Survey of Abundant Aphid Species on Common Economic Crops and Wild Plants in North Sinai Governorate, Egypt

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Abstract: A survey of the most abundant aphid species (Homoptera: Aphididae) found on 42 common economic crops and wild plants in the region of El-Arish and surrounding districts was conducted in North Sinai, Egypt in 2005-07. 21 aphid species identified as; *Brachycaudus (Appelia) schwartzi* Borner, *Pterochloroides persicae* Chol., *Aphis gossypii* Glov., *Aphis fabae* Scop., *Aphis punicae* Pass., *Aphis citricola* Good, *Acyrthosiphon pisum* Harris, *Hyalopterus pruni* Geoffroy, *Aphis craccivora* Koch. *Aphis nerii* Boyer, *Brevicoryne brassicae* L., *Eriosoma lanigerum* Hausman, *Myzus persicae* Sulzer, *Rhopalosiphum maidis* Fitch, *Rhopalosiphum padi* L., *Diuraphis noxia* Mord., *Therioaphis trifolii* Monell, *Sitobion avenae* Fabricius, *Schizaphis graminum* Rondani, *Hyperomyzus lactucae L.* and *Brachycaudus amygdalinus* Sch. were found attacking common economic crops and/or wild plants in the region.

Keywords: Survey, Aphid species, Economic crops, Wild plants, North Sinai, Egypt.

INTRODUCTION

Great attention has been given to increase the horizontal cultivated area in Egypt, particularly in certain Governorates such as North Sinai by adding new lands, and at the same time; conservation of the biodiversity in the old and new areas as a major objective. Therefore, attention has been directed towards the studies of the fauna and the flora of Sinia region.

All cultivations; either economic crops and/or wild plants are subjected to attack by several pests. Aphids (Homoptera: Aphididae) are among the most important economic insect pests. Aphids are familiar to most people as dense colonies, mostly of green or black soft bodied insects attacking cultivated plants. They are widespread in temperate and to a lesser degree tropical regions and attack a wide range of plants, including herbs, trees and even some mosses. Although many species form dense colonies on the aerial parts of plants, others attack roots. Nearly all species reproduce parthenogenetically (Dixon, 1998).

Damage caused by aphids happens directly from sucking plant sap or indirectly by transmitting some virus diseases to their host plants. Aphids are one of the insect groups of which economic importance increases with the development of agriculture and they have a wide range of hosts in agro-ecosystems (Stary, 1976). Few studies have been carried out on the aphids' fauna in North Sinai (Ismail *et al.*, 1991; Attia and El-Hamaky 1992 and Abdel-Salam, Shahinaz 1999 and 2001).

The present study aimed to survey the most abundant aphid species found on common economic crops and wild plants in the region of El-Arish and surrounding districts.

MATERIALS AND METHODS

Field survey of the aphid species which attack most common economic crops and wild plants, at four localities in North Sinai Governorate; Bir El-Abd, El-Arish, El-Sheikh Zwied and Rafah for the successive two years; February 2005 to January 2007 was carried out biweekly. Wild and grass host plants found infested with aphids were identified by the specialists of the Plant Production Dept., Faculty of Environmental Agricultural Sciences, Suez Canal University, El-Arish.

Aphid samples were collected biweekly as follows; from the fruit trees, three infested leaves /tree (representing the three tree's height levels) from five trees per each of the different working sites allover the study period. From the field, vegetable, medicinal, ornamental crops and wild plants, 15 infested leaves (representing the three plant heights; terminal, medium and lower leaves) from 5 plants per crop / site allover the two seasons. Collected data included host plant(s), date of occurrence, locations, infested plant part(s) and abundance rate.

Collected samples were kept in paper bags and transferred to the laboratory for inspection. Specimens were first classified according to the keys of Habib and El-Kady (1961) and then mounted in Swan's medium on glass slides for identification. Identification was made by the Insect Survey and Classification Department, Plant Protection Research Institute, Agricultural Research Center, Giza, Egypt.

RESULTS AND DISCUSSION

The survey included 42 crops and wild plants; 11 fruit crops, namely Orange (*Citrus simensis*), Mandarin (*C. reticulates*), Limon (*C. aurantifolia*), Peach (*Prunus persicae*), Almond (*P. amygdalinus*), Apple (*Pyrus malus*), Apricot (*P. armeniacae*), Pear (*P. communis*), Plum (*P. cerasipersa*), Guava (*Psidium guava*) and Pomegranate (*Punica granatum*), 10 vegetable crops, namely Cantaloupe (*Cucumis cantaloupinis*), Cucumber (*Cucumis sativus*), Watermelon (*Citriullus vulgaris*), Cowpea (*Dolichos sesquipedalis*), Eggplant (*Solanum melongena*), Pepper (*Capsicum annum*), Cabbage (*Brassica oleracea* var. *capitata*), Cauliflower (*B. oleracea*), Jew's mallow (*Corchorus olitoius*) and Okra (*Albelmoschas esculentus*), 6 field crops, namely Wheat (*Triticum vulgar*), Barley (*Hordeum vulgar*), Maize

(*Zea mays*), Faba bean (*Vicia faba*), Lentil (*Lens esculenta*) and Lucerne (*Medicago sativa*), 2 ornamental plants, namely Duranta (*Duranta plumieri*) and Oleander (*Nerium oleander*), one medicinal plant, Common Fennel (*Foeniculum vulgare*), and 12 wild and grass plants, namely black night shade (*Solanum nigrum*), Purslane (*Portulaca oleracea*), Bur clover (*Medicago hispida*), Hamo (*Cascuta* spp.), Wild oats (*Avena fatua*), Beread grass (*Polypogon monspeliensis*), Sow thistle (*Sonchus oleraceus*), Chees weed (*Mulva parviflora*), Sour clover (*Melilotus indicus*), Common reed (*Phragmitis communistrin*), Lamps guarter (*Chenopodium* spp.) and Daddish weed (*Diplotaxi* spp.). The survey of most abundant aphid species found on the abovementioned host plant species in the region of El-Arish, North Sinia Governorate and its surrounding districts revealed the presence of 21 aphid species. Obtained data including; occurrence periods, locations, most infested plant parts and abundance rates for each of the surveyed aphid species are summarized in table (1).

Table (1): Survey of abundant aphid species infesting common economic crops and wild plants in North Sinai Governorate during 2005-07 years.

No	Common name	Scientific name	Host plant	Occurrence Period	Localities	Infested Plant part	Abundance rate
1	Peach aphid	*Brachycaudus (Appelia) schwartzi* Borner	Peach	Allover the year	Rafah, Elsheikh Zewaid, El-Arish & Ber El-Abed	Leaves	+++
			Occasionally Almond	June			
2	Brown bark aphid	*Pterochloroides persicae* Chol.	Peach, Almond, Apricot & Plum	Feb. – Oct.	Rafah, Elsheikh Zewaid, El-Arish & Ber El-Abed	Stems & branches	+++
3	Cotton aphid	*Aphis gossypii* Glover	Cantaloupe	Mar. -May and June - Aug.	Rafah, Elsheikh Zewaid, El-Arish & Ber El-Abed	Leaves	+++
			Cucumber, Water melon, Cucurbit, Okra & Marrow	Mar. - May			
			Eggplant	July – Oct.			
			Pepper	Dec.- Mar. and July-Sept.			
			Maize	July - Aug.			
			Orange, Mandarin, Apple & Pear	Feb. - June			
			Lime	Mar. - May			
			Guava	Mar. - Nov.			
			Garden Purslane	Apr. - June			
			Chees weed	Mar. - June			
			Black- night shade	Feb. - July			
			Lampsquarter	Mar. - June			
			Jew's- mallow	Apr. - July			
4	Faba been aphid	*Aphis fabae* Scop.	Black- night shade	Allover the year	El-Arish & Elsheikh Zewaid	Leaves & Stems	+++
			Common fennel plants	Feb. – June			
			Hibiscus plants	Mar. - June			
5	Pomegranate aphid	*Aphis punicae* Pass	Duranta	Allover the year	Rafah El-Arish & Ber El- bed	Leaves	++
			Pomegranate	Feb. - Sept.			
			Reeds plants	Allover the year			

+++ Abundant ++ Occasional + Scarce

Table (1) *Continued*: Survey of abundant aphid species infesting common economic crops and wild plants in North Sinai Governorate during 2005-07 years

No	Common name	Scientific name	Host plant	Occurrence Period	Localities	Infested Plant part	Abundance rate
6	Green citrus aphid	*Aphis citricola* v. d. Good	Nobile orange	Feb. - Oct.	Rafah & El-Arish	Leaves	+++
			Baladi orange, Mandarin, Lemon, Pear & Apple	Feb. - June			
			Garden Pea and Bean	Mar. - May			
			Sour clover	Feb. - Apr.			
7	Pea aphid	*Acyrthosiphon pisum* Harris	Garden Pea and Bean	Mar. – May	Rafah & El-Arish	Leaves	+
			Sour clover	Feb. – Apr.			
8	Mealy plum aphid	*Hyalopterus pruni* Geoffroy	Peach & Apricot	Feb. - Sept.	Rafah & El-Arish	Leaves	+
			Reeds plants	Allover the year			
9	Cowpea aphid	*Aphis craccivora* Koch.	Broad bean & Lentil	Dec. – Apr.	Rafah, Elsheikh Zewaid, El-Arish	Leaves	+++
			Cowpea	May – Aug.			
			Bur clover	Dec. – Mar.			
			Purslane	Nov. – Feb.			
			Sour clover	Nov. – Mar.			
10	Oleander aphid	*Aphis nerii* Boyer	Oleander	Nov. – June	Rafah, Elsheikh Zewaid, El-Arish & Ber El-Abed	Leaves	++
			Bind weed	Mar. – May & July - Oct.			
11	Cabbage aphid	*Brevicoryne brassicae* L.	Cabbage & Cauliflower	Nov. - Apr.	Rafah, Elsheikh Zewaid, El-Arish & Ber El-Abed	Leaves	+++
			Turnip & Radish	Feb. – Apr.			
			Radish weed	Mar. - June			
12	Woolly apple aphid	*Eriosoma lanigerum* Hausman	Apple	Feb. – Nov.	Rafah	Stems & branches	+++
13	Green peach aphid	*Myzus persicae* Sulz.	Cabbage, Cauliflower & Pepper	Jan. – Mar.	Rafah, Elsheikh Zewaid & El-Arish	Leaves	++
			Sow thistle	Apr. - June			
14	Corn leaf aphid	*Rhopalosiphum maidis* Fitch	Wheat & Barley	Mar. – Apr.	Rafah, Elsheikh Zewaid & El-Arish	Leaves & tassels	++

+++ Abundant ++ Occasional + Scarce

As shown in table (1), 21 aphid species were recorded infesting 6 field crops, 10 vegetable crops, 11 fruit trees and 15 wild / or thistle plants. Some of the surveyed host plants such as; peach, almond, orange, pear, apple, wheat, barely, maize, cabbage, cauliflower, pepper, black night shade, common reed and sow thistle received more than one species of the aphids while the others were attacked by only one species. Leaves were the highly infested plant part that received aphids' attack. Aphid species were found all the year around; either on the primary hosts or on the secondary ones. Some aphid species were found over-wintered by migrating from and to the grasses and wild plants as secondary or temporary shelter hosts spending certain periods during the year (Semeada *et al.*, 2004), particularly when their main hosts were absent, while some others were confined to their primary hosts throughout the year such as; *B. schwartzi, A. punicae, A.*

fabae, *H. pruni* and *T. trifolii*. Populations of the aphid species were always much higher on the primary hosts than on the secondary ones. 8 species were found in a relatively high abundance (Table 1). Obtained data are in agreement with the findings of Hall (1927), Ismail *et al.* (1991), Attia and El-Hamaky (1992), Abdel-Salam, Shahinaz (1999 and 2001) and Semeada *et al.* (2004) where most of the aphid species recorded in the present study have been reported before by these authors in Egypt as well in many parts of the world.

Further studies on the migration pattern of the aphids' species from and to the host plants as well on their natural enemies should be carried out in the region for controlling the pest on the economic crops as well for conserving the biodiversity in the region.

Table (1): *Continued*: Survey of abundant aphid species infesting common economic crops and wild plants in North Sinai Governorate during 2005-07 years

No	Common name	Scientific name	Host plant	Occurrence Period	Localities	Infested Plant part	Abundance rate
15	Oat aphid	*Rhopalosiphum padi* (L).	Wheat & Barley	Jan. –May	Rafah & El-Arish	Leaves & tassels	++
			Maize	June – Oct			
			Beard grass and wild oats	May - June			
16	Russian wheat aphid	*Diuraphis noxia* Mord.	Wheat & Barley	Mar. – Apr.	Rafah, Elsheikh Zewaid & El-Arish	Leaves	+
17	Spotted alfalfa aphid	*Therioaphis trifolii* Monell	Lucerne	Allover the year	Rafah, Elsheikh Zewaid & El-Arish	Leaves	+
			Hamoul	Apr. - June			
18	English grain aphid	*Sitobion avenae* Fabricius	Wheat & Barley	Mar. - May	Rafah, Elsheikh Zewaid, El-Arish & Ber El-Abed	Leaves	+
19	Green bug	*Schizaphis graminum* Rondani	Wheat & Barley	Dec. – Feb.	Rafah, Elsheikh Zewaid, El-Arish & Ber El-Abed	Leaves & tassels	+
20	Sow thistle aphid	*Hyperomyzus lactucae*	Sow thistle	Mar. - June	Rafah & El-Arish	Leaves, stalks & branches	++
21		*Brachycaudus amygdalinus*	Almond & Peach	Apr. - June	Rafah & El-Arish	Leaves & tassels	++

+++ Abundant ++ Occasional + Scarce

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