

INTRODUCTION

Trichoplusia ni belonging to the family noctuidae of order Lepidoptera, has a great economic importance. *Brassica oleracea var capitata* and related plants such as *Brassica oleracea var botrytis*, collards, broccoli vegetables & sometimes tomato and cucumber too damaged by the *Trichoplusia ni*.

Field crops which may be attacked by *Trichoplusia ni* are cotton and soyabean. Collard and cotton are preferred hosts for egg laying.

The order consists of 10,000 species in India, and in the order lonely the family noctuidae is explored maximum since it incorporate a large number of species associated with vegetable crops.

A comprehensive study of noctuid pest of different plants of economic importance reveals 472 species only in India.

Though noctuid adult moths don't damage directly to the host plants, yet their caterpillars larvae results into defoliating the crops also affected their yield.

Brassica oleracea var capitata is an important leafy vegetable as it is source of the various vitamins like vitamin K (Phylloquinone) which is responsible to health in the formation of prothrombin.

Prothrombin is essential for blood clotting during external dermal injury like wounds or any cut.

There is potential loss to the crop by caterpillars and offer enough of scope to take up the biology in gravimetric of food consumption and its subsequent utilization in the body system and to control these devastating holometabolus -

caterpillars on the *Brassica oleracea var capitata* becomes in Uttar Pradesh.

HISTORICAL RÉSUMÉ

The existing literature of noctuid pest reveals that a few species of family papilionidae, pieridae, satyridae, saturnidae are of economic importance.

Brassica oleracea var capitata is affected by a number of noctuid caterpillar pests.

Crumb (1934) is an earlier entomologist to classify the noctuid larvae.

Evans (1939) b. described the utilization of food by certain lepidopterous larvae.

Basu (1943) described life-history and bionomics of the cauliflower pests.

Kasting and Mc Ginnis (1959) in their experiment found out the food consumption value. In (1962) they studied quantitative relationship between consumption and excretion of dry matter for the fourth & 6th instar of *Agrotis orthoegonia*.

Chlodny (1967) described the energetics of the development of cabbage white *Pieris brassica* L.

Chlodny (1967) and Reddy, Alfered (1979) observed and noted that the greater part of the food is consumed during the 4th and 5th instar and the daily food requirements and biomass production per individual increased with the larvae lays on the basis of calory. Mukherjee and Guppi (1970) on the other hand described the same in noctuidae family of Lepidoptera.

Bhattacharya and Gupta (1971) identify some lepidopterous infesting pests.

The quantitative analysis of food consumption, assimilation and growth of tissue was studied on different insect by Latheef and Harcourt (1972).

Bhattacharya and other (1977) studied biology of *Plusia orichrasia* noctuid.

Dhandapani and Balasubramanian (1980) studied the consumption and utilization of various different food plants by *Heliothis armigera*.

Browning, Federici and Oatman (1982) found out the presence of a disease in the larval population of *Trichoplusia ni*.

Reddy (1983) studied the food consumption and its utilization by the larvae of *Philosomia ricini* Hutt.

Reddy (1983) Benerjee and Haque (1984) and several other workers studied on various aspects of bioenergetics on different species.

Kenny and Chapman (1988) explained the effect on an intercrop on the insect pests for better production of crops.

Fitt and Dely (1990) studied the activity of the wintering pupae and the spring generation of *Helicoverpa*.

Charensone (1992) studied the biology of entomophagous insects.

Apablaza and Norero (1993) studied the synthetic pheromone of *Trichoplusia ni* and *Agrotis ypsilon*.

Landolt (1995) observed the affect of pheromonic activity of cabbage looper moths in the field.

Landolt and Molina (1996) studied the activity of male pheromone on the starved cabbage looper moths.

Gunaseelan (1998) pointed his search on impact of anaerobic digestion on inhibition potential of parthenium solids and also studied on its biomass and bioenergy.

White and Demianyk (1999) studied on the bioenergetics of insects feeding on stored cereals.

Tanzubil, Mensah (2000) studied the diapaus initiation and incidence in the *coniesta ignetusalis* and role of the host plant in the diapaus of the insect.

Scriber (2002) studied bioassays as to explain heterospecific mating preference of North American butterfly of Lepidoptera.

Valella and Scriber (2002) studied latitudinal variation of pupal diapause in *Papillio trailus* in photoperiodic induction.

More than one hundred forty million of crop land had been covered over by synthetic pesticides.

Gunjan and R.K. Gautam (2005) reported that higher incidence of dipause in larva of *Heliothis armigera* (Lepidoptera; Noctuidae) was recorded when larvae were exposed to thermophoto periods with cryophase of 20°C to 25°C, than under thermoperiods during constant darkness.

On the other hand larvae exhibited significantly lower percentage of dipause, when exposed to cryophases lower than 20°C under thermo or thermophoto periodic condition.

R.K. Gautam & Gunjan Verma (2006) studied toxicity of synthetic pyrethroids on lepidopteran insect pest (*Heliothis armigera*) and reported that decamethrin is more effective than cypermethrin permethrin, and fenvalerate respectively.

Gunjan and R.K. Gantam (2007) studied the bioenergetics of *Heliothis armigera* as regard to consumption of food and on behalf of which tissue growth of different instars, assimilation and respiration studied. Such studies indicated that metabolic rate of the larvae depends on consumption of food which provide the tissue growth of insect pests.

Synthetic pesticides have of course, played very significant role in controlling many pest problem but extensive and indiscriminate use of chemicals has its own limitations, as it create several ecological and medical problems, like environmental problems, development of resistance in pest, adverse effect on parasitoids and non target organism.

Recent awareness about the hazards of persistent synthetic pesticides and their high cost have generated fresh interest and intensified research on pesticides of plant origin.

Crude extract of *Allium cepa* bulb showed insecticidal properties against pulse beetle and larvae of rice moth Prakash & Rao (1987).

PURPOSE OF STUDY

Brassica oleracea var capitata is an edible crop of vegetables. It has a great economic importance covering thousand of hectare of land in Uttar Pradesh, which is attacked by a number of papilionidae, pieridae, satyridae, saturnidae, comprising

the bulk of spp. The biology of some noctuids is described by some individuals study.

Brassica oleracea var capitata contents antioxidant activity. So it has more medicinal value as well as it is resource of body regulators like vitamin A, Vitamin M and Vitamin K.

The Nutritional studies almost a fold of study, yet undescribed. Nutritional value is a better indicator of the insect significance in a community then its biomass as far as the agroecosystem is concerned.

Morphological study at each larval stage, pupal stage with subsequent weight loss in successive pupal period are several aspects of additional knowledge. This will give a new line of classification on the basis of larval and pupal bioenergetic basis.

Morphomatrix study of larvae and pupae will also support the existing laws of growth.

Trichoplusia ni (Lepidoptera : Noctuidae) is a serious defoliator of the *Brassica oleracea var capitata* from the Western U.P. and is being chosen to undertake the description regarding Nutritional studies.

Such studies are of fundamental importance for the proper understanding of the insect mutation and will be of immense value in building up the feeding models for the pest management.

METHODOLOGY

For observation of Nutritional study during different stages of life cycle Kasting and Mc Ginni's methods is standard as there is no chance of error in which for body weight of both male and female sexes from I instar upto middle of the VI instar, the body weight will represent graphically on the basis of dry weight before prepupal stage for tissue growth we will observe body weight corresponding low level of feeding after each moult from I to last instar.

For consumption of food by an individual caterpillar we will observe the data of ingestion of food from I to VI instar in both male and female.

For assimilation by the caterpillars we will observe its 'larval period taking each instar's body weight graphically and will find the efficiency of food assimilating the calories separately in male and female both.

Growth efficiency will observe on live weight basis in the later larval life from IV to VI instar graphically in different efficiencies such as ECI, ECD, digestibility and growth rate. All these parameters will represent graphically as well as in table form.

In the same way for calculation of food energy budget we will use Bailel's method in which the observation of energy flow in a single food chain from one trophic level of producers *Brassica oleracea* var *capitata* to the other trophic level of primary consumers or herbivorous during different larval stages of *Trichoplusia ni* which will be illustrate in both male and female on the average basis.

Such energy budget will estimate through the larval stages in which there

will observe caloric values of various developmental stages of *Trichoplusia ni* & their faeces along with the whole plant material on the basis of calory / my dry weight.

TOXICOLOGY:

For toxicological experiment one synthetic pesticide selected namely endosulphan and one plant extract as biopesticide has been selected which is Parthenium hysterophorus, belongs to family, asteraceae of plant kingdom.

The newly hatched larva of *Trichoplusia ni* will take for estimating the residual toxicity where as the 3rd instar will select for determines LC₅₀ of synthetic pesticide and plant extract. Relative toxicity of synthetic pesticide and plant extract will give a new line of worked.

BROAD OUTLINE OF THE WORK

CHAPTER

1. Introduction

2. Historical Resume

3. Methodology

A. Utilization of food by caterpillars:

- i) Body weight
- ii) Tissue growth
- iii) Consumption
- iv) Egestion
- v) Assimilation

B. Growth Efficiencies:

- i) Efficiency of conservation of ingested food (ECI)
- ii) Efficiency of conservation of digested food (ECD)
- iii) Approximate digestibility
- iv) Growth rate
- v) Consumption index

C. Food Energy Budget:

Toxicology:

- i) Pesticidal property of endosulphme (synthetic pesticides) and Partheneium hysterothorus (a plant extract as pesticide) against *Trichoplusia ni*.
- ii) Relative toxicity of used synthetic pesticide and plant extract to *Trichoplusia ni*.

4. Discussion

5. Summary

6. Bibliography

7. Acknowledgement

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