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EFFICACY OF THE PREDATORY MITE *Neocunaxoides anderi* BAKER AND HOFF. (ACTINEDIDA: CUNAXIDAE) PREYING DIFFERENT ANIMAL NOURISHMENT UNDER DIFFERENT TEMPERATURE.

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ABSTRACT

Feeding capacity and life span of *Neocunaxoides anderi* when reared at 26 ±1°C and 70% ± 5 R.H and 30 ±1°Cand 75% ± 5 R.H. on eggs of *Agrotis ipsilon* (Ashmed), *Phythorimaea opercullela* (Zeller) and *Meloidogyne javanica* (Treub) Chitwood were studied.

Female feeding capacity of *N. anderi* when feed on *P.opercullela* was 434.8 ± 16.1 with daily rate 8.8 eggs/female and 365.5 ± 25 with daily rate 12.6 eggs/female at 26 ±1°C and 30 ±1°C respectively.

Shorter life span of female *N. anderi* was observed when reared on egg masses of nematodes; it was 55.2 ± 3.2 and 27.9 ± 2.2 at 26 ±1°C and 30 ±1°C respectively than the other preys.

Keywords :Soil mites, Cunaxidae ،*Neocunaxoides anderi*

INTRODUCTION

Mites are the most common soil arthropods in number of both individuals and species. Among the important natural enemies are the predatory mites, which may play an important role in suppressing pest population. *N. anderi* (Actinedida: Cunaxidae) is one of the most common soil predacious mites, which play an important role in controlling the soil pests. *N. anderi* was collected from lawn grass at Giza Governorate (Zaher, 1986), soil grasses, animal debris and faba straw at Fayoium Governorate (Taha *et.al.*, 1988)

Zaher *et al.* 1975 studied the food preference of *Cunaxa capereolus* under different temperature. Also (Taha *et al.*, 1988) studied the effect of some prey nematodes, *Panagralimus rigidus* and immature stages of *Caloglyphus rhizoglyphoides* on duration and fecundity of *N. anderi.*

The present work aims to study the effect of different prey, temperature and humidity on developmental stages and fecundity of the predatory mite of *N. anderi*.

MATERIAL AND METHODS

Neocunaxoides anderi Baker & Hoffmann was extracted from soil under citrus, fig, clover and grasses. Individuals adult of *N. anderi* were reared singly in rearing cell (5.5 cm in diameter and 1.5 cm in depth) El-

Khateeb, 1998. A layer of mixture of plaster of Paris, clay and charcoal (5:4:1) was placed on the bottom at about 3mm depth. The cells were kept moisture to maintain in a suitable relative humidity by adding 3 drops of water daily. Mites were supplied daily with suitable food of free living nematodes.

For individual rearing, newly deposited eggs of identified females were placed in the plastic cell supplied with food and kept in incubator at 26 ±1°C and 70% ± 5 R.H and 30 ±1°Cand 75% ± 5 R.H.respectively.

For the study the life span and fecundity two newly emerged adults (one female and one male) were placed in each cells. Each cell receiving a different types of egg. A control cell with normal food was offered.

After the predator female deposited about 15-20 eggs, it was mounted in Berlese fluid (Schuster &Pritchard, 1963) on microscope slides for identification according to (Krantz, 1978 and Zaher, 1987). Thus the eggs of *N. anderi* formed the nucleus of its pure culture, (Hafez, 1977).

Sources of food:

The Cunaxid mite *N. anderi* was allowed to feed on three prey i.e. egg masses of *Meliodgyne javanica* (root-knot nematodes), eggs of *Phythorimaea opercullela* and *Agrotes ipislon N. anderi* was reared singly in rearing cells and supplied daily with enough suitable food.

Eggs of *P. opercullela* (potato tuber moth) was obtained from Faculty of Agriculture Ismailia Governorate and it was reared under laboratory condition, *A. ipsilon* (black worm) was obtained from a standard colony maintained under natural condition and of *M. javanica* (root-knot nematodes) collected from roots of cucumber plants at greenhouse and infesting tomato under laboratory condition.

Surplus food types were introduced to each predator and the devoured ones were counted daily and replaced by others.

RESULTS AND DISCUSSION

Two types of food and two degrees of temperature and humidity were studied on *N. anderi*. (Table 1,2). As shown in table 1. no difference between male and female when fed on eggs of *P. opercullela* and *A. ipsilon*. 26 ±1°C and 70% ± 5 R.H.

No. of eggs fed by female during the longevity was 434.6 ± 16.1 and 105.7 ± 11.8 and for male 306.9 ± 25.5 and 90.4 ± 3.4 for eggs of *P. opercullela* and *A. ipsilon* respectively. The daily rate ranged from 3 to 8.8 egg /female and 2.7 to 7.4 egg /male. On the other hand, results of total egg fed by *N. anderi* at 30±1°Cand 75% ± 5 R.H. shown in (table 2). The consumption during longevity of male was 289.6 ± 13.4 & 56.2 ± 3.9 and for female were 365.5 ± 25 & 71.7 ± 5.4 when fed on eggs *P. opercullela* and *A. ipsilon* respectively. The daily rate ranged from 2.5 to 12.6 egg/ male and 3.1 to 10.7 egg / female.

Results of food consumption on *N. anderi* indicated that at 26 ±1°C and 70% ± 5 R.H. was more suitable when fed on egg *P. opercullela* than egg of *A. ipsilon*. On the other hand no big difference between male and female in both preys and temperatures. Taha *Et al.* (1988) recorded the same result when reared *N. anderi* at 30ºCand 70% R.H. on nematodes, *Panagralimus rigidus* and immature stages of *Caloglyphus rhizoglyphoides*.

Table (1): Average no. and daily rate of two type of eggs on *Neocunaxoides* anderi during its life span at 26 ± 1 ºC and 70 ± 5%R.H.

Predator stages	Sex	No. of eggs devoured preys		No. of eggs devoured preys	
		Potato tuber moth		Black worm	
		Total average	Daily rate	Total average	Daily rate
Larva	♀	8.8± 0.9	2.6	17.3±2.5	2.8
	♂	9.6±1	2.9	17.9±2	3.4
Protonymph	♀	9.8±1.1	2.6	23.9±2.2	4.7
	♂	10.3±1.3	2.7	22.6±2.4	5.3
deutonymph	♀	15.7±1.2	3.4	26.7±2.9	2.4
	♂	12.6±1.1	2.9	25.7±1.6	3.1
Tritonymph	♀	16.3±1	3.7	31.3±2.9	3.6
	♂	15.6±1.1	3.4	30.9±3	4.7
Total immature stages	♀	50.6± 2.8	2.5	99.2±6.9	2.6
	♂	49.4± 4.4	2.5	96.3± 6	3.3
Longevity	♀	434.8±16.1	8.8	105.7±11.8	3
	♂	306.9± 25.5	7.4	90.4±3.5	2.7

Table (2): Average no. and daily rate of two type of eggs on *Neocunaxoides* anderi during its life span at 26 ± 1 ºC and 75 ± 5%R.H.

Predator stages	Sex	No. of devoured preys		No. of devoured preys	
		Potato tuber moth		Black worm	
		Total average	Daily rate	Total average	Daily rate
Larva	♀	15.4±1.2	7.11	24.2±9.5	4.7
	♂	14.7± 0.75	8.8	23.2±3.2	4.6
Protonymph	♀	18± 0.8	9.4	25.5±3.9	5.3
	♂	17.1± 0.9	7.8	26.2±3.2	6.5
deutonymph	♀	19.5± 0.9	8.4	22.4±3.3	2.5
	♂	18.3 0.8	6.4	21.61.7	2.8
Tritonymph	♀	22.9± 2.2	8.9	28.8±2.8	3.1
	♂	21± 0.8	7.3	27±2.5	4.7
Total immature stages	♀	75.7± 2.8	6.4	102.4±7.8	3.1
	♂	71±1.6	5.7	91.3±6.7	3.2
Longevity	♀	365.5± 25	12.6	71.7±5.4	2.5
	♂	298.6±13.4	10.7	56.2±3.9	3.1

Starvation periods was study on different stages of *N. anderi* at 30C ± 1ºC and 75 ± 5% R.H.(Table 3); Results shown that larval fed on *A. ipislon* more starvation than that fed on *P.opercullela.* No difference between other immature and adult in both fed and sex.

N. anderi was reared on nematodes, potato tuber moth and black worm at two of temperature and humidity (Table 4).

Table (3): Average starvation periods of different stages of *Neocunaxoides anderi* when reared on *Agrotis ipsilon* and *Phythorimaea opercullela* at 30 °C ± 1 °C and 75% ± 5%R.H.

Type Preys	periods (days)					
	Larva	Protonymph	Deutonymph	Tritonymph	Adult ♀	Adult ♂
Black worm	3.7 ± 1.0	2.9 ± 0.8	3.8 ± 1.3	5.2 ± 0.9	12.8±1.7	10.6 ± 1.1
Potato tuber moth	2.3 ± .8	2.1 ± 0.7	3.2 ± 0.9	4.5 ± 0.7	12.7 ± 1.3	9.9 ± 0.8

Average based on date 15 replicates.

From (Table 4) results indicated that life span was 55.2 ± 3.2, 74.1±1.5 and 77.1 ± 5.7 for female and 32.9 ± 1.3, 66.4 ± 2.8 and 68.7 ± 2.7 for male under the three preys respectively. No. of eggs/female was 61.4 ± 9.9, 61.8 ± 2.3 and 64.7 ± 5.8 with a daily rate 18, 1.8 and 2.7 for three preys respectively (table 5).

Table (4): Duration of *Neocunaxoides anderi* different stages when fed on three preys at 26 °C ± 1°C and 70% ± 5% R.H.

Predator stage	Sex	Average periods in days		
		Egg masses nematodes	Eggs of potato tuber moth	Eggs of Black worm
Incubation period	♀	3±0.9	4.6± 0.5	6.5± 0.4
	♂	2.4± 0.5	4.9± 0.4	6.5± 0.4
Larval stage	♀	3± 0.9	4.6±0.4	7.2± 0.9
	♂	2.9± 0.7	4.5± 0.5	6.4± 0.5
Protonymphal stage	♀	3.09± 0.7	4.7± 0.2	6.4± 0.8
	♂	2.9± 0.4	4.7± 0.2	5.5± 0.7
Deutonymphal stage	♀	4.9±0.6	5.3±0.6	12.7± 0.8
	♂	2.4± 0.5	5.1±0.3	9.6± 0.6
Tritonymphal stage	♀	4.3±0.7	5.7±_0.3	10.7± 0.9
	♂	3.4±0.5	5.8± 0.3	7.8± 0.6
Life cycle	♀	17.7±1.3	25± 0.9	44.4± 2.8
	♂	14.1±0.6	25.1±1.1	35.8± 0.9
Longevity	♀	40.9±2	49.1± 1.9	33.7± 4.4
	♂	18.9±1.4	41.3±2.2	32.9± 2
Life span	♀	55.2±3.2	74.1± 1.5	77.1±5.7
	♂	32.9±1.3	66.4± 2.8	68.7± 2.7

Table (5): Effect of prey species on females longevity and fecundity of *Neocunaxoides anderi* 26 °C ± 1 °C and 70% ± 5% R.H.

Preys	Average periods in days				No. of eggs / female	
	Preovi-position	Ovi-position	Posovi-position	Longevity	Total average	Daily rate
1	2.6 ±0.7	34.4 ±1.7	4 ± 1	40.9 ± 2	61.4 ± 9.9	1.8
2	3.6 ± 0.6	38.8 ± 2.1	7 ± 0.4	49.1 ± 1.9	61.8 ± 2.3	1.8
3	5.3 ±1.3	24.5 ± 3.3	3.4 ± 1.2	33.7 ± 4.4	64.7 ± 5.8	2.7

1= egg masses of *Meliodgyne javanica*.
2= eggs of *Phythorimaea opercullela*.
3= eggs of *Agrotis ipsilon*.

Obtained data in table (6) cleared that *N.anderi* when reared at 30 °C ±1 °C and 75% ± 5% R.H. female life span was 27.9 ± 2.2, 44.2 ± 1.7 and 67.3 ± 2.8 while male life span lasted 16.4 ± 1.3, 43.1 ± 2.6 and 52.3 ± 1.2. The average no. of eggs /female was 28.6 ± 2.7, 31.9 ± 3.7 and 64.7 ± 5.8 with a daily rate of 1.9, 1.3 and 2.7 eggs for the three preys at the same trend (table 7).

Table (6): Duration of *Neocunaxoides anderi* reared on three preys at 30±1°C and 75% ± 5% R.H.

Predator stage	Sex	Average periods in days		
		egg masses of nematodes	eggs of Potato tuber moth	eggs of Black worm
Incubation period	♀	1.4± 0.4	3.1± 0.1	5.2± 0.8
	♂	1.4± 0.4	2.7± 0.2	5.8± 0.3
Larval stage	♀	1± 0.2	3± 0.4	6.9±0.3
	♂	1.3± 0.3	2.4±0.3	6.3± 0.3
Protonymphal stage	♀	1.6± 0.7	2.5± 0.2	6.2± 0.7
	♂	1.5± 0.1	2.9± 0.4	5.6± 0.3
Deutonymphal stage	♀	2.5±0.5	3.2±0.4	10.6± 0.4
	♂	1.3± 0.4	3.2± 0.2	9.3± 0.6
Tritonymphal stage	♀	2.3± 0.4	3.4± 0.3	8.8± 0.9
	♂	2±0.3	3.7± 0.3	7.1± 0.6
Life cycle	♀	8.7±1	15.1± 0.5	38.7± 2.1
	♂	7.6± 0.5	15± 0.7	34.9±1.3
Longevity	♀	19.2± 1.4	29.1± 1.9	28.6± 2.7
	♂	8.8± 1	28± 2.2	17.7± 1.4
Life span	♀	27.9± 2.2	44.2± 1.7	67.3±2.8
	♂	16.36± 1.3	43.1± 2.6	52.3± 1.2

Table (7): Effect of prey species on females longevity and fecundity of *Neocunaxoides anderi* 30 °C ±1 °C and 75% ± 5% R.H.

Preys	Average periods in days				No. of eggs / female	
	Preovi-position	Ovi-position	Posovi-position	Longevity	Total average	Daily rate
1	1.7 ± 0.6	15.2 ± 1.6	2.3 ± 0.7	19.2 ±1.4	28.6 ± 2.7	1.9
2	2.2 ± 0.4	23.7 ± 2.1	3.2 ± 0.4	29.1 ±1.9	31.9 ± 3.7	1.3
3	5.3 ±1.3	24.5 ± 3.3	3.4 ± 1.2	33.7 ±4.4	64.7 ± 5.8	2.7

1= egg masses of *Meliodgyne javanica*.
2= eggs of *Phythorimaea opercullela*.
3= eggs of *Agrotis ipsilon*.

Results of effect of type preys on the duration of *N.anderi* was affected by prey types and the egg masses of nematodes *Meliodgyne javanica* was the most suitable diet. Taha *et al.* (1988) recorded the same result when reared *N. anderi* at 30°Cand 70% R.H. on nematodes, *Panagralimus rigidus* and immature stages of *Caloglyphus rhizoglyphoides*.

Notice:

This paper is a part of PH.D. thesis belonging to Salwa – Mahmoud-Elsaeid- Sholla.

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دراسة بيولوجية علــى الحلــم المفتــرس نيوكيوناكســيد أنــدرى (اكتينيديــدا: كيوناكسيدى)

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أجريت دراسات معملية للنوع نيوكيوناكسيد أندرى عند درجــة حــرارة 26± 1 ورطوبة نسبية 70 ± 5% و30°م ±1 درجة مئوية و 75 ± 5% رطوبة نسبية و ذلك بالتغذية علي بيض كلا من :

فراشة درنات البطاطس ، الدودة القارضة و كتل البيض لنيماتودا تعقد الجذور.

وقد أظهرت دراسة كمية الغذاء بواسطة إناث النوع نيوكيوناكسيد أنــدرى 434 للنوع نيوكيوناكسيد أندرى 434± 1، 16 بمعدل يومي 8،8 بيضة/ للأنثى عند درجة حرارة 26 ، 30 على التوالي.

و قد سجلت فترة الحياة الكاملة أقصر فترة عند تغذية النوع نيوكيوناكسيد أندرى على بيض النيماتودا بمقدار 2،25 ± 2،3 و 9، 27 ± 2،2 عند درجــات الحــرارة و الرطوبة . وذلك بمقارنة العوائل الأخرى موضع الدراسة.