Aphids of ornamental plants and winter vegetables and their aphidiine parasitoids (Hymenoptera: Braconidae) in Aligarh region, Uttar Pradesh

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India has tremendous scope for the earning of foreign exchange by exporting ornamental plants and cut flowers round the year. The production of Roses, Carnations, Chrysanthemums and Gladioli at a very cheaper rate is possible in our country but still cannot compete with other nations (Holland and China) due to lack of proper transportation facility at required time. At present the floriculture in the country is not only meeting the domestic requirements, but its export has gone up to ₹78 (Indian National Rupees) crores (1 crore = 10 million) in 1998 and only from Roses ₹75.17 crores (Atwal & Dhaliwal 2002).

On the other hand, vegetables provide adequate quantities of vitamins, proteins, carbohydrates and minerals. The existing area under vegetable cultivation in India is around 7.98 million hectare with a production of about 129.08 million metric tones. In terms of production, India is second only to China (Johnson et al. 2008; Indiastat 2010).

Both the vegetable crops and ornamental plants are heavily attacked by aphids. Aphid parasitoids (Aphidiine) are very important control agents for aphid pests in a variety of agricultural and horticultural crops (Hagvar & Hofsvang 1991). Aphidiines are specific solitary endophagus parasitoids of Aphids (Stary 1970; Stary & Ghosh 1983). In the present study an attempt was made to parasitoids complex of aphids associated with winter vegetables and ornamental plants in Aligarh.

Material and Methods: The collections of host insects were made during the period from October to March, 2005-06 in Aligarh, Uttar Pradesh. Small twigs of host plants, infested with colonies of aphids, were brought to the laboratory and their cut ends were placed in water to prevent quick withering of the leaves. During the collection, every care was taken to avoid the mixing of different species. As soon as the parasitized aphids were mummified, they were separated in different tubes covered with muslin cloth. A slip was fixed to each tube indicating serial number, host, date and place of collection. Some healthy aphids were preserved in 80% alcohol with few drops of glycerin for the proper identification of host species. The tubes were examined daily in the morning for the emerged parasitoids. After emergence parasitoids were transferred to separate tubes. Later on, the parasitoids were killed by the vapours of ethyl acetate. The dead parasitoids were collected by means of a brush kept in 80% alcohol. Some specimens were mounted on triangular cards for proper identification.

Results and Discussion: The present study is confined to the aphidiine parasitoids complex of aphids associated with winter vegetables and ornamental plants in Aligarh. Fourteen different winter vegetables and 13 ornamental plants were found in this region (Table 1). There are 14 species of aphids found to be attacked on all these species of plants, out of these only *Pentalonia nigronervosa* is found as monophagus species while other are polyphagus. Among them *Aphis craccivora, A. corrianderi, A. gossipii, Acrythosiphon pisi, Bravicoryne brassicae, Lipaphis erysimi, Myzus persicae, Pentalonia nigronervosa,* were observed as a regular pests of 12 plant species (Table 1), while *Aphis gossipii, A. fabae, M. persicae*, were also serious pest of four plant species though sporadic nature (Table 1). *Macrosiphoniella sanborni, Hydaphis corriandri, Pentalonia nigronervosa, Lipaphis erysimi, Acrythosiphone pisi, Macrosiphum rosaeformes,* were regular pests of six plant species. *Aphis craccivora, Uroleucon compositae, Aphis fabae, Aphis spiraecola, Aphis gossypii, Rhopalosiphum nymphae* were observed as sporadic pests of seven plant species (Table 1).

Seven species of aphidiine parasitoids viz., *Aphidius colemani* Viereck, *Aphidius smithi* Subba Rao & Sharma,

Date of publication (online): 26 August 2010
Date of publication (print): 26 August 2010
ISSN 0974-7907 (online) | 0974-7893 (print)

Editor: R.K. Avasthi

Manuscript details:
Ms # o2399
Received 06 February 2010
Finally accepted 07 July 2010

Citation: Rafi, U., M.K. Usmani & M.S. Akhtar (2010). Aphids of ornamental plants and winter vegetables and their aphidiine parasitoids (Hymenoptera: Braconidae) in Aligarh region, Uttar Pradesh. *Journal of Threatened Taxa* 2(9): 1162-1164.

Acknowledgements: The authors are greatly thankful to Prof. Asif Ali Khan, Chairman, Department of Zoology, Aligarh Muslim University, Aligarh for providing necessary facilities through out study. Thanks are also due to Prof. Shujauddin for his guidance and Mrs. Asna Ghani for her help during course of study.

Table 1. Incidence of aphids in Aligarh

	Plants	Aphids	Aphidiine parasitoids	Intensity of aphids	Incidence of aphids
Ornamental plants					
1.	*Argimon* sp.	*Aphis crccivora* Koch	*Lipolexis oregmae* (Gahan) *L. gracilis* Foerster	*	Sporadic
2.	*Bougainvillea* sp.	*Aphis craccivora* Koch	*Lipolexis oregmae* (Gahan) *L. grecilis* Foerster	*	Sporadic
3.	Calendula	*Uroleucon compositae* Theob	Nil	*	Sporadic
4.	*Castrum nocturnum*	*Aphis fabae solanella* Theob	*Binodoxys indicus* (Subba Rao & Sharma)	*	Sporadic
5.	*Chrysanthemum* sp.	*Macrosiphoniella sanborni* (Gillette)	Nil	***	Regular
6.	Coriander	*Hyadaphis coriandri* Das	Nil	**	Regular
7.	Cosmos	*Aphis spiraecola* Patch	Nil	*	Sporadic
8.	*Hibiscus rosa-sinensis*	*Aphis gossypii* Glover	*B. indicus* (Subba Rao & Sharma)	*	Sporadic
9.	Ornamental Banana	*Pentalonia nigronervosa* Cock.	Nil	***	Regular
10.	Ornamental Cabbage & Kale	*Lipaphis erysimi* (Kalt.)	*Diaeretiella rapae* (M'Intosh)	***	Regular
11.	*Lathyrus odoratus*	*Acrythosiphon pisi* (Kalt.)	*Aphidius smithi* Subba Rao & Sharma	**	Regular
12.	Rose	*Macrosiphum roseiformis* Das	Nil	***	Regular
13.	Verbena	*Rhopalosiphum nymphae* (Linn.)	Nil	*	Sporadic
Winter Vegetables					
14.	Brinjal	*Myzus persicae* (Schulz)	*Aphidius colemani* Viereck	*	Sporadic
		Aphis gossypii Glover	*B. indicus* (Subba Rao & Sharma)	*	Regular
15.	Beans	*Aphis crccivora* Koch	*L. oregmae* (Gahan)	**	Regular
16.	Banana	*Pentalonia nigronervosa* Cock.	Nil	**	Regular
17.	Bathua (*Chenopodium* sp.)	*Aphis fabae* Theobalt	*L. oregmae* (Gahan)	*	Sporadic
		A. gossypii Glover	*B. indicus* (Subba Rao & Sharma)	*	Sporadic
18.	Cauliflower	*Lipaphis erysimi* (Kalt.)	*D. rapae* (M'Intosh)	***	Regular
19.	Cabbage	*L. erysimi* (Kalt.)	*D. rapae* (M'Intosh)	***	Regular
20.	Mustard	*L. erysimi* (Kalt.)	*D. rapae* (M'Intosh)	***	Regular
			L. gracilis Foerster		
21.	Potato	*M. persicae* (Schulz)	*L. oregmae* (Gahan)	***	Regular
22.	Pea	*Acrythosiphon pisi* Kalt.	*Aphidius smithi* Subba Rao & Sharma	**	Regular
23.	Papaya	*M. persicae* (Schulz)	*Lysaphidus qadrii* Shuja-Uddin	*	Sporadic
		A. gossypii Glover	*B. indicus* (Subba Rao & Sharma)	*	Sporadic
24.	Saunf	*Hyadaphis corrianderi* Koch.	*L. gracilis* Foerster	**	Regular
25.	Raddish	*L. erysimi* (Kalt.)	*D. rapae* (M'Intosh)	***	Regular
		Brevicoryne brassicae L.	*D. rapae* (M'Intosh)	**	Regular
26.	Tomato	*M. persicae* (Schulz)	*L. qadrii* Shuja-Uddin	**	Regular
			A. colemani Viereck		
		A. gossypii Glover	*B. indicus* (Subba Rao & Sharma)	*	Sporadic
27.	Turnip	*L. erysimi* (Kalt.)	*D. rapae* (M'Intosh)	***	Regular
		B. brassicae L.	*D. rapae* (M'Intosh)	**	Regular

Binodoxys indicus (Subba Rao & Sharma), *Diaeretiella rapae* (M'Intosh), *Lipolexis gracilis* Foerster, *Lipolexis oregmae* (Gahan), *Lysaphidus qadrii* Shujauddin were found parasitizing nine aphid species (Table 1).

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