



Interspecific abundance and seasonal incidence of aphids and aphidophagous predators associated with cabbage

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ABSTRACT: Among the three species of aphids that damaged the cabbage crop, *Myzus persicae* (Sulz.) constituted 45.30% of the total population, followed by *Brevicoryne brassicae* (L.) (33.88%) and *Lipaphis erysimi* (Kalt.) (20.82%). *M. persicae* was prevalent throughout the cropping season, but was most active during December and January (159.83-239.90 nymphs and adults / 3 leaves). *L. erysimi* was active during the early part of the cropping season with peak activity during November and first fortnight of December (118.82-136.09 nymphs and adults/3 leaves). *B. brassicae* was a late starter which commenced its activity from mid-December and lingered on the crop till harvest during March end. Its peak incidence was noticed during January and February (119.69-263.18 nymphs and adults / 3 leaves). Out of the four species of coccinellid predators, *Coccinella transversalis* F. was the dominant species constituting 55.08 % of the total population followed by *Cheilomenes sexmaculata* (Fab.) (27.73 %), *Micraspis discolor* (Fab.) (12.05%) and *Coccinella septempunctata* L. (5.14%). *C. transversalis* and *C. sexmaculata* appeared during mid-November and attained their peak population during January and February (7.27-10.94 and 4.26-5.08 grubs and adults / 10 plants, respectively). *M. discolor* and *C. septempunctata* appeared during mid-December and mid-January, respectively. They reached the peak population during February (2.44-3.34 and 1.29-1.83 grubs and adults / 10 plants). Of the two species of syrphid predators, *Ischiodon scutellaris* (Fab.) was overwhelmingly more numerous (80.06%) than *Eumerfus albifrons* Walker (19.94%). While *I. scutellaris* appeared during early November, *E. albifrons* appeared during early December. The peak activity of *I. scutellaris* was observed during January and first fortnight of February (8.64-11.45 larvae / 10 plants), whereas that of *E. albifrons* during the second fortnight of January and first fortnight of February (2.79 - 4.06 larvae / 10 plants).

KEY WORDS: Aphidophagous predators, aphids, interspecific abundance, seasonal incidence, syrphids

Many workers have recorded different species of aphids (Butani *et al.*, 1977; Kumar, 1993; Koteswara Rao and Lal, 2004) and aphidophagous predators (Kotwal *et al.*, 1984; Agarwala *et al.*, 1989; Thakur *et al.*, 1989; Makhmoor and Verma, 1989) associated with cabbage crop. These aphids constitute a major

group of insect pests on cabbage and their population growth is generally kept under control in the field by an array of coccinellid and syrphid predators. In the present investigation, the interspecific abundance of the pests and their predators was studied along with their seasonal incidence.

The study was undertaken at the Central Research Station, Orissa University of Agriculture and Technology, Bhubaneswar, during *Rabi* 2001-02 and 2002-03. Cabbage crop (cv. Golden Acre) was raised in a plot of 400m² with the recommended package of practices except insect pest control schedule.

The crop was transplanted in the last week of October and allowed to stand in the field unharvested till the end of March when the aphids and predators disappeared. Observations were recorded at fortnightly intervals from 10 randomly selected and tagged plants. Population of different species of aphids was recorded separately from three open leaves (one each from lower, middle and top) of a plant. For recording the specieswise population of predators, the whole plant was examined. The inter-specific abundance was calculated by the following formula.

$$\text{Inter-specific abundance} = \frac{\text{No. of individuals of the species concerned / unit area}}{\text{Total number of individuals of all the species / unit area}} \times 100$$

Aphids

The cabbage crop was damaged by three species of aphids, viz., *Lipaphis erysimi*, *Myzus persicae* and *Brevicoryne brassicae*. *M. persicae* contributed 45.30% of the total aphid population followed by *B. brassicae* (33.88%) and *L. erysimi* (20.82%) (Table 1). *M. persicae* was prevalent throughout the cropping season showing maximum activity during December and January (159.83 - 239.90 nymphs and adults / 3 leaves). On the other hand, *L. erysimi* was most active during the early part of the cropping season up to the first fortnight of December (118.82 - 136.09 nymphs and adults / 3 leaves). Thereafter, the population slowly fizzled out to zero after the first fortnight of February. Contrary to the activity of these two species, *B. brassicae* did not appear in the field till the first fortnight of December. Its activity started in the second fortnight of December and continued up to

Table 1. Interspecific abundance and seasonal incidence of aphids on cabbage

Month and fortnight	Aphid (nymphs and adults) population/3 leaves		
	<i>L. erysimi</i>	<i>M. persicae</i>	<i>B. brassicae</i>
November I	118.82	54.87	0.00
II	136.09	82.25	0.00
December I	120.68	159.83	0.00
II	51.64	239.90	36.48
January I	32.98	231.69	119.69
II	42.10	178.12	263.18
February I	21.80	88.46	196.26
II	0.00	54.16	137.02
March I	0.00	30.90	56.72
II	0.00	20.18	43.53
Total	524.11	1140.36	852.88
Interspecific abundance (%)	20.82	45.30	33.88

Table 2. Interspecific abundance and seasonal incidence of coccinellid predators on cabbage

Month and fortnight	Coccinellid (grubs and adults) population/10 plants			
	<i>C. transversalis</i>	<i>C. sexmaculata</i>	<i>M. discolor</i>	<i>C. septempunctata</i>
November I	0.00	0.00	0.00	0.00
II	4.04	0.82	0.00	0.00
December I	4.80	1.57	0.00	0.00
II	4.38	2.01	0.59	0.00
January I	7.37	4.26	1.32	0.00
II	9.83	4.71	1.85	0.61
February I	10.94	5.08	3.34	1.29
II	7.27	4.62	2.44	1.83
March I	2.60	2.32	1.50	0.84
II	0.91	0.86	0.37	0.30
Total	52.14	26.25	11.41	4.87
Interspecific abundance	55.08	27.73	12.05	5.14

Table 3. Interspecific abundance and seasonal incidence of syrphid predators on cabbage

Months and fortnight	Syrphid (larval) population / 10 plants	
	<i>I. scutellaris</i>	<i>E. albifrons</i>
November I	1.34	0.00
II	2.65	0.00
December I	3.92	0.27
II	5.41	1.47
January I	8.64	1.59
II	11.45	4.06
February I	10.28	2.79
II	4.88	1.25
March I	2.19	1.01
II	0.84	0.41
Total	51.60	12.85
Interspecific abundance	80.06	19.94

the end of March when the crop was harvested. Its peak activity was recorded during January and February (119.69-263.18 nymph and adults / 3 leaves).

Coccinellids

During the course of field observations, it was noticed that aphid colonies were visited by four species of coccinellid predators, viz., *Coccinella transversalis*, *Cheilomenes sexmaculata*, *Micraspis discolor* and *Coccinella septempunctata*. *C. transversalis* was the most predominant species occupying 55.08 per cent of the total population followed by *C. sexmaculata* (27.73%), *M. discolor* (12.05%) and *C. septempunctata* (5.14%). *C. transversalis* and *C. sexmaculata* were the first visitors in the cabbage field during the second fortnight of November (Table 2). *M. discolor* made its first appearance in the second fortnight of December and *C. septempunctata* in the second fortnight of January. The peak population of *C. transversalis* and *C. sexmaculata* was observed during January and February (7.27-10.94 and 4.26-5.08 grubs and adults / 10 plants, respectively) while that of *M. discolor* and *C. septempunctata* during February (2.44-3.34 and 1.29-1.83 grubs and adults / 10 plants, respectively).

Syrphids

Out of the two species of syrphid predators, *Ischiodon scutellaris* was overwhelmingly more numerous (80.06%) than *Eumerus albifrons* (19.94%) (Table 3). While *I. scutellaris* appeared at the beginning of the cropping season (early November), *E. albifrons* appeared a bit late in the first fortnight of December. *I. scutellaris* maintained its peak population during January and the first fortnight of February (8.64-11.45 larvae / 10 plants),

whereas the population of *E. albifrons* was higher during the second fortnight of January and first fortnight of February (2.79 - 4.06 maggots / 10 plants).

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