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Biological Studies on *Oecobius templi* O. Pickard-Cambridge (1876), (Arachnida: Araneida: Oecobiidae) Feeding on Different Preys

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Article History

Abstract

Oecobius templi *O. Pickard-Cambridge (1876), belonging to the family* ***Oecobiidae****, was investigated. It possessed 8 and 7 spiderling instars prior to adulthood regarding female and male, respectively. The cotton leafworm Spodoptera larva littoralis, the two-spotted spider mite Tetranychus urticae, the stored grain moth Ephestia kuhniella, and other instars were raised on them. Prey consumption for each stage was calculated. Additionally, mating behaviour was reported.*

Keywords: *True spider, Biology and Behavior, Biological Control, Tetranychus urticae, Ephestia kuhniella, Spodoptera littoralis.*

Introduction

The family Oecobiidae Blackwall, 1862, is widely distributed, with native as well as cosmopolitan and synanthropic species found in numerous countries **(Santos & Gonzaga, 2003)**. It consists of six genera and 120 species, one of which is the genus *Oecobius* Lucas, 1846, which contains 90 species found globally **(Platnick, 2020)**. Seven species and two genera of Oecobiidae are found in Egypt, including five species belonging to the genus *Oecobius*, namely *Oecobius putus*, *Oecobius maculatus*, *Oecobius navus*, *Oecobius amboseli*, and *Oecobius temple* (El-Hennawy, 2017).*O. putus was* recorded in Cairo, Badr district, El-Giza, El-Menoufeia, Ismailia, Qena, and Upper Egypt **(El-Hennawy, 2017)**. According to (El-Hennawy, 2017), all genders have been found in Sohag and are classified as new to Egypt's fauna..

Materials and methods

The species of spider, *Oecobius templi* was obtained from guava trees (25 Jun to 24 Oct 2018) in Tahta city, Sohag Governorate. They were transferred to the lab and stored in polypropylene tubes. First, second, third, and fourth spiderling individuals were placed individually within transparent plastic chamber spaces measuring 15 cm deep by 5 cm wide. The first, second, and third spiderlings on T. urticae were produced independent of the other stages, whereas the fourth to eighth stages were developed on the phases of E. kuehniella and larval S. littoralis. After putting them in a container (10 cm wide by 15 cm long), every one of them was covered with a piece of muslin. To have intercourse and preserve the egg sacs, each couple of Male and Female was placed within the container. The experiments were conducted at 25±2°C and 60–70% R.H. Two times a day, each

container was filled with identified amounts of the preceding prey and examined. Before the test was over, there were fifty duplicates of the containers and cylinders. A record was kept of perspectives, natural views, and the quantity of prey that was consumed.

Results and discussion

Behavior and habitant:

High numbers of the Oecobiidae spider, *O. templi*, were found on trees of fruit (guava, grapes, citrus, and banana) in two studied localities at Sohag Governorate (Tahta and Al-minshah). They were found to occupy orchard trees associated with various insects and mites. The spiders *O. templi* were found under stones and trees.

Feeding behavior:

The spider snatched the membrane between the head and the thorax of the *S. littoralis* larva and sucked its contents. The spiders ate the prey's life stages. It observed the prey, approached it, and abruptly snatched it between its chelicerae from the anterior half of the body, imbedding the chelicerae in the victim, before sucking its body contents. It took roughly 7 minutes to eat the prey. The attacking spider's abdomen expanded after swelling, and it normally rested for a few minutes prior to hunting another prey. The spiders were raised in the lab on *T. urticae*, a two-spotted spider mite, and *S. littoralis*, a leafworm. Often, the victim was caught in the space between the lead and the thorax. The spider then used its front limbs to capture its victim between its chelicerae, where it started to suction out its contents. The spider would typically relax for a few minutes after feeding, during which time its abdomen would get irritated. The predator pursued any additional victims it saw in order to collect more food. The spider sucked the contents of the prey with its mouthparts.

Mating behavior:

On top of the female's retreat, the male weaved a tubular silk mating web to draw her inside. Only if she penetrated the male's web did she copulate, and the female might cannibalize the male during or after mating. In this species, females are not attentive moms; they spin multiple egg sacs containing only 2 to 10 eggs and then leave them.

Incubation period:

The eggs were incubated for 10 to 15 days, with a mean of 13 days at 60-70 percent R.H. and 30± 5°C (Table 1).

Table (1): Fecundity and longevity of spider ***O. templi*** female fed on various victim (65-70%R.H. and 30 ± 5ºC).

Parameters	**Mean**	**± S.E.**
Pre-oviposition/ days	21.8	± 1.01
Oviposition/ days	29.5	± 1.29
Post-oviposition/ days	128.7	± 1.86
Mean of female egg sacs	2.3	± 0.32
Total average number of eggs / females	9.7	±0.58

Oviposition:

Adult females of the true spider species have to go via a pre-oviposition stage before they can deposit egg sacs. The average was 21.8 days under the lab conditions (65-70%R.H. and30 ± 5ºC). Before beginning oviposition, females normally stopped eating for a day and focused all their energy on spinning silky webbing with their spinnerets. The female prefers to lay her eggs in clusters within an egg sac. During the oviposition stage, each mated female laid an average of 2.3 egg sacs (65-70%R.H. and30 ± 5ºC). Every egg sac was enveloped by the female with an additional

layer of thick, silky, spherical webbing. It took 29.5 days for the oviposition while 128.7 days for the post-oviposition (Table 1).

Longevity:
Sex influences longevity. Females 180.1 were under the circumstances of the study facility (65-70%R.H. and 26 ± 5ºC) (Table 2).

Development:
The spiderlings went through eight instars for females and seven instars for males (Table 2). These results were consistent with El-Hennawy & Mohafez (2003) for male Stegodyphus dufouri (Audouin, 1825) (Family Eresidae), but not for females (7 instars). Furthermore, in contrast to females (6–8 instars), males of Steatoda paykulliana (Walckenaer, 1805) (Family Theridiidae) concurred with Sallam (2004).

Table (2): Various immature stages of *O. templi* fed on various victims (65-70%R.H. and 30 ± 5ºC).

Stages	**Prey**	**Period of various stages (in days)**	
		Female	**Male**
		Mean ± S.E.	**Mean ± S.E.**
Incubation period		13.0 ± 0.44	-
1st spiderling	***T. urticae***	8.6 ± 0.30	7.0 ± 0.41
2nd spiderling		11.2 ± 0.37	11.5 ± 0.65
3rd spiderling		14.1 ± 0.42	13.3 ± 0.71
4th spiderling	***S. littoralis***	21.0 ± 0.57	20.5 ± 1.32
5th spiderling	***E. kuehniella***	30.3 ± 0.83	25.3 ± 1.85
6th spiderling		36.6 ± 0.90	32.2 ± 0.91
7th spiderling		41.2 ± 0.72	43.5 ± 1.85
8th spiderling		46.1 ± 2.16	-
Total immature	-	209.3 ± 2.44	152.8 ± 2.43
Life cycle	-	222.1 ± 2.33	163.3 ± 2.03
Longevity		180.1 ± 3.12	36.8 ± 2.93
Life span		402.2 ± 4.35	200.1 ± 2.53

Spiderling duration average values were 8.6 ± 0.30& 7.0 ± 0.41, 11.2 ± 0.37& 11.5 ± 0.65, 14.1 ± 0.42& 13.3 ± 0.71, 21.0 ± 0.57& 20.5 ± 1.32, 30.3 ± 0.83& 25.3 ± 1.85, 36.6 ± 0.90& 32.2 ± 0.91, 41.2 ± 0.72&43.5 ± 1.85, and 46.1 ± 2.16 days, for female and male respectively. The whole duration of spiderling development was influenced by sex, with females having a longer period than males. Sallam (2004) found that the first and second instars of both males and females were the shortest. For both genders, however not in conjunction with Sallam and El-Hennawy (2003) In the case of N. albomaculata, the lifetime increased in the first instar and subsequently declined in the second and third. After six moults, 60% of males moulted seven times, while 40% reached adulthood. Females (20%) moulted seven times after eight moults, whereas most (80%) matured. For all genders, the sixth instar had the longest duration. For all genders, the first till third instars were the shortest.
Life span:
For O. templi, the typical life expectancy was 200.1 for males and 402.2 for females.

Efficiency of O. *templi* in various prey consumption:
Various spiderling instars were fed T. urticae first, second, and third during *O. putus* food consumption research. Spiderlings in the fourth and fifth instars were fed the first instars of *E. kuhniella* and *S. littoralis*. The second instar of prey was fed to spiderlings in the sixth, seventh, and eighth instars. Table 3 shows the number of victims devoured by various spiderling instars. The spider snatched the membrane between the thorax and the head of the *S. littoralis* larva and sucked its contents. A mean of 43.3 and 57.6 spider mite individuals were devoured by the first male and

female spiderling stages, respectively. In contrast, the second male and female spiderling stages consumed 57.3 and 90.9 spider mite individuals, respectively (Table 3). The average numbers of spider mites eaten by the third male and female spiderling stages were 109.5 and 133.9. In contrast, the fourth, fifth, sixth, and seventh male fed spiderling stages ate 44.5, 62.8, 92.8, and 98.9 *S. littoralis* and *E. kuhniella* individuals, respectively (Table 1). The fourth, fifth, sixth, seventh, and eighth female's spiderling stages fed on 49.7, 72.3, 94.1, 102.9, and 102.9 larvae of *S. littoralis* and *E. kuhniella*. This was consistent with (**Sallam & El-Hennawy, 2003; El-Hennawy & Mohafez, 2003; Sallam** *et al.*, **2014; Rashwan, 2017).**

Table (3): Food consumption of the spider, ***O. templi*** under laboratory conditions (30± 5ºC and 65-70%R.H.).

Stages	**Prey**	**Period of different stages (in days)**	
		Female	**Male**
		Mean ± S.E.	**Mean ± S.E.**
1st spiderling	***T. urticae***	57.6 ± 1.67	43.3 ± 1.18
2nd spiderling		90.9 ± 3.13	57.3 ± 1.93
3rd spiderling		133.9 ± 1.65	109.5 ± 1.26
4th spiderling	***S. littoralis E. kuehniella***	49.7 ± 1.97	44.5 ± 1.63
5th spiderling		72.3 ± 1.44	62.8 ± 1.25
6th spiderling		94.1 ± 1.08	92.8 ± 1.12
7th spiderling		102.9 ± 2.13	98.9 ± 1.49
8th spiderling		111.7± 1.41	-

Morphological characteristics for identification of *O. temple.*

Female

Epigyne has a lengthy scapus. Prosoma length: 0.8–1.1 mm. Sternum yellow-colored, with a few light-colored spots at the borders. Eyes: interdistance AME-AME twice as AME-ALE, posterior row procurved, anterior row straight, PME triangular (Figs b,e). Length of female body: 4.2–4.5 mm (**Wunderlich, 1995).**

Male

Palp: a tooth prolateral to a tiny basal apophysis. Prosoma might be mostly bright with a black border, or it can include spots near the eyes. Length of prosoma is 0.65–0.88 mm. Legs (Figs. c, d) are not very sharply annulated. Length of the male body (Fig. a): 2.2–3.4 mm.

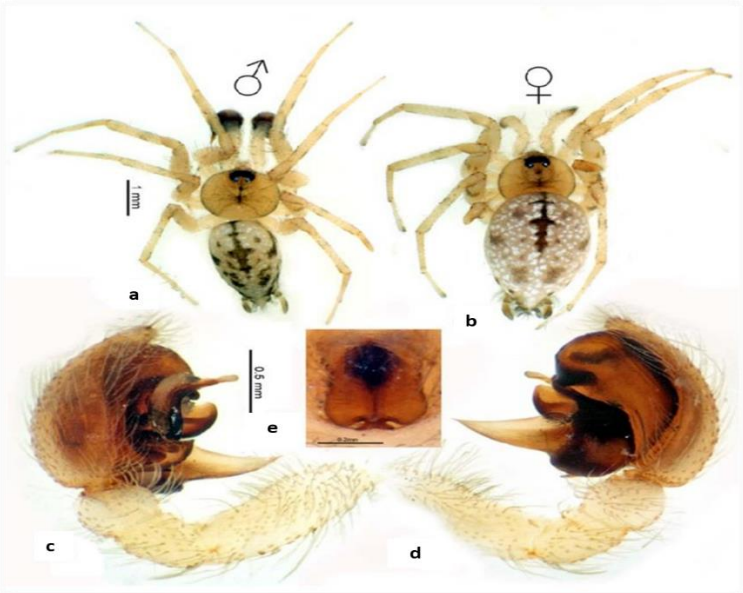

Fig. 1. Copulatory organs and habitus of ***O. templi*. A,b,c,d.e)** male habitus, dorsal view; a) female habitus, dorsal view; **b)** male palp, lateral view; **d,c)** epigyne, ventral view;e).

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