

Seasonal incidence of Epilachna beetle (*Henosepilachna septima* Dieke) in relation to weather parameters on pointed gourd (*Trichosanthes dioica* Roxb.)

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ABSTRACT

The experiment was carried out at the 'Incheck farm', 'C' Block, BCKV, Kalyani, Nadia, West Bengal during two consecutive years i.e. 2010-11 and 2011-12 from the month of November to June to study the incidence pattern of *Henosepilachna septima* (Dieke) in relation to weather parameters on pointed gourd. The insect occurred persistently throughout entire crop seasons of all the two years of study. During 2010-11, peak grub and adults was recorded during the first and last week of April, 2011 respectively with highest leaf damage of 24% encountered during first week of April, 2011. During 2011-12, peak grub and adults recorded during last week of March, 2012 and third week of April, 2012 respectively with 27% leaf damage during third week of April, 2012. Abiotic factors found to be responsible for certain changes on incidence such as, temperature (both maximum and minimum) and relative humidity which had significant association with incidence of epilachna beetle on pointed gourd.

Keywords: Abiotic factors, *Henosepilachna septima* (Dieke), incidence, pointed gourd

Pointed gourd (*Trichosanthes dioica* Roxb.) is dioecious, semi-perennial creeper (Niir, 2004) with origin of Indian subcontinent, commonly known as 'Prawal' and is one of the most nutritive, wholesome and highly accepted vegetable (Wadhvani *et al.*, 2007). Colloquially, in India it is often called as green potato and widely cultivated in eastern parts of India particularly West Bengal, U.P., Bihar, Odisha and to some extent in north eastern states like Assam, Tripura etc. (Barma and Jha, 2013). For cucurbits, epilachna beetle (*Henosepilachna septima*, Dieke; Coccinellidae: Coleoptera) known as a notorious pest, the adult and grub feed throughout the growth stages skeletonising the leaves and causing great debilitation to the crop (Jha, 2008, Barma and Jha, 2013). Scrapping of the epidermis indicates the feeding manner of the grubs while semicircular cuts in rows, of the adults. It is necessary to have basic information on the incidence of the pest in relation to weather parameters which in turn help us in determining appropriate time of action and suitable management methods to be adopted. Keeping this in view, the present study made an attempt to record periodicity of occurrence of epilachna beetle in relation to various abiotic factors as a help to evolve an effective and economical strategy of management.

MATERIALS AND METHODS

The experiment was conducted at the 'Incheck farm', 'C' Block, Bidhan Chandra Krishi

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Viswavidyalaya, Kalyani, Nadia, West Bengal which was located at 22.5° N latitude and 88.22° E longitude at an elevation of 9.75m above sea level for two consecutive years i.e., 2010-11 and 2011-12 from the month of November to June. Local variety "Kajli" was replicated two times of plot size 8m² (2×4m) with a plant spacing 100 × 40cm following all agronomical practices excluding plant protection. Observations on pest incidence were taken at an interval of seven days at morning hours during the whole period of crop growing season. Direct count of the developmental stages of the epilachna beetle (grub and adult) and leaf damage were taken from randomly selected seven plants from each plot. Further, leaf damage % was calculated from total number of leaves along with number of leaves damage from plant. Meteorological data viz., average maximum and minimum temperature (°C), total rainfall (mm) and relative humidity % (maximum and minimum) were collected from the Department of Agricultural Meteorology and Physics, Bidhan Chandra Krishi Viswavidyalaya, Kalyani, Nadia, West Bengal. Pooled correlation was done with the incidence of pest using SPSS software.

RESULTS AND DISCUSSION

Epilachna beetle (*H. septima*) is an important pest as both larval and adult stages feed on the foliages initiated from first week of December, 2010 when the average maximum and minimum temperature varied from 26.1° C to 14.4° C and average maximum and

minimum relative humidity ranged from 95% and 58%, respectively with no rainfall to last week of June, 2011. During 2011, infestation by epilachna beetle initiated from third week of December when the average maximum and minimum temperature varied from 21.5°C to 10.1°C and average maximum & minimum relative humidity ranged from 99% and 63%, respectively with no rainfall and continued to occur till the crop was finally harvested during last week of June, 2012. The finding reveals that insect occurred persistently throughout entire crop seasons of all the two years of study. During 2011, grub and adult incidence was gradually increased up to the month of March, 2011 with slightly declination in the month of February, 2011. Subsequently, grub incidence reached to its peak level (6.2grubs plant⁻¹) during the first week of April, 2011 (Fig. 1) when the average maximum and minimum temperature varied from 37.7°C to 24.5°C and average maximum & minimum relative humidity ranged from 90% and 51%, respectively with 3.8mm total rainfall. On the other hand, peak adult incidence (4.1adults plant⁻¹) was recorded during last week of April, 2011 when the average maximum and minimum temperature varied from 35.3°C to 24.6°C and average maximum &

minimum relative humidity ranged from 91% and 63%, respectively with 3.3mm total rainfall. Highest percentage of leaf damage of 24% could be recorded during first week of April, 2011. During 2012, peak grub incidence (6.9grubs plant⁻¹) was recorded during last week of March, 2012 when the average maximum and minimum temperature varied from 34.7° C to 22.9°C and average maximum & minimum relative humidity ranged from 88% and 54%, respectively with 14.1mm total rainfall whereas, peak adult incidence (6.1adults plant⁻¹) observed during third week of April, 2012 when the average maximum & minimum temperature varied from 35.7°C to 23.6°C and average maximum and minimum relative humidity ranged from 92% and 52%, respectively with 61mm total rainfall. Highest percentage of leaf damage of 27% was recorded during second and third week of April, 2012. The observations were in conformity with Barma and Jha (2013) who recorded highest population of epilachna beetle during second week of April, third week of March and end of March of 2008, 2009 and 2010 respectively on pointed gourd from same region of experiment. Results were also similar to the findings of Vijayasree *et al.*, 2011.

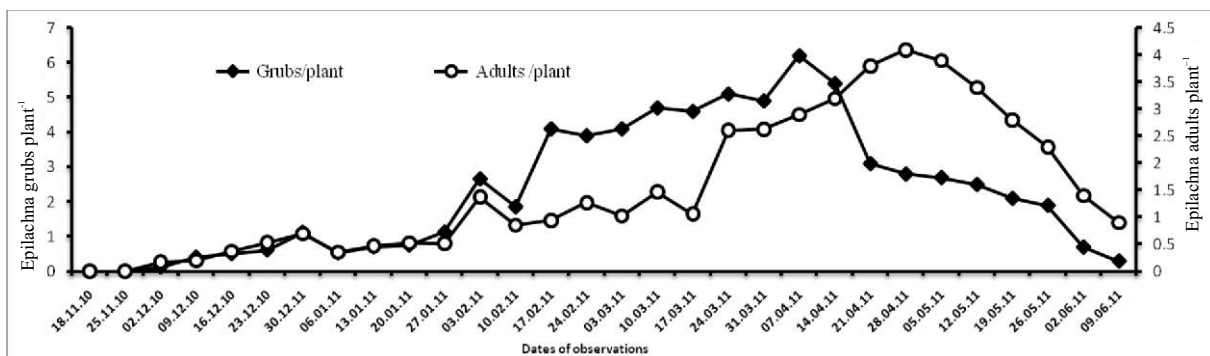


Fig. 1: Seasonal incidence of epilachna beetle on pointed gourd during 2010-2011

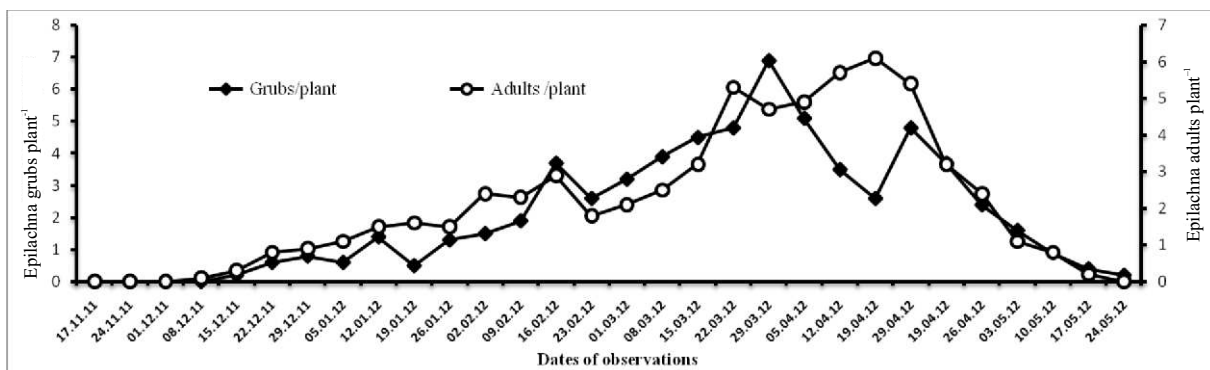


Fig. 2: Seasonal incidence of epilachna beetle on pointed gourd during 2011-2012

Pooled correlation of pest (grub and adult) population build up with each of five weather factors prevailing during occurrence of the pest were worked out and presented in table 1. Relating the weather factors with incidence of grub revealed significant positive correlation with maximum ($r = + 0.642$) temperature whereas, maximum relative humidity ($r = -0.708$) and minimum relative humidity ($r = -0.378$) showed negatively significant correlation. On the

other hand, adults incidence revealed significant positive correlation with both maximum ($r = +0.736$) and minimum ($r = +0.522$) temperature and maximum relative humidity ($r = -0.647$) showed negative significant correlation. Rainfall showed positive correlation with both grub and adult incidence. These results are also in conformity with the findings of Barma and Jha (2013) and Jha (2008).

Table 1: Pooled correlation between incidence of epilachna and weather parameters.

Parameters	Temperature		Total Rainfall	Relative Humidity	
	Max.	Min.		Max.	Min.
Grubs.plant ⁻¹	0.642**	0.359	0.168	-0.708**	-0.378*
Adults.plant ⁻¹	0.736**	0.522**	0.347	-0.647**	-0.146

** . Correlation is significant at the 0.01 level (2-tailed); * . Correlation is significant at the 0.05 level (2-tailed)

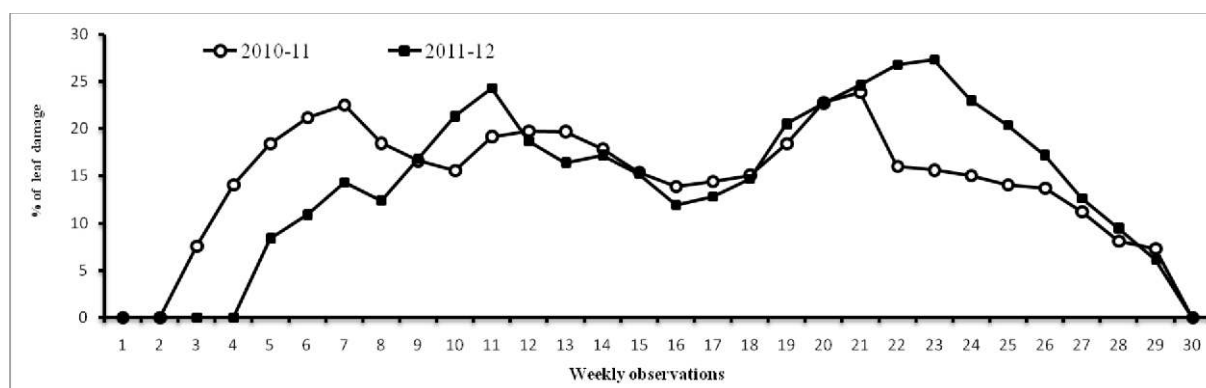


Fig. 3: Percentage of leaf damage by epilachna beetle during 2010-11 and 2011-12

Infestation of epilachna beetle is found to be notorious to the pointed gourd. So it was essential to know the peak period of occurrence of this pest. Keeping these facts in mind, current investigation was conducted on population fluctuation and effect of abiotic factors to evolve an effective and economical strategy of management of this pest. In this study, population of epilachna beetle found to be active during March, April and May months. Variability in abiotic factors found to be responsible for certain changes in incidence and abiotic factors such as temperature (both maximum and minimum) and relative humidity had significant association with epilachna beetle incidence on pointed gourd.

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REFERENCES

Barma, P. and Jha, S. 2013. Insect and non insect pests infesting pointed gourd (*Trichosanthes dioica* Roxb.) in West Bengal. *Bioscan.* **8**:537-43.

Jha, S. 2008. Bio-ecology and management of fruit fly and epilachna beetle in bitter gourd. *SAARC J. Agric.* **6**: 1-15.

Niir, B. 2004. *Cultivation of Tropical, Subtropical Vegetables, Spices, Medicinal, and Aromatic Plants.* National Institute of Industrial Research, New Delhi, pp.209-15.

Vijayasree, V., Nalinakumari, T. and Xavier, G. 2011. Seasonal abundance and damage potential of major defoliators infesting Coccinia, *Coccinia grandis* (L.) Voigt. in Kerala. *Pest Manage. Horti. Ecosystems.* **17**: 113-20.

Wadhvani, M. K., Singh, S. B., Sahoo, R. N. and Abrol, I. P. 2007. Economics of production and post-harvest management of pointed gourd (*Trichosanthes dioica* Roxb.) under diara ecosystem of the lower indo-gangetic plains. *Acta Hort.*, **752**: 153-56.