Spatial distribution of *Brumoides suturalis* (Fabricius) (Coleoptera: Coccinellidae) in mungbean [*Vigna radiata* (L.) Wilczek]

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ABSTRACT: Distribution pattern of *Brumoides suturalis* (Fabricius) was studied on mungbean [*Vigna radiata* (L.) Wilczek] during summer season. Results of various indices of dispersion revealed that distribution was random. The values of each index were comparatively higher when population was lower. However, k index of dispersion was low when the population was low. The results, therefore, indicate that the predator has tendency to aggregate in case of higher density.

KEY WORDS: *Brumoides suturalis,* indices of dispersion, mungbean, spatial distribution, *Vigna radiata*

The coccinellid beetle, *Brumoides* (=*Brumus*) *suturalis* (Fabricius) (Coleoptera: Coccinellidae) is an important predator and has been reported to feed on the jassid, *Amrasca* (=*Empoasca*) *kerri* Pruthi in cowpea ecosystem (Sardana and Verma, 1986; Faleiro *et al.*, 1980); the nymphs and adults of *Sogatella furcifera* (Horv.), nymphs of *Nephotettix virescens* (Dist.) and eggs and newly hatched nymphs of *Pyrilla perpusilla* (Walker) in rice (Garg and Sethi, 1983); *Melanaspis glomerata* (Green) in sugarcane (Misra *et al.*, 1980); *Aphis craccivora* Koch in groundnut (Bakhetia and Sidhu, 1977); *Lipaphis erysimi* (Kalt.) in mustard (Nath and Sen, 1976); *Hyadaphis coriandri* in coriander (Prem Sagar and Narinder Kumar, 1996); nymphs of *Hishimonus phycitis* (Dist.) in brinjal (Bindra and Singh, 1969); larvae of *Earias* sp. in cotton (Das and Basu, 1997); larvae and pupae of *Chilo partellus* (Swinhoe) in maize and sorghum (Singh *et al.*, 1977). Chandrababu *et al.* (1997) confirmed its preying upon mealybugs *Ferrisia virgata, Planococcus pacificus*

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and *Maconellicoccus hirsutus* and aphid, *Aphis craccivora* in lab studies. Goel and Kumar (1982) and Satyanaryana (1995) found this beetle associated with sunflower and ricebean crops, respectively.

Plant characteristics often influence the distribution of pest species and its natural enemy. The degree of spatial association between pest and its natural enemy is likely to influence the ability of a natural enemy to take over the prey and serve as effective mortality agent. An understanding of distribution pattern of an insect (pest or parasitoid) is important as it affects the sampling programme and method of analysis of the data to be used for measuring the population size and description of the conditions for prevailing population (Elliott, 1979). The present study was, therefore, aimed to investigate the distribution pattern of the predatory beetle, *B. suturalis* in mungbean [*Vigna radiata* (L.) Wilczek] during summer 1992.

Mungbean crop was sown on 30.3.92 at the research farm of Indian Institute of Pulses Research, Kanpur. All the recommended package of practices were followed to raise a good crop. No insecticide was applied on the crop to maintain natural homeostasis. Inter row and plant distances were maintained at 30 and 10 cm, respectively. The cropped area was divided into 9 quadrants and each quadrant measured 5 m^2. Population of *B. suturalis* was estimated at weekly interval with the help of a drop cloth measuring 50 x 100cm. The cloth was covered with high-density polythene and it was stitched with the cloth on the margin. This helped in slowing the movement of beetles. The cloth was rolled lengthwise. At the time of sampling, it was unrolled to fit between the two rows. To obtain unbiased estimate of the population, all the observations were taken between 9-10 AM. Drop cloth in each quadrant was placed randomly at 5 places between the two rows and plants were shaken thrice to dislodge the beetles. The beetles fallen on dropcloth, were counted separately for each sample. The data thus obtained were subjected to analyses for the dispersion indices (Table 1). Various indices used in this study were selected to confirm the type of dispersion prevailing.

The values of various indices of dispersion presented in Table 1 revealed that regular or uniform distribution was absent. Values calculated for maximum regularity, randomness and maximum contagion for various indices indicated that dispersion was random as the values revolved around the random values and were much lower than for maximum contagion. Values of various indices for different dates varied. It was higher when population was comparatively low as can be seen in 2^{nd} and 5^{th} observations for all the indices except in negative binomial where the values of 1^{st} and 3^{rd} observations were negative and rest had positive values. Also, the samples which had less number of insects, the k values were less as compared to those where population was higher, indicating that larger the population tendency was towards aggregation. To epitomize, it can be said that population varied in each observation and so the values

of indices. The k values were less when the population was low and this was reverse in other indices. In general the distribution was random but the tendency towards aggregated dispersion was noticed in case of higher population densities.

Table 1. Values of various indices for distribution pattern of *B. suturalis* in mungbean

Indices	Date of observation					
	1st 30.4.92	2nd 7.5.92	3rd 14.592	4th 21.5.92	5th 28.5.92	6th 4.6.92
Weekly densities	51.00	40.00	54.00	52.00	39.00	59.00
Index of dispersion	0.73	1.70	0.84	1.12	1.31	1.21
Coefficient of dispersion	32.08	64.53	37.02	49.35	57.69	53.13
David & Moore index	-0.27	0.47	-0.16	0.12	0.31	0.21
Index of Laxis	0.85	1.21	0.92	1.06	1.15	1.10
Charlier coefficent	Err.	83.67	Err.	32.75	59.16	41.57
Green index	-0.01	0.02	-0.01	0.01	0.01	0.01
K (negative binomial)	-4.27	1.43	-8.27	9.32	2.86	5.79
1/k index	-0.23	0.70	0.12	0.11	0.35	0.17
Morisita's index	0.02	0.04	0.02	0.03	0.03	0.03
Coles index	0.04	0.07	0.04	0.04	0.06	0.04

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