

**Bioecology of painted bug (*Bagrada cruciferarum*) (Hemiptera :
Pentatomidae) on seed crop of cauliflower (*Brassica oleracea* var
botrytis subvar *cauliflora*)**

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Received: 3 April 1992

catalogued *

The painted bug (*Bagrada cruciferarum* Kirkaldy) is one of the most notorious pests of oilseeds and vegetables belonging to *Brassica* spp. In the mid-hill regions of Himachal Pradesh the painted bug is a serious pest of cauliflower (*Brassica oleracea* L. var *botrytis* L. subvar *cauliflora* DC.) during April–May at siliqua-formation stage (Dhaliwal and Goma 1979). The attack is generally sporadic, but as it is a direct pest it greatly reduces the yield. Since no information is available on the life processes of this pest and factors responsible for its outbreak in Himachal Pradesh, an experiment was conducted on these aspects.

Seasonal incidence of the painted bug was studied during 1989–91. About 6-week-old seedlings of 'Snowball 16' cauliflower were transplanted in October and the crop was raised in a pesticide-free environment. Observations were recorded soon after appearance of the pest on the seed crop and were continued till harvest. The infestation index was calculated as:

$$\text{Infestation index} = \frac{\text{Mean number of bugs/plant} \times \text{plant infestation (\%)}}{\text{plant infestation (\%)}}$$

The laboratory study was conducted using the stock culture raised from the adults

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collected from field. The bugs were placed in battery jars (15 cm x 10 cm), whose tops were covered with muslin, and fresh seed pods of cauliflower were provided to them as food as also for egg-laying. The newly hatched nymphs were reared on Indian mustard [*Brassica juncea* (L.) Czernj. & Cosson] seedlings as per the method described by Batra and Sarup (1962). Eggs thus obtained were used to study the life-history of the pest in laboratory. The eggs were placed singly in glass-vials (5 cm x 1 cm), loosely plugged with cotton. The nymphs were also reared individually on Indian mustard seedlings placed in glass-vials. The seedlings were changed daily. Both the sexes were separated soon after adult emergence and were held in glass-chimneys in pairs. Bugs were reared at room temperature 24° C ± 4.2 and relative humidity 44% ± 8.3 and there were 10 replicates for each set of observations.

Three-year data on the occurrence of *B. cruciferarum* in the field on cauliflower grown for seed production reveal that the pest appeared on the crop soon after increase in temperature. It could therefore resume activity any time during March (as in 1989) and May (as in 1990) (Fig 1). The peak population generally coincided with the pod-formation stage and was observed generally in the first

week of May to as late as the end of May. Infestation (weekly data) showed significant positive correlation with the maximum temperature during 1989 and 1991 (when the pest appeared in severe form) but non-significant during 1990, perhaps owing to late appearance and low levels of infestation. The infestation was correlated positively with the minimum temperature and sunshine hours but negatively correlated with rainfall in all the 3 years (Table 1).

The oval, dirty-white eggs are glued to the plant surface. The eggs show reticulations on the chorion. Before hatching, the chorion of egg changes to pink. The length and breadth of the egg is 0.876 and 0.698 mm respectively.

The mean incubation period is 6.2 days. However, Vora *et al.* (1985) from Gujarat reported the incubation period of the bug 3 days during June, which may be attributed to higher temperature and variable relative humidity prevailing in that region.

There were 5 nymphal instars. The first instar nymph is orange, which changes to reddish brown and to dark red before moulting, with average length and breadth 1.12 and 0.77 mm respectively. The average duration of the first instar is 3.33 days. Immediately after moulting, the second-instar nymph is orange, but it changes to red before moulting. Its average length and breadth is 1.39 and 1.09 mm respectively, whereas average duration

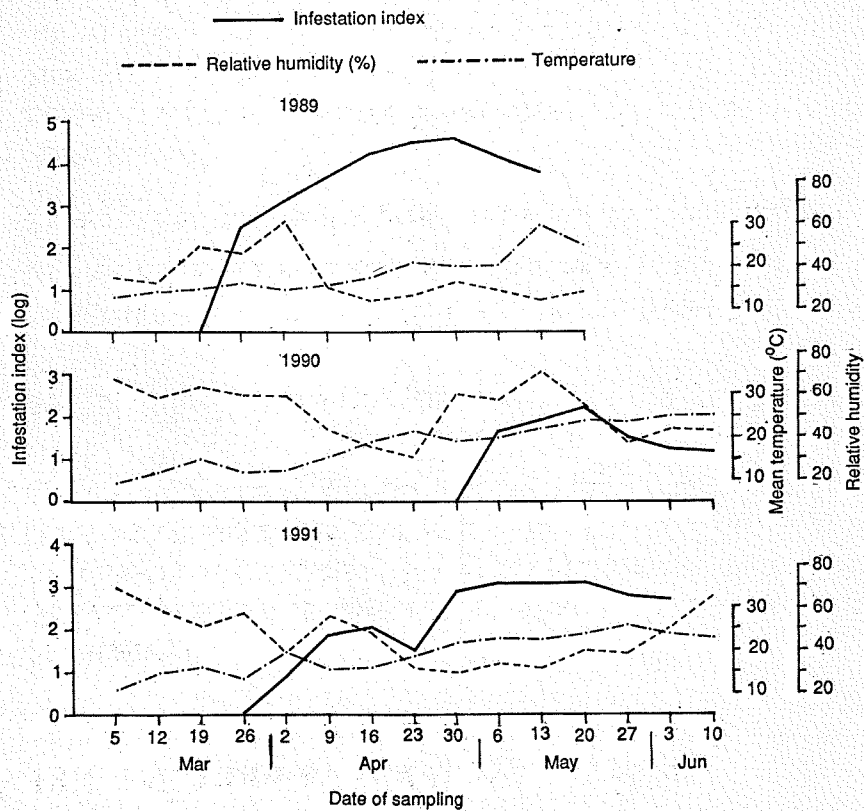


Fig 1 Seasonal incidence of painted bug on seed crop of cauliflower during 1989-91

Table 1 Coefficient of correlation (r) of infestation index of the painted bug with abiotic factors

Year	Coefficient of correlation					
	Maximum	Minimum	Mean	Sunshine	Rainfall	Wind velocity
1989	0.839**	0.305	-0.466	0.337	-0.436	-0.148
1990	-0.353	0.362	0.512	0.403	-0.630	0.437
1991	0.704*	0.656*	-0.426	0.537	-0.312	0.112

**P = 0.01; *P = 0.05

is 4 days. The third-instar nymph is red, with black markings on the body. It measures 1.50 mm in length and 1.45 mm in breadth. The average duration is 4.31 days. The fourth-instar nymph has similar body coloration. The average length and breadth is 2.45 and 1.69 mm respectively. This instar takes an average 4.54 days to moult. The fifth-instar nymph resembles the adult but is of smaller size, with mean length and breadth 5.29 and 3.04 mm respectively. The average total duration of nymphal instars is 20.62 days, ranging between 19 and 21 days. However, Vora *et al.* (1985) reported the duration of total nymphal instar 14–18 days, which could be attributed to difference in rearing temperature and other environmental factors. Adults are black with yellow and pink spots on the body. The males are smaller than the females. The length of female is 7.12 mm and breadth 3.94

mm, whereas the length of adult male is 5.29 mm and the breadth 3.04 mm. The female requires a pre-mating period of 3.83 days. Repeated matings are observed. Males live longer (27 days) than females (23.40 days). The average fecundity of the female is 95.00 eggs (36–173 eggs). The bug takes 41–87 days to complete 1 generation under laboratory condition and the life-cycle is completed in 38–65 days.

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