

## **Elytral Spot Variability In The Phytophagous Ladybird Beetle, *Epilachna vigintioctopunctata* (Fabr.)**

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### **ABSTRACT:**

*Adults of Epilachna vigintioctopunctata (Fabr.) collected from Nadia district of West Bengal possessed 12 – 28 spots on elytra. 30.55% specimens had 28 spots on elytra which comprised of 6 persistent and 8 non-persistent spots on each elytron. 23.64% individuals possessed 26 spots on elytra, whereas, 19.46% possessed only 12 spots on elytra and had no non-persistent spot. 2.18 – 6.18% individuals had 14 – 24 spots on elytra. Among the non-persistent spots, spot 'd' was most abundant (found in 76.46% specimens) whereas, 'a' was the least abundant (in 12.41% specimens). Other non-persistent spots appeared in the following descending order: 'c' – 71.64%, 'g' – 69.82%, 'h' – 67.27%, 'b' – 67.27%, 'f' – 65.45% and 'e' – 58.55%. Only a few individuals showed confluence between persistent spots 3 and 5, and 3, 4 and 5. E. vigintioctopunctata populations of Indian subcontinent appear to differ from that of Indonesia by possessing higher numbers of elytral spots.*

**Key words:** *Epilachna vigintioctopunctata*, elytral spot variability

### **INTRODUCTION:**

*The ladybird beetle, Epilachna vigintioctopunctata (Fabr.) is a destructive pest widely distributed in south and South-east Asia, Oceania including Australia and New Zealand (Rajagopal and Trivedi, 1989). Though the pest has been reported to cause extensive damage to many crops belonging to the family Solanaceae, Cucurbitaceae and Papilionaceae, Mandal and Mandal (2003) considered it as oligophagous, attacking solanaceous hosts only. They were of the opinion that, some other species of Epilachna might have wrongly identified as E. vigintioctopunctata on the basis of elytral spots as the number of spots present on elytra of most epilachnines vary from 12 – 28 (Dieke, 1947). In adult beetles, each elytron bears 6 persistent spots (1 – 6). In addition maximum 8 non-persistent spots (a – h) may also be present on each elytron (Dieke, 1947). Furthermore, coalescence may occur between some of the spots. Abbas et al. (1988) while working with E. vigintioctopunctata population of Sumatera Barat, Indonesia failed to get any individual bearing 28 spots on elytra, whereas, Falak Naz et al. (2012) obtained higher proportion of 28-spotted population of the insect from Pakistan. Here, the occurrence of persistent and non-persistent spots on the elytra of E. vigintioctopunctata population from Nadia district of West Bengal, India was investigated.*

## **MATERIALS AND METHODS:**

Full grown grubs and pupae of *Epilachna* were collected from different cultivated and wild solanaceous plants. These were reared in the laboratory for emergence of adults. The insects were examined under Stereo zoom binocular microscope for elytral spots. The identity of all the individuals was further confirmed by examining the male genitalia and female sub-genital plate following Kapur (1966). The insects were grouped on the basis of numbers of elytral spots and relative abundance (%) of different groups was calculated. The percent occurrence of each of the non-persistent spots among these groups and total population was also calculated.

## **RESULTS AND DISCUSSION:**

Number of elytral spots varied from 12 to 28 in different individuals (Table 1). Among the specimens inspected, 19.46% possessed 12 elytral spots only and did not bear any non-persistent spot. On the contrary, 30.55% specimens had 28 elytral spots, i.e. all the non-persistent spots (a – h) were present on each elytron. Moreover, 23.64% individuals had 26 spots on elytra, hence, these individuals have lost one non-persistent spot from each elytron. Fewer proportions of insects (2.18 – 6.18%) possessed 14 – 24 spots on elytra.

### **Occurrence of non-persistent spots:**

Among the eight non-persistent spots, spot 'd' appeared most frequently (in 76.36% individuals), while, spot 'a' was least frequent, possessed by 36.73% individuals. It is to be noted that, if 12-spotted (without any non-persistent spot) and 28-spotted individuals are excluded from the lot, spot 'a' is present only in 12.41% specimens (17 out of 137 specimens that possessed 1 – 7 non-persistent spots on each elytron). The descending order of occurrence of other non-persistent spots was as follows: 'c' – 71.64%, 'g' – 69.82%, 'h' – 67.27%, 'b' – 67.27%, 'f' – 65.45% and 'e' – 58.55%.

14-spotted individuals: These insects contained only one non persistent spot on each elytron ('d', 'g' or 'h'). Spot 'd' was possessed by 50% of the individuals, followed by 'g' and 'h' (37.50 and 12.50%, respectively).

16-spotted individuals: Spot 'g' was most frequent (in 60.00% individuals), followed by 'c' and 'd' (40% each), 'h' (30%), 'b' (20%) and 'a' (10%).

18-spotted individuals: All the non-persistent spots except 'a' and 'e' were found in different combinations, of which 'd' was most frequent (83.33%), followed by 'c' (66.67%), 'f' and 'h' (50% each), 'g' (33.33%) and 'b' (16.17%).

20, 22 and 24-spotted individuals: All the non-persistent spots were present in various combinations. In all three groups, spot 'd' was most frequent and appeared in all individuals followed by 'c' (76.47 – 93.33%), whereas, 'a' appeared least frequently (5.88 – 33.33%).

26-spotted individuals: All the non-persistent spots, except 'a', 'e' and 'h' appeared in all individuals. Only one specimen lacked spot 'h'. Spot 'e' was present in 90.77% individuals, whereas, only 9.23% individuals harboured spot 'a'.

Confluence of spots: Confluence took place among persistent spots only. Nine individuals showed confluence between spots 3 and 5, and 3 specimens showed confluence of spot 3 with 4 and 5.

Abbas *et al.* (1988) observed a maximum of 7 non-persistent spots on each elytron in *E. vigintioctopunctata* population collected from different localities of Sumatera Barat, Indonesia. However, more than half (53%) of the insects examined by them had no non-persistent spot on the elytra and additional 19.3% individuals possessed only one non-persistent spot on each elytron. Contrary to the above finding, Falak Naz *et al.* (2012) recorded 8 non-persistent spots on each elytron in highest proportion of insects (40%), closely followed by 7 spots on each elytron (32.31%) in population from Pakistan. Only 9.13% of the specimens examined by them had no non-persistent spot on elytra. During the present investigation, 30.55% of the individuals possessed 8 non-persistent spots on each elytron, whereas, 23.64% individuals possessed 7 non-persistent spots on each elytron. Hence, 54.19% of the population had 7 – 8 non-persistent spots on each elytron resulting in 26 – 28 spots on elytra. Only 19.46% population had no non-persistent spot on elytra. The proportion of individuals that had 1 – 6 non-persistent spots on each elytron was relatively fewer. The result of present investigation and that of Falak Naz *et al.* (2012) indicates that, *E. vigintioctopunctata* population of Indian subcontinent may differ from that of Indonesia in having higher number of non-persistent spots (7 – 8 on each elytron). Among the non-persistent spots, 'd' was most abundant, whereas, 'a' was the least. Spot 'a' was found frequently in individuals bearing 22 or more elytral spots. Rest of the non-persistent spots (b, c, e, f, g and h) were, however, relatively less frequent than 'd'. Confluence occurred rarely between persistent spots only (3 – 5).

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Table 1: Occurrence of non-persistent spots on elytra of *E. vigintioctopunctata* (Fabr.)

Elytral spots	No. of specimens	Non-persistent spots							
		a	b	c	d	e	f	g	h
12	54 (19.46)*	--	--	--	--	--	--	--	--
14	8 (2.91)	--	--	--	4 (50.00)	--	--	3 (37.50)	1 (12.50)
16	10 (3.64)	1 (10.00)*	2 (20.00)	4 (40.00)	4 (40.00)	--	--	6 (60.00)	3 (30.00)
18	6(2.18)	--	1 (16.17)	4 (66.67)	5 (83.33)	--	3 (50.00)	2 (33.33)	3 (50.00)
20	17 (6.18)	1 (5.88)	10 (58.82)	13 (76.47)	17 (100)	3 (17.65)	7 (41.18)	8 (47.05)	9 (52.94)
22	16 (5.82)	4 (25.00)	12 (75.00)	13 (81.25)	16 (100)	6 (37.50)	8 (50.00)	10 (62.50)	11 (68.75)
24	15 (5.45)	5 (33.33)	11 (73.33)	14 (93.33)	15 (100)	8 (53.33)	13 (86.67)	14 (93.33)	10 (66.67)
26	65 (23.64)	6 (9.23)	65 (100)	65 (100)	65 (100)	60 (92.31)	65 (100)	65 (100)	64(98.46)
28	84 (30.55)	84(100)	84(100)	84 (100)	84(100)	84(100)	84 (100)	84(100)	84(100)
Total	275	101 (36.73)	185 (67.27)	197 (71.64)	210 (76.36)	160 (58.55)	180 (65.45)	192 (69.82)	185 (67.27)

\*percent relative density; \*\*percent population bearing the spot