01 ± 0.14 days for *C. carnea* reared on *A. gossypii* from mango, mandarin, and navel orange trees.

Sattar *et al.* (2011) observed shorter 2nd instar duration of 2.75 ± 0.16 days for *C. carnea* on the same aphid. The 3rd larval instar duration of *C. jeanneli* varied significantly across host plants **(Table 1).** The longest duration (7.50 ± 0.14 days) occurred in larvae reared on *A. gossypii* from mango trees, while the shortest (5.82 ± 0.23 days) was observed in those fed aphids from navel orange trees. **El-Maghraby *et al.* (2008)** reported 3rd instar durations of 8.03 ± 0.25, 8.31 ± 0.11, and 6.75 ± 0.28 days for *C. carnea* on *A. gossypii* from mango, mandarin, and navel orange trees, respectively. **Sattar *et al.* (2011)** recorded a shorter duration of 3.12 days for *C. carnea.* **Mohamed *et al.* (2024)** reported 1st, 2nd, and 3rd larval instar durations of 3.33 ± 0.47, 3.46 ± 0.57, and 5.10 ± 1.32 days, respectively, for *C. carnea* reared on *A. gossypii*. Thus, the total larval stage of *C. jeanneli* lasted 16.29 ± 0.29, 14.36 ± 0.31, and 14.45 ± 0.35 days when reared on *A. gossypii* from mango, navel orange, and mandarin trees, respectively (Table 1), with highly significant differences among means (**F = 11.648****). **Sattar *et al.* (2011)** reported a shorter total larval period of 8.50 ± 0.23 days for *C. carnea*, while **Mohamed *et al.* (2024)** observed a mean larval duration of 11.90 ± 1.74 days for *C. carnea* on *A. gossypii*.

Moreover, pupal stage durations for *C. jeanneli* were 7.57 ± 0.23, 7.33 ± 0.50, and 7.85 ± 0.14 days when larvae were reared on *A. gossypii* from mango, navel orange, and mandarin trees, respectively **(Table 1)**. Differences were not statistically significant. **Mannan *et al.* (1997)** reported longer pupal periods for *C. carnea*: 9.43 days on *A. gossypii* and 11.40 days on *Myzus persicae*. **El-Maghraby *et al.* (2008)** documented 6.53 ± 0.09 and 6.39 ± 0.22 days for *C. carnea* on mango and navel orange trees. **Mohamed *et al.* (2024)** noted a pupal duration of 8.70 ± 1.31 days for *C. carnea*. Thus, the total developmental period of *C. jeanneli* was longest (26.86 ± 0.36 days) on *A. gossypii* from mango trees and shortest (25.11 ± 0.59 days) on mandarin trees **(Table 1).** Differences were highly significant. **Sattar *et al.* (2011)** reported a shorter developmental period of 18.50 days for *C. carnea*, while **Saleh *et al.* (2017)** observed 23.8 ± 1.36 days for the same species. **Mohamed *et al.* (2024)** recorded 20.60 ± 1.99 days for *C. carnea*.

2- Predation efficacy of *C. jeanneli* on *A. gossypii*.

As shown in **Table (2)**, the 1st; 2nd; and 3rd larval instar of *C. jeanneli* consumed 73.43 ± 2.52, 70.64 ± 2.52 and 36.07 ± 1.37; 169.64 ± 8.16, 166.36 ± 3.27 and 57.00 ± 2.22; and 496.71 ± 13.33, 364.27 ± 9.52 and 277.07 ± 2.74 individuals of *A. gossypii* from mango, navel orange and mandarin trees, respectively. Thus, the 3rd instar consumed the highest proportion of aphids (67.14%, 60.58%, and 74.86% for mango, navel orange, and mandarin, respectively). **El-Maghraby *et al.* (2008)** reported total aphid consumption of 359.13 ± 9.20 (mango) and 617.57 ± 5.29 (navel orange) for *C. carnea*. Saleh *et al*. (2017) stated that the total consumption rate per *C. carnea* larva was 367.31 ± 50.28 individuals of *A. gossypii***.**

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Table 2: Predation efficacy of the three larval instars of *C. jeanneli* reared on *A. gossypii* colonizing mango, navel orange, and mandarin trees.

Host Plants	Total consumed aphids (Mean ±SE)				Proportion of aphids (%)		
	1st instar	2nd instar	3rd instar	Total larval stage	1st instar	2nd instar	3rd instar
Mango	**73.43 2.52a**	**169.64±8.16a**	**496.71±13.33a**	**739.78±16.03a**	**9.93**	**22.93**	**67.14**
Navel orange	**70.64±1.39a**	**166.36±3.27a**	**364.27±9.52b**	**601.27±4.15b**	**11.75**	**27.67**	**60.58**
Mandarin	**36.07±1.37b**	**57.00±2.22b**	**277.07±2.74c**	**370.14±7.96c**	**9.75**	**15.39**	**74.86**
F value	**114.882****	**204.788****	**140.879****	**310.611****			
L.S.D. 0.05	**6.187**	**14.238**	**30.117**	**34.242**			

- ** refered that the variances among treatments (host plants) are highly significant at 0.01 level of probability.

3- Effect of host plants infested with *A. gossypii* on larval mortality (%), cocooning (%), adult emergence and sex ratio of *C. jeanneli*.

Data in **Table (3)** demonstrate that the mortality percentage of *C. jeanneli* larvae varied across host plants infested with *A. gossypii* Mortality rates of the 1st; 2nd; and 3rd larval instar of *C. jeanneli* were 6.67, 0.00 and 0.00 %; 13.33, 7.69 and 8.33 %; and 6.67, 7.14 and 0.00% for those reared on *A. gossypii* from mango, navel orange, and mandarin trees, respectively. Overall, larval mortality was highest (26.67 %) when lacewing larvae were fed *A. gossypii* from navel orange trees, followed by 13.33 % on mandarin trees, and lowest (6.67 %) on mango trees. **El-Maghraby *et al.* (2008)** reported the highest larval mortality (12.50%) in *C. carnea* reared on *A. gossypii* from navel orange trees, while **Sattar *et al.* (2011)** documented 13.50% mortality for the same species.

Concerning cocooning success, cocooning percentage in *C. jeanneli* was highest (100 %) when larvae were reared on *A. gossypii* from mango trees, compared to 81.82 % on navel orange trees **(Table 3).** Emergence rates and sex ratios of adults varied by host plants. Data presented in **Table (3)** illustrate that the highest emergence rate (92.86 %) was found when the larvae of *C. jeanneli* fed on *A. gossypii* from mango, while the lowest emergence rate (77.78 %) was found when navel orange trees was the host plant of prey. On the other hand, corresponding sex ratio means (expressed as female bias percentages) were 66.67 and 57.14 %, respectively.

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Table 3: Effect of different host plants infested with *A. gossypii* on larval mortality, cocooning, emergency and female bias of the predator *C. jeanneli*.

Host Plants	Larval mortality (%)				Cocooning (%)	Emergence (%)	Female bias (%)
	1st instar	2nd instar	3rd instar	Total larval stage			
Mango	6.67	0.00	0.00	6.67	100.00	92.86	66.67
Navel orange	13.33	7.69	8.33	26.67	81.82	77.78	57.14
Mandarin	6.67	7.14	0.00	13.33	92.31	83.33	60.00

Mohamed *et al*. (2024) reported a sex ratio of 5.9♀: 4.1♂ for *C. carnea* reared on *A. gossypii*. In regard to effect of host plants on larval and cocoon weights, larvae reared on *A. gossypii* from mandarin trees attained the highest mean weight (6.3 ± 0.2 mg), while those from mango trees were lightest (5.09 ± 0.7 mg) **(Table 4).** Female cocoons were heaviest on mango trees (7.2 ± 0.1 mg), while male cocoons were lightest on mandarin trees (5.8 ± 0.6 mg) **(Table 4)**.

Concerning female reproductive periods, the results in **Table (5)** revealed that the pre-ovipositional, ovipositional and post-ovipositional periods, as well as adult longevity of *C. jeanneli* females was greatly affected by different host plants infested with aphid, *A. gossypii*. Pre-oviposition period was shortest on mango (3.88 ± 0.30 days), and longest on navel orange (7.75 ± 0.58 days). Oviposition period extended to 26.88 ± 1.04 days on mango vs. 16.00 ± 1.29 days on navel orange. Moreover, post-oviposition period was shortest on mango (5.13 ± 0.44 days), and longest on mandarin (7.00 ± 0.32 days). These results align with **Sattar *et al.* (2011)** who stated that the pre-oviposition, oviposition, post-oviposition periods of females after rearing on *A. gossypii* were 3.37± 0.18, 27.62± 0.42 and 6.87± 0.47 days, respectively. **Murtaza *et al.* (2020)** found that pre-oviposition, oviposition and post-oviposition periods were 8.2±1.25, 30.6±1.72 and 9.4±1.02 days, respectively after rearing on *A. gossypii***. Mohamed *et al.* (2024)** reported that the pre-oviposition, oviposition, and post-oviposition periods were 2.70 ±0.48, 45.20 ±2.69, and 13. 60 ±2.45 when the larvae of *C. carnea* fed on *A. gossypii*, respectively.

As presented in **Table (5) and Fig. (1)**, also, the adult female and male longevities were affected by different host plants infested with aphid, *A. gossypii*. It was found that the longevity of females was longest (35.88 ± 1.03 days) when lacewings were reared on *A. gossypii* colonizing mandarin trees, meanwhile, it was shortest (29.50 ± 1.66 days) on navel orange. For adult males, the longest longevity (11.00 ± 1.15 days) was noticed for the chrysopids reared on *A. gossypii*

Table (4): Effect of different host plants infested with *A. gossypii* on the weight of larvae and cocoons of *C. jeanneli*.

Host Plants	Average weight (mg)		
	Larva	Cocoon	
		Female	Male
Mango	6.3±0.2a	7.2±0.1	6.1±0.6a
Navel orange	5.9±0.5b	6.9±0.1	5.9±0.6ab
Mandarin	5.09±0.7b	6.5±0.2	5.8±0.6b
F value	4.758*	2.197 ns	4.728*
L.S.D. 0.05	3.111	4.481	2.047

- NS and * refered that the variances among treatments (host plants) are not significant and significant at 0.05 level of probability, respectively.

Table 5: Effect of different host plants infested with *A. gossypii* on the pre–ovipositional, ovipositional and post–ovipositional periods, and adult longevity (in days) of *C. jeanneli*.

Biological parameters	*C. jeanneli* (Mean ±SE) on *A. gossypii* from			F value	L.S.D. $_{0.05}$
	Mango	Navel orange	Mandarin		
Pre-ovipositional period	3.88 ± 0.30 c	7.75 ± 0.25 a	5.20 ± 0.58 b	22.560**	1.428
Ovipositional period	26.88 ± 1.04 a	16.00 ± 1.29 c	20.60 ± 1.21 b	21.631**	4.252
Ovipositional period/day/ Female	22.50 ± 1.12 a	13.75 ± 1.49 c	18.00 ± 0.84 b	13.463**	4.265
Post-oviposition period	5.13 ± 0.44 b	6.50 ± 0.29 a	7.00 ± 0.32 a	6.117*	1.509
Longevity female	35.88 ± 1.03 a	29.50 ± 1.66 b	32.80 ± 0.49 ab	8.077**	3.985
Longevity male	10.08 ± 0.8 6	11.00 ± 1.15	8.20 ± 0.58	3.731 ns	3.129

- NS refered that the variances among treatments (host plants) are not significant.
-*and ** refered that the variances among treatments (host plants) are significant and highly significant at 0.05and 0.01 level of probability, respectively.

colonizing navel orange trees, whereas the shortest (8.20 ± 0.58 days) was found on mango trees. Generally, longevity of *C. jeanneli* females was longer than these of males on all tested different host plants infested with aphid. According to **Sattar *et al.* (2011),** the females of chrysopid, lived longer, with an average of 38.00 ± 0.65 days, when the lacewing larvae, nurtured on *A. gossypii*. **Mohamed *et al.* (2024)** reported that the longest mean longevity of female and male *C. carnea* were (61.40±2.71 and 37.00±3.05 days) respectively, when the larvae of chrysopid fed on *A. gossypii*.

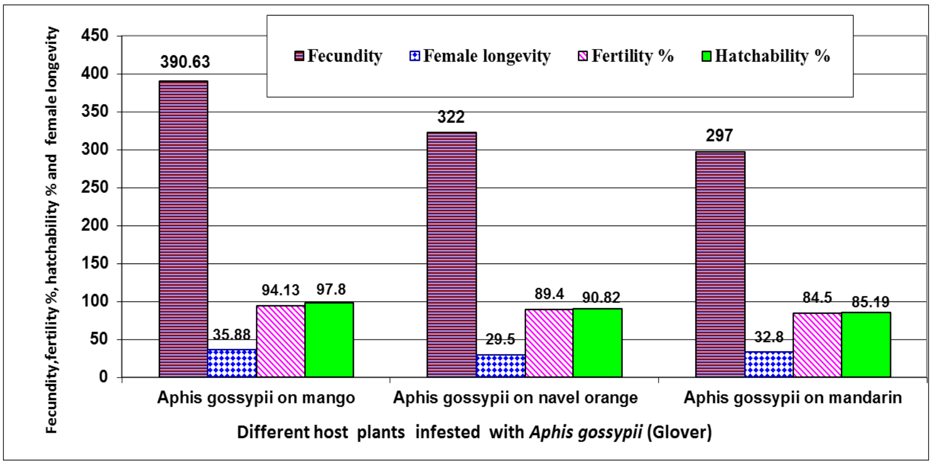

Fig. 1: Effect of aphid, *A. gossypii* from different host plants on the fecundity, fertility (%), hatchability (%) and female longevity (in days) of the predator *C. jeanneli*.

4. Fecundity, fertility (%) and hatchability (%) of *C. jeanneli* fed *A. gossypii* colonizing different host plants in relation to total protein and carbohydrate contents (%) of aphids.

Fecundity of predator, *C. jeanneli* females was strongly influenced by host plants infested with aphids. Chrysopid females reared on *A. gossypii* from mango trees laid the most eggs (390.63 ± 12.26), while those from mandarin trees laid the fewest (297.00 ±

8.26) **(Table 6** and **Fig. 1).** Statistical analysis revealed that the differences among means were highly significant (**F = 16.689****). Generally, *A. gossypii* reared on mango trees proved to have a high significant effect on the fecundity of predator, *C. jeanneli*. **Sattar *et al.* (2011)** reported that the eggs production per female averaged 419.80 ± 6.35 eggs when *C. carnea* females were fed on *A. gossypii* at a constant temperature of 26 ± 2°C and 65 ± 5% RH. **Saleh *et al.*, (2017)** stated that the average number of deposited eggs per *C. carnea* female was 316 ± 21.88 eggs when fed on the same aphid species. The obtained findings are in full agreement with observations of **Mohamed**

Table 6: Fecundity, fertility (%) and hatchability (%) of *C. jeanneli* fed *A. gossypii* colonizing different host plants in relation to total protein and carbohydrate contents (%) of aphids.

parameters	*Aphis gossypii* on			F value	L.S.D . 0.05
	Mango trees Mean ±SE.	Navel orange trees Mean ±SE.	Mandarin trees Mean ±SE.		
Fecundity	390.63±12.26 a	322.00± 12.69b	297.00 ± 8.26b	16.689**	45.217
Fertility%	94.13	89.40	84.50		
Hatchability %	97.80	90.82	85.19		
Total protein %	37.55 ± 0.26	33.55±0.29	31.55±0.37		
Carbohydrate %	35.45 ±0.17	31.19 ±0.77	29.66 ±0.67		

- ** refered that the variances among treatments (host plants) are highly significant at 0.01 level of probability.

***et al.* (2024)** who stated that the mean number of eggs produced by lacewing females fed on *A. gossypii* was 392.70±80.54 eggs.

Regarding of fertility and hatchability percentages, the highest mean percentages (94.13 ± 0.81 and 97.08 ± 0.59 %, in respect) were occured when the lacewing, *C. jeanneli* females were reared on aphid, *A. gossypii* from mango trees, meanwhile the lowest ones (84.50 ± 2.10 and 85.19 ± 1.87 %, in respect) were noticed when the chrysopid, *C. jeanneli* fed on the same aphid species from mandarin trees. The differences among means were significant (F=**16.689****). **Sattar *et al.* (2011)** mentioned that the percentage of fertility was (87.88 ± 0.74%), when the larvae of *C. carnea* were fed on *A. gossypii*. **Mohamed *et al.* (2024)** found that the hatchability percentage was 80.32% when lacewing larvae were reared on *A. gossypii*. As shown in **Fig. 2**, fecundity correlated strongly with aphid nutritional content. The highest fecundity of *C. jeanneli* females was observed when *A. gossypii* fed on mango trees. Also, the highest fertility and hatchability percentages resulted from rearing on that aphid having the highest protein (37.55%) and carbohydrate (35.45%) contents. Conversely, fecundity, fertility and hatchability of *C. jeanneli* were decreased when fed on aphids from mandarin trees. These aphids had the lowest protein content, and likely limited egg production and reproduction. This supports a direct relationship between prey nutrient profiles (protein/carbohydrates) and predator reproductive success.

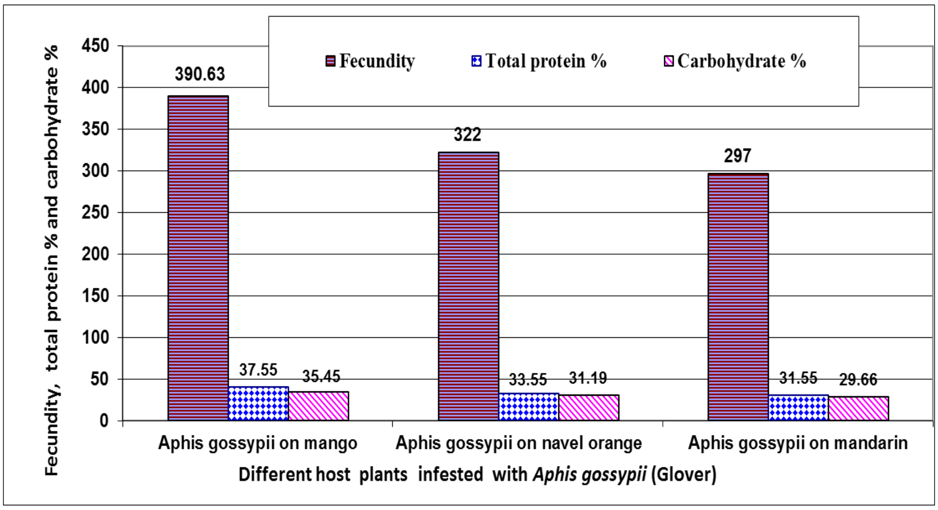

Fig. 2: Effect of total protein and carbohydrate content (%) of aphid, *A. gossypii* colonizing different host plants on fecundity of the predator *C. jeanneli*.

CONCOLUSION

The study on the effects of different host plants infested by the aphid *Aphis gossypii* on the biological parameters of the chrysopid *Chrysemosa jeanneli* revealed that *A. gossypii* colonizing mango trees served as the most suitable prey for *C. jeanneli*. Adult females reared on this prey exhibited the highest fecundity, depositing 390 eggs per female. Furthermore, these females demonstrated the longest adult longevity (35.88 days), with an oviposition period of 22.50 days. Additionally, this host-prey combination was characterized by the longest total larval stage (16.29 days) and the lowest mortality rate (6.67%), suggesting its strong potential for mass production in specialized laboratories to optimize *C. jeanneli* as a biocontrol agent in open fields and greenhouses. Biochemical analysis further indicated a direct relationship between the fecundity, fertility, and hatchability of *C. jeanneli* and the total protein and carbohydrate content of *A. gossypii* infesting different host plants. These findings underscore the critical role of prey nutritional quality in enhancing the efficacy of *C. jeanneli* for biological pest control.

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الملخص العربى

تأثير العوائل النباتية المختلفة المصابة بمن القطن على الخصائص البيولوجية لأسد المن *Chrysemosa jeanneli* (Navás): نوع مسجل حديثا فى مصر.

شيرين مجاهد محمد يوسف هلالى ، ولاء مجاهد محمد يوسف هلالى و محمد أحمد إبراهيم يوسف

قسم وقاية النبات – كلية الزراعة – جامعة الزقازيق – مصر

سجل أسد المن *Chrysemosa jeanneli* (Navás) كمفترس حشرى جديد فى مصر، حيث تم تعريفه بواسطة متحف التاريخ الطبيعى (المتحف البريطانى) بلندن. أجريت الإختبارات المعملية فى قسم وقاية النبات – كلية الزراعة – جامعة الزقازيق تحت ظروف مُتحكَّم بها (26 ± 1°م، رطوبة نسبية 65 ± 5%) لتقييم تأثير ثلاثة عوائل نباتية مختلفة مصابة بمن القطن (Glover) *Aphis gossypii* وهى أشجار المانجو ، البرتقال بسرة واليوسفى على الخصائص البيولوجية للمفترس. أوضحت النتائج المتحصل عليها أن أقصر وأطول فترة للطور اليرقى للمفترس كانت 14,36 ± 0,31 و 16,29 ±0,29 يوم عندما تم تربية يرقات المفترس على من القطن الذى يصيب أشجار المانجو والبرتقال بسرة على التوالى. لوحظت اطول وأقصر فترة نمو كلية للمفترس بتربية اليرقات على من القطن الذى يصيب أشجار المانجو (26.86 ± 0.36 يومًا) واليوسفي (25.00 ± 0.46 يومًا). اختلف عدد المن الكلى المستهلك خلال فترة الطور اليرقى طبقا لنوع العائل النباتى حيث بلغ 739,78 ± 16,03 ، 601,27 ± 4,15 و 370,14 ± 7,96 فردا بتغذية يرقات المفترس على من القطن الذى يصيب أشجار المانجو ،البرتقال بسرة واليوسفى ،على الترتيب. سجلت نسب خروج الحشرات الكاملة 92,86 ، 77,78 و 83,33 ٪ بنسب جنسية 66,67 ، 57,14 و 60,00 ٪ بتغذية يرقات أسد المن على نفس نوع المن الذى يصيب الأشجار سالفة الذكر، على التوالى. سُجّل أعلى متوسط خصوبة (390.63 ± 12.26 بيضة / أنثي) وأطول عمر للإناث (35.88 ± 1.03 يومًا) بتغذية يرقات المفترس على من القطن الذى يصيب أشجار المانجو. أشارت التحاليل الكيميائية الحيوية إلى وجود علاقة مباشرة بين عدد البيض / أنثى والخصوبة ونسبة الفقس للمفترس مع كلا من محتوى البروتين الكلي والكربوهيدرات بمن القطن الذى يصيب أشجارالعوائل النباتية المختبرة . ولاشك ان تلك النتائج توضح الكفاءة الافتراسية العالية لأسد المن على من القطن الذى يصيب أشجار الفاكهة تحت الدراسة وتحديد نوع المن الذى يوفر للمفترس الكفاءة التناسلية العالية مما يساعد فى الاكثار الكمى للمفترس بغرض الاستخدام التطبيقى والاطلاق الدورى لمكافحة أنواع المن المختلفة كما يفيد هذا فى وضع برامج السيطرة على المن فى بساتين الفاكهة.