EFFECT OF PREY SPECIES ON THE DEVELOPMENT AND FECUNDITY OF THE TWO PREDACEOUS MITES, *COSMOLAELAPS PARAVACUA* AND *STRATIOLAELAPS MILES*

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Abstract

Cosmolaelaps paravacua Nasr and Nawar and Stratiolaelaps *miles* (Evans) were found in organic manure on the farm at Giza. The duration of their developmental stages and reproduction were determined. *Cosmolaelaps paravacua* was fed, developed and reproduced on the free-living nematode, *Rhabditis scanica*, acarid mite, *Rhizoglyphus robini* Claparede and Cotton leaf worm *Spodoptera littoralis* (Biosd.). Acarid mite resulting in the greatest reproduction for the former, and the free living nematode was the best for both.

INTRODUCTION

Members of the two genera *Stratiolaelaps* and *Cosmolaelaps* Berlese for the family Laelapidae are free-living predators inhabiting soil, organic manures and debris. Their diagnostic characteristics and taxonomic rank were discussed by many authors (Evans 1963, Evans and Till 1966; Bregetova *et al.* 1977; Shereef and Afifi 1980, Hafez *et al.* 1982 and Zaher 1986). Of these two genera, the two species Cosmolaelaps paravacua which was described as new species by Nasr and Nawar 1989, and Stratiolaelaps miles (Berlese) were common in the Egyptian soil fauna. No biological data were known on the former species while the latter was reared by Afifi 1977, Metwally *et al.*, 1983 and Hoda *et al.*, 1986. Therefore, it was felt necessary to study the biology of these two species bred on some associated pests .

MATERIALS AND METHODS

Samples of *C.paravacua* and *S.miles* were obtained from organic manure in a

farm at Giza. Cultures of C.paravacua and S.miles were reared on free-living nematode, Rhabditis scania, the acarid mite, Rhizoglyphus robini, at the fruit acarology section, Plant Protection Research Insititute, A.R.C., Dokki, Giza, Egypt.

Newly hatched larvae from both predators were confined singly within plastic rings, 2.8 cm in diameter and 2 cm in depth, with a mixture of plaster of paris and charcoal at the bottom. Experiments were conducted at 26 ± °C.

For extracting free-living nematodes, humus samples were placed in a baermann funnel for 24h. The extract was added to a Petri-dish containing slices of ornamental pulb and potatoes as food source for the nematodes. The Petri-dish was left for 1 week at room temperature. Drops of this nematode-rich mixture were picked up with a camel's hair brush and placed in the mite rearing rings as source of food. The sole food source, Spodoptera littoralis larvae,was tested as a food to determine the abilily of *C. paravacua* to feed on and develop .

RESULTS AND DISCUSSION

C.Paravacua fed, developed and reproduced on free-living nematode *R.scanica*, the acarid mite, *R. robini* and larvae of S.littorlis. Results (Table 1) showed that the free-living nematode slightly accelerated the development, as life cycle duration of *C.paravacua* female averaged when fed on the free-living nematode, the acarid mite and the larvae of cotton leaf worm. 13.36, 14.00 and 14.58 days, respectively .

Table 1. Effect of different preys on the duration of *C.paravacua* life cycle.

Diet	Sex	Mean duration (days)				
		Egg	Larva	Protonymph	Deutonymph	Life cycle
Free-living Nematode R.Scanica	F	3.26±0.65	3.30±0.75	3.46±0.51	3.61±0.67	13.63±1.09
	M	3.21±0.78	3.27±0.64	3.36±0.50	3.63±0.67	13.47±1.36
Acarid mite R.robini	F	3.26±0.65	3.50±0.67	3.41±0.51	3.83±0.83	14.00±1.16
	M	3.21±0.78	3.20±0.78	3.60±0.51	4.00±0.81	14.01±1.33
Larvae of S.Littoralis	F	3.26±0.65	3.40±0.63	3.86±0.74	4.06±0.79	14.58±0.91
	M	3.21±0.78	3.11±0.60	4.30±0.50	4.30±0.70	14.92±1.11

Mean ± SD F= Female M=Male

Adult female longvities did not differ significantly when fed on the two free-living nematode and the acarid mite, but was significantly shorter on the larvae of the cotton leaf worm. This duration averaged 40.08 and 40.82 days for free-living nematode and the acarid mite, respectively and 36.95 days on larvae of the cotton leaf worm (Table 2) .

Male developmental stages followed a similar trend.

The oviposition period differed according to diet (Table 2), being longer on free-living nematode and the acarid (20.08 and 20.91 days, respectively) than on larvae of the cotton leaf worm (16.83 days).

Table 2. Effect of different preys on female longevity and fecundity *C.paravacua.*

Diet	Mean duration (days)			Mean of eggs/female	
	Pre-oviposition	oviposition	Longevity	Mean	Rate/day
Free-living Nematode R.Scanica	3.08±1.19	20.08±1.11	40.08±1.04	12.84±2.16	0.64
Acarid mite R.robini	6.00±1.04	20.91±1.44	40.82±1.69	14.92±1.44	0.71
Larvae of S.Littoralis	9.20±1.78	16.83±1.48	36.95±1.83	9.93±1.58	0.59

Concerning female fecundity, table 2 showed that acarid mite significantly increased number of deposited eggs (14.92 eggs) compared with that fed on free-living nematode (12.84 eggs) and cotton leaf worm larvae (9.93 eggs).

S.Miles fed, developed and reproduced on the free-living nematode *R.scanica* and the acarid *R. robini* .

Results (Table 3) showed that life cycle duration did not differ significantly when fed on both mentioned preys. This duration averaged 8.03 and8.58 days for R.Scanica and R. robini, respectively.

Male developmental stages followed a similar trend but with slightly shorter durations .

Table 3. Effect of different preys on the duration of development of s.miles life cycle.

Diet	Sex	Mean duration (days)				
		Egg	Larva	Protonymph	Deutonymph	Life cycle
Free-living Nematode R.Scanica	F	2.59±0.64	0.91±0.37	2.06±0.51	2.47±0.53	8.03±0.89
	M	2.33±0.36	0.75±0.40	1.42±0.42	1.92±0.56	6.42±0.75
Acarid mite R.robini	F	2.59±0.64	0.96±0.41	2.39±0.56	2.64±0.63	8.58±1.08
	M	2.33±0.36	0.73±0.39	1.50±0.58	1.92±0.79	6.48±0.66

Mean ± SD F= Female M=Male

Adult female longevity differed according to diets (Table 4), being significantly longer when fed on the acarid mite (54.71 days) than on the free-living nematode (52.66 days).

Concerning female fecundity, it was found that a greater number of eggs was deposited by female fed on the acarid mite than on free-living nematode. An average female deposited 54.94 and 50.99 eggs/female on the two diets, respectively (table 4).

Neither oviposition period nor pre-oviposition period differed according to tested diets.

Finally, it can be concluded that the acarid mite R.robini is a more suitable prey for both predaceous mites C. paravacua and S.miles. Food type greatrly affected the duration of the developmental stages and female fecundity. The most suitable diet was that giving the shortest life cycle and greatest fecundity.

Table 4. Effect of different preys on female longevity and fecundity of *S.miles* .

Diet	Mean duration (days)			Mean of eggs/female	
	Pre-oviposition	oviposition	Longevity	Mean	Rate/day
Free-living Nematode R.Scanica	2.41±0.37	41.87±2.16	52.66±2.53	54.94±1.18	1.31
Acarid mite R.robini	2.57±0.55	43.60±1.09	54.71±0.99	50.99±2.12	1.17

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تأثير نوع الغذاء على تاريخ حياة وخصوبة نوعين من المفترسات وهما *Stratiolaelaps miles, Cosmolaelaps paravacua* من فصيلة ليلابيدى

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استهدف البحث دراسة تأثير عدد من انواع الافات التى تضر بالمحاصيل الزراعية على تاريخ حياة وخصوبة المفترسين السابق ذكرهما.

وقد تم الحصول على المفترسين ***Stratiolaelaps miles, Cosmolaelaps paravacua*** من بين الاوراق والمواد المتحللة تحت اشجار الفاكهة فى محافظة الجيزة.

ودرست مراحل نمو المفترسين ودرجة خصوبة الأنثى عند التغذية على نيماتودا حرة الحركة Rhabditis Scanica ا والاكاروس الاكاريدى Rhizoglyhus robini وكذلك دودة ورق القطن Spodoptera Lit-toralsis.

و اتضح من النتائج أن الأكاروس الأكاريدى R.robini يعتبر غذاء مفضلا للمفترسين السابق ذكرهما ، حيث زاد متوسط وضع البيض ١٤,٩٢ بيضة للمفترس C.paravacua عند تغذيته على الأكاروس الأكاريدى بينما قل متوسط وضع البيض لنفس المفترس عند تغذيته على نيماتودا حرة الحركة ودودة ورق القطن وكان ١٢,٨٤ ، ٩,٩٣ بيضة على التوالى. أما بالنسبة لمفترس S.miles كان متوسط وضع البيض متقارباً مع نتائج دودة ورق القطن.