PRELIMENARY TRIAL FOR REARING THE SPIDER *ACHAERANEA LUNATA* AS A BIOCONTROL AGENT OF *SPODOPTRA LITTORALIS* (BIOSD)

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Abstract

The present work was carried out to rear *Achaeranea Lunata* under laboratory conditions. the spider *A. Lunata* was reared on first and second instar of the cotton leafworm, *Spodoptera littoralis* (Boisd.). Results obtained show that incubation period of *A. Lunata* lasted 14 days .Spider individuals passed five spiderlings before reaching adult. The life cycle ranged between 102.9 and 85.3 days was for female and male,respectively. Female oviposition period was 10.6 days. The averaged of eggs per femal was 1.5 sac. Food consumption of *A. Lunata* Femal was 352.1 eggs/femal , white it was 179.3 larval /male.

INTRODUCTION

Because of mis-use of chemical pesticides, this resulted in increase the environmental hazardous of pesticides , human health hazardous , increase pesticides residue in food stuff , effect on wild life as well as farmers livestock(Theiling and crofty 1988).Because of these ,plant protection investigators work hardely to look for other safely alternatives such as insect pathogens ,plant extract, and natural enemies. Spiders have always been known to be effective predators, though their potential as biocontrol agents has not been exploited to its fullest, at least in Egypt. In addition , spiders have been found to be the most abundant group of predators in the cotton ecosystem.(Riechert and Lockley,1984).Spiders are cosmopolitan that live in many ecological environments. as predators, they play a considerable role in agroecosystem as biocontrol agents (Levy, 1998).

Members of family Theridiidae are small to medium size. They are usually found hanging upside down in an irregular web suspended on plants or hidden in rock crevices or fissures in soils (Levy,1998 and El-Erksousy,2000). Many of them use very fine threads often hard to be noticed unless occasionally glitter in the sun light or covered with dust (Levy and Amitai, 1981).

In Egypt, some species of this family were usually found in different field and truck crops and orchards. Due to its spread and importance El-Erksousy,2003, El-Erksousy *et al.,* 2006 and Hussein *et al.,* 2003 studied the biology of three species of this family.The present work throw light on biological aspects and predation efficiency of the spider *Achaeranea Lunata*.

MATARIALS AND METHODES

Rearing technique:

Experiment was carried out under laboratory conditions (27±2°C and 70±5 R.H.%).*Achaeranea Lunata* individuals were collected from citrus trees at Beni-sueif. governorate, using sweep net technique. Individuals were transferred to laboratory.The individuals were examined directly by using steromicroscop .taxonomical key used for identification (Jones, 1983).Newly emerged adult female and male were confined together in a test tube (20 cm long and 0.5 cm in diameter), closed with cotton pad and supplied daily with prey. The female was noticed daily until laying the egg sac and hatched spiderlings. Each spiderling was isolated separately in a test tube together with surplus numbers of prey individuals and noticed till reaching adult stage. 1st and 2nd larval instars of the cotton leafworm, *Spodoptera littoralis* (Boisd.) were used as food through the life span. The numbers of consumed prey individuals were recorded daily and replaced by fresh ones. Behaviour and some biological aspects were also recorded.

RESULTS AND DISCUSSION

Feeding behavior:

When the predator *A. Lunata* noticed the prey, it usually comes close and moves around it for few seconds, then catched it between its chelicerae by the help of the front legs. Embeding its chelicerae in the prey, the predator starts to suck prey contents. The predator abdomen becomes enlarged and usually rests for few minutes before searching again for another one..

Mating :

1-Preparing period

The virgin female stayed for about 9 days as a premating period. The male was firstly placed in the test tube and then followed by the female. The latter started to come close to the male in relative movements for about 2

minutes. The male came close to it, moving his front legs up and down and pedipalps alternatively. it then touched the tips of the front female legs and pidipalps, before the beginning of copulation. Both sexes female and male must pass through the preparing period before copulation occurs. Otherwise, the female refuses the male threatening by its chelicerae to enforce male to move away.

2-Copulation

The male holds the female using its first pair of legs, leg I to hold her leg II, and his leg II to hold her leg III. it then inserts his right palp into the female genital opening. The sperms are transferred in female seminal receptacles. The mating process continued for about 1-2 minutes, then the male escaped away.

Development of stages:

1. Eggs

Each egg sac contained with average 34.3±4.3 egg as shown in (Table 1). incubation period for both spider female and male was 14 days under laboratory conditions of 27±2°C and 70±5 R.H.%

2. Spiderling duration and food consumption

The spider females and males have five spiderlings stages .The fifth spiderling was shorter in their duration than other spiderlings in both females and males , it averaged 5.3 and 4 days ,respectively as shown in (Table 1) The duration of 1st, 2nd, 3rd, 4th and 5th spiderlings averaged 37.2 ,23.2 , 14.3 , 8.8 and 5.5 days for female respectively and 29.1 ,19.6 , 11.2 , 7.4 and 4 days for male , respectively. Total female spiderlings duration were longer (88.9 days) comparing with the males spiderlings duration (71.3 days).

The food consumption of the spiderlings increased with the spiderlings growth as shown in (Table 1). The first spiderling of both female and male consumed about 114.6 and 58.3, prey/spiderlings/day for female and male,respectively .The value gradually increased depending upon the spiderling growth, for example the second spiderlings consumed about 93 and 37.3 prey/spiderlings/day for female and male,respectively. On the other hand, the fifth spiderling consumed about 58.1 and 21.2 prey/spiderlings /day for female and male, respectively . The total food consumption of the female spiderling was 352.1 prey / spiderlings / day, while male was 179.3 prey / spiderlings / day.

3. Adult longivity

as shown in (Table 2) During the oviposition period, the spider female deposited about 1.5 egg sacs . preovipostion , ovipostion and postovipostion per femal durated 7.7 , 10.6 and 4.7 days while male longivety durated 21.1 days.The adult female devoured an average of 78.9 , 114.9 and 23.9 prey per female pre-ovipostion,ovipostion and post-ovipostion respectively while male devoured an average of 140.6 preys during longevity. The female stopped their feeding about one day after the pre-ovipostion and began to web the egg sac by her spinnerets and deposited the eggs with covered it by layer of dense silky webbing .

Table 1. Spiderlings duration and food consumption of the spider *Achaeranea Lunata* female and male when fed on the newly hatched larvae of *S. littoralis* at laboratory conditions

Spider stages	Sex	Average duration in days	No. of devoured prey individuals
Number of egg sac/female		1.5±0.55	
Total number of eggs/Sac		34.3±4.5	
1st spiderling	♀	37.22±2.9	114.6±8.8
	♂	29.1±2.1	58.3±3
2nd spiderling	♀	23.22±0.8	93±3.2
	♂	19.6±1.2	37.3±2.9
3rd spiderling	♀	14.3±0.7	42.7±2.3
	♂	11.2±0.9	33.7±1.7
4th spiderling	♀	8.8±0.4	43.8±1.9
	♂	7.4±0.5	28.8±2.2
5th spiderling	♀	5.3±0.5	58.1±3.7
	♂	4	21.2±1
Total spiderling	♀	88.9±2.5	352.1±17
	♂	71.3±2.6	179.3±6.7
Life cycle	♀	102.9±2.6	352.1±17
	♂	85.3±3.2	179.3±6.7

When female of *Anelosimus aulicus* (Koch) of family theridiidae was feeding on Aphis, *Aphis craccivora*,passes through five spiderlings and laid an average of 8.6 egg-sacs (Hussein *et al* .,2003)

Putman (1967) described the life cycle of *Philodromus praelustris* Keyserling (Family: Philodromidae). Females produced up to 12 egg sacs containing a total of over 299 eggs in insectory ,but the later eggs did not hatch.

During the oviposition period, the females deposited 6.3 sac/female, each egg-sac contained about 31.1 eggs, the incubation period was 16 days. The spider females passed life cycle and life span longer than males. Also, the females consumed individuals of prey higher than males during life cycle and life span.

Table 2. Adult female longevity and fecundity of *Achaeranea Lunata* when fed on the *S.littoralis* at laboratory conditions

Biological aspects	Duration (day)	Food consumption (prey/spiderling/day)
Pre-ovipostion	7.7±0.7	78.9±6.8
Ovi-postion	10.6±0.7	114.9±6.3
Post- ovipostion	4.7±0.7	23.9±2.3
Adult longevity	♀	22.9±1.4
	♂	21.1±4.5
Life span	♀	125.8±2.9
	♂	106.4±3.6

5. Life span

As shown in (Table 2) obtained results cleared that the spider female life span durated 125.8days ,while the duration of spider male life span was 106.4 days . On the other hand, during this period , the spider female consumed about 569.8 prey /female this value decreased to 319.9 prey /male. The food consumption depends on both spiderlings and adult stage .The spider male less efficiency than female ,therefore, female devoured 1.78 times than male during life span.

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تجربة مبدئية لتربية العنكبوت *Achaeranea Lunata* (CLERK 1752) كعنصر مكافحة حيوية لدودة ورق القطن

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تم تربية المفترس العنكبوتى ***Achaeranea Lunata*** على يرقات العمر الأول لدودة ورق القطن فبلغت فترة حضانة البيض حولى ١٤ يوم لكل من الذكر والأنثى وقد مر كل من الذكر والأنثى بخمسة اطوار يرقية حتى بلغ الطور البالغ وكانت دورة الحياة ١٠٢,٩ و٥٨,٣يوم لكل من الأنثى والذكر على التوالى وكانت فترة وضع البيض ٤,٥ يوم وضعت خلالها ١,٥ كيس بيض فى المتوسط.وكان مجموع ماافترسته خلال اطوارها اليرقية هى ٣٥٢,١ و١٧٩,٣ فرد لكل من الأنثى والذكر على التوالى.بينما كان متوسط الأفتراس لكل من الأنثى والذكر خلال فترة حياتهما ٥٦٩,٨ و٣١٩,٩ على الترتيب