Minia J. of Agric. Res. & Develop.
Vol. (٣١) No. ١ pp ٨١ - ٨٩,
٢٠١١

FACULTY OF AGRICULTURE

SURVEY OF PHYTOPHAGOUS MITES ON FIG TREES AND THEIR ASSOCIATED PREDATORS AT ASSIUT GOVERNORATE

A. K. Abou El-Saad and A.A.A. Salem
Plant Protec. Res. Ins., Agric., Res. Center, Dokki, Giza, Egypt.

Received ١٧ April ٢٠١١ Accepted ٢ May ٢٠١١

ABSTRACT

A survey of phytophagous mites on fig trees and their associated predators were carried out during ٢٠٠٩ and ٢٠١٠ growing seasons at Sahel Saleem district, Assiut Governorate. Four phytophagous mites belonging to ٣ families were recorded on fig trees, These families are; Tetranychidae, Eriophyidae and Tenuipalpidae (order: Acari). Five species of associated predaceous mites were found belong to ٣ families and eleven species of the associated insect predators were found belonging to ٨ families and ٥ different orders, of ١١ species collected, ٥ were belonging to order Coleoptera. Other orders were Hemiptera, Neuroptera, Thysanoptera and Diptera. Also, one insect parasite, *Aphidoletes aphidimyza* (Rondani) (Diptera: Cecidomyiidae) was found on fig trees leaves. The obtained result can help as a biocontrol agents against phytophagous mites infested fig trees.

INTRODUCTION

Fig trees (*Ficus carica* L.) represent one of the most economic fruit crops in Egypt. A great attention has been done to increase the production and to improve the quality and quantity of this fruit crop. These trees are subjected to the attacked of several phytophagous mites causing considerable damage and consequently affecting the yield (El-Halawany *et al*., ١٩٨٦; Mannaa, ١٩٨٨ and Ali, ٢٠٠٦).

Phytophagous mites found on fig trees are fed on the plant sap causing serious damage by piercing leaf cells and sucking out the contents, which causes the cells to collapse and die. This damage vary according to the degree of infestation as at the end of the growing season (in case of severe infestation) these mites consumed nearly all the chlorophyll causing decrease in the leaves vitality and lead to a reduced or damaged crop (El-Dabaa, ١٩٩٦ and Farrag *et al*., ١٩٩٨).

In many fruit orchards, predaceous mites and insect predators play a natural role against phytophagous mites attacking fig trees. Nowadays, great attention on studying the natural role of these predators (Mannaa, ١٩٨٨; El-Halawany *et al*., ١٩٩٠ and Ahmed & Ibrahim, ٢٠٠١).

In the present study, a survey of phytophagous mites attacking fig trees leaves and their associated predators was carried out during two seasons of ٢٠٠٩ and ٢٠١٠ at Assiut Governorate. Such survey may help in design and integrated Pest Management (I.P.M.) strategies, against phytophagous mites attacking fig trees.

MATERIALS AND METHODS

The present studies was carried out on fig trees orchard (one feddan), located at Sahel Saleem district, Assiut Governroate during the two successive seasons of ٢٠٠٩ and ٢٠١٠. Ten trees of approximately the same canopy size (١٥ years-old) were chosen and marked for surveying the phytophagous mites and their associated predators. Five leaves were randomly collected at ٧-day intervals,

from the canopy of the trees. Leaves of each replicate was put in a wide plastic bag tightly bound with rubber band, then transferred to the laboratory for identification (a circular ring of ٤.٥ cm in diameter was taken for each leave).

Identification and classification of phytophagous mites and predators was made by the staff of classification at Plant Protection Research Institute, Agricultural Research Center, Egypt.

RESULTS AND DISCUSSION

Table ١ show the list of surveyed phytophagous mites and their associated predators on fig trees leaves at Sahel Saleem district, Assiut Governorate during ٢٠٠٩ and ٢٠١٠ growing seasons and indicate the following:

Phytophagous mites:

These mites were belonging to ٣ families: ١] Family: Tetranychidae The members of this family found throughout those parts of the world where high plants flourish. The occur on virtually every major food crop and ornamental plants, often causing serious injury or death of the host (Hanna *et al*., ١٩٩٧ and Adam & Mohamed, ١٩٩٨). In the present investigation, one tetranychid mite species was found on fig leaves; the two-spotted spider mite, *tetranychus urticae* Koch. ٢]Family: Eriophyidae: Members of the two species recorded from this family caused considerable agricultural problem to cultivated plants, they infest leaves, buds, flowers and fruits (Abou-Awad *et al*., ٢٠٠٠; Shahinia *et al*., ٢٠٠٩ and Al-Atawi and Halawa, ٢٠١١). In the present study, this family was represented by two species, *Eriophyes ficus* Cotte and *Rhyncaphytoptus ficifolia* Kiefer and ٣] Family: Tenuipalpidae : Tenuipalpid mites infest fruit trees, vegetable crops and ornamental. Severe infestation caused dryness and pubescence of leaves which result into great loss in crop yield (El-Laithy & Fouly, ١٩٩٨; Putatunda *et al*., ٢٠٠٢ and Ali, ٢٠٠٦). Only one species of tenuipalpid was found on fig trees, *Tenuipalpus* sp.

Predaceous mites:

These mites were represented by ٣ families: ١] Family: Phytoseiidae: Predatory mites of the family phytoseiidae of special interest because many species prey on phytophagous mites, and very few species had been described. However, some early studies indicted that phytoseiids prey on spider mite (McMurty & Croft, ١٩٩٧ and El-

Gazar, ٢٠٠١). In this investigation, three mite species were found on fig leaves, *Phytoseiulus persimilies* (A.-H.), *Phytoseius* sp. and *Euseius* sp. ٢] Family: Stigmaeidae: It is a large cosmopolitan group. They inhabit soil, fruit trees, field crops and also found in leaf debris. On the basis of general field observation, this family has been recognized as natural enemies of phytophagous mites (Abou-Awad & El-Sawy, ١٩٩٣ and Kim *et al*., ٢٠٠٣). Our survey is revealed the presence of only one species of this family, *Agistemus exsertus* Gonzalez and ٣] Family: Tydeidae: Tydeidae are cosmopolitan mites which are found on plants, stored products and soil. Some of them are predaceous on small plants pests including phytophagous mites (Muma *et al*., ١٩٦١ and Demite & Feres, ٢٠٠٥). Faunistic surveys list tydeids on deciduous fruit in Egypt (Rasmy *et al*., ١٩٧٢).

In this study, one mite species was found on fig leaves; *Pronematus ubiquitous* (Mc Gregor).

Insect predators:

Table ١ shows the most common insect predators found associated with phytophagous mites on fig trees, these predatory species belong to ٥ orders (Coleoptera, Hemiptera, Neuroptera, Thysanoptera and Diptera) and eight families.

The period of insect predators occurrence extended allover the season in both years. The maximum total numbers of these predators were recorded during July and August (Mannaa, ١٩٨٨; Felland & Hull, ١٩٩٦ and Ali, ٢٠٠٦).

Order Coleoptera recorded ٥ species represented the majority of the found insect predators on fig trees followed by order Hemiptera recorded ٣ species and orders; Neuroptera, Thysanoptera & Diptera (recorded one species to each).

Insect parasite:

Table ١ represents one species insect parasite; predaceous midge, *Aphidoletes aphidimyza* (Rondani). These parasite released on pepper and tomato in glasshouse to control aphids (Schelt & Mulder, ٢٠٠٠).

The obtained results demonstrated that, the period of high population level of phytophagous was usually coincided with a period of high abundance in the population of their predators in both years of investigation, which are in agreement with the finding of Mannaa, (١٩٨٨); El-Halawany *et al*., (١٩٩٠) and Nassef *et al*., (١٩٩٦).

Table ١: Phytophagous mites and their associated predators found on fig trees at Assiut Governorate in ٢٠٠٩ and ٢٠١٠ growing seasons.

Order	Family	Scientific name	Status
Acari	Tetranychidae	*Tetranychus urticae* Koch	Phytophagous mite
	Eriophyidae	*Eriophyes ficus* Cottle	„ „
		Rhyncaphytoptus ficifolia Kiefer	„ „
	Tenuipalpidae	*Tenuipalpus* sp.	„ „
	Tydeidae	*Pronematus ubiquitous* (McGregor)	Predaceous mite
	Stigmaeidae	*Agistemus exsertus* Gonzalez	„ „
	Phytoseiidae	*Phytoseiulus persimilis* (A.-H.)	„ „
		Phytoseius sp.	„ „
		Euseius sp.	„ „
Coleoptera	Coccinellidae	*Coccinella* spp.	Insect predator
		Scymnus syriacus Merseul	„ „
		Cydonia vicinaisis Mulsant	„ „
		Stethorus picipes Casey	„ „
	Staphylinidae	*Paederus* sp.	„ „
Hemiptera	Anthocoridae	*Orius* spp.	„ „
	Lygaeidae	*Geocoris* spp.	„ „
	Nabidae	*Nabis* spp.	„ „
Neuroptera	Chrysopidae	*Chrysopa carnea* (Steph.)	„ „
Thysanoptera	Thripidae	*Scolothrips sexmaculatus* (Pergande)	„ „
Diptera	Syrphidae	*Syrphus* sp.	„ „
	Cecidomyiidae	*Aphidoletes aphidimyza* (Rondani)	Insect parasite

It could be concluded that, predators play an active natural role in fig orchards against phytophagous mites attacking these trees. Accordingly, this role must be encouraged and developed continuously. Also, *Phytoseiulus persimilis* and *Agistemus exsertus* could be mass reared and released against the phytophagous mites during the critical periods of pest infestation which other safe control methods, in the frame of Integrated Pest Management (I.P.M.) strategies.

Scolothrips sexmaculatus is amongst the most abundant predators associated phytophagous mites and thus could play a noticeable role in reducing phytophagous mites population (Hideo *et al*., ٢٠٠١).

REFERENCES

Abou-Awad, B.A. and S.A. Elsawy (١٩٩٣). Biology and life table of the predaceous mite, *Agistemus exsertus* Gonzalez (Acari: Stigmaeidae). Anzegiar Firschadlingshunde Pflanzen Schutz. Unweltschutz, ٦٦ (٥): ١٠١-١٠٣.

Abou-Awad, B.A.; B.M. El-Sawaf; A.S. Reda and A.A. Abdel-Khalek (٢٠٠٠). Environment management and biological aspects of two Eriophyoid fig mites in Egypt: *Aceria ficus* and *Rhyncaphytoptus ficifoliae*. Acarologia Vol. ٤٠, ٤١٩-٤٢٩.

Adam, K.M. and A.M. Mohamed (١٩٩٨). Seasonal abundance of the two-spotted spider mite, *Tetranychus arabicus* Attiah and its predaceous mite, *Phytoseius finitimus* Ribaga-Egyptian. J. Agric. Res., ٧٦ (٣): ٩٥٥-٩٥٨.

Ahmed, W.D.G. and A.M.A. Ibrahim (٢٠٠١). Feeding capacity, reproduction and competition between the two predators, *Agistemus exsertus* (Prostigmata: Stigmaeidae) and *Orius laevigatus* (Fieber) (Hemiptera: Anthocoridae) associating with spider mite, *Tetranychus*

urticae Koch. J. Agric. Sci. Mansoura Univ., ٢٦ (٩): ٥٧٨٣-٥٧٩٠.

Al-Atawi, F.J. and A.M. Halawa (٢٠١١). New records Eriophyoid mites (Acari: Prostigmata: Eriophyoidea) from Saudi Arabia. Pak. J. Biol. Sci., ١٤: ١١٢-١١٧.

Ali, M.M. (٢٠٠٦). Studies on some mites species infesting deciduous fruits in Upper Egypt. Ph.D. Thesis, Fac. Agric., Assiut Univ., ١٥٥ pp.

Demite, P.R. and R.J.F. Feres (٢٠٠٥). Influência de Vegetacao vizinha na distribuicao de acaros ergal (Hevea brasiliensis Muell. Arg., Euphorbiaceae) em Sao Jose do Rio Petro, SP. Neotrop. Entomol. ٣٤ (٥): ٨٢٩-٨٣٦.

El-Dabaa, M.A. (١٩٩٦). Studies on some mites inhabiting apple orchard in Egypt. M.Sc. Thesis, Agric. Zool. (Acarology), Fac. Agric., Cairo Univ.

El-Gazar, H.F.H. (٢٠٠١). Ecological and biological studies on some predaceous mites (Phytoseiidae). M.Sc. Thesis, Fac. Agric., Cairo Univ., ١٠١ pp.

El-Halawany, M.E.; M.A.H. Kandeel and M.A. Rakha (١٩٨٦). Mites inhabiting deciduous fruit trees. Agric. Res. Rev. ٦٤: ١١٥-١٢٢.

El-Halawany, M.E.; R.G. Abou El-Ela and H.M. Esmail (١٩٩٠). Population dynamics of mites and their natural enemies on apple and apricot trees. Agric. Res. Rev. ٦٨: ٥٩-٦٩.

El-Laithy, A.Y.M. and A.H. Fouly (١٩٩٨). Aggregation pattern and minimum sample size estimates of the false spider mite, *Brevipalpus pulcher* (C. & G.) (Acari: Tenuipalpidae)

and associated predatory mites in apple orchards. Phytophagapermo, ٨: ١٥٥-١٦٤.

Farrag, A.M.I.; M.K. Megali and N.H. Habashy (١٩٩٨). Survey of mites inhabiting cucurbitaceous and leguminous vegetables in Qaluobia and Giza Governorates. Egypt. J. Agric. Res., ٧٦ (١): ٦٣-٦٨.

Felland, C.M. and L.A. Hull (١٩٩٦). Over wintering of *Stethorus punctum punctum* (Coleoptera: Coccinellidae) in apple orchard ground cover. Environmental Entomology, ٢٥ (١٥): ٩٧٢-٩٧٦.

Hanna, R.; L.T. Wilson; F.G. Zalom and D.L. Flaherty (١٩٩٧). Effects of predation and competition on the population dynamics of *Tetranychus pacificus* on grapevines. J. Appl. Ecology, ٣٤: ٨٧٨-٨٨٨.

Hideo, T.; T. Akio; T. Junji; Y. Shuichi and S. Takeshi (٢٠٠١). Seasonal occurrence of specialist and generalist insect predators of spider mites and their response to volatiles from spider mite infested plans in Japanese pear orchards. Environmental and Applied Acarology, ٢٥: ٣٩٣-٤٠٢.

Kim, D.S.; C. Jung; S. Kim; H.Y. Jeon and J.H. Lee (٢٠٠٣). Regulation of spider mite population by predaceous mite complex in an unsprayed orchard. Kora Journal of Applied Entomology, ٤٢ (٣): ٢٥٩-٢٦٢.

Mannaa, S.H. (١٩٨٨). Biological and ecological studies on some fig pests with special reference to their integrated control. Ph.D. Thesis, Fac. Agric., Assiut Univ., ٢٨٠ pp.

McMurty, J.A. and B.A. Croft (١٩٩٧). Life styles of phytoseiid mites and their roles in biological control. Annual Review of Entomology, ٤٢: ٢٩١-٣٢١.

Muma, M.H.; A.G. Selhime and H.A. Denmark (١٩٦١). An annotated list of predators and parasites associated with insect and mites on Florida citrus. Bull. Fla. Agric. Expt. Stn., ٦٣٤: ١-٣٩.

Nassef, M.A.; A.M. Hamid; S.A. El-Bassiouny and W.M. Watson (١٩٩٦). Correlation between sucking pests infesting cotton plants and their associated natural enemies. Egypt. J. Agric. Res., ٧٤ (٣).

Putatunda, B.N.; R.B. Mathur and S. Mathiji (٢٠٠٢). Mites associated with some fruit trees in Hisar-Haryana, India. Indian J. Agric. Res., ٣٦ (٢): ٨٨-٩٥.

Rasmy, A.H.; M.A. Zaher and B.A. Abou-Awad (١٩٧٢). Mites associated with deciduous fruit trees in U.A.R. Z. Angew. Entomol., ٧٠: ١٧٩-١٨٣.

Schelt, J.V. and S. Mulder (٢٠٠٠). Improved methods of testing and release of *Aphidoletes aphidimyza* (Diptera: Cecidomyiidae) for aphid control in glasshouses. European J. of Entomol., ٧٩ (٤): ٥١١-٥١٥.

Shahinia, S.; E. Kullajab; A. Akallic and E.D. Lillod (٢٠٠٩). Preliminary survey and population dynamics of some Eriophid mites (Acari: Eriophyoidea) associated with olives in Albania. Int. J. Aarol., ٣٥: ٤١٩-٤٢٣.

حصر الأكاروسات النباتية علي أشجار التين وما يصاحبها من مفترسات في محافظة أسيوط

A. K. Abou El-Saad and A.A.A. Salem

أيمن كامل أبو السعد ، علاء الدين عبدالقادر أحمد سالم

معهد بحوث وقاية النباتات – مركز البحوث الزراعية – الدقى – الجيزة – مصر

أجريت الدراسة علي أشجار التين بمركز ساحل سليم – محافظة أسيوط ، والدراسة تمت علي عشرة أشجار بغرض حصر للأكاروسات النباتية المتواجدة عيها خلال موسمي ٢٠٠٩ و ٢٠١٠ ، كذلك اشتمل الحصر المفترسات الهامة المصاحبة لتلك الأكاروسات النباتية.

وقد تبين من النتائج الآتي :

١- حصر وتعريف ٤ أكاروسات نباتية، تتبع ثلاثة فصائل (Tetranychidae و Eriophyidae و Tenuipalpidae) ورتبة واحدة.

٢- حصر وتعريف ٥ أكاروسات مفترسة ، تتبع ثلاثة فصائل ، ورتبة واحدة (Acari).

٣- حصر وتعريف ١١ نوع مفترس حشري ، يتبعوا ثمانية فصائل ، وخمسة رتب حشرية ، أكثرهم تواجداً Coleoptera يليها رتبة Hemiptera ثم Neuroptera ، Thysanoptera و Diptera.

٤- وجود الطفيل الحشري *Aphidoletes aphidimyza* علي أشجار التين.

والنتائج المتحصل عليها يمكن استخدامها كعناصر للمكافحة البيولوجية ضد الأكاروسات التي تصيب التين.