

## SHORT COMMUNICATION

## Host Range and Diversity of Syrphid Predators (Insecta: Diptera) of aphids on Vegetable Crops of Kashmir, with New Host Aphid/ Plant Records

DEEN MOHD BHAT<sup>1</sup> AND R. C. BHAGAT<sup>2</sup><sup>1</sup>Department of Zoology, Govt. Degree College Ganderbal, Jammu & Kashmir<sup>2</sup>Department of Zoology, University of Kashmir, Hazratbal Srinagar, Jammu & Kashmiremail: bhatdm2014@gmail.com<sup>1</sup> ; bhagatrc@yahoo.com<sup>2</sup>

## ABSTRACT

An extensive periodical survey on biodiversity of Syrphid (Insecta: Diptera) predators of aphid pests (Insecta: Homoptera) on vegetable crops was conducted for a period of two consecutive years (2013–2014). The present survey revealed the occurrence of 10 species of Syrphid fly predators preying on 7 species of aphids on various vegetable crops across 5 districts of the Valley. Apart from this, an up to date catalogue-cum- checklist of Syrphid predators of aphids in respect of vegetable crop ecosystems of Kashmir has been incorporated in this work. The

checklist reveals that a total of 11 species of Syrphid flies preyed upon 7 species of aphids on 15 species of plants, distributed over 6 families in vegetable ecosystem of Kashmir. A total of 37 different host/prey aphid-predator couples in vegetable ecosystems are being recorded for the first time from Kashmir. Apart from this, 2 new predator-aphid prey couples on vegetable crops are recorded for the first time from Kashmir region

**Key words** *Aphids, Syrphid predators, vegetable, Kashmir*

Table 1. A catalogue of Syrphid predators of aphids on vegetable crops of Kashmir

S. No	Insect Predator (Diptera: Syrphidae)	Aphid prey	Host-plant species	Author/s reporting & New host aphid plant record (=NR)	Period of activity/ month	District
1	<i>Episyrphus balteatus</i>	<i>Cavariella aegopodii</i>	<i>Daucus carota</i> (G)	NR	July-Aug	2, 3
		<i>Brevicoryne brassicae</i>	<i>Brassica oleracea</i>	Ahmad & Bhat, 1986 Bhagat & Matta, 2002	NG NG	NG NG
			<i>Brassica oleracea</i> var. <i>gongylodes</i> (B)	NR	June-August	1, 2, 3, 5
			<i>Brassica oleracea</i> var. <i>acephala</i> (B)	NR	June-August	2, 3, 4, 5
			<i>B. o.</i> var. <i>botrytis</i> (B)	NR	June-August	2, 5
			<i>B. o.</i> var. <i>capitata</i> (B)	NR	June-August	2
			<i>B. o.</i> var. <i>kashmiriana</i> (B)	NR	June-August	5
	<i>Acyrtosiphon pisum</i>	<i>Pisum sativum</i> (D)	<i>Pisum sativum</i> (D)	Ahmad & Bhat, 1986 PA	NG May-June	S 2, 5
	<i>Aphis gossypii</i>	<i>Solanum melongena</i> (F)	<i>Cucumis sativus</i> (C)	NR	July-August July-Sep	2, 3, 5 2, 5
			<i>Cucurbita maxima</i> (C)	NR	July-Sep	1, 2, 5
			<i>Capsicum annuum</i> (F)	NR	June-July	2, 5
			<i>Lagenaria siceraria</i> (C)	NR	July-Sep	1, 2, 4, 5
			<i>Solanum tuberosum</i> (F)	NR	May-June	2
	<i>Lipaphis erysimi</i>	<i>B. campestris</i> (B)		Bhagat & Matta, 2002 PA	NG May-June	NG 2, 4
	* <i>Myzus persicae</i>	<i>Solanum lycopersicum</i> = <i>Lycopersicon esculentum</i> (F)		NR	July-August	1, 3, 5
			<i>Cucurbita maxima</i> (C)	NR	June-Sep	1, 2, 5
			<i>S. tuberosum</i> (F)	NR	May-June	1, 5
			<i>Capsicum annuum</i> (F)	NR	June-July	5

S. No.	Insect Predator (Diptera: Syrphidae)	Aphid prey	Host-plant species	Author/s reporting & New host aphid plant record (=NR)	Period of activity/ month	District
2	<i>Eupeodes (Macrosyrphus) confrater</i>	<i>Aphis craccivora</i>	<i>Rumex acetosella</i> (E)	NR	May-June	2
			<i>Solanum lycopersicum</i> (= <i>Lycopersicon esculentum</i> ) (F)	NR	June-Aug	1, 2, 3
			<i>Phaseolus vulgaris</i> (D)	NR	May-Aug	3
3	<i>Sphaerophoria scripta</i>	<i>Aphis craccivora</i>	<i>Rumex acetosella</i> (E)	NR	May-June	2, 3, 5
			<i>Solanum lycopersicum</i> (= <i>Lycopersicon esculentum</i> ) (F)	NR	June-Aug	5
			<i>Phaseolus vulgaris</i> (D)	NR	May-Aug	5
		<i>Brevicoryne brassicae</i>	<i>Solanum tuberosum</i> (F)	NR	May-June	1, 2
			<i>Brassica oleracea</i> var. <i>gongylodes</i> (B)	NR	June-August	5
			<i>Brassica</i> sp.	Ahmad & Bhat, 1986	NG	5
			<i>Brassica oleracea</i> var. <i>acephala</i> (B)	NR	June-August	1, 2, 4
		<i>Lipaphis erysimi</i>	<i>B. o. var. botrytis</i> (B)	NR	June-August	1, 2, 4, 5
			* <i>Brassica napus</i> (B)	NR	April-May	2, 3, 4, 5
			<i>Brassica campestris</i> (B)	PA	May	1, 5
4	<i>Melanostoma univittatum</i>	<i>Acyrtosiphon pisum</i>	<i>Pisum sativum</i> (D)	Ahmad & Bhat, 1986	NG	5
			<i>Pisum sativum</i> (D)	PA	May-June	2
		<i>Aphis craccivora</i>	<i>Phaseolus vulgaris</i> (D)	NR	May-Aug	3, 5
			<i>Rumex nepalensis</i> (E)	NR	May-June	3
		<i>Lipaphis erysimi</i>	<i>B. campestris</i> (B)	Ahmad & Bhat, 1986	NG	NG
				PA	April-May	1, 5
		5	<i>Ischiodon scutellaris</i>	<i>Aphis craccivora</i>	<i>Rumex acetosella</i> (E)	NR
<i>Lipaphis erysimi</i>	<i>B. campestris</i>			NR		
6	<i>Metasyrphus corolae</i>	<i>Lipaphis erysimi</i>	<i>Brassica napus</i> (B)	NR	April-May	1, 2, 3, 4
			<i>B. campestris</i> (B)	NR	April-May	1, 2, 5
7	<i>Metasyrphus confrator</i>	* <i>Lipaphis erysimi</i>	<i>B. campestris</i> (B)	NR	April-May	2, 5
8	<i>Paragus tibialis</i>	<i>Aphis craccivora</i>	<i>Phaseolus vulgaris</i> (D)	NR	May-Aug	5
9	<i>Paragus seratus</i>	<i>Lipaphis erysimi</i>	<i>B. campestris</i> (B)	NR	May	2
10	<i>Betasyrphus serarius</i>	<i>Lipaphis erysimi</i>	<i>B. campestris</i> (B)	NR	May	4
11	<i>Syrphus</i> sp.	<i>L. erysimi</i>	<i>B. campestris</i> (B)	Bhagat & Lone, 1984	NG	NG

Keys to the table. 1: 1= Bandipora, 2= Badgam, 3=Ganderbal, 4=Pulwama, 5=Srinagar; B= Brassicaceae, C= Cucurbitaceae, D=Fabaceae, E= Polygonaceae, F= Solanaceae, G= Apiaceae ; \*= new predator-aphid prey couples; NR= New host aphid plant record; PA= Present author/s'; NG= not given

The aphids or 'plant lice' (Homoptera: Aphididae) are an important group of plant insect pests having a high biological potential. They are found to inflict direct (sucking)

and indirect (transmission of viruses and honeydew secretion) damage to different types of vegetation including cultivated and wild grown vegetable crops in Kashmir

**Table 2. No. of different Syrphid species preying on different aphid species infesting number of vegetable plant species belonging to different families in Kashmir**

S. No.	Prey Aphid species	No. of species of Syrphid predators	No. of host plant species	Name of plant family
1	<i>Acyrtosiphon pisum</i>	1	1	Fabaceae
2	<i>Aphis craccivora</i>	5	4	Polygonaceae Fabaceae Solanaceae
3	<i>Aphis gossypii</i>	1	6	Cucurbitaceae Solanaceae
4	<i>Brevicoryne brassicae</i>	2	1	Brassicaceae
5	<i>Cavariella aegopodii</i>	1	1	Apiaceae
6	<i>Lipaphis erysimi</i>	9	2	Brassicaceae
7	<i>Myzus persicae</i>	1	4	Cucurbitaceae Solanaceae

(Bhagat, 1986 & 2012 and Bhat *et al.*, 2011). The control measures of aphids are diverse incorporating both chemical and biological methods. In recent years, biological control of aphids by utilizing natural enemies-parasites and predatory insects, has shown promising results in different parts of the world. In Kashmir, there are diverse insect natural enemies (parasites and predators) of aphids in various agro-ecosystems, belong to various insect orders and families. However, there are only a very few earlier reports of Syrphid predators (Insecta: Syrphidae) of aphid pests on vegetable crop in Kashmir Valley (Ahmad & Bhat, 1986 & Bhagat & Matta, 2002). The aim of this study was to investigate, identify and document biodiversity of aphidophagous Syrphid predators of different noxious aphids in vegetable ecosystems of the Valley.

An extensive and detailed survey was carried out in the 5 districts of Kashmir (India) *viz.*, Ganderbal, Srinagar, Budgam, Bandipora, and Pulwama during the years, 2013 to 2014. In total, 5 study sites were selected for sampling purpose, one from each district, primarily in vegetable cultivated areas and localities. These sites included Danderkhah Batamao (Srinagar), Nunar (Ganderbal), Bugam (Badgam), Neva (Pulwama) and Zazuna shadipora (Bandipora). The vegetable Crops/ plants were searched by direct inspection for aphids and their Syrphid predator larvae. The young aphid colonies and their Syrphid predator larvae were collected from the undersides of young leaves/ flower buds/ flower heads/ and along green stems. The collected samples were reared in the laboratory till the emergence of aphid and their Syrphid predatory flies.

The periodical survey conducted during this investigation revealed the occurrence of 10 species of Syrphid flies preying on 7 species of aphids on various vegetable crops across 5 districts of the valley (table 1 & 2). This work also presents an up to date catalogue-cum-

checklist (table 1 & 2) of Syrphid predators of aphids in respect of vegetable crop ecosystems of Kashmir. The perusal of data presented in the catalogue-cum-checklist shows that a total of 11 species of Syrphid flies (Insecta: Diptera) prey upon 7 species of aphids on 15 species of plants, distributed over 6 families in vegetable ecosystem of Kashmir. A total of 37 different host/prey aphid-predator couples in vegetable ecosystems are being recorded for the first time from Kashmir. With the new host record of predators, a total of 45 different aphid host/ predator species couples in vegetable ecosystems are recognized from Kashmir. Apart from this, 2 new predator-aphid prey couples on vegetable crops are recorded for the first time from Kashmir region.

#### LITERATURE CITED

- Ahmad, D. and Bhat, M. R. 1986. Distribution and host range of some aphidophagous Syrphid flies in Kashmir. *Geobios New Reports*, 5:165-166
- Bhagat, R.C. 1986. On aphid pests and their aphidoid parasitoids of agricultural importance. *Indian Agriculturist*, 30 (3):229-235
- Bhagat, R. C. 2012. Aphids (Insecta) of agricultural importance in J&K state, India: a checklist and biodiversity. *International Journal of Food, Agriculture and Veterinary Sciences*, 2 (3) : 116-125
- Bhagat, R. C. & Lone, M. A. (1984); New records and host range of predators of predates of aphids (Aphididae: Homoptera) in Kashmir valley India. *Science and Culture*, 50: 364-366.
- Bhagat, R. C. & Matta, T.A. 2002. Host range and diversity of aphidophagous insect (predators) of Kashmir Himalaya, with new host aphid/plant records, pp. (269-282). *In*: Khan, M. A. (Ed.). Environment Biodiversity and Conservation. A. P.H. Publishing corporation New Delhi
- Bhat, D. M., Bhagat, R. C. & Qureshi, A. 2011. A survey of insect pests damaging vegetable crops in Kashmir valley (India), with some new records. *Journal of Entomological Research*, 35 (1): 85-91