

BIOLOGICAL STUDIES OF *Nigma conducens* (Cambridge,1876) (Araneae: Dictynidae)

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ABSTRACT

The spider, *Nigma conducens* (Cambridge, 1876) was locality recorded in El-Gharbia Governorate, Egypt. It was collected from cotton plants cultivated in El-Gemmeiza Agricultural Research Station, El-Gharbia Governorate. The biology of the spider, *Nigma conducens* (Cambridge,1876) was studied under laboratory conditions of 28 °C and 60-65 % RH on nymphs and adult stages of the cotton jassid, *Empoasca lybica* (De Berg.). Males pass through five spiderling instars, while females pass through six spiderling instars before reaching adult stage. The mean of female pre-oviposition, oviposition and post-oviposition periods were 15.8, 19.5 and 44.5 days, respectively. The female laid 3-6 egg sacs. The mean number of egg/sac was 12-19 eggs. The incubation period of eggs was 11.7 days. The life cycle of this spider was 59.2 days for male and 62.6 for female. Adult longevity, life span, fecundity of female and food consumption were also studied.

Key words: Spider - Dictynidae - *Nigma conducens* - life span

INTRODUCTION

species of spider belonging to the family Dictynidae which was registered as a new species in upper Egypt, Elephantine, Philoe island (Aswan), Wadi-Halfa by Cambridge ,1876. This species was listed in **El-Hennawy (2006)** and World Spider Catalog (2015) as one genus and one species around the world, where no literature was reported at Africa. The purpose of this article to biological studies of this spider under laboratory conditions at El-Gharbia Governorate, Egypt.

MATERIAL AND METHODS

Collection and rearing of the Spider:

Adult female of *Nigma conducens* was collected by hands from cotton plants using camel hair brush , and placed in a glass tube (1 cm x 9 cm depth) covered with plastic cover and transferred to the laboratory. Individuals were reared under laboratory conditions of 28 °C and 60-65 % RH. After egg sacs were laid by females, every newly hatched spiderling was transferred to a separate tube, where it was daily supplied with adult and nymphs stages of Jassid as food adult

female or spiderlings until the complete of the life span. All biological aspects of the spider were determined according to **Abo-Taka et al. (2003)**, **Aiad et al. (2013)** , **Abdel-Sattar et al.(2015)** and **Mohafez (2015)**.

Collection and rearing of Jassids as prey :

Jassid nymphs and adult stages were collected by hairy brush from the lower surface of cotton leaves and were put inside small containers supplied with some green leaves to remain alive and transported to the laboratory to introduce it as foods to spiders, stages. The obtained data were analyzed by counting the average (\pm) standard error according to CoStat software program (Version 6.400).

RESULTS AND DISCUSSION

Biological studies:

a- Development stages :

Data presented in Table (1) show the duration periods of different stages of the spider , *Nigma conducens* . Results indicated that the incubation period ranged between 7-12 days with mean \pm SE as 11.7 ± 0.2 . Females have six spiderlings each has duration ranged between 6-12 days with total of 47 -64 days and mean 50.9 ± 3.6 days. While the males have five spiderlings each has duration ranged between 6-13 days with total of 25-52 days and mean 47.2 ± 1.2 days (**Foelix, 1996**).

Table (1): Duration of different stages of *Nigma conducens* feeding on different stages of Jassid, *Empoasca lybica*

Developmental Stages	Female		Male	
	Range	Mean \pm SE	Range	Mean \pm SE
	Duration in days			
Incubation period	7-12	11.7 ± 0.2	7-12	11.7 ± 0.2
1 st spiderling	8-11	10 ± 0.3	7-10	9.6 ± 0.4
2 nd spiderling	9-10	6.1 ± 0.9	6-8	7.5 ± 0.2
3 rd spiderling	9-10	6.5 ± 1.0	6-9	7 ± 0.4
4 th spiderling	7-12	9.3 ± 1.3	9-12	10.7 ± 0.3
5 th spiderling	6-10	9.8 ± 0.1	7-13	12.7 ± 0.4
6 th spiderling	8-11	9.2 ± 0.2	-	-
Total spiderlings	47-64	50.9 ± 3.6	25-52	47.5 ± 1.2
Life cycle	54-76	62.6 ± 3.3	32-64	59.2 ± 1.2
Longevity	27-53	47.3 ± 3.4	26-48	36.2 ± 3.4
Life span	81-129	109.9 ± 7.0	58-112	95.4 ± 4.2

The life cycle of female lasted between 54-76 days with mean \pm SE 62.6 ± 3.3 . On the other hand, 32-64 days in males with mean \pm SE 59.2 ± 1.2 days .

As for longevity it was 27-53 at females with mean \pm SE 47.3 ± 3.4 days , while it lasted 26-48 days in males with mean \pm SE 36.2 ± 3.4 days. The total life span was lasted for 81-129 days at females with mean \pm SE 109.9 ± 7.0 days , while it lasted 58-112 days for males with mean \pm SE 95.4 ± 4.2 days .

b- Fecundity of females:

Data presented in Table (2) show the duration periods of the females of the studied spider. Results indicated that the pre-oviposition period ranged between 12-17 days with mean \pm SE 15.8 ± 1.3 days , the Oviposition period 15-24 days with mean \pm SE 19.5 ± 1.2 days , and the Post-oviposition lasted 35-57 days with mean \pm SE 44.5 ± 2.3 days.

As for the laid egg sacs , results in the same table indicated that the number of eggs / egg sac was ranged between 12-19 with mean \pm SE 17.6 ± 2.5 , and each female laid 3-6 egg sacs with mean \pm SE 3.8 ± 1.9 sacs.

Table (2): Fecundity of *Nigma conducens* female feeding on different stages of Jassid, *Empoasca lybica*

Developmental period of female	Range (days)	Mean \pm SE (days)
Pre-oviposition	12-17	15.8 ± 1.3
Oviposition	15-24	19.5 ± 1.2
Post-oviposition	35-57	44.5 ± 2.3
The laid eggs	Range	Mean \pm SE
Number of eggs / egg sac	12-19	17.6 ± 2.5
Number of egg sacs / female	3-6	3.8 ± 1.9

c- Consumption of *Nigma conducens* fed on Jassid stages , *Empoasca lybica*:

Data presented in Table (3) show the consumption rates of the developmental stages of *Nigma conducens* males and females fed on Jassid stages , *Empoasca lybica*. The obtained data (Table 3) revealed that the consumption rate was increased by increasing the age of spiderlings at both males and females. Spiderlings of male consumed a total of 117-180 jassid stages with mean \pm SE 146.3 ± 11.0 Jassid, while spiderlings of female consumed a total of 131-191 Jassid stages with mean \pm SE 158 ± 7.6 Jassid.

d- Feeding behavior:

The spider rushed out of its nest and grasped a leg of the prey with its chelicerae. Immediately, the spider released the prey and returned to its nest the spider initially grasped a leg or antenna of the prey. Of the spiders already feeding when found, some were feeding on the head, thorax, or abdomen of the prey, and it was noted that the spiders sometimes initially grasped the prey by its head or body rather than by an appendage (**Jackson,1979**).

Table (3): Consumption of the developmental stages of *Nigma conducens* males feeding on Jassid, *Empoasca lybica*

Developmental stages	Daily rate		Total	
	Range	Mean \pm SE	Range	Mean \pm SE
mean no of jassid stages				
Males				
1 st spiderling	2-4	2.2 \pm 0.4	12-18	15.1 \pm 1.1
2 nd spiderling	3-5	3.1 \pm 0.3	17-22	19.3 \pm 1.4
3 rd spiderling	2-6	3.5 \pm 1.4	15-29	21.1 \pm 2.6
4 th spiderling	4-9	6.3 \pm 2.6	23-44	37.6 \pm 4.3
5 th spiderling	6-10	8.1 \pm 2.1	50-67	53.2 \pm 1.6
Total consumed	17-34	23.2 \pm 2.8	117-180	146.3 \pm 11.0
Male longevity	6-22	19.4 \pm 4.6	150-227	178.3 \pm 35.4
Females				
1 st spiderling	2-4	3.2 \pm 2.2	15-19	16.5 \pm 1.3
2 nd spiderling	2-5	3.4 \pm 2.6	16-25	18.7 \pm 1.1
3 rd spiderling	3-7	4.6 \pm 3.1	18-36	25.2 \pm 2.4
4 th spiderling	5-7	4.3 \pm 2.3	27-47	36.3 \pm 2.1
5 th spiderling	6-12	7.1 \pm 2.4	55-78	63.1 \pm 3.2
6 th spiderling	11-16	8.3 \pm 3.2	49-66	58.6 \pm 2.3
Total consumed	29-51	30.9 \pm 16.8	131-191	158 \pm 7.6
Pre-oviposition	7-11	8.2 \pm 2.5	103-135	119.2 \pm 8.7
Oviposition	6-9	9.3 \pm 3.3	88-114	107.5 \pm 7.6
Post-oviposition	20-28	11.2 \pm 4.1	35-103	86.5 \pm 14.3
Female longevity	33-48	28.7 \pm 9.9	226-352	313.2 \pm 29.7

e- Description of adult male and female and sex ratio:

The body length excluding legs is about 2 to 3.5 mm, the females being slightly larger than the males (Figs. 1 - 2) . The carapace is dark brown. The head is covered with five rows of white hairs. The abdomen has a pattern of white hairs with a gap in the cardiac region and at the rear. The legs are brownish yellow. *Nigma conducens* builds webs in the dried heads of plants and on gorse and heather.



Fig (1) Male



Fig. (2) Female

Nigma conducens

From rearing *Nigma conducens* for one generation, sex ratio was recorded, where the male : female ratio was 1:1.2 .

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الملخص العربي

دراسات بيولوجية للعنكبوت (*Nigma conducens* Cambridge, 1876)
التابع لعائلة Dictynidae

السيد جابر إبراهيم حمادة ، المدثر عبد العظيم وهبة ، احمد إبراهيم عامر
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المفترس العنكبوتي *Nigma conducens* سجل في محافظة الغربية وتم جمعه من حقول القطن بمحطة البحوث الزراعية بالجميزة ، تم تربية هذا النوع تحت الظروف العملية عند درجة حرارة 28° م ورطوبة نسبية 60-65 % وتم تغذيته على الحوريات والأطوار الكاملة لجاسيد القطن (*Empoasca lybica* De Berg.)

مرت الذكور ب 5 أعمار غير كاملة بينما مرت الإناث ب 6 أعمار غير كاملة قبل الوصول للطور الكامل . كان متوسط فترات قبل وضع البيض وفترة وضع البيض وبعد وضع البيض هي 18، 19.5 ، 44.5 يوم على التوالي . تضع الإناث 3-6 أكياس بيض ومتوسط عدد البيض لكل كيس 12-19 بيضه . فترة حضانة البيض 11.7 يوم . وفترة حياة العنكبوت 59.2 يوم للذكور و 62.6 يوم للإناث ، كما تم دراسة معدل الاستهلاك وطول فترة حياة الأفراد .