

**STUDIES ON BIOLOGY OF HADDA BEETLE, *EPILACHNA VIGINTIOCTOPUNCTATA* ( COLEPTERA , COCCINILLIDAE ): A SERIOUS PEST OF WILD BEETER GOURD, *MOMORDICA DIOICA*.**

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**ABSTRACT**

Economically, beetles are important in two basic ways .On the debit side ,plant feeders, when abundant, are pests of agriculture crops and forest trees .On credit side ,predatory species contribute significantly to man's attempt to control plant feeder pest . An animal whose population increases to such an extent as to causes economic losses to crops or a nuisance and health hazard to human being and his live stock is called pests. Fruits of *Momordica dioica* Roxb (wild bitter gourd) are less bitter than *Momordica charantia* L. (bitter gourd). It has also good medicinal value. It is wild annual species and has less germinating capacity. Its production is less than bitter guard and have high market value. Attack of *Epilachna* larvae (grubs) and adults were observed on wild bitter gourd *Momordica dioica*. However present investigation clears that it is a pest of cucurbitace hosts also and is a pest *Momordica dioica*. It cause defoliation and stunted growth and finally reduces yield of it.

**KEY WORDS:** Biology, *Epilachna* beetle, *Momordica dioica*, pest.

**INTRODUCTION**

Insects are economically important organism some of them are beneficial and some are harmful to human being and his things of interest .Beneficial insects are used as food, for production of silk, medicine and other products useful to human being .Some of them play important role in pollination (Mani 1988).Insects which are called pests .They transmit various disease in society and cause damage to crops, timbers forests etc. An animal whose population increases to such an extent as to causes economic losses to crops or a nuisance and health hazard to human being and his live stock is called pests.

An insect belonging to Coleoptera, the largest order not only of insect but also of entire animal kingdom. The name Coleoptera is derived from the Greek words Koleon, means "Sheath",and pteron ,means "Wing". It refers to beetle's characteristic hardened front wings that meet along middle line of the back and form a protective sheath over the hind wing. Economically, beetles are important in two basic ways .On the debit side ,plant feeders, when abundant, are pests of agriculture crops and forest trees .On credit side ,predatory species contribute significantly to man's attempt to control plant feeder pest. *Mordica dioica* is probably originated from the Indian sub-continent. Distribution is in tropical region of Asia .It is climbing creeper plant having fruits of yellow and green colour and surface is covered with soft spine, and rich in calcium, phosphorus, iron, and carotene.

Fruits of *Momordica dioica* Roxb (wild bitter gourd, Kakrol, Teasle gourd, small bitter gourd) are less bitter than *Momordica charantia* L. (bitter gourd).It has also good medicinal value. It is wild annual species and has less germinating capacity. Its production is less than bitter guard and have high market value M.C.Palada and L.C.Chang, 2003 have reported that fruit fly is the most destructive insect pest of bitter gourd. *Epilachna dodecatigma* (Wied.) and *Epilachna vigintioctopunctata* Fab are serious pests of vegetables (Khan *et al.*, 2000). *Epilachna dodecatigma* is fairly common and causes serious damage to solanaceous and cucurbitaceous crops (Khan *et al.*, 2000). The growth and development of plants are greatly hampered and yield is markedly reduce by attack of *Epilachna* beetle (Alam,1969). Rajgopal and Trivedi (1989) have reported that *Epilachna* beetle may damage up to 80% of plants depending on place and season. Hossain *et al.*, (2009), have stydied effect of different host plants on growth and development *Epilachna* beetle. However information of biology of *Epilachna* beetle as a pest of *Momordica dioica* is scanty. So efforts are made to focus on this point.This study forms new report on *Epilachna* beetle as a pest of *Momordica dioica* in this region (Karveer, Kolhapur and State Maharashtra).

**MATERIAL AND METHODS**

Attack of *Epilachna* larvae (grubs) and adults were observed on wild bitter gourd *Momordica dioica*,during last week of June,2011.Newly laid egg masses of same were collected from field. They were brought to laboratory and incubated in plastic containers. For aeration, mouth of plastic containers was closed with muslin cloth. Morphology and incubation period of eggs were observed. Different egg masses were kept in different containers. Grubs hatched from them were also reared in separate container and they were fed on fresh leaves of *Momordica dioica* . Feeding was done daily for once at morning (10-11 am). Cleaning i.e. removal of non-consumed leaves, excavate of grabs was done during the time of feeding. Tender leaves were provided to early instars and semi mature leaves were provided to late

instars. These grubs were allowed for pupation and (beetle) formation. Life span of each stage, number of larvae (grubs) moults with its period was recorded. Observations were also done on feeding behavior of grubs and beetles as well as on pronotal and elytral spots of male and female beetle.

**Results**

Study of lifecycle of *Epilachna vigintioctopunctata* showed (Figure 1) complete metamorphosis with four different stages; egg, grub (larva), pupa and adult (beetle). Morphology of each stage is as below-

**1. Egg**

Eggs are pale yellow in colour, spindle shaped, found in clusters of 16-40, and attached vertically on ventral of leaves near midrib. They were spindle shaped and 1.3 mm in length and 0.6 mm in breadth.



**Figure 1. Life cycle: Hadda Beetle, *Epilachna vigintioctopunctata***

## 2. Grub

The newly hatched larva / Grub were dull blackish-green coloured and was 1.6 mm in length. It had appearance of the typical ladybird larva and showed elongate-elliptical shape with moderately long legs. Body was covered with branched bristles. These bristles were yellow coloured in newly hatched grub but later on turned to black. On half hour of emergence larvae started feeding on leaves of *Momordica dioica* and became pale yellow and then showed greenish yellow colour gradually. The grub showed surface feeding only. It consumed soft surface tissues of leaves between veins. Total four moults and five larval instars were observed. According to growth and development of grub there was gradual increase in feeding rate. During moulting grubs did not consumed leaves. Period of different larval instars was different, however that for different moults was same and it was one and half day.

## 3. Pupa

The pupa of *Epilachna vigintioctopunctuata* was oxarate obteel type. The whole body was covered dorsally with small bristles. It was 6-7 mm in length, yellow and quiescent (no feeding) stage. It lasts for seven days.

## 4. Adult

On 7<sup>th</sup> day of pupation adult (beetle) emerged out. It was oval in outline and 1-2 cm in length. Males are slightly smaller than females. Newly emerged beetles were straw or pale yellow coloured later on they become brownish. Seven separate spots were observed on pronotum of male and female. Elytra of both males and females was glossy and twelve & fourteen melanized black spots were observed on each elytra (right and left) of female and male respectively. Very low melanized outlines were appeared around each spot. No melanization of elytral ground was observed. The feeding behavior of adult was same as that showed by larvae. Duration of feeding of female (22 – 48 days) was more than that of male (11–57 days).

## DISCUSSION

*Epilachna vigintioctopunctuata* is a pest of wild bitter gourd, *Momordica dioica* and it showed many life cycles in a year. Hossain *et al.*, 2009 have reported the effect of different host plants on growth and development of *Epilachna dodecastigma*. Leaf consumption rate of grub on different hosts is influenced by many factors (Hossain *et al.*, 2009). Different chemical stimuli and physiological factors in host plants influence the food consumption rate of *Epilachna* beetle (Jones *et al.*, 1981). Damaged leaves turn brown, curl up and die before falling off (Krishnamurti, 1932; Atwal, 1976). According to Richards and Filewood (1990) *Epilachna vigintioctopunctuata* is restricted to solanaceous hosts. However present investigation clears that it is a pest of cucurbitace hosts also and is a pest *Momordica dioica*. It cause defoliation and stunted growth and finally reduces yield of it.

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