



Survey of pests and their associated natural enemies occurred on cucumber plants (*Cucumis sativus*)

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Abstract :

A survey was carried out to investigate different types of insects, mites and associated natural enemies found on three hybrids of cucumber (Hayal, ashrak, and bahi) at Qaha area, Qalubiya Governorate, during two successive seasons, 2015 and 2016. The results revealed 28 insect and mite species belonging to 25 families within 9 orders. Among the recorded pest species, six species namely, *Bemisia tabaci* (Gennadius) (Hemiptera: Aleyrodidae), *Aphis gossypii* Glover (Hemiptera: Aphididae), *Thrips tabaci* Lindeman (Thysanoptera: Thripidae), *Liriomyza bryoniae* (Kaitenbach) (Diptera: Agromyzidae), *Dacus ciliatus* (Loew) (Diptera: Tephritidae) and *Tetranychus urticae* Koch (Acari: Tetranychidae) are of highly economic importance. While the rest were of no economic importance based on population. It was found also that, cucumber plants in the surveyed area were inhabited with five natural enemies, that were: *Hippodamia (Adonia) variegata* (Goeze) (Coleoptera: Coccinellidae), *Polistes gallica* L., *Vespa orientalis* (L.) (Hymenoptera: Vespidae), *Brachymeria aegyptiaca* Masi (Hymenoptera: Chalcididae) and *Euseius scutalis* (Athias-Henriot) (Acari: Phytoseiidae).

Introduction

Cucumber (*Cucumis sativus* L.) is one of the most important vegetable crops grown in Egypt and cultivated in both the open fields and greenhouses. Cucumber plant is one of the annual plants in the Cucurbitaceous family that has been cultivated by man for over 3,000 years (Adetula and Denton, 2003 and Okonmah, 2011). The cultivated area recently increased, especially for exportation. The production of cucumber was 11750 tons from the cultivated areas of about 1726 feddans (Abdallah *et al.*, 2019).

Cucumber plants are a subject for infestation by many pests that reduce the productivity and quality. Some of these pests

are known to be of great economic importance and causes many direct and indirect damages (transmitting several viral and fungal pathogens) such as, the whitefly, *Bemisia tabaci* (Gennadius) (Hemiptera: Aleyrodidae), the aphid, *Aphis gossypii* Glover (Hemiptera: Aphididae), *Thrips tabaci* Lindeman (Thysanoptera: Thripidae), *Liriomyza bryoniae* (Kaitenbach) (Diptera: Agromyzidae) and in addition to the two spotted spider mite, *Tetranychus urticae* Koch (Acari: Tetranychidae) (Abdel-Rahman *et al.*, 2016 ; Adly, 2016; Chaven *et al.*, 2015; Hassan *et al.* , 2008; Ibrahim *et al.* , 2017; Saleh *et al.*, 2017 and Shaheen *et al.*, 1973).

The present work was undertaken to survey the pests and associated natural enemies occurred on some hybrids of the cucumber plants to assist in their control.

Materials and methods

A survey of insects, mites and associated natural enemies found on three cucumber hybrids (Hayel, ashrak and bahi) was conducted during two successive seasons (2015 and 2016) at the experimental farm of the Plant Protection Research Station at Qaha, Qalubiya Governorate. An area of about quarter Fadden (1050 m²), planted with the three hybrids of cucumber (each hybrid of 2 Kirats) was chosen for the survey. The survey was conducted using the sweeping net (25 double stokes were taken across the two diagonals) and counting on leaves (15 leaves picked at random before sun rise), at weekly intervals. The survey started on 5th of August till 18th of November in the two seasons. All the recommended agricultural practices were conducted, and no chemical insecticides were applied throughout the two growing seasons.

The collected insects were killed in cyanide Jars in the field, transferred to the laboratory in paper bags, then sorted, counted and preserved in vials containing 70% ethanol. The materials were identified in the Taxonomy Department of the Plant Protection Research Institute. The obtained insects and mites were classified according to its numbers as follows:

- a. Rare (from 0.0 to 2 individuals).
- b. Few (from 3.0 to 5 individuals).
- c. Moderate (from 5 to 10 individuals).
- d. Abundant (more than 10 individuals).

The data obtained were arranged in a Table (1) including the order, family, scientific name, together with the economic status, the stage, the abundance degree, the part of infested plant and the period of occurrence.

Results and discussion

Survey of insects, mites and their natural enemies associated with cucumber plant was conducted at the experimental farm

of the Plant Protection Research Station at Qaha. Qalubiya Governorate, during the Nile season of two consecutive years of 2015 and 2016. The survey revealed the presence of 28 insect and mite species belonging to 25 families and 9 orders. Of these only 6 species were most abundant and considered as the major pests of cucumber, these are: the cotton and tomato white fly, *B. tabaci*, the cotton aphid, *A. gossypii*, the cotton and onion thrips, *T. tabaci*, the clover leaf fly, *L. bryoniae*, the cucurbitaceous fly, *Dacus ciliatus* (Loew) (Diptera: Tephritidae), and the two spotted spider mite, *T. urticae*. The rest were of minor importance, based on population density per plant, nature and extent of damage (Table,1).

Among the minor species, the seed eating bugs, *Graptostethus servus* (F.) (Hemiptera: Lygaeidae), the green bug, *Nezara viridula* Mill. (Homoptera: Pentatomidae), the cotton cicadell, *Empoasca lypica* De Berg Gean (Homoptera: Cicadellidae), the cotton mealybug, *Phenacoccus solenopsis* Tin. (Homoptera: Pseudococcidae), the spiny boll worm, *Earias insulana* (Boisd.), the greater cotton leafworm, *Spodoptera littoralis* (B.) (Lepidoptera: Noctuidae), Mallow bind weed butterfly, *Danaus chrysippus chrysippus* L., *Gegenesn ostromus* Fab. (Lepidoptera: Nymphalidae), the cabbage butterfly, *Artogeia paeleucosoma* (Schawerda) (Lepidoptera: Pieridae), *Hetera crisannuslosa* Walker (Orthoptera: Acrididae) the African stick grasshopper, *Pyrgomorph congota* Krauss (Orthoptera: Pyrgomorphidae). The surveyed and recorded predators during the study were: The predaceous mite, *Euseiuss cutalis* (A.-H.) (Acari: Phytoseiidae), Adonis ladybird, *Hippodamia (Adonia) variegata* (Goeze) (Coleoptera: Coccinellidae), the paper wasp, *Polistes gallica* L., the oriental hornet, *Vespa orientalis* F. (Hymenoptera: Vespidae). They were found to be of moderate populations. The parasitoid *Brachymeria aegyptiaca* Masi (Hymenoptera: Chalcididae) was found to be rare (Table, 1).

Table (1): Checklist of insects, mites, predators and visitors surveyed from cucumber plants, *Cucumis sativus* in Qaha, Qalubiya during 2015 and 2016 seasons.

Taxonomic position		Common name	Scientific name	Economic status	Stage	Frequency	Part of infested plant	Period of occurrence	
Order	Family								
(A) Insects									
Coleoptera	Coccinellidae	Adonis ladybird	<i>Hippodamia (Adonia) variegata</i> (Goeze)	Predator	Adult and nymph	Rare	Aphid	October and November	
Diptera	Agromyzidae	Clover leaf fly	<i>Liriomyza bryoniae</i> (Kaitenbach)	Pest	Larvae and adult	Abundant	Leaves	August and November	
	Chloropidae		<i>Eutropha triangularis</i> Becker	Visitor	Adult	Rare	Leaves	October	
	Muscidae	Hunter fly	<i>Coenosia attenuate</i> Stein	Visitor	Adult	Few	Leaves	October	
				<i>Helina confiformis</i> (Stein)	Pest	Adult	Rare	Flower	October and November
			Lesser house fly	<i>Fannia conicularis</i> (L.)	Visitor	Adult	Rare	Any part of plant	October
			Eyes fly	<i>Morellia albina</i> Wied.	Visitor	Adult	Rare	Leaves	October
		Phoridae	Laboratory fly	<i>Megaselia scalaris</i> (Loew)	Visitor	Adult	Rare	Fruits	October
	Tephritidae	Cucurbitaceous fly	<i>Dacus ciliatus</i> (Loew)	Pest	Adult and larvae	Moderate	Fruits	September and November	
Hemiptera	Aleyrodidae	Cotton and Tomato white fly	<i>Bemisia tabaci</i> (G.)	Pest	Eggs, Nymph and adults	Abundant	Leaves	August and November	
	Aphididae	Cotton aphid	<i>Aphis gossypii</i> Glover	Pest	Nymph and adults	Abundant	Leaves stems flower fruit	August and November	
	Cicadellidae	Cotton cicadell	<i>Empoasca lypica</i> De Berg Gean	Pest	Nymphs and Adults	Moderate	Leaves	September and November	
	Lygaeidae	Seed eating bugs	<i>Graptostethus servus</i> (F.)	Pest	Adult	Rare	Seeds	October	
	Pentatomidae	Green bug	<i>Nezara vridula</i> Mill.	Pest	Nymphs and Adults	Rare	All plant parts	September	
	Pseudococcidae	Cotton mealybug	<i>Phenacoccus solenopsis</i> Tin.	Pest	Nymphs and adults	Moderate	Leaves Flower stem	August and November	
Hymenoptera	Andrenidae	Solitarybee	<i>Andrena biskrensis</i>	Visitor (Pollinator)	Adults	Few	Flowers	September	

Table (1): Cont.

Taxonomic position		Common name	Scientific name	Economic status	Stage	Frequency	Part of infested plant	Period of occurrence
Order	Family							
(A) Insects								
	Apidae	Western honeybee	<i>Apis mellifera</i> L.	Visitor (Pollinator)	Adults	Few	Flowers	September
			<i>Lasioglossum (Ctenonomia) vagans</i> (Smith, 1857)	Pollinator	Adults	Few	Flowers	October
	Chalcididae		<i>Brachymeria aegyptiaca</i> Masi	Parasitoid	Adults	Rare	Pupa of <i>Euploca core</i>	October
	Formicidae	Ants	<i>Tapinoma erraticum</i> Latr.	Scavengers	Nymphs and adults	Moderate	Leaves	September and November
	Ichnemonidae	Parasitoid wasp	<i>Diadegma aranginator</i>	Parasitoid	Adults	Few	Flowers	October
	Vespidae	Paper wasp	<i>Polistes gallica</i> L.	Predator	Adults	Few	Insects	August
		Oriental hornet	<i>Vespa orientalis</i> F.	Predator	Adults	Few	Insects	August and October
Lepidoptera	Noctuidae	Spiny boll worm	<i>Earias insulana</i> (Boisd)	Pest	Larvae	Rare	Fruit	September
		Greater cotton leafworm	<i>Spodoptera littoralis</i> (B.)	Pest	Larvae	Few	Many parts of plant	August
	Nymphalidae	Mallow bind weed butterfly	<i>Danaus chrysippus chrysippus</i> L.	Pest	Larvae	Few	Leaves	October and November
			<i>Gegenes ostromus</i> Fab.	Pest	Adults	Rare	Leaves	October and November
	Pieridae	Cabbage Butterfly	<i>Artogeia rapae leucosoma</i> (Schawerda)	Pest	Adults	Few	Leaves	August
Orthoptera	Acrididae		<i>Heteracris annuslosa</i> Walker	Pest	Adults	Rare	Leaves	October and November
	Pyrgomorphidae	African stick grasshopper	<i>Pyrgomorph congata</i> Krauss	Pest	Adults	Rare	Leaves	October and November
Thysanoptera	Thripidae	Cotton and onion thrips	<i>Thrips tabaci</i> Lind.	Pest	Nymphs and adults	Moderate	Leaves stems	August and November

Table (1): Cont.

Taxonomic position		Common name	Scientific name	Economic status	Stage	Frequency	Part of infested plant	Period of occurrence
Order	Family							
(B) Mites								
Acarina	Phytoseiidae		<i>Euseius scutalis</i> (A. H.)	Predator	Nymph and adults	Moderate	Phytophagous mites and small insects	August and November
	Tetranychidae	Two spotted spider mite	<i>Tetranychus urticae</i> Koch	Pest	Nymph and adults	Moderate	Leaves	August and November
	Tydeidae		<i>Tydeus californicus</i> (Banks)	Mesolemus	Nymph	Moderate	Leaves	August and November

References

- Abdallah, E. S. E.; Metwally, S.A.G. and Mikhail, W. Z. A. (2019):** Susceptibility of certain cucumber hybrids (*Cucumis sativus* L.) through different planting dates for main pest infestation under field conditions. Biosciences Biotechnology Research Asia, 16(4): 811-815.
- Abdel-Rahman, M. A. A.; Ali, M. M. A.; Awad, A. M. A.; Shafea, A.M.H. and Abdel-Rahem, G.H. (2016):** Co-Existence of pests and their associated predators inhabiting cantaloupe plants, *Cucumis melo* L. in Assiut, Egypt. Assiut University bulletin for environmental researches, 19 (2):1-9.
- Adetula, O. and Denton, L. (2003):** Performance of vegetative and yield accessions of cucumber (*Cucumis sativus* L.) Horticultural Society of Nigeria (HORTSON) Proceedings of 21st Annual Conference, 10-13.
- Adly, D. (2016):** Use of predators for controlling the whitefly, *Bemisia tabaci* Genn. and the two spotted spider mite, *Tetranychus urticae* Koch., in cucumber greenhouses in Egypt. Egyptian Journal of Biological Pest Control, 26(4):701-706.
- Chaven, V.M.; Bhosle, A.B. and Chandrashekar, K. (2015):** Status of thrips as vectors of viruses infesting important vegetable crops in Maharashtra. Journal of Insect Science (Ludhiana), 28 (2): 159-167.
- Hassan, M.F.; Ali, F.S.; Hussein, A.M. and Mahgoub, M.H. (2008):** Biological and chemical control of three plant piercing-sucking insect pests on cucumber in plastic houses. Egyptian Journal of Biological Pest Control, 18(1):167-170.
- Ibrahim, I. L.; Abdel-Ghaffar, M. M.; Abdel-Fatah, O. A. and Khttab, H. M. (2017):** Effects of certain environmental factors on population fluctuations of *Aphis gossypii* in cucumber fields at Assiut Governorate. Annals of Agric. Sci., Moshtohor, 55(3): 657–664.
- Okonmah, L. U. (2011):** Effects of different types of staking and their cost effectiveness on the growth, yield and yield components of cucumber (*Cumumis sativus* L.). Int. J. of Agric. Sci., 1 (5): 290- 295.
- Saleh, A. A. A.; El-Sharkawy, H. M.; El-Santel, F. S. and Abd El-Salam, R. A. (2017):** Seasonal abundance of certain piercing sucking pest on cucumber plants in Egypt. Egypt. Acad. J. Biolog. Sci., 10 (7): 65–79.
- Shaheen, A. H.; Samhan, M. and Elezz, A. A. (1973):** Cucurbit pest sat Komombo. Agricultural Research Review, 51(1): 97-101.