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# HOST-BIOLOGY RELATIONS OF EPILACHNA VIGINTIOCTOPUNCTATA F.

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*Epilachna vigintioctopunctata* F. (Coccinellidae: Coleoptera) is a polyphagous plant feeder and a serious pest of many cultivated and wild solanaceous and cucurbitaceous crops. It is well established that the quality and quantity of food are two important factors of the biotic environment of an insect governing its population dynamics. Studies on these factors are both of scientific and applied values. The only insects on which these studies have been made in India are *Spodoptera (Laphygma)exigua* (Srivastava 1959), *Spodoptera (Prodenia) litura* (Thobbi 1961, 62, Rattan Lal and Nayak 1963, Thobbi and Srihari 1967, Pandey and Srivastava 1967, Thomas *et al.* 1969) and *Diacrisia obliqua* (Pandey *et al.* 1968). The present studies were hence undertaken towards filling up this great lacuna in our knowledge and these relate to the biological response of *Epilachna vigintioctopunctata* to different food plants.

## Material and Methods

First instar grubs of *E. vigintioctopunctata* were obtained from eggs laid in the laboratory by beetles reared on brinjal leaves. The grubs were reared out on the different host materials, in petri dishes, ten larvae being reared in each dish. Five replications were run for each host material. The host materials used were those shown in Table 1. Feeding was *ad libitum.* After five days, the grubs were transferred to hurricane chimneys closed by muslin. The survival of the larvae and pupae and their developmental periods were recorded. The weight of the grubs on the tenth day and the sex ratio of the adults emerging from each host material were also noted. The growth index values as suggested by Srivastava (1959) were calculated. The data were analysed statistically. The experiment was conducted under laboratory conditions of temperature and relative humidity which, during the period, ranged from 25° to 29° C and from 88 to 94.5 per cent respectively.

## Results and Discussion

Results are shown in Table 1.

The average larval duration on the different hosts ranged from 13 days on *Physalis maxima* to 16.35 days on brinjal. Analysis of variance showed significant difference between the larval durations on the different host plants indicating that the host plants on which the insect fed influenced the rate of larval growth significantly. Thomas *et al* (1969; observed similar effects on *Spodoptera litura.*

Chi-square test for the association of the type of host plant and the survival of larvae showed that the value of Chi-square was 43.04 which was significant at

5 percent level, showing that the type of food significantly affected the larval survival of *E. vigintioctopunctata*. *Physalis maxima* was the most suitable food with respect to survival and tomato the least suitable.

On the basis of growth index values development of the grubs was best on *P. maxima* and poorest on tomato and the different host plants could be arranged in the following descending order: *Physalis maxima* > *Solatium insanum* > *Datura stramonium* > brinjal > tomato.

Table 1

Effect of food plants on the biological processes of *Epilachna vigintioctopunctata* F.

| Biological process | Host plant | | | | |
|---|---|---|---|---|---|
| | *Solanum insanum* | *Datura stramonium* | *Physalis maxima* | Tomato | Brinjal |
| Larva : | | | | | |
| Average duration (days) | 13.71 | 13.41 | 13.00 | 14.11 | 16.35 |
| Range of duration (days) | 13-14 | 13-15 | 13 | 14-15 | 15-18 |
| Survival % | 76 | 68 | 94 | 36 | 76 |
| Average weight (mg) | 183 | 207 | 281 | 220 | 130 |
| Growth index | 5.54 | 5.07 | 7.23 | 2.55 | 4.04 |
| Pupa : | | | | | |
| Average duration (days) | 4.11 | 5.16 | 5.38 | 5.00 | 5.59 |
| Range of duration | 4-5 | 4-6 | 5-7 | 5 | 5-7 |
| Survival % | 100 | 94.11 | 89.36 | 87.10 | 87.10 |
| Adult : | | | | | |
| Sex ratio, male : female | 1:1.19 | 1:0.89 | 1:0.51 | 1:0.80 | 1:1.55 |

The average larval weight was highest on *P. maxima* and least on brinjal. There appeared to exist some inverse correspondence between the larval duration and the weight of larvae.

The mean pupal duration on different host plants ranged from 4.11 days on *S. insanum* to 5.59 days on brinjal ; this variation was not statistically significant. The survival of the pupae was highest (100 percent) on *S. insanum* and lowest (88.89 per cent) on tomato. Chi-square was not significant and there was no association between the type of food and pupal survival.

The females outnumbered the males in the case of those bred on brinjal and 5. *insanum*. Eventhough *P. maxima* recorded the highest growth index value, it showed a preponderance of males.

## Summary

Biological responses of grubs of *Epilachna vigintioctopunctata* F. to five host plants namely *Solanum insanum*, *Physalis maxima*, *Datura stramonium*, tomato and brinjal were studied. The host plants had significant effect on larval duration and

percentage survival of the grubs. No definite association existed between the type of food and duration and survival of pupae. *Physalis maxima* appeared to be the most suitable host for *E. vigintioctopunctata* and tomato the least.

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**References**

Pandey, S. N., Srivastava, R. P. 1967. Growth of larvae of *Prodenia litura* F. in relation to wild food plants. *Indian J. Ent.* **29:** 229-33

Pandey N. D., DayaRam Yadava and Teotia, T.P.S. 1968. Effect of different food plants on the larval and post-larval development on *Diacrisia obliqua* W. *Indian J. Ent.* 30: 229-34

RattanLal and Nayak, G. N. 1953. Effect of host plants on the development of caterpillars of *Prodenia litura* F. and their susceptibility to different insecticides. *Indian J. Ent. 25:* 299-306

Srivasthava, B. K. 1959. Growth potential of *Laphygma exigua* Hb. in relation to certain winter food plants. *Madras Agric. J. 46:* 255-259

Thobbi, B. V. 1961. Growth potential of *Prodenia litura* F. in relation to certain food plants at Surat. *Indian J. Ent.* 23: 262-264

Thobbi, B. V. 1962. Growth response of *Prodenia litura* F. in relation to three species of cotton. *Indian Cott. Grow. Rev.* ***16:*** 148

Thobbi, B. V. and Srihari, T. 1967. Growth response *of Prodenia litura* F. in relation to the castor leaves obtained from irradiated plants. *Indian J. Ent.* 29: 154-56

Thomas, M. J., Abraham Jacob and Nair, M. R. G. K. 1969. Host-biology relations of *Spodoptera litura* F. (Lepidoptera: Noctuidae) *Indian J. Agric. Sci.* 39 (5): 276-278

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