



POPULATION DYNAMICS OF MAJOR INSECT PESTS OF COMMON BEAN IN KASHMIR VALLEY

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ABSTRACT

This study is on the bean aphid *Aphis fabae* Scopoli, whitefly *Bemisia tabaci* (Genn.), bean weevil *Conapium* sp. indet., flea beetle *Altica himensis* Shukla which are found associated as pests at different phenological stages of the common bean *Phaseolus vulgaris* L. Of these *A. fabae*, *B. tabaci* and *Conapium* sp. indet. were categorized as major pests as they caused significant damage. The incidence of these pests showed a peak on the 35th standard meteorological week (SMW) in all the three locations studied. The peak incidence at Bandipora was 11.80± 0.66, 3.10± 0.58 and 1.20± 0.08, respectively; at Baramulla, the peak was 10.40± 0.62, 3.40± 0.13 and 1.30± 0.07, respectively; and at Kupwara, it was varying as 12.60± 0.69, 3.40± 0.13 and 1.30± 0.07 for the three pests, respectively.

Key words: *Aphis fabae*, *Bemisia tabaci*, *Conapium* sp., *Altica himensis*, phenological stages, meteorological week, multilocation, seasonal incidence, peaks

The most important grain legume for direct human consumption is common bean (*Phaseolus vulgaris* L., Fabaceae), which is a highly diverse crop in terms of morphological diversity, uses, and cultivation (Broughton et al., 2003). Beans are susceptible to both biotic and abiotic stresses; however, the damage caused by insect pests and diseases are major constraints. The yield losses due to insect pests alone have been estimated to the tune of 35% to 100% annually (Singh and Schwartz, 2011). Whitefly, flower thrips, leafhopper and foliage beetle are the main insect pests attacking legumes (Ogecha et al., 2019). In Kashmir valley also, bean crop is attacked by numerous insect pests which cause economic damage. There is no systematic research work, on the documentation of insect pest complex of beans in Kashmir. Hence the present study which focused on the incidence of bean aphid *Aphis fabae* Scopoli, whitefly *Bemisia tabaci* (Genn.). Bean weevil *Conapium* sp., flea beetle *Altica himensis* Shukla in *P. vulgaris* at different stages of the crop.

MATERIALS AND METHODS

Roving survey was carried out in three districts of Kashmir viz., Baramulla, Bandipora and Kupwara for the study of incidence of major insect pests on beans during kharif 2018. Observations were carried out once in a week on the crop of variety Shalimar

Rajmash-2 from germination onwards on ten randomly selected plants from five plots/ locality. The incidence was recorded from three leaves selected from upper, middle and terminal part in all the phenological stages viz., vegetative, reproductive and pod formation stages. The insect samples were collected, sorted out and counted. The population buildup of the major pests was studied in one location of each district viz., Chaklu (Baramulla), Chogul (Kupwara) and Kaloosa (Bandipora). Yellow sticky traps were also installed in the field for monitoring *A. fabae* and *B. tabaci*, with the former counted as no./ 5cm shoot and the latter and *Conapium* sp., as no./ leaf.

RESULTS AND DISCUSSION

The insect pest complex of beans (*P. vulgaris*) studied in three districts of Kashmir viz., Baramulla, Bandipora and Kupwara. The results revealed the occurrence of four insects viz., *A. fabae*, whitefly *B. tabaci*, bean weevil *Conapium* sp. and flea beetle *A. himensis*. Out of these, the first three were found to be the major pests, associated with the crop throughout the growing season and causing significant damage (Table 1). It was observed that *A. fabae* remained closely associated with the crop from last week of June (26th standard week- SW) to 3rd week of September (38th SW). Similarly, *B. tabaci* was active from 1st week of July

Table 1. Insect pest complex of beans *Phaseolus vulgaris* in Kashmir

Common name	Scientific name	Family/ order	Crop stage infested	Main period of activity	Status
Bandipora					
Bean aphid	<i>Aphis fabae</i> (Scopoli)	Aphididae/ Hemiptera	Vegetative, Reproductive and Pod formation stage	last week of June to 3rd week of September	Major
Whitefly	<i>Bemisia tabaci</i> (Gennadius)	Aleyrodidae/ Hemiptera	Vegetative, Reproductive and Pod formation stage	1 st week of July to 3 rd week of September	Major
Bean weevil	<i>Conapium</i> spp. Indet. (Motschulsky)	Apionidae/ Coleoptera	Vegetative, Reproductive and Pod formation stage	1 st week of July to last week of September	Major
Flea beetle	<i>Altica himensis</i> (Shukla)	Chrysomelidae/ Coleoptera	Pod formation stage	last week of June to last week of August	Minor
Baramulla					
Bean Aphid	<i>Aphis fabae</i> (Scopoli)	Aphididae/ Hemiptera	Vegetative, Reproductive and Pod formation stage	last week of June to 3rd week of September	Major
Whitefly	<i>Bemisia tabaci</i> (Gennadius)	Aleyrodidae/ Hemiptera	Vegetative, Reproductive and Pod formation stage	1 st week of July to 3 rd week of September	Major
Bean weevil	<i>Conapium</i> spp. Indet. (Motschulsky)	Apionidae/ Coleoptera	Vegetative, Reproductive and Pod formation stage	1 st week of July to last week of September	Major
Flea beetle	<i>Altica himensis</i> (Shukla)	Chrysomelidae/ Coleoptera	Pod formation stage	last week of June to last week of August	Minor
Kupwara					
Bean Aphid	<i>Aphis fabae</i> (Scopoli)	Aphididae/ Hemiptera	Vegetative, Reproductive and Pod formation stage	last week of June to 3rd week of September	Major
Whitefly	<i>Bemisia tabaci</i> (Gennadius)	Aleyrodidae/ Hemiptera	Vegetative, Reproductive and Pod formation stage	1 st week of July to 3 rd week of September	Major
Bean weevil	<i>Conapium</i> spp. Indet. (Motschulsky)	Apionidae/ Coleoptera	Vegetative, Reproductive and Pod formation stage	1 st week of July to last week of September	Major
Flea beetle	<i>Altica himensis</i> (Shukla)	Chrysomelidae/ Coleoptera	Pod formation stage	last week of June to last week of August	Minor

Table 2. Mean incidence of major insect pests of beans *Phaseolus vulgaris*

Standard week (SW)	Bandipora			Baramullah			Kupwara		
	<i>Aphis fabae</i>	<i>Bemisia tabaci</i>	<i>Conapium</i> spp.	<i>Aphis fabae</i>	<i>Bemisia tabaci</i>	<i>Conapium</i> spp.	<i>Aphis fabae</i>	<i>Bemisia tabaci</i>	<i>Conapium</i> spp.
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.10± 0.04	0.00	0.00	0.10± 0.03	0.00	0.00	0.10± 0.05	0.00	0.00
27	0.40± 0.16	0.12± 0.06	0.10± 0.03	0.40± 0.07	0.12± 0.07	0.10± 0.03	0.40± 0.12	0.20± 0.05	0.10± 0.03
28	1.90± 0.38	0.46± 0.24	0.20± 0.11	1.80± 0.43	0.50± 0.25	0.20± 0.11	1.90± 0.50	0.40± 0.18	0.20± 0.10
29	2.70± 0.92	0.80± 0.26	0.30± 0.11	2.70± 1.13	0.90± 0.23	0.40± 0.13	2.90± 0.2	0.90± 0.25	0.40± 0.11
30	2.90± 0.57	1.28± 0.32	0.50± 0.16	3.60± 0.61	1.40± 0.23	0.50± 0.15	4.90± 0.9	1.40± 0.17	0.50± 0.13
31	4.30± 1.41	1.58± 0.40	0.60± 0.20	5.90± 1.55	1.70± 0.30	0.70± 0.15	5.30± 1.45	1.90± 0.29	0.60± 0.16
32	5.10± 2.01	2.00± 0.48	0.70± 0.20	6.90± 2.31	2.30± 0.34	0.80± 0.17	7.10± 2.49	2.40± 0.30	0.80± 0.15
33	7.90± 1.36	2.40± 0.60	0.90± 0.19	8.50± 1.45	2.80± 0.18	0.90± 0.15	8.80± 1.95	2.80± 0.27	0.90± 0.15
34	8.70± 1.21	2.68± 0.58	1.06± 0.10	9.50± 1.21	3.00± 0.21	1.10± 0.07	10.70± 1.17	3.20± 0.24	1.10± 0.07
35	11.80± 0.66	3.10± 0.58	1.20± 0.08	10.40± 0.62	3.40± 0.13	1.30± 0.07	12.60± 0.69	3.50± 0.17	1.40± 0.06
36	10.30± 1.26	2.38± 0.58	0.90± 0.09	8.20± 1.24	2.80± 0.23	0.90± 0.08	11.70± 1.18	2.80± 0.24	0.90± 0.11
37	7.40± 1.25	1.54± 0.58	0.70± 0.10	6.70± 1.00	1.90± 0.52	0.70± 0.10	7.40± 0.97	1.80± 0.53	0.60± 0.08
38	1.50± 0.40	0.68± 0.08	0.40± 0.11	1.50± 0.23	1.20± 0.66	0.40± 0.08	1.50± 0.22	1.10± 0.62	0.40± 0.13
39	0.00	0.50± 0.08	0.16± 0.05	0.00	0.10± 0.09	0.20± 0.05	0.00	0.10± 0.04	0.10± 0.05

(27th SW) to 3rd week of September (39th SW). Allen et al. (1996) observed that aphid and whitefly occur as major insect pests on common beans. The *Conapium* weevil was observed from 1st week of July (27th SW) to last week of September (39th SW) and *A. himensis* was observed occasionally during the pod formation stage. Thakur and Firake (2019) also observed aphids,

whiteflies and pod boring weevils as major pests on pulses and flea beetle as minor pest.

The first appearance of *A. fabae* occurred in district Bandipora during the 26th SW and reached peak (11.80 ± 0.66 aphids/ 5cm shoot) during 35thSW. similar trend was observed at Baramulla and Kupwara (Table 2).

These observations corroborate with those of Selem et al. (2017), Singh and Malik (1998) and Kataria and Kumar (2015). Likewise, first appearance of *B. tabaci* in Bandipora was 27th SW with peak (3.10 ± 0.58 /leaf) during 35thSW; similar observations were made at Baramulla and Kupwara. Chaudhuri et al. (2001) also observed similar results with whitefly. *Conapium* sp. incidence also revealed similar trends like aphid and whitefly. Bhateja and Pajni (1989) reported 18 species of the genus *Conapium* in India. Wanat (2007) in his studies reported that only eleven species were described by Motschulsky.

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