



Egyptian Journal of Plant
Protection Research Institute

www.ejppri.eg.net



Incidence of mites associated with stored products in Al-Arish, North Sinai Governorate

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ARTICLE INFO

Article History

Received: 31 /10 /2022

Accepted: 26 / /2022

Keywords

Incidence, Astigmata, Prostigmata, Mesostigmata, Cryptostigmata, mites and stored products.

Abstract

In this study 49 mite species were collected from 14 different stored product sources, onion, fodder, garlic, wheat-bran, corn, the barley, flour, potato, oats, peanut, wheat, rice, animal feed and broad-bean were collected from the North Sinai Governorate, during two years from January 2020 to December 2021. Mite incidence proved the occurrence of 28 astigmatic mite species belonging to nine families, on other hand prostigmatid mites were represented by eight mite species in five families, in addition to 11 mite species of mesostigmatid belonging to four families and two mite species in one family of cryptostigmatid mites.

Introduction

Stored product mites are important pests of all types of stored commodities. Mites flourish in warm and damp environments where they feed on protein rich substances such as grain, fungi and other micro-organisms. They are not only responsible for direct damage in the form of weight reduction but also imply the indirect damage in form of germination loss of the grains, deterioration of the nutrients and the quality of the stored grains and other stored products.

Mites cause significant grain weight losses and a decrease in germinability (Hughes, 1976 and Zdarkova and Reska, 1976). Their activities cause heating of grain mass and moisture translocation which permits the development of molds and germination of the grain, contamination

by alive and dead mites, different stages as well as exuviae and faces resulting in being harmful for human consumption.

Studies on mites inhabiting stored products were reported previously by Wafa *et al.*, 1966; Attiah, 1969; Hughes, 1976; Taha, 1985; Zaher *et al.*, 1986 and recently, by Hoda *et al.*, 1990; Fawzy, 1996; Halawa, 2003; El-Sanady, 2005; Yassin *et al.*, 2018 and Halawa *et al.*, 2021.

So, the present work was investigated the Incidence of mites associated with stored products in the North Sinai Governorate in Egypt.

Materials and methods

1. Mites collection:

General incidence from the North Sinai governorate was undertaken for two successive years 2020 and 2021. Samples of 14 different stored product sources: onion, fodder,

garlic, wheat-bran, corn, barley, flour, potato, oats, peanut, wheat, rice, animal feed and broad-bean were collected monthly from some groceries and houses.

Samples about 500g. each, from the previous materials were picked and singly kept in tightly closed polyethylene bags. A label including all necessary information concerning habitat, locality and date of collection were attached to each bag and then, transferred to the laboratory.

2. Mounting, preservation and identifications:

A sample of 250 gm from each material was isolated by modified Tullgren funnels, in 3cm deep layers and kept for 24 hours below 40-watt electric lamps. The mites were collected into petri-dishes with the airing of Vaseline mixed with citronella oil to prevent mite escape (Metwally, 1976). Isolated specimens were placed in Nesbitt as a clearing solution (Hughes, 1976 and Krantz and Walter, 2009).

3. Mites identification:

Identification was carried out according to Hughes (1976), Summers and Price, (1970), Zaher *et al.* (1984) and Krantz and Walter (2009). Mite specimens were kept in the mite collection of Agric., Zoology and Nematology Department Faculty of Agric., AL-Azhar University.

Results and discussion

A general incidence at Al-Arish, North Sinai Governorate was undertaken for two years 2019 and 2020. The study revealed the occurrence of 49 different mite species belonging to 15 families under four suborders as follows (Table 1).

1. Suborder: Asitgmata:

This suborder was represented by 28 mite species belonging to five families:

1.1. Family: Acaridae was represented by 21 species as; *Acars siro* L., *Acarus farris* (Oude)., *Acarus*

immobilis Griffiths., *Acotyledon Lmiai* Eraky, *Tyrophagus putrescentiae* (Schrank), *Tyrophagus tropicus* Robertson, *Tyrophagus similis* Volgin, *Tyrophagus lini* Oud., *Mycetoglyphus fungivorus* Oud., *Thyreophagus* sp., *Tyrophagus brevicrinatus* Roboertston., *Tyrobors lini* Oud., *Tyrophagus* sp., *Tyrolichus casie* Oud., *Aleuroglyphus ovatus* (Troupeau), *Caloglyphus mycophagus* (Megnin), *Caloglyphus hughesi* (Samsmak), *Caloglyphus berlese* (Michael), *Caloglyphus rhizoglyphoides* (Zacvatkin), *Rhizoglyphus robini* Claparede and *Rhizoglyphus* sp. which were inhabiting onion, fodder, garlic, wheat-bran, corn, barley, flour, potato and oats in high numbers.

1.2. Family: Pyroglyphidae was represented by two mite species as; *Euroglyphus* sp. and *Phyroglyphus ofricanus* (Hughes), which were found in a rear number in onion, fodder, garlic and wheat-bran.

1.3. Family: Lardoglyphidae Oud. was represented by *Lardoglyphus* sp. which was collected from barley and flour in a rear number.

1.4. Family: Suidasidae (Hughes) was represented by *Suidasi anesbitti* Hughes which was found in few numbers in garlic, fodder, broad-bean and peanut.

1.5. Family: Glycyphagidae (Berlese) was represented by *Lepidoglyphagus destructor* (Schrank) which was found in few numbers in onion.

2. Suborder: Mesostigmata:

This suborder was represented by 11 mite species belonging to four families as follows:

2.1. Family: Ascidae (Vogits and Oudemans) which was included five mite species as; *Blattisocius tarsalis* (Berlese) was isolated from wheat, onion and garlic as dominant species.

Blattisocius keegani Fox. was isolated in a rear number from corn.

Proctolaelaps pygmaeus (Muller) was isolated from onion, garlic, corn and rice in a few numbers.

Melichars agilis Hering was isolated in a rear number from corn and rice.

Lasiasus peniciliger (Berlese) was isolated in few numbers from corn and rice.

2.2. Family: Ameroseiidae Evans was represented by *Kleemania plumosus* (Oud.) inhabiting wheat, onion and garlic in a rear number.

2.3. Family: Uropodidae Berles was represented by *Treature* sp. inhabiting onion and garlic in few numbers.

2.4. Family: Laelapidae (Berlese) was represented by four mite species as;

Hypoaspis miles Berlese which was isolated in a rear number from onion.

Hypoaspis wahabi Metwally and Ibrahiem which was isolated in few numbers from garlic.

Androlaelaps casalis (Berlese) and *Androlaelaps* sp. which were isolated in a few numbers from onion.

3. Suborder: Prostigata:

This suborder was represented by eight mite species belonging to five families as follows:

3.1. Family: Cunaxidae (Thor) was represented by *Canaxa* sp. inhabiting corn and animal feed in a rear number.

3.2. Family: Tydeidae Kramer was represented by *Tydeus* sp. inhabiting garlic, corn and broad-bean in few numbers.

3.3. Family: Tarsonemidae Kramer was represented by *Tarsonemus granarium* Lindquist which was collected in few numbers in corn.

3.4. Family: Pyemotidae Oud. was represented by *Pyemote sherfsi* Oud. was collected in few numbers in garlic.

3.5. Family: Cheyletidae leach was represented by four mite species as:

Cheyletus malaccensis Oud. was isolated from onion, wheat and corn as a dominant species.

Cheyletus eruditus (Schrank) was isolated from garlic, corn and broad-bean in few numbers.

Cheyletomorpha lepidopterorum (Shaw) was isolated from onion, fodder, corn and garlic in a few numbers.

Euchyeletia sp. was isolated from corn and onion in a rear number.

4. Suborder: Cryptostigmata:

This suborder was represented by two mite species belonging to the **family Oribatidae** as: *Pediculida* sp. and *Pediculus* sp. which were rarely collected from corn.

Survey research associated with stored product mites were done by many authors; Hughes (1961), Zaher *et al.* (1986) and Taha (1985) for prostigmatid mites and for acarid mites. Also, Attiah (1969) studied the tyroglyphid mites, while El-Naggar *et al.*, (1992), El-Sayed and Ghallab (2007), Yassin *et al.* (2018) and Halawa *et al.* (2021) recorded several mite species associated with stored products. In their study, Zaher *et al.* (1986) noticed that members of the families Cheyletidae and Acaridae were the most common mites, found in many stored seeds and food products in Upper Egypt.

Table (1): Incidence of some mites associated with stored products in Al-Arish North Sinai Governorate.

Order: Acariformes			
Suborder: Asitgmata			
Family	Species	Habitat	Abundance
Acaridae (Ewing and Nesbitt)	1. <i>Acars siro</i> L.	Onion, fodder, garlic, wheat-bran, corn, barley, flour, potato, oats.	+++
	2. <i>Acarus farris</i> (Oud).		
	3. <i>Acarus immobilis</i> Griffiths.		
	4. <i>Acotyledon Lmiai</i> Eraky.		
	5. <i>Tyrophagus putrescentiae</i> (Schrank).		
	6. <i>Tyrophagus tropicus</i> Robertson.		
	7. <i>Tyrophagus similis</i> Volgin.		
	8. <i>Tyrophagus lini</i> Oud.		
	9. <i>Mycetoglyphus fungivorus</i> Oud.		
	10. <i>Thyreophagus</i> sp		
	11. <i>Tyrophagus brevicrinatus</i> Roboertston.		
	12. <i>Tyrobors lini</i> Oud.		
	13. <i>Tyrophagus</i> sp.		
	14. <i>Tyrolichus casie</i> Oud.		
	15. <i>Aleuroglyphus ovatus</i> (Troupeau).		
	16. <i>Caloglyphus mycophagus</i> (Megnin).		
	17. <i>Caloglyphus hughesi</i> (Samsmak).		
	18. <i>Caloglyphus Berlese</i> (Michael).		
	19. <i>Caloglyphus rhizoglyphoides</i> (Zachvatkin).		
	20. <i>Rhizoglyphus robini</i> Claparede.		
	21. <i>Rhizoglyphus</i> sp.		
Pyroglyphidae	1. <i>Euroglyphus</i> sp.	Onion, fodder, garlic, wheat-bran.	+
	2. <i>Phyroglyphus ofricanus</i> (Hughes).		
Lardoglyphidae Oud.	1. <i>Lardoglyphus</i> sp.	Barley, flour.	
Suidasidae (Hughes)	1. <i>Suidasi anesbitti</i> Hughes.	Garlic, fodder, broad-bean, peanut	++
Glycyphagidae (Berlese)	<i>Lepidoglyphus destructor</i> (Schrank).	Onion	++
	<i>Gohieria wahabi</i> El-Naggar, Taha and Hoda		
	<i>Gohiera fusca</i> (Oud).		
Order: Parasitiformes			
Suborder: Mesostigmata			
Ascidae (Vogits and Oudemans)	1. <i>Blattisocius tarsalis</i> (Berlese).	Wheat, onion, garlic	++++
	2. <i>Blattisocius keegani</i> Fox.	corn	+
	3. <i>Proctolaelaps pygmaeus</i> (Muller).	Onion, garlic, corn, rice	++
	4. <i>Melichars agilis</i> Hering.	Corn, rice	+
	5. <i>Lasiaius peniciliger</i> (Berlese).	Corn, rice	++
Ameroseiidae Evans	1. <i>Klemania plumosus</i> (Oud.).	Wheat, onion, garlic	+
Uropodidae Berles	1. <i>Treature</i> sp.	Onion, garlic	++
Laelapidae (Berlese)	1. <i>Hypoaspis miles</i> Berlese.	Onion	+

	2. <i>Hypoaspis wahabi</i> Metwally and Ibrahiem.	Garlic	++
	3. <i>Androlaelaps casalis</i> (Berlese).	Onion	+
	4. <i>Androlaelaps</i> sp.	Onion	+
Order: - Acariformes			
Suborder: - Prostigmata			
Cunaxidae (Thor)	1. <i>Canaxa</i> sp.	Corn, animal-feed	+
Tydeidae Kramer	1. <i>Tydeus</i> sp.	Garlic, corn, broad-bean	++
Tarsonemidae Kramer	1. <i>Tarsonemus granarium</i> Lindquist.	Corn	++
Pyemotidae Oud.	1. <i>Pyemote sherfsi</i> Oud.	Garlic	++
Cheyletidae leach	1. <i>Cheyletus malaccensis</i> Oud.	Onion, wheat, corn	++++
	2. <i>Cheyletus eruditus</i> (Schrank).	Garlic, corn, broad bean	++
	3. <i>Cheyletomorpho lepidopterorum</i> (Shaw).	Onion, fodder, corn, garlic	++
	4. <i>Euchyeletia</i> sp.	Corn, onion	+
Order: - Acariformes			
Suborder: - Cryptostigmata			
Oribatidae	1. <i>Pediculida</i> sp.	Corn	+
	2. <i>Pediculus</i> sp.	Corn	+

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