



ISSN : 0973-7057

Int. Database Index: 663 www.mjl.clarivate.com

Taxonomic studies of Bihar hairy caterpillar, *Spilosoma obliqua* Walker, 1855

Manisha Kumari*

Department of Zoology, B.N Mandal University, Madhepura, Saharsa, India

Received : 17th November, 2017 ; Revised : 28th December, 2017

Abstract: Taxonomic studies of Bihar hairy caterpillar has been done briefly under the set norms of HTA insects morphological description in order to confirm the generic & species identity of the pest as *Spilosoma obliqua* Walker, 1855. Additional focus has also been given on life cycle pattern to strengthen the taxonomy of the caterpillar. It has been found to be serious Lepidopteron nocturnal erbid pest of varieties of weeds & agricultural crops of Saharsa & Madhepura.

Keywords: HTA taxonomy, life cycle pattern, Lepidopteron moth, pest of weeds.

INTRODUCTION

The Bihar hairy caterpillar *Spilosoma obliqua* Walker, 1855 (jute hairy caterpillar) is a moth of the family Erebiidae. It is a polyphagous pest, known to cause severe damage to several crops of agricultural and horticultural importance besides feeding on weeds. *S. obliqua* is a sporadic and severe pest during monsoon and post monsoon periods. The young caterpillars of *S. obliqua* are gregarious and they feed on the soft green tissues mostly on the under surface of the leaves and causes defoliation. In severe cases, only stems are left behind. It is found in south eastern Afghanistan, northern Pakistan, India, Bhutan, Bangladesh and Burma.

Biology and life-history of *S. obliqua* was studied in West Pakistan (Bangladesh) on jute (Kabir and Khan, 1969)¹. Biology of *S. obliqua* on mulberry, *M. alba* was studied in Karnataka (Kotikal, 1982)².

The present study is exclusively focused on the taxonomy of the pest, on the basis of its morphological characters and other biological features.

MATERIALS & METHODS

Study area description

After detailed survey of Saharsa district of Bihar some of the mulberry fields, bean fields, cotton field as well as the jute field were selected for the collection of defoliator insect pests. The selected fields were from different areas of Saharsa district of Bihar. Insects were collected by visiting each of the gardens for 2 annual cycles with more or less monthly periodicity.

Collecting method

Different defoliator insect's pests were collected from the field in and around the selected fields of Saharsa district, Bihar, India by insect collection techniques. Immature stages of hairy caterpillar were collected from the field and used as nucleus culture to study the biology at room temperature. Pair of male and female adult moths were released into a cage for egg laying and incubation period was recorded. The adults were fed with 10 percent honey solution. The freshly hatched larvae were placed on its host with the help of hair brush and kept in Petri plate whose cap is made perforated in order to facilitate aeration and were observed twice a day for the larval moulting. For the last instar larvae the soil was to be provided to facilitate pupation. Egg period, larval period, pre-pupal

*Corresponding author :

Phone : 07004317966

E-mail : todeardeepak70@gmail.com

period, pupal period was also recorded. Biological characteristics of adults such as pre-oviposition period, oviposition and post oviposition period, and fecundity were also recorded.

Killing & Preservation methods

All defoliator insects pest are allowed to dry at once they are dead. They should be placed directly into a liquid preservative usually 70-95% ethyl alcohol. Formalin should not be used for storing as it makes the specimen hard and difficult to examine. Insects can also be killed by placing them in freezer usually the reared moths. Larger butterflies can be killed by pinching the thorax. While most insects can be killed in killing bottles. The bottle should wide mouthed and made up of glass: polypropylene or polythelene.

OBSERVATION

Morphological features of the pest (adult moths- both male & female were observed under HTA morphotaxonomic plan):-

A. HEAD:

- i. Probnathous and egg shaped
- ii. Antennae filiform
- iii. Maxila with lacinea

B. THORAX:

- i. By virtue of the possession of 3 pairs of walking legs it belongs to class insect.
- ii. 2 pairs of wings were found hence it belongs to subclass Pterygota
- iii. Colorful scales were found on triangular wings hence it belongs to order Lepidoptera

C. ABDOMEN:

- i. Blunt, hairy and small in male with reduced ovipositor
- ii. Tappered, long and hairy in female

The adult moths were found active in the night hence it belonged to super family Noctuoidea.

RESULTS & DISCUSSION

In the present study, analysis of the morphotaxonomical characters of the collected samples reveals that the insects belonged to the order Lepidoptera, which is regarded as one of largest orders consisting of more than 105,000 species.

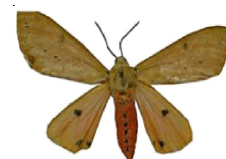
It has following taxonomic classification:

Taxonomic classification:-

Kingdom:	Animalia
Class:	Insecta
Order:	Lepidoptera
Superfamily:	Noctuoidea
Family:	Erebidae/Arctiidae
Genus:	<i>Spilosoma</i>
Species:	<i>S. oblique</i>



Blunt abdomen
(female)



Tapered abdomen
(male)

The investigation revealed that *S.obliqua* was terrestrial in habitat. The maximum density was noted in the month of August to February. The growth parameters such as egg, larvae, pupae, and adult developmental period and structures were recorded. The pupae were kept in respective petridish without causing any disturbance until the adult emergence to record the pupal period. When kept in observation it was found that the eggs laid by the female moths were present in cluster below the surface of leaves and usually creamy white to yellowish in appearance. Its size was about 0.25 ± 0.021 mm in diameter and 148-232 in groups covered with hairy scales. Biology of *Diacrisia oblique* Walker was studied by Djou(1938)³. The eggs produced by the moths also varied depending on food plant intake and ranged from 354-821. Incubation period of the egg were found to be different depending upon the habitat. The variation in incubation period might be due to the different environmental condition. During the larval developmental period, the caterpillar molted five times and had six larval instars. The larva became sluggish and ceased feeding prior to molting. Length and breadth

increased instantly at each and every moulting and segmentation became more clear. The head possessed by the first instar larvae was greater than its body. Its body was covered with light colour delicate hairs arising from dark coloured tubercles. The width of the head capsule ranged from 0.06-0.07mm. The body of the second instars larvae grew very fast and the body turned wider than the head. Now the larvae were light yellow in colour. The third instar larvae were morphologically similar to that of the second instar larvae with black patches on the anterior and posterior region of the body. The larvae molted were now with different colour patterns such as red, dark orange, black. Such observations were also supported by the finding of Bhuyian and Sardar (1971)⁴. The fourth instar larvae were yellowish in colour with yellow longitudinal stripes. Head and prothoracic shield were dark brown. The fifth instars larvae were almost similar to fourth instar except size. The larvae had dense hairs on its body. When the sixth instar larvae were observed it was found that larvae were stout and cylindrical.

Larval development period

The duration of larval development was different depending on the host plant. Variation in duration of different larval instars was reported by Singh and Sehgal

(1992)⁵. The length and weight of the larvae were significantly affected by their habitat. The prepupal and pupal stage also differed among different instar larvae due to the influence of food and temperature. It was also observed by Deshmukh *et al.* (1982)⁶, and Prasad and Chand (1980)⁷.

The adult's moths were medium in size, light pinkish buff coloured with black dots on its wings. The female was comparatively bigger than male.

Mortality

The mortality rate of the larvae and pupae differed due to different host plant.

Life cycle

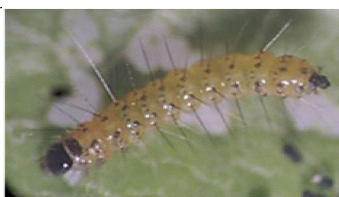
Total life span of male and female ranged from 37-42 days with an average 39.8-80 days and 39-44 days. Dahale *et al.* (1988)⁸ reported that male moths completed their life cycle in 40.12-43.64 days and female in 40.80-44.89days. These controversial results reveals that life cycle duration of *S. obliqua* is highly influenced by the quality of food, environmental temperature and humidity.

Oviposition

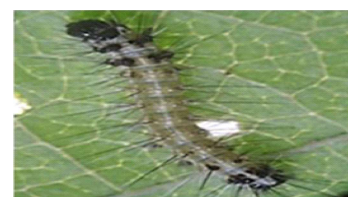
Oviposition took place immediately after. The eggs were deposited in 2 to 3 batches. The pre-oviposition period varied from 1.00 to 1.50 days with an average of



Egg mass



First & Second instar



Third instar



Fourth instar



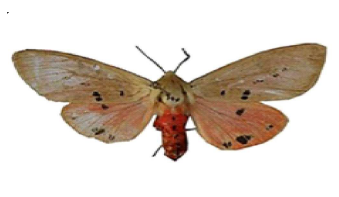
Fifth instar



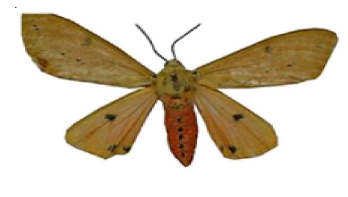
Sixth instar



Pupa



Blunt abdomen (female)



Tapered abdomen (male)

Life cycle of *Spilosoma obliqua*

1.33 days, ovipositional period was 3.00 to 4.00 days with an average of 3.66 days and post-oviposition period was 1.00 to 1.50 days with an average of 1.10 days.

ACKNOWLEDGEMENT

The author is highly thankful to her guide Dr. Arun Kumar, Associate Professor, Dept. of Zoology, B.N.Mandal University, Madhepura and also to Z.S.I, Kolkata for help in the taxonomic identification

REFERENCES

1. **Singh, S. and Sehgal, S.S 1992.** Studies on growth and development of *Spilosoma oblique* (Walker) on different food plants. *Indian J.Ent* **54(4)**: 471-482.
2. **Deshmukh, P.D. Rathore, Y.S and Bhattacharya, A.K 1982.** Effect of temperature on the growth and development of *Diacrisia oblique* (Walk) on five host plants. *Indian J. Ent.* **44(1)**: 21-33.

3. **Djou Y.W. 1938.** A limbean leaf-hopper, *Diacrisia oblique* Walk. (Lepidoptera:Arctiidae). *Lingran Sci. J.* **17(4)**: 639-645
4. **Prasad, D. and Chand, P. 1980.** Growth and development of *Diacrisia oblique* Walk. On various food plants. *J. ent,* **42(4)**: 611-616.
5. **Kabir, A.K.M.F. and Khan, S.A 1969. Biology and life history of jute hairy caterpillar, Diacrisia oblique Walk.** In East Pakistan. *Pak. J. zool.* **1(1)**: 45-48.
6. **Kotikal, Y.K (1982).** Studies on the pest of mulberry, *Morus alba* L. With special reference to black headed hairy caterpillar , *spilosoma oblique* Walker (Lepidoptera: Arctiidae) M.Sc. Thesis , University of agricultural sciences, Dharwad,pp, 1-210.
7. **Bhuiyan, T.C and Sardar. N. (1971).** Studies on the phase variation in jute hairy caterpillar . *Diacrisia oblique* (Walker). (Lepidoptera : Arctiidae). *Pak. J. zool.,* **3(1)**: 101-121.
8. **Dahale P.S., Puri S.N. and Bilapate, G.G. 1988.** Biometrics, growth and development of *Diacrisia oblique* Walk. on different hosts. *J. Maharastra Agric. Univ.* **13(2)**: 164-168

ADDITIONAL REFERENCE

9. **D.B.Tembhare. 2016.** *Modern Entomology*, Himalaya Publishing house, Mumbai.

