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INFLUENCE OF ADULT NUTRITION ON THE BIOLOGICAL ASPECTS AND PREDATION EFFICIENCY OF THE BROWN LACEWING, *Sympherobius fallax* (NAVÁS) (NEUROPTERA: HEMEROBIIDAE)

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ABSTRACT: The influences of four adult artificial diets on biological parameters and predation efficiency of brown lacewing, *Sympherobius fallax* (Navás), were assessed under laboratory conditions (27 ± 1 °C and 65 ± 5% RH). Obtained results showed that diet (1) led to the longest oviposition period (29.33 ± 0.99 days) and the highest number of deposited eggs (399.17 ± 9.42 eggs). The highest male longevity was recorded on diet (3). Diet (1) also resulted in the highest hatchability and fertility percentages. The incubation period was prolonged on diets (1) and (4), recording 6.90 ± 0.21 and 6.2 ± 0.23 days, respectively, compared to 5.8 ± 0.35 and 5.4 ± 0.24 days on diets (2) and (3). The durations of the 1st, 2nd, and 3rd larval instars were longer on diets (1), (3) and (4) than on diet (2). Total aphid consumption by larvae was significantly higher on diets (1), (3), and (4), with 159.10 ± 6.10, 149.50 ± 2.78, and 136.80 ± 3.98 aphids consumed, respectively, compared to 129.50 ± 5.66 aphids on diet (2). The 3rd larval instar was the most efficient, accounting for 69% of total aphid consumption when adults were fed on diets (1), (3), and (4). Overall, rearing *S. fallax* adults on diet (1) significantly enhanced both biological performance and larval predation efficiency.

Key words: Lacewing, predation efficacy, *Aphis gossypii*, artificial diets

INTRODUCTION

Members of the family Hemerobiidae are well-known predators of small, soft-bodied arthropods, with both larvae and adults exhibiting predatory behavior (**Neuenschwander *et al.*, 1975; New, 1975**), and both stages are predatory. Hemerobious predators are small to medium-sized insects, with forewing lengths ranging from 3 to 9 mm. They primarily prey on soft-bodied insects such as aphids, mealy bugs, and insect eggs. Larvae of various hemerobiid species, particularly those in the genera *Hemerobiella*, *Hemerobius*, *Nesobiella*, *Sympherobius* and *Wesmaelius* are known to attack economic insect pests in various environments (**Aspock *et al.*, 1996**).

Hemerobiids undergo complete metamorphosis with four stages: egg, larva, pupa and adult. Females lay sessile (non-stalked) eggs either singly or in small clusters (**Cutright, 1923**). Most identified hemerobiid larvae are relatively dynamic predators, and often found on plants feeding on insect eggs and other soft-bodied prey. Currently, family Hemerobiidae includes 9 subfamilies: Megalominae, Drepanepterginae, Microminae, Zachobiellinae, Carobiinae, Drepanacrinae, Notiobiellinae, Sympherobiinae and Hemerobiinae (**Garzón-Orduǹa *et al.*, 2016**).

The brown lacewing, *Sympherobius fallax* (Navás) (Neuroptera: Hemerobiidae), is commonly originated in diverse agricultural ecosystems, characterized by a high frequency of occurrence and notable resistance to a wide range of pesticides (**New, 1984**). The larval stage includes three instars and typically requires about 15–20 days for development. The larvae are active predators with broad bodies and possess curved and impressive mandibles, which they use to capture and extract the body fluids of soft-bodied phytophagous insects. Pupation occurs

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within a small silk cocoon (**Monserrat, 2002**). Brown lacewings are vital in biological control and are often more effective than green lacewings at low aphid densities, as they do not require honeydew for oviposition.

S. fallax larvae are voracious predators of exposed, small soft-bodied arthropods and their eggs, such as thrips, aphids, mealy bugs, whiteflies, scale insects, jassids, small lepidopteran and coleopteran larvae, and spider mites. In contrast, adult feed exclusively on nectar, pollen, and honeydew (**Tjeder, 1961)**. So, the present study was conducted to assess the influences of adult feeding on the biological parameters of *S. fallax* adults, and to evaluate the biological performance and predation efficiency of larvae derived from adults fed on four different diets.

MATERIALS AND METHODS

Insect Collection and Identification

Sympherobius fallax (Navás) (Neuroptera: Hemerobiidae) was recorded on mango trees infested with the aphid *Aphis gossypii* (Glover) in El-Khatara District, Sharkia Governorate, Egypt. Specimens of the unidentified lacewing were sent to the Natural History Museum (British Museum), UK, for identification. It was identified as *Sympherobius fallax* by Research Entomologist: Prof. Dr. Hannah Cornish, , Systematic Entomology Department, Communications and Taxonomic Services Unit, Natural History Museum, UK. Taxonomic confirmation was based on Key 45 (p. 55), Abb. 529–531, 556; F.117. B.M. Reg. No. 15902013.

Predator Rearing

S. fallax adults were collected from mango trees infested with *A. gossypii* and reared under laboratory conditions at 27 ± 1 °C, 65 ± 5% RH, and a 14:10 h (L:D) photoperiod. Larvae were provided daily with *A. gossypii* as a food source. Both males and females were housed in glass chimneys measuring 19 cm in height, 8.5 cm in bottom diameter, and 7 cm in top diameter. Each chimney was placed on a Petri dish (9 cm diameter) lined with filter paper. The open top of the chimney was covered with black muslin cloth secured by a rubber band. Inside each chimney, adults were provided with small paper strips containing three drops of honey. Pollen was also offered as a food source. The diet was replenished every 24 hours. A wet cotton piece was put over muslin cloth at the chimney top to maintain humidity. Females laid stalkless eggs on the chimney walls and base, which were collected daily.

Effect of Artificial Diets on *S. fallax* Adults

Four tested artificial diets (Table 1) were evaluated. The diet ingredients were homogenized using a stirrer. Forty newly emerged adults of *S. fallax* (20 males and 20 females) were sexed and divided into four groups, each corresponding to one of the tested diets. Each treatment included five replicates, with one male-female pair per replicate. Adults were placed in individual glass chimneys as described above. Diet was provided in the form of three drops placed on a 3 × 4 cm card, introduced daily into each chimney. The following parameters were recorded: fecundity (number of eggs), fertility, hatchability, incubation period, and adult longevity (for both males and females).

Predator's Biological Characteristics and Predation Efficiency

Sixty a fresh laid eggs (less than 24 hours old) from mated *S. fallax* females were individually preserved in plastic vials (7 × 2 cm) till hatching. The resulting larvae were fed *A. gossypii* individuals, which were offered daily. Larvae originated from adults that had been fed on the tested diets. The number of aphids provided per larva was adjusted based on the developmental stage, and increased as the larvae matured. The number of aphids consumed was recorded daily until each larva spun its spherical silk cocoon. Cocoons were left undisturbed until adult emergence. The following parameters were assessed: larval survival percentage, duration of each larval instar, total developmental period, cocooning percentage, sex ratio (percentage of female offspring), and adult emergence rate.

Table 1. Components of tested artificial diets for adults

Artificial diet	Ingredients	Weight or Volume
Diet (1)	Hen's egg yolk : yeast extract: milk : royal jelly: propolis	5 ml: 2.5 g: 5 ml: 5 g: 2.5 g
Diet (2)	Hen's egg yolk: honey: royal jelly	5 ml: 10 ml: 5 g
Diet (3)	Hen's egg white: milk : honey: pollen grains	5 ml: 5 ml: 5 ml: 5 g
Diet (4)	Sucrose: yeast extract: honey: distilled water : casein	3 g: 2.5 g: 2.5 g: 10 ml: 2.0 g

Statistical Analysis

Data were tested for normality using the Shapiro–Wilk and Kolmogorov–Smirnov tests. Results were expressed as mean ± standard error (SE). Statistical comparisons among treatments were performed using one-way analysis of variance (ANOVA) in SPSS software (Version 15.0, Chicago, IL, USA). Post hoc comparisons were carried out using the Least Significant Difference (LSD) test at significance levels of $p < 0.05$ and $p < 0.01$ to determine statistically significant differences among treatments.

RESULTS AND DISCUSSION

Different Developmental Stages of *S. fallax*

Different developmental stages of *S. fallax* are illustrated in Plate 1. Data offered in Table 2 and Fig. 1 show that the shortest pre-oviposition period (6.50 ± 0.34 days) was detected when adults were reared on diet (1), which consisted of hen’s egg yolk, yeast extract, milk, royal jelly, and propolis (5 ml: 2.5 g: 5 ml: 5 g: 2.5 g). In contrast, the longest pre-oviposition period (10.67 ± 0.61 days) occurred in adults fed on diet (3), which contained hen’s egg white, milk, honey, and pollen grains (5 ml: 5 ml: 5 ml: 5 g). Statistical analysis revealed highly significant differences among diets ($F = 9.59$; df = 3, 20; $P < 0.0001$). **Yayla and Satar (2013)** reported similar findings for *S. pygmaeus*, where the maximum pre-oviposition period (4 days) occurred with water, and the shortest (1.4 days) with a diet of mealy bug plus 10% honey-water.

According to Table 2 and Fig. 1, the longest oviposition period (29.33 ± 0.99 days) was noted for females fed on diet (1), while the shortest (13.67 ± 1.69 days) occurred with diet (3). These differences were also statistically significant ($F = 23.59$; df = 3, 20; $P < 0.0001$). These findings are consistent with those of **Attia and El-Arnaouty (2008)** who observed an average oviposition period of 32.60 ± 0.92 days for *S. amicus* on *Ephestia* eggs with honey. Similarly, **Yayla and Satar (2013)** reported an oviposition period of 14.80 ± 2.19 days for *S. pygmaeus* fed mealy bugs and 10% honey-water. The post-oviposition period varied from 4.33 ± 0.42 to 11.00 ± 1.06 days among tested diets (Table 2 and Fig. 1), and these differences were highly significant ($F = 18.59$; df = 3, 20; $P < 0.0001$). These findings contradict **Yayla and Satar (2013)**, who reported a much shorter post-oviposition period of 1.70 ± 2.13 days for *S. pygmaeus*.

Female longevity ranged from 33 to 40 days (Table 2), with the longest average lifespan (40.17±0.61 days) observed on diet (1), followed by diets (2) (36.00 ± 1.24), (3) (35.50 ± 1.57), and (4) (33.67 ± 1.33). Significant differences were found between diet (1) and the other diets ($F = 4.92$; df = 3, 20; $P < 0.01$), indicating that diet (1) promoted greater female longevity. These results align with **Attia and El-Arnaouty (2008)**, who found a female lifespan of 36.60 ± 0.92 days for *S. amicus* on a semi-artificial diet containing *Ephestia* eggs and honey. **Gillani and Copland (2012)** also reported longevity of 45.92 days for *S. fallax* females. Conversely,

Yayla and Satar (2013) recorded a shorter adult female lifespan (21.50 ± 1.47 days) for *S. pygmaeus* on a mealy bug + 10% honey-water diet. **Amruta and Chaugale (2023)** mentioned that the longevity of female was 29.42 days when *S. fallax* larvae were reared on aphids. Concerning the longevity of *S. fallax* male, the highest mean value (33.25 ± 1.75 days) was recorded on diet (3), while the lowest (29.25 ± 1.49 days) was observed with diet (4), which consisted of sucrose, yeast extract, honey, distilled water, and casein **(Table 2)**. However, these differences were statistically insignificant (F = 0.75; df = 3, 20; P = 0.543). **Attia and El-Arnaouty (2008)** reported similar male longevity (35.20 ± 2.40 days) for *S. amicus* on a semi-artificial diet consisted of *Ephestia* eggs with honey.

Data in Table 3 and Fig. 2 reveal that the highest number of eggs deposited per *S. fallax* female (399.17 ± 9.42) occurred when adults were fed diet (1). The minimum number of laid eggs (178.83±16.34 eggs/female) was observed with diet (4). The differences among diets were highly significant (F = 55.21; df = 3, 20; P<0.0001), confirming that diet (1) significantly enhanced reproductive output. These findings are consistent with **McEwen and Kidd (1995)**, who emphasized the importance of components such as yeast extract, egg yolk, royal jelly, and sugar in maximizing egg production. Honey was also noted as a key dietary element for enhancing fecundity. **Milevoj (1999)** studied the feeding of adult aphid lion species on diets composed of egg yolk, milk, yeast, fruit sugars, and found that higher fecundity was observed with the egg yolk diet due to its richness in proteins (amino acids). Similarly, **Abdel-Samad (2011)** reported the highest mean number of eggs per female (196.00 ± 11.80), with a maximum number of hatching eggs (175 ± 17.00, 89.30%) when lacewing predators were reared on diet containing 5 g honey, 1 g pollen grains, 1 g royal jelly, and 5 ml water. Regarding daily egg deposition, the average numbers of eggs laid per day by *S. fallax* were 13.71 ± 0.64, 13.76 ± 0.68, 15.76 ± 1.36, and 11.71 ± 1.05 when fed on the four tested diets, respectively. The differences between these means were statistically insignificant (F = 2.07; df = 3, 20; P < 0.135) **(Table 3)**. **Attia and El-Arnaouty (2008)** recorded a mean of 203.70 ± 18.46 eggs per *S. amicus* female when reared on a semi-artificial diet of *Ephestia* eggs with honey. **Yayla and Satar (2013)** found that extreme egg production (349.67 eggs) in *S. pygmaeus* occurred in the mealy bug + 10% honey-water treatment, whereas the lowest was 15.875 eggs in the pure water treatment. The mean daily egg production was 24.90 ± 2.46 eggs per female on the mealy bug + 10% honey-water diet. Also, data in **Table 3** and **Fig. 2** show that the mean percentages of fertilized eggs per female of *S. fallax* were 84.67 ± 2.95, 72.17 ± 2.93, 58.83 ± 1.64, and 52.67 ± 2.67% for diets (1) to (4), respectively.

Corresponding percentages of hatchability, its were 93.09 ± 0.63, 72.35 ± 3.69, 59.55 ± 1.73, and 50.01 ± 2.13%, respectively. These differences were highly significant (F = 64.5; df = 3, 20; P<0.0001). **Kubota and Shiga (1995)** also reported that a yeast and honey autolysis mixture was suitable for producing fertile eggs.

Table 4 shows that the incubation period of *S. fallax* eggs was longest on diet (1) (6.90 ± 0.21 days) and diet (4) (6.20 ± 0.23 days), while the shortest periods were observed on diet (2) (5.80±0.35 days) and diet (3) (5.40 ± 0.24 days). The differences were statistically significant (F = 4.83; df = 3, 36; P < 0.006). **Smith (1923)** reported the life cycle of *S. amicus* as 9.15 days for eggs, 22.2 days for larvae, and 10.01 days for pre-pupal and pupal stages, in line with our findings. These results align with **Attia and El-Arnaouty (2008)**, who found an average egg incubation period of 7.00 ± 0.63 days for *S. amicus* fed on the aphid, *Schizaphis graminum*. However, they differ from **Rueda *et al.* (2011)**, who recorded a shorter egg incubation period of 3.80 ± 0.11 days for *S. barberi* at 25.8°C and 61.5% RH. Regarding larval development, durations of the 1st, 2nd and 3rd instars were longer on diets (1), (3), and (4) compared to diet (2). Consequently, the total larval durations were 20.20 ± 0.38, 19.80 ± 0.18, and 19.90 ± 0.32 days on diets (1), (3), and (4), respectively,

Table 2. Adult longevity of *Sympherobius fallax*, when adults fed on the tested artificial diets under laboratory conditions

Biological characteristics	Mean±SE			
	Diet (1)	Diet (2)	Diet (3)	Diet (4)
Pre- oviposition period	6.50 ± 0.34 c	8.17 ± 0.48 b	10.67 ± 0.61 a	9.0 ± 0.73 b
Oviposition period	29.33 ± 0.99 a	20.33 ±1.26 b	13.67 ±1.69 c	15.67 ± 1.74 c
Post-oviposition period	4.33 ± 0.42 c	7.67 ± 0.49 b	11.00 ±1.06 a	9.00 ± 0.37 b
Female longevity	40.17±0.61 a	36.00±1.24 b	35.50±1.57 b	33.67±1.33 b
Male longevity	30.00±2.20 a	31.00±2.45 a	33.25±1.75 a	29.25±1.49 a

Means ± SE in the same column followed by different letters are significant ($P < 0.05$) and highly significant ($P < 0.01$). Six replications were used for each treatment (One pair's adult/replicate).

Plate1. Different stages of *Sympherobius fallax* (Navás)

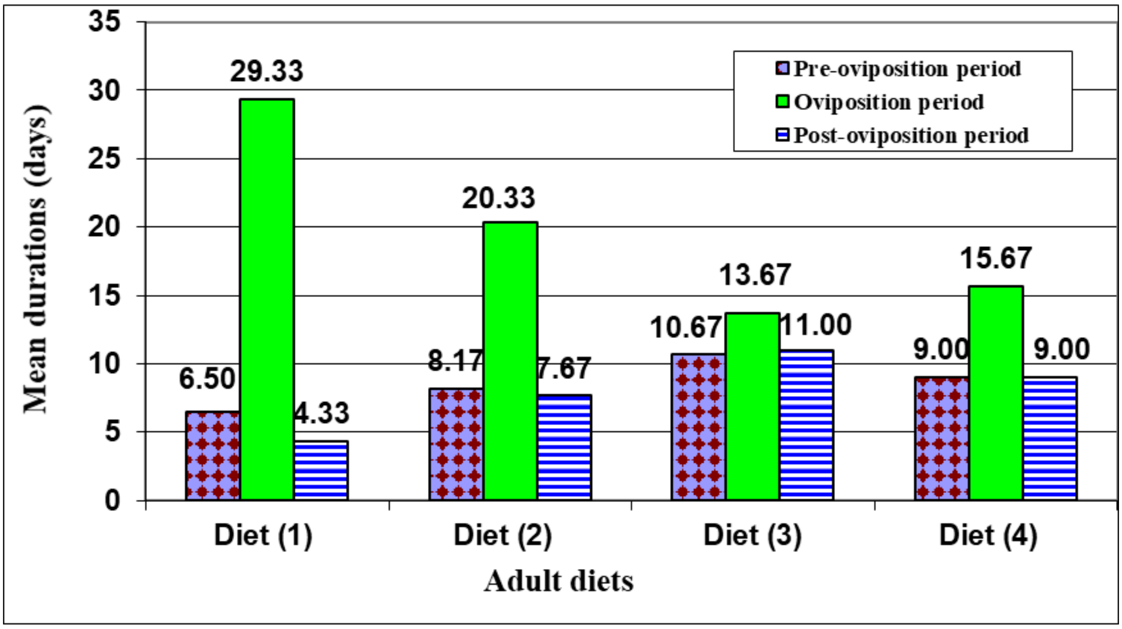

Fig. 1. Influence of different adult diets on the pre-oviposition, oviposition and post–oviposition periods of *Sympherobius fallax* (Navás) adults under laboratory conditions

Table 3. Influence of the tested adult diets on the fecundity, fertility and hatchability of *Sympherobius fallax* under laboratory conditions

Adult diet	Fecundity		Fertility	Hatchability
	No. of laid eggs /day	Mean±SE	%	%
Diet (1)	13.71±0.64 ab	399.17±9.42 a	84.67±2.95 a	93.09±0.63 a
Diet (2)	13.76±0.68 ab	276.00±13.65 b	72.17±2.93 b	72.35±3.69 b
Diet (3)	15.76±1.36 a	206.83±12.52 c	58.83±1.64 c	59.55±1.73 c
Diet (4)	11.71±1.05 b	178.83±16.34 c	52.67±2.67 c	50.01±2.13 c

Means ± SE in the same column followed by different letters are significant ($P < 0.05$) and highly significant ($P < 0.01$). Six replications were used for each treatment (One pair's adult /replicate).

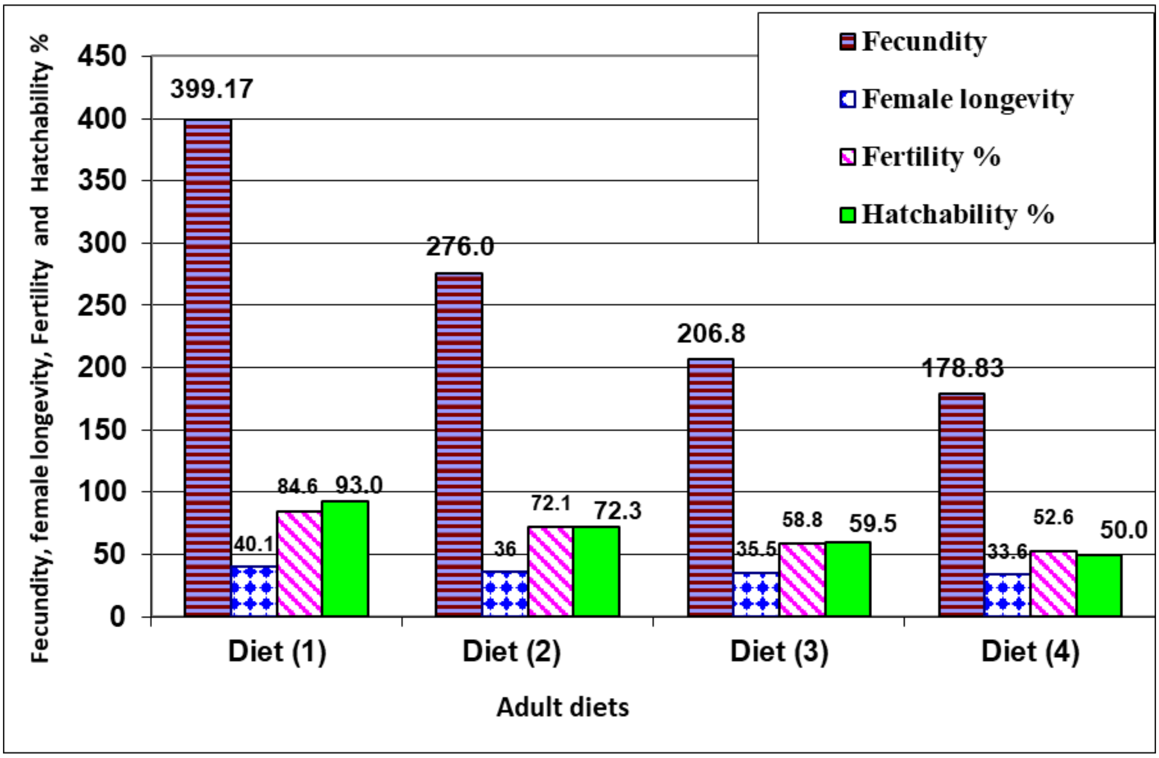

Fig. 2. Influence of different adult diets on the fecundity, Fertility, Hatchability % and female longevity of *Sympherobius fallax* (Navás) under laboratory conditions

Table 4. Durations of different stages of *Sympherobius fallax* reared as adults on four diets under laboratory conditions

Parameter		Mean ± SE			
		Diet (1)	Diet (2)	Diet (3)	Diet (4)
Incubation period		6.90±0.21 a	5.8±0.35 b	5.4±0.24 b	6.2±0.23 ab
Larval duration	**1st instar**	6.00±0.19 a	4.60±0.15 b	6.10±0.16 a	6.00±0.27 a
	2nd instar	7.10±0.21 a	6.10±0.21 b	6.60±0.15 ab	6.50±0.20 ab
	3rd instar	7.10±0.25 ab	6.50±0.15 b	7.10±0.16 ab	7.40±0.20 a
	Total larval duration	20.20±0.38 a	17.20±0.30 b	19.80±0.18 a	19.90±0.32 a
Pupal duration		11.30±0.43 a	8.60±0.34 b	11.20±0.35 a	10.20±0.47 a
Total developmental period		38.40±0.51 a	31.60±0.67 c	36.40±0.47 b	36.30±0.45 b

Means ± SE in the same column followed by different letters are significant (P < 0.05) and highly significant (P <0.01). Ten replications were used for each treatment (larva /replicate).

compared to 17.20 ± 0.30 days on diet (2) (Table 4). These differences were statistically significant (F = 17.61; df = 3, 36; P < 0.0001). Similar observations were reported by **Smith (1923) and Attia and El- Arnaouty (2008)**. **Rueda *et al.* (2011)** reported larval instar durations of 4.40, 4.30, and 4.90 days, and a total larval duration of 28.00 ± 0.53 days for *S. barberi*, which is higher than our results. **Amruta and Chaugale (2023)** found a 25.0-day larval development period for *S. fallax* fed on the aphid, *Myzus persicae*. Pupal duration was shorter on diets (2) and (4) (8.60 ± 0.34 and 10.20 ± 0.47 days) than on diets (1) and (3) (11.30 ± 0.43 and 11.20 ± 0.35 days), with significant differences (F = 8.10; df = 3, 36; P < 0.0001). This matches **Rueda *et al.* (2011)**, who reported pupal period of 9.80 ± 0.12 days for *S. barberi* fed aphids, but contradicts **Attia and El- Arnaouty (2008)**, who recorded a longer pre-pupal and pupal period (16.20 ± 0.87 days) when the larvae were fed on the aphid, *S. graminum*. Total developmental duration was longest on diet (1) (38.40 ± 0.51 days), followed by diets (3) and (4) (36.40 ± 0.47 and 36.30 ± 0.45 days), and shortest on diet (2) (31.60 ± 0.67 days), with significant differences (F = 24.28; df = 3, 36; P < 0.0001).

Regarding the daily feeding capacity, 1st instar larvae consumed significantly more aphids on diet (2) (3.73 ± 0.13) compared to diets (1), (3), and (4). However, total aphids consumed were highest on diet (1) (18.40 ± 0.85) **(Table 5)**. The 2nd instar showed the highest daily consumption on diet (3) (4.66 ± 0.21), and total consumption was also highest on this diet (30.50 ± 1.07). Third instar larvae consumed between 12.93 and 15.70 aphids daily, with total consumption ranging from 89.50 to 110.30 aphids. The overall daily prey consumption across larval stages was highest on diet (1) (23.13 ± 0.96 preys per larva), with total larval-stage consumption being 159.1 ± 6.10 aphids on diet (1) and 149.5 ± 2.78 on diet (3). These were significantly different among diets (F = 6.17; df = 3, 36; P < 0.001). The third instar consumed the majority of prey (up to 69.30%) on diet (3). **Amruta and Chaugale (2023)** reported similar findings for *S. fallax* feeding on *M. persicae*.

The lowest larval survival rate (80.00%) was observed on diets (3) and (4), while the highest (93.33%) was recorded on diet (1) **(Table 6)**. The highest cocooning and adult emergence percentages (100% both), as well as sex ratio (64.29%), were recorded on diet (1). The lowest percentages of cocooning (92.31%) and adult emergence (75%) occurred on diets (2) and (3), respectively, while the lowest sex ratio values occurred on diet (4).

Table 5. Predation efficacy of *Sympherobius fallax* larvae reared as adults on four diets under laboratory conditions

Diet	Daily consumed aphids				Total consumed aphids				Consumption rate (%)		
	(Mean ± SE)										
	1st instar	2nd instar	3rd Instar	Total larval stage	1st instar	2nd instar	3rd instar	Total larval stage	1st Instar	2nd instar	3rd Instar
Diet (1)	3.11±0.19b	4.33±0.25ab	15.70±0.90ab	23.13±0.96a	18.40±0.85a	30.40±1.42a	110.30±5.22a	159.1±6.10a	11.58±0.37b	19.36±1.06a	69.02±1.09a
Diet (2)	3.73±0.13a	3.84±0.20b	13.94±0.99b	21.50±1.08ab	17.00+0.47ab	23.2±1.16b	89.50+5.46c	129.7+5.66c	13.41±0.75a	18.14+0.96a	68.46+1.48a
Diet (3)	2.60±0.12c	4.66±0.21a	14.62±0.26ab	21.68±0.27ab	15.4±0.46bc	30.50±1.07a	103.60±2.23ab	149.5±2.78ab	10.35±0.38b	20.39±0.51a	69.30±0.47a
Diet (4)	2.51±0.15c	4.20±0.16ab	12.93±0.60a	19.61±0.66b	14.80±0.77c	27.20±1.22a	94.8±3.34bc	136.80±3.98bc	10.82±0.42b	19.96±0.87a	69.23±1.07a

Means ± SE in the same column followed by different letters are significant (P < 0.05) and highly significant (P <0.01). Ten replications were used for each treatment (larva /replicate).

Table 6. Larval survival, cocooning, emergence and sex ratio percentages of *Sympherobius fallax* larvae reared as adults on four diets under laboratory conditions

Diet	Larval survival %				Cocooning %	Emergence %	Sex ratio (Females %)
	1st instar	2nd instar	3rd instar	Total %			
Diet (1)	93.33 (15)	100.00 (14)	100.00 (14)	93.33 (14)	100.00 (14)	100.00 (14)	64.29 (9)
Diet (2)	93.33 (15)	92.86 (14)	100.00 (13)	86.67 (13)	92.31 (12)	83.33 (10)	60.00 (6)
Diet (3)	86.67 (15)	92.31 (13)	100.00 (12)	80.00 (12)	100.00 (12)	75.00 (9)	55.56 (5)
Diet (4)	93.33 (15)	92.86 (14)	92.31 (13)	80.00 (12)	100.00 (12)	91.67 (11)	54.55 (6)

Numbers in parentheses are replications

Conclusion

The influences of four tested artificial diets on key biological aspects and predatory efficiency of the brown lacewing, *S. fallax*, were evaluated. The results demonstrated that Diet (1), comprising hen's egg yolk, yeast extract, milk, royal jelly, and propolis, significantly enhanced various biological aspects, including shorter incubation and larval periods, higher fecundity, fertility, and hatchability rates, prolonged female longevity, an extended oviposition period, and improved larval predatory performance. This indicates that Diet (1) is the most effective formulation for optimizing the rearing and biological efficiency of *S. fallax.*

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تأثير تغذية الحشرات الكاملة على الخصائص البيولوجية والكفاءة الإفتراسية لأسد المن البنى *Sympherobius fallax* (Navás)

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تم تقييم أربع بيئات غذائية على الخصائص البيولوجية والكفاءة الافتراسية لأسد المن البنى *Sympherobius fallax* (Navás) تحت الظروف المعملية 27 ± 1 °م و 65 ± 5 ٪ رطوبة نسبية. أوضحت النتائج أن أطول فترة لوضع البيض (29,33 ± 0,99 يوم) وأعلى عدد للبيض الموضوع (399,17 ± 9,42 بيضة) قد لوحظ مع البيئة (1). وجد أن أطول فترة للحشرة الكاملة الذكر قد سجلت عند تربية الذكور على البيئة الصناعية (3). أعطت البيئة (1) أفضل النتائج لكل من نسب الخصوبة وفقس البيض. إستطالت فترة حضانة بيض المفترس *S. fallax* بتربيته على البيئة (1) و (4) مسجلة (6,90 ± 0,21 و 6,2 ± 0,23 يوم) مقارنة بالبيئة (2) و (3) (5,8 ± 0,35 و 5,4 ± 0,24 يوم) ، على التوالي. سجلت أعلى متوسطات لفترات الأعمار اليرقية الأول، الثاني والثالث وذلك عند التربية على البيئات (1) ، (3) و (4) مقارنة بالبيئة (2). زاد عدد المن الكلى المستهلك معنوياً خلال الطور اليرقي بالتربية على البيئة (1)، (3) و (4) مسجلاً (159,10 ± 6,10 ، 149,50 ± 2,78 و 136,80 ± 3,92 فرد من)، على التوالي مقارنة بالبيئة (2) (129,50 ± 5,66 فرد من). كان العمر اليرقي الثالث للمفترس *S. fallax* أكثر كفاءة إفتراسية حيث استهلك 69% من التعداد الكلى للمن المستهلك وذلك بالتربية على البيئات (1)، (3) و (4). وبصفه عامة عند تربية الحشرات الكاملة للمفترس *S. fallax* على البيئة (1) قد حسنت غالبية الصفات البيولوجية إضافة إلى الكفاءة الإفتراسية لليرقات.

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