

THE PREDATORY INSECTS, MITES AND SPIDERS ASSOCIATED WITH DATE PALM PESTS IN RASHID REGION, EL-BEHEIRA GOVERNORATE, EGYPT

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Abstract

A survey of different predators associated with date palm pests was carried out from November, 2004 to October, 2006 at Rashid region, El Beheira Governorate, Egypt. Three insect species were recorded on leaves and two under tree bark. Fifty-two predator mites were recorded in this study belonging to 25 families under suborders, Prostigmata and Mesostigmata. The most dominant predator mites were belonging to the Families Macrochelidae and Cheyletidae. The spiders of this study were recorded in 17 families. The most dominant spider families were Agelenidae, Theridiidae and Lycoseidae. A trial for rearing the predatory mite *M. muscaedomesticae* (Scopli) infesting fallen fruits under laboratory conditions was conducted.

Key words: Mite, Prostigmata, Mesostigmata, Spiders, *Macrocheles muscaedomesticae*

INTRODUCTION

Date palm tree (*Phoenix dactylifera* L.) is considered one of the most crops that have a unique status in Egypt. Many important industries have been initiated on them and are considered the main income of many inhabitants. Palm date fruits produced in Egypt are considered the best date fruit varieties, which can be exported to foreign markets provided that the product qualities are most satisfactory, being free of pest infestation and residues of pesticides, El-Dakroury *et al.*, 2002. Date fruits are liable to be infested with so many insect and mite pests resulting in reduction of the crop and its quality. Some of these pests, *Arenipses sabella* (Hampson) which attacks unripped, ripped and fallen date fruits (Saleh, 1974, Talhouk, 1991 and Kaschef *et al.*, 2002. Larvae of *A. sabella* attack the growing spathes resulting bore into leaf base, fruit stalk, developing fruits and date fruits all year round, Gharib, 1969, Abu Fadl, 2001 and Kaschef *et al.*, 2002. Applied biological control by predators has been an effective and highly desirable method of date palm pests control. Utilization of predators provide an inexpensive, non-hazardous means of reducing pest populations and maintaining them often permanently below their economic thresholds Mahr and Ridgeway, 1995 and Lee and Landis, 2001. The importance of the spiders as biological control agents may be due to their occurrence in a wide variety of environments

(Alderweireldt and Macelfait, 1989, their spread in a majority of plantations with remarkable density, Bogya, 1995, their high tolerance for chemicals and pesticides, Thang *et al.*, 1990 and their predatory behavior against moving stages of insects, that are harmful to plants. A survey for natural enemies of date-palm pests was carried out in date-growing areas in Jamahiriya, Libya. Bitaw and Bin Saad 1988. Thirteen different species of predators and parasitoids were recorded. The predators were the coccinellids *Coccinella quinquepunctat*, *C. septempunctata*, *Exochomus nigripensis*, the nitidulid *Cybocephalus* sp. and *Chrysopa carnea* (*Chrysoperia carnea*) which attacked the diaspidid *Parlatoria blanchardii*, the coccinellid *Pharoscymnus* sp. which attacked *P. blanchardii*, and the ascid mite, *Blattisocius tarsalis* which attacked the pyralids *Carda cautella* (*Ephestia cautella*) and *Ectomyelois ceratoniae*. Very little work has been done on the predators of date-palm pests. Therefore a survey of these predators in Egypt (Rashid region) was carried out to foresee their existence, activity and possible future utilization in an integrated date-palm pests control program. Although certain macrochelid species can function as effective biological components in integrated fly control programs, yet their use has still been limited for date palm. The genus *Macrocheles* Laterille is the most important and most abundant predator worldwide that is associated with pest flies which breed on poultry and livestock premises, Axtell 1969, Krantz 1983 and Nawar and Ahmed 1993. Filipponi 1960 stated that *Macrocheles muscaedomesticae* (Scopoli) was common as a phoretic on *Musca domesticate*, *Stomoxys calcitrans* and *Fannia canicularis* and was recovered from 11 additional fly species by Petrova 1964. This study also is a trial for rearing of the predatory mite, *Macrocheles muscaedomesticae* which infesting fallen date fruits under laboratory conditions on different kind of foods.

MATERIALS AND METHODS

The experimental area

An area about three feddans was chosen in close neighborhood of Rashid City (El-Beheira Governorate) cultivated with date palm trees about thirty years old during the period from November 2004 to October, 2006 to study the occurrence and abundance of different predator insects, mites and the spiders associated with pests of date-palm (leaves, fruits, bark, fallen fruits and also stored fruits). The chosen planted area cultivated with the date-palm trees close with citrus trees in the same field. Samples of about 25 trees randomly distributed in every selected orchard were examined for collection the different predators (insects, mites and spiders).

Collection and identification of mites

Insects and mites lived on bark and associated with stored and fallen fruits were collected by using modified Tullgren funnel kept for about 24 hours below 60-watt electric lamp, received in 9 cm diam Petri-dish, filled with eater, and carefully inspected. The insects and mites on leaflets were collected and identified by using a stereomicroscope. Collected mites were put in Nesbitt's clearing agent, then mounted on glass slide using Hoyer's medium for examination. Labels with necessary data were stuck on the slides. Identification of mounted species were identify according to review given by Hughes 1961 and Mouray and Jamil 1982, for harmful mites, and Zaher (1986) for predaceous mites. The identification of insects was carried out by Entomology Department, Fac. Sci., Cairo University.

Hand sorting methods for spider collection

The spiders live on foliage, on the tree bark, associated with stored and fallen fruits were collected by hand sorting the spiders and by using small sieve . The collection was conducted one monthly during the surveying period. The surveyed spiders were kept in glass vials containing 75 % ethyl alcohol and droplets of glycerin. Identification of the collected spiders was available for adults only. The identification of adult female is depend on the epigynal plate, but in case of male, the palp anatomy is an important factor for identification, Sallam 2002

Obtained tabulated data clarified the family of the predator, scientific name, status of abundance (few, moderate and high), the attacked and infested parts of the date-palm trees.

Rearing of the predatory mite *M. muscaedomesticae* (Scopli)

The predatory mite, *Macrocheles muscaedomesticae* was collected from fallen date-palm fruits from the tested region by using Tullgren funnel. The first preparation of pure culture of the predator mite, adults were placed singly in screening plastic cells (closed round plastic transparent containers) (2.5 cm in diameter), with a layer of mixture of Plaster of Paris and charcoal (9 : 1) on its bottom to depth 5 mm.

For obtaining pure culture, male and female of identified *M. muscaedomesticae* were placed in 3 Petri-dishes which contained pure stocks of 2 identified fungi *Aspergillus niger.*, and *Penicilum* sp.. which are harmful to stored products which extracted and cultured in Plant Pathology Research Institute, Agriculture Research Center, Giza, Department of Post Harvesting Diseases) .Cultures were examined daily and kept at 25 ± 2 °C and 70 ± 5 % R.H. Occasionally, contamination with another fungi occurred before the mite become adult despite the medium remaining hydrated. So, it was necessary to

review it move often. Renewing every 3 - 4 days was typically required. A pure culture of *Tyrophagus putrescentiae* (collected from the fallen fruits) was maintained by feeding this mite on the fungi *A. niger* and *Penicillium* sp.

A fine broken pieces of glass cover were added on the bottom of rearing cells. The cells were supplied with food and kept at 25 °C and about 70 ± 5 % R.H. .Water drops were added when needed . For individual rearing, newly deposited eggs were transferred each to a rearing plastic cell. Each newly hatched larva was supplied with different preys and devoured ones were replaced daily with prey till reaching maturity. Emerged females were allowed to mate and monitored for oviposition. All biological aspects of the predatory mite *M. muscaedomesticae* (incubation period, life cycle, longevity and fecundity were recorded. Acarid mite *Tyrophagus putrescentiae* eggs and larvae, and the fungi of (*Aspergillus niger*, and *Penicillium* sp.) were used as diets for the predator feeding. The predatory mites and preys were observed twice daily.

RESULTS AND DISCUSSION

A general incidence covering Rashid region, El-Beheira Governorate to study the occurrence and abundance of the different predator insects, mites and the spiders associated with pests infesting date-palm (leaves, fruits, bark, fallen fruits and stored date fruits) through the period from November 2004 to October, 2006.

Predatory insects

Five predatory insects were collected during this study, Table (1), three of them fed on pests infesting date-palm leaflets, *Coccinella undecimpunctata* Linnaeus, *Chrysoperla carnea* (Stev.) larvae and *Paederus alfieri* Koch. On the other hand, two predaceous insects collected under the bark of the trees namely Hister beetle *Teretrius acaciae* Reit. and *Tenebroides mauritanicus* L. These collected predators affects and fed on the different date-palm tree pests, Table (2). Kaschef *et al.*, 2002 listed 6 different date fruit lepidopterous pest species which the greater date moth, *Arenipses sabella* (Pyralidae), the lesser date moth, *Batrachedra amydraula* (Cosmopterigidae), the pomegranate fruit butterfly, *Virachola livia* (Lycaenidae), the almond moth, *Ephestia cautella* (Pyralidae), the oases date moth, *E. calidella* (pyralidae) and the carab moth, *Ectomyelois ceratoniae* (Pyralidae).

Similar results were obtained by Okil, 1991 who observed that *Tenebroides mauritanicus* beetle was associated with *Melanophila picta* infestation while Batt 2006 found it under bark of infested trees and galleries of some borers. Al-Haidari (1981) found that the black ant *Crematogaster* sp. is a predator on the immature stages of *Batrach amydraul* associated with date-palm tree in the Yemen. Kaschef *et al.*, 2002

found four predatory insects in palm orchards in Siwa Oasis, Egypt, *Chrysoperla carnae* on the date fruit in palm orchards, *Orius albidipennis* (Reuter) nymphs and adults were found among fallen date fruits under palm trees and in the open date storages.

Predatory Mites

Considering the non-predaceous mites which may be used as preys for the different collected predators as shown in Table (2), 13 mite species were recorded belonging to 7 families under two suborders (Astigmata and Prostigmata). Most of the ten astigmatid mite species were collected from stored and /or fallen fruits except *Tyrophagous putrescentiae* which collected on leaves and from fallen and stored fruits. The three phytophagous species of prostigmatid mites live on the leaflet sap and can be controlled successfully by using the different collected predators. The prostigmatid predatory mites in this study as tabulated in Table (3) included 32 mite species under 12 families. On the other hand, Table (4) shows 20 mite species belong to 13 families of mesostigmatid mites. Families Cheyletidae, Cunaxidae and Stigmaeidae (Prostigmata) and Ascidae, Laelapidae and Macrochelidae (Mesostigmata) were dominant, while the predatory mite, *Macrocheles muscaedomesticae* was the most abundant species in fallen and stored fruits and reached in some inspections to more than 65 individuals per 500 gram of fallen fruits, and collected during the most periods of the study.

Similar results were obtained by Sallam and Yassin (2005). They found 36 different mite species belonging to 33 genera of 18 families associated with date palm at El-Wahat El-Baharia Oasis, Egypt. They added that mites of families Cunaxidae, Stigmaeidae, Camerobiidae, Cheyletidae, Bdellidae, Pseudocheyleidae, Raphignathidae and Tydeidae (Suborder:Prostigmata), Laelapidae, Ascidae, Parasitidae, Rhodacaridae -6- and Pachylaelapidae (Suborder : Mesostigmata) were widespread. In Saudi Arabia, Hammad *et al.*,1983 collected several predators on the leaflets of date-palm preying on the scale insects. Such mites are *Acaropsis docta* (Cheyletidae), *Tyrophagus* sp. (Acaridae), *Bdella* sp. (Bdellidae), *Siteroptes* sp. (Pyemotidae), *Tarsonemus* sp. (Tarsonemidae) and *Typhlodromus lilliae* (Phytoseiidae).

Spiders

As shown in Table (5) the collected spiders were belonging to 17 families. The identification of the species of the families Araneidae, Scytodidae, Hersillidae, Pholcidae and Agelenidae is impossible and this is return to the collected specimens were juveniles individuals (immatures).

The complete identification of the collected spiders was achieved for the following species, *Thomisus spinifer* (Thomisidae), *Theyene imperialis* (Audouin) (Salticidae), *Hogna ferox* (Lucas) (Lycoseidae), *Steatoda payauliieu* (Theridiidae) and *Tetragnatha nitens* (Audouin) (Tetragnathidae). On the other hand the identification of the collected spiders was available only to the general level in case of the families (Oecobidae, *Oecobius*), (Philodromidae, *Philodromus*), (Linyphiidae, *Erigone*), Uloboridae, *Uloborus*), (Miturgidae, *Cheiracanthium*), (Gnaphosidae, *Zelotes*) and (Dictynidae, *Dictyna*). The most abundant species was noticed for *Hogna ferox* which associated with fallen fruits, juveniles of Agelenidae on fallen fruits associated with some astigmatid mites and under the tree bark associated with unidentified beetles and *Steatoda payauliieu* which much found on the date-palm leaflets associated with the collected phytophagous mites and some of non-predaceous mites.

The beneficial role of the spiders might be interpreted by the low populations of the pests when they existed. Accordingly, conservation of these spider's species is crucial to keep the natural balance in soybean as well in other ecosystem, Hendawy and Abul-Fadl (2004). This could be mainly done by minimizing the application of any chemicals, Sallam 2002. Barrion and Litsinger, 1980 and Nentwig (1987) reported that small pests, such as thrips, midges and aphids, may die by being eaten or caught in the webs of large spiders. Kaschef *et al.*, 2002 recorded four spider families namely Filistatidae, Gnaphosidae (*Synaphosus* sp. and *Zelotes* sp.), Salticidae and Thomesidae (*Xysticus* sp.) from date fruit samples collected from orchards and open date storages. It could be stated that date-palm harbored different predators which propagated and utilized in a future biological or integrated pest management designed to suppress the population of date-palm pests.

Biological study

Laboratory experiment was conducted to investigate some biological aspects of the predatory mite, *M. muscaedomesticae* (Scopli) collected from fallen and stored date fruits. Four different diets eggs and immature stages of *Tyrophagus putrescentiae* and two fungi, *Aspergillus niger* and *Penicillium* sp.) were used for rearing the predatory mite *M. muscaedomesticae* (Scopli) which passed through a larval and two nymphal stages during its development from eggs to adult stages.

Incubation period

As shown in Table (6), there were no significant differences between the incubation periods of the predatory mite females and males when they fed on the different tested diets.

Life cycle

As observed from the Table (6), female and male life cycle were affected significantly by different food types, whereas, this period changed from 3.98 to 5.5 days when females fed on *Aspergillus niger* and eggs of the grain mite, *T. putrescentiae*, while for male, this period changed from 3.62 to 5.0 days at the same trend.

Adult longevity

As observed from Table (6), the adult longevity of *M. muscaedomesticae* which reared on eggs of *T. putrescentiae* was significantly longer than on any other diets.

The period lasted (10.82&11.20), (9.82 & 10.11), (8.71& 9.99) and (7.95 & 9.07) days for males and females when they fed on *T. putrescentiae* eggs, larvae, *A. niger* and *Penicillum* sp., respectively.

Fecundity

Concerning data in Table (6) revealed that female showed high preference to fed on eggs of the acarid mite than any other tested diets The observed maximum total number of eggs laid by one female during the oviposition period ranged between 36.51 eggs (the maximum number on *T. putrescentiae* eggs and 20.24 as a minimum number on *Penicillum* sp.

Food consumption of the predatory mite, *M. muscaedomesticae* when fed on different diets

Hence, the results indicated that the predatory mite, *M. muscaedomesticae* successfully controlled eggs and immatures of *T. putrescentiae* with the average daily average number of 15.00 eggs and 8.71 larval stages in case of adult female. On the other hand , the adult male appeared to feed on 12.49 eggs and 7.23 larval stages of *T. putrescentiae* .

Sheref *et al.*, 1990 noticed that 30 C was best and that housefly eggs were the preferred prey for *Macrocheles glober* development and fecundity.

El- Nenay 1992 found that *Macrocheles muscaedomesticae* successfully controlled eggs and first instar larvae of *Drosophila melanogaster* Meig. The daily consumption rates averaged 11.70 , 3.6 and 1.15 for egg stage, first and second instar larvae, respectively. The mite had no effect on both third instar larvae and pupal stage.

However, the gained results are of great importance, as they are taken into account in planning programs of integrated pest management on date palm.

Table 1. List of collected predatory insects associated with pests infesting date palm at Rashid region

| Family | Species | Collection fauna | Abundance |
|-------------------------|--------------------------------------|------------------|-----------|
| Coccinellidae Laterille | <i>Coccinella undecimpunctata</i> L. | Leaves & F. | ++ |
| Chrysopidae | <i>Chrysoperla carnea</i> (Stev.) | Leaves & F. | ++ |
| Staphylinidae Laterille | <i>Paederus alferii</i> Koch | Leaves & F. | ++ |
| Histeridae | <i>Tertrius acaciae</i> Reit. | Under bark | ++ |
| Tenebrionida Laterille | <i>Tenebroides mauritanicus</i> L. | Under bark | + |

Table 2. List of collected non-predaceous mites associated with date palm pests at Rashid region

| Family | Species | Feeding habitat | Fauna | Abundance | |
|---|--|---|--------------|--------------|-----|
| Suborder Astigmata Family : Acaridae Leach | <i>Tyrophagus putrescentiae</i> (Schrank) | Fungivorous or / and stored organic matters feeders | L. | +++ | |
| | <i>T. tropicus</i> Robertson | | F.F. & S.F. | +++ | |
| | <i>T. tropicus</i> Robertson | | F.F. | + | |
| | <i>Acarus siro</i> (Oudemans) | | F | + | |
| | <i>Caloglyphus beta</i> Attiah | | F. F. & S.F. | +++ | |
| Pyroglyphidae Cunliffe | <i>Euroglyphus longior</i> Troussart | | | S.F. | ++ |
| Chortoglyphidae Berlese | <i>Cortoglyphus arcuatus</i> (Troup) | | | S. F. | + |
| Glycyphagidae Berlese | <i>Blomia frumani</i> Hughes | | | F. F. & S.F. | + |
| | <i>Glycyphagus destructor</i> Schrank | | | S. F. | + |
| | <i>Gramolichus</i> sp. | | | F. F. & S.F. | +++ |
| Suidasidae Canestrini | <i>Suidasia nesbitti</i> Hughes | | S.F. | + | |
| Suborder: Prostigmata Tetranychidae Oudemans | <i>Eutetranychus orientalis</i> Klein | Phytophagous | F. F. & S.F. | + | |
| | <i>Oligonychus</i> sp. | | L. | ++ | |
| | <i>Oligonychus</i> sp. | | L | + | |
| <i>Brevupalpus obovatus</i> Donnadieu | L | | +++ | | |

Table 3. List of collected predaceous prostigmatid mites associated with date palm pests at Rashid region

| Family | Species | Fauna | Abundance |
|-------------------------------|---|-----------------|-----------|
| Bdellidae Duges | <i>Spinebdella bifurcate</i> Atyeo | B. | + |
| | <i>S. comini</i> (Baker & Balock) | S. F. | |
| Caligonellidae Grandjean | <i>Neognathus oblongus</i> (Soliman) | S. F. | + |
| | <i>N. oteifi</i> Soliman | S. F. | + |
| Cheyletidae Leach | <i>Cheyletus eruditus</i> (Schrank) | S.F.. | +++ |
| | <i>C. malaccensis</i> (Oudemans) | S. F. | +++ |
| | <i>Cheletomorpha lepidopterorum</i> (Schaw) | S.F.&F.F. | +++ |
| | <i>Acaropsellina docta</i> (Berlese) | F.F. | +++ |
| | <i>Ker palmatus</i> Muma | F.F. | +++ |
| | <i>Nodele calamodia</i> (Muma) | S. F. | + |
| Cunaxidae Thor | <i>Cunaxa capreolus</i> (Berlese) | B. | +++ |
| | <i>Coleoscerius breslauensis</i> (Den Heyer) | B. | + |
| | <i>Neocunaxoides andrei</i> (Baker and Hofmann) | F.F. | ++ |
| | <i>Pseudocunaxa simplex</i> (Ewing) | S.F. | +++ |
| | <i>Pulaeus zaheri</i> El-Bishlawy & Rakha | B. | +++ |
| | <i>P. pectinatus</i> Ewing | F. F. | |
| Raphignathidae Kramer | <i>Raphignathus bakeri</i> (Zaher & Gomaa) | B.& F.F | + |
| | <i>R. niloticus</i> Rakha & Mohamed. | F. F. | + |
| | <i>R. saydei</i> Gomaa and Hassan | S. F. | ++ |
| Eupodidae Koch | <i>Eupodes aegyptiacus</i> Abou | F. F. | + |
| | Awad & El-Bagoury | S. F. | + |
| Tydeidae Kramer | <i>Pronematus rykei</i> (Baker) | L. & F. F. | + |
| | <i>P. ubiquitous</i> McGregor | L& F. F. | +++ |
| Stigmaeidae Oudemans | <i>Stigmaeus africanus</i> Soliman & Gomaa | F.F | +++ |
| | <i>S. triameas</i> Soliman & Gomaa | F.F.& S.F. F.F. | ++ |
| | <i>Agistemus banksi</i> Gomaa & Hassan | S.F. | + |
| | <i>Agistemus exsertus</i> Gonzales | L. | +++ |
| | <i>N. gonzalis</i> Zaher and Gomaa | S. F. | + |
| Camerobiidae Southcott | <i>Neophyllobius gonzalis</i> Zaher and Gomaa | F. & F.F | + |
| | <i>N. aegyptium</i> Soliman and Zaher | L. | +++ |
| Pediculocheilidae Lavoipierre | <i>Pediculocheles</i> sp. | S.F. | + |
| Pachyhnathidae Kramer | <i>Protacarus</i> sp. | B. | + |
| Cryptognathidae | <i>Cryptognathus</i> sp. | B | + |

Table 4. List of collected predaceous mesostigmatid mites associated with date palm pests at Rashid region

| Family | Species | Fauna | Abundance |
|--------------------------------|---|------------------|-----------|
| Ascidae Voigts and Oudemans | <i>Blatisocius keegani</i> (Fox) | S. F. | +++ |
| | <i>B. tarsalis</i> (Berlese) | S.F. | ++ |
| | <i>Lasioseius bispinosus</i> Evans | S.F. & F.F. | + |
| | <i>Laelaspis astronomicus</i> (Koch) | F. F. & S. F. | ++ |
| | <i>Proctolaelaps pygmaeus</i> (Muller) | F.F. | ++ |
| Laelapidae Berlese | <i>Androlaelaps casalis</i> (Berlese) | B. & S.F. | +++ |
| | <i>H. miles</i> Berlese | S.F. & F.F. | ++ |
| | <i>H. sarrdoa</i> (Berlese) | F.F. | + |
| Phytoseiidae Berlese | <i>Euseius scutalis</i> (A. H.) | L. | ++ |
| Macrochelidae Vitzthum | <i>Macrocheles carinatus</i> Koch | S. F. | +++ |
| | <i>M. muscaedomesticae</i> (Scopii) | S. F. & F. F. | +++ |
| Uropodidae Berlese | <i>Chiropturopoda bakeri</i> Zaher&Afifi | F. F. & S.F | +++ |
| Ologamaseidae Ryke | <i>Gamasiphis</i> sp. | F.F & S.F. | + |
| Pachylaelapidae Berlese | <i>Pachylaelaps aegypticus</i> Hafez and Nasr | F. F. & S.F. | ++ |
| Rhodacaridae Oud. | <i>Rhodacarus tabeenus</i> Hafez and Nasr | S.F. | + |
| Digamasilidae Evans | <i>Dendrolaelaps</i> sp. | Bark | + |
| Vejidae Oudemans | <i>Veigaias</i> sp. | S. F. | + |
| Parasitidae Oudemans | <i>Parasitus consanguineus</i> Oudemans and Voliqts | S.F. | + |
| Sejidae Berlese | <i>Sejius</i> sp. | Bark | + |
| Dermanysiidae | <i>Androlaelaps cabalism</i> (Berlese) | S. F. | ++ |

Table 5. List of collected spiders associated with date palm pests at Rashid region

| Family | Species | Fauna | Abundance |
|-----------------------|-------------------------------------|-------------|-----------|
| Araneidae Simon | J. | L., F. & B. | ++ |
| Oecobiidae Blackwall | <i>Oecobius</i> sp. | B | ++ |
| Philodromidae Thorell | <i>Philodromus</i> sp. | L. & F. | L. & F. |
| Linyphiidae Blackwall | <i>Erigone</i> sp. | F. | + |
| Scytodidae | J. | F. F. | + |
| Thomisidae Sundeval | <i>Thomisus spinifer</i> | F. F. | + |
| Salticidae Blackwall | <i>Theyene imperialis</i> (Audouin) | L. & F. F. | ++ |
| Uloboridae | <i>Uloborus</i> sp. | F.F. | ++ |
| Lycoseidae Sundeval | <i>Hogna ferox</i> (Lucas) | F.F. | +++ |
| Hersiliidae | J. | F.F. | + |
| Pholcidae Koch | J. | L. & F.F. | + |
| Agelenidae | J. | F.F. & B. | +++ |
| Theridiidae Sundevall | <i>Steatoda payaulieu...</i> | L. | +++ |
| Miturgidae Simon | <i>Cheiracanthium</i> sp. | L. & F. | + |
| Gnaphosidae Pocock | <i>Zelotes</i> sp. | B. | + |
| Tetragnathidae Menge | <i>Tetragnatha nitens</i> (Audouin) | L. | + |
| Dictynidae Cambridge | <i>Dictyna</i> sp. | L. | ++ |

L. = Leaves F. F = Fallen fruits F. = Fruits S. F. = Stored fruits

B. = Bark J. = Juvenile

+ = rare (1 – 3 individuals)

++ = moderate (3 – 9 individuals)

+++ = high (more than 9 individuals)

Table 6. Duration, food consumption and fecundity of *Macrocheles muscaedomesticae* when fed on different diets at 25° C and 70 % R.H.

| Biological aspect | Sex | Average period in days ± D.S. | | | | L.S.D. at 0.05 |
|------------------------|-----|---------------------------------|-----------------------------------|------------------------------------|---------------------------|-------------------|
| | | <i>T. putrescentiae</i> eggs | <i>T. putrescentiae</i> larvae | <i>Aspergillus</i> <i>niger</i> | <i>Penicillium</i> sp. | |
| Incubation period | ♂ | 0.70 ± 0.01 | 0.61 ± 0.11 | 0.69 ± 0.69 | 0.69 ± 0.07 | n.s. |
| | ♀ | 0.72 ± 0.02 | 0.70 ± 0.12 | 0.72 ± 0.1 | 0.66 ± 0.08 | n.s. |
| Life cycle | ♂ | 5.0 ± 0.20 | 4.70 ± 0.35 | 3.62 ± 0.34 | 3.62 ± 0.18 | 0.056*** |
| | ♀ | 5.5 ± 0.31 | 4.91 ± 0.24 | 3.98 ± 0.23 | 4.11 ± 0.24 | 0.049*** |
| Longevity | ♂ | 10.82 ± 0.69 | 9.82 ± 0.60 | 8.71 ± 0.59 | 7.95 ± 1.0 | 0.039*** |
| | ♀ | 11.20 ± 1.02 | 10.11 ± 0.51 | 9.99 ± 0.62 | 9.07 ± 0.87 | 0.046*** |
| Preoviposition | | 1.1 ± 0.09 | 1.31 ± 0.1 | 1.11 ± 0.12 | 1.00 ± 0.08 | - |
| Oviposition | | 8.8 ± 0.46 | 7.56 ± 0.61 | 7.6 ± 0.72 | 7.11 ± 0.81 | - |
| Postoviposition | | 1.3 ± 0.04 | 1.24 ± 0.11 | 1.28 ± 0.13 | 0.96 ± 0.11 | - |
| Food consumption / day | ♀ | 15.00 ± 3.24 | 8.71 ± 3.42 | - | - | - |
| | ♂ | 12.49 ± 4.96 | 7.23 ± 2.34 | - | - | - |
| Fecundity | | 36.51 ± 3.24 | 28.26 ± 3.11 | 31.21 ± 2.62 | 20.24 ± 1.18 | 2.241*** |

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الحشرات والاكاروسات والعناكب المفترسة المرتبطة بأفات نخيل البلح فى منطقة رشيد - محافظة البحيرة- مصر

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معهد بحوث وقاية النباتات - مركز البحوث الزراعية - الدقى -الجيزة

اجريت هذه الدراسة لحصر المفترسات الحشرية والاكاروسية والعنكبوتية المختلفة والمرتبطة بافات نخيل البلح فى الفترة من نوفمبر ٢٠٠٤ - اكتوبر ٢٠٠٦ فى منطقة رشيد بمحافظه البحيرة- مصر. تم تسجيل ثلاث انواع حشرية على الاوراق وتحت قلف الشجرة. وايضا سجل اثنين وخمسون نوع اكاروسى مفترس فى هذه الدراسة تنتمى الى خمس وعشرون فصيلة فى تحت رتبة الثغر الامامى Prostigmata والثغر المتوسط Mesostigmata . وكان اكثر الفصائل تواجدا هى Macrochelidae و Cheyletidae . اما العناكب فى هذه الدراسة فتم تسجيل سبعة عشرة فصيلة. واهم هذه الفصائل كانت Agelenidae و Theridiidae و Lycoseidae . وفى هذه الدراسة ايضا تم اجراء محاولة لتربية الاكاروس المفترس الشائع *Macrocheles muscaedomesticae* (Scopli) والذى تم جمعه من ثمار البلح المتساقطة.