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# Biology of *Metanastria hyrtaca* cramer (Lepidoptera: Lasiocampidae) on *Syzygium cumini*

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**Abstract**
The biology of *Metanastria hyrtaca* was studied under laboratory as well as in field conditions on *Syzygium cumini*. Adult female laid eggs in clusters on the bark of tree, branches and also on lower surface of leaves. The number of eggs laid by a gravid female moth was about 145. Average incubation period was 9.3 days. The prepupal period was lasted for 1 day while pupal period lasted for 11.11 days. The total life cycle of *M. hyrtaca* ranges from 78 to 93 days. The average longevity of the adult was 6 to 7 days. It is a polyphagus pest feed on 03 different plants. It was only found on the *S. cumini* in Pandharpur area.

**Keywords:** *S. cumini*, *M. hyrtaca*, moth, lepidoptera

## Introduction
The Jamun is common plant found in most of South Western areas of Maharashtra. Moreover, it is also cultivated in backyards, roadsides, borders of fields and wind breakers around the orchards. It has immense economic value because of its use as timber and delicacy of fruits, its bark and seeds are used as traditional medicine. Fruit contains nutritional value iron, calcium and protein. Dried and powdered seeds were used to treat diabetes, diarrhoea and dysentery. Numerous insect pests were recorded on Jamun. *S. cumini* attracts and shelters a variety of insect pests of other trees. Jamun trees are attacked by 36 insect pests at all stages of growth (Butani, 1979) [6]. The pests of common occurrence are scale insects, thrips, white flies, bark eating caterpillar, leaf roller, and leaf miners. Among the various insect pests of Jamun, *M. hyrtaca* is a regular pest in Pandharpur area, Maharashtra. This is distributed in Tamil Nadu, Madhya Pradesh, Maharashtra, Orrisa, Eastern Himalaya, Assam and Sri Lanka. (Hampson, 1892; Flethcher, 1914) [10] Caterpillars feed greedily on leaves leaving behind midrib only. Severe infestation may result in to extensive defoliation of the tree. The objective of the present investigation is to determine the nature of damage, habits and biology of the Lasiocampid moth *M. hyrtaca* in the field as well as in the laboratory conditions.

## Material and Method
Among the lepidopterous insects, the immatures of *Metanastria hyrtaca* was recorded frequently on the foliage *of Syzygium cuminii*. The life cycle of *M. hyrtaca* on *S. cumini* was studied during January 2020 to September 2020 in laboratory by collecting last instar larvae regularly from Pandharpur area Maharashtra. Larvae were hand collected by using forceps from the trunks of Jamun. Larvae were placed in plastic containers (2 kg capacity) and brought to the laboratory. Branches were also examined in the field and any eggs found were removed (often attached to a piece of bark), placed on moist filter paper on a sealed Petri dish. The survival of eggs in the field and fate of shells could not be assessed as very few eggs found by field inspections. In field, eggs were found in clusters.

Collected larvae were reared in glass jars (20 x 20 x 17 ½) by providing fresh *S. cumini* leaves daily. Male and female adults obtained were released in cages for egg laying. After egg laying, eggs were transferred to petridishes containing fresh tender *S. cumini* leaves at room temperature. A moistened filter paper (Whatman No. 3) was kept in each petri dish to prevent drying of leaves.

The caterpillars were maintained in Petri dishes up to second instar. Later on they were transferred and reared in separate glass jars (20 x 20 x 17 ½) and allowed them to complete first generation. Observations were recorded daily on the development of colour, size and durations of different instars of larvae. The body length and width of first instar and eggs were measured by using ocular micrometer while second to last instar, pupal morphometric data were recorded by using a standard graphic method. The duration of prepupal, pupal stages and change in colour were also recorded. Fecundity studies were made by releasing individual pairs (5) of newly emerged adult and they were kept in separate cages containing fresh tender twigs of *S. cumini*. The identification of the species under study was made by using literature (Hampson, 1892; Lefroy, 1909) [10].

## Results and Discussion
The life cycle, nature of damage was studied in the field and also in laboratory. The complete account life cycle stages i.e. egg, larva, pupa and adult are presented in table number 1 and 2.

### Egg
The adult female laid eggs in clusters on bark and foliage

lower surface. The studies on fecundity revealed that single mated female can lay about 145 eggs in clusters. They are spherical in shape and ash grey to black in colour. They remain attached to each other closely. The exterior of the egg is smooth with three deep brown, circular spots. The average incubation period of eggs was 9.3 days.

**Larval Development**
There were five larval instars in male and six larval instars in females which totally lasted for 50 to 58 days.

**First Instar**
The newly hatched first instar larva is black in colour with dirty white lines between the segments. The duration of first instar lasted for 4.88 days.

**Second Instar**
The second instar larvae are little brown in colour clothed with hair. The duration of second instar is of 7.44 days.

**Third Instar**
The third instar larvae are brown in colour with reddish lines dorsally. The third instar larval period was recorded 7.55 days.

**Fourth Instar**
The fourth instar larvae were resembled the third instar larvae except in size. The fourth instar larval period was recorded 12 days.

**Fifth instar**
The full grown caterpillar is brown with reddish lines dorsally and brown and yellow patches ventrally. There are lateral tufts of hair on the thoracic segments projecting anteriorly. All the segments bear a thin tuft of hairs on the mid dorsal line. Short tuft of soiled hairs also occur in patches on the mesothoracic and abdominal segments. There are five larval instars in male and six in females. The fifth instar male larva lasted for 11.22 days and sixth instar female larva lasted for 11.11 days.

**Habits of larva**
The larval stages of the *M. hyrtaca* Cramer causes damage by voracious feeding on leaves of *Jamun*, they feed from the margin reaching the mid rib. The caterpillars remain inactive throughout the day. They become active immediately after the dusk and migrate towards the green foliage of the tree. The caterpillars remain on green foliage of the tree and come down before sunrise for rest. The observations on the habit of larva were confirmatory with the observations of Arrora (1986) [3]. During survey of the larvae, they were observed on the trunk of the tree 1 foot above from the ground level and on underside of the branches of the tree.

**Prepupa**
The full grown caterpillar stops feeding one day prior to pupation. The pre pupal period was observed to be 1 day.

**Pupa**
Pupation takes place in a brown silken cocoon. The cocoon is attached to the lower surface of the leaf or it spins the cocoon in between the leaf, with the help of silk threads, it ties the both the edges of the leaf and finally it pupates within the cocoon. The pupa is brown in colour with yellow coloured hair arranged transversely in rows on all segments but in the head region they are being more prominent. There are seven pairs of spiracles. The pupal period lasts for 11.11 days in male and 10.88 days in female.

**Adult**
The male moth has wing expanse of 39 to 41 mm and a body length of 21 to 25 mm and 4 to 6 mm in width while the female has wing expanse of 67 to 71 mm and 21 to 30 mm in body length and 8 to 10 mm width respectively. The total life cycle from egg to adult is complete in 78 to 93 days. The colour of the body is light brown in female and is deeper in males. There is a profound brown patch with a white spot on fore wings of male. The oviposition commences after mating and continuous till death.

Several lepidopterus insects were reported to be pests of economically important area plants viz. *Acrocercops, Inderbella sp*. *Eutectona machaeralis. M. hyrtaca* many of the times it occurs in serious proportions and defoliates the trees. Regupathy *et al* (1995) reported 11 insect pests of *S. cuminii* and described the nature of damage by the developing stages of the pests. Most of the pests of *S. cuminii* belong to order Lepidoptera. During the study it was found that lepidopterous pests causing more damage to *S. cuminii* in Pandharpur area throughout all the seasons. *M. hyrtaca* was found to be major during the winter and summer season.

It is polyphagus pest feed on *Anacardium occidentale, Acacia nilotica, and Acacia catechu.* On *Syzigium cuminii* it takes 45 to 60 days for completion of life cycle.(Prem Chand, 1995). Ananthkrishnan (1995) has described host plants and parasitoids of *Metanastria hyrtaca* and reported that it feeds on *Tamarindus indica* and *Acacia nilotica*. The *Metanastria punctata* is a major pest of pine plantations in central and southern China. Its larvae feed on the *Pinus* spp.; *P. massoniana*; *P. radiata*; *P. taeda*. Generally it attacks young Pine plantations and pure natural stands of specific age group from 8 to 15 years. There is no report on the tree mortality by this pest but the major effect is retardation in growth of trees (FAO, 2007) [8]. On the other hand in one growing season, defoliation can take place several times on one set of trees; this grow weaker trees making them more susceptible to attack by bark beetles. The subsequent feeding by the beetles may then cause tree mortality (Browne, 1968) [7]. *Metanastria hyrtaca* feed voraciously on the leaves of Sapota and defoliate the trees. It is distributed in many parts of the India and found to infest tree crops. On Sapota it completes its life cycle in 61-72 days (Paul, 2007) [14] This pest in addition defoliates *Mimusops elengi, Nyctanthes arboristris* and *Terminalia catappa* (Fletcher, 1914) [9] In 1940 Ayyar reported it on *Anacardium occidentale*. In Kerala, it was reported that *M. hyrtaca* attacks on isolated trees of *Ancardium occidentale.* It was also reported on *Moringa oleifera* (Nair *et al.*1974; Abraham, 1958; Basheerand jayaraj, 1964, Sivagami and David, 1968). Lefroy (1909) reported it on *T. catappa*.

**Table 1:** Duration of different stages of *Metanastria hyrtaca* in days.

| Stage | | Min | Max | Mean | S.D. |
|---|---|---|---|---|---|
| Egg: | Incubation Period | 8 | 11 | 9.3 | 1 |
| Larval Period | I$^{st}$ instar | 4 | 6 | 4.88 | 0.927 |
| | II$^{nd}$ instar | 7 | 8 | 7.44 | 0.527 |
| | III$^{rd}$ instar | 7 | 8 | 7.55 | 0.527 |
| | IV$^{th}$ instar | 12 | 12 | 12 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| | V$^{th}$ instar | 10 | 12 | 11.22 | 0.971 |
| | VI$^{th}$ instar | 10 | 12 | 10.55 | 0.726 |
| Pupa | Male | 10 | 12 | 11.11 | 1.054 |
| | Female | 10 | 12 | 10.88 | 1.054 |
| Adult | Male | 6 | 7 | 6.3 | 0.483 |
| | Female | 6 | 7 | 6.9 | 0.316 |

**Table 2:** Morphometric data of *Metanastria hyrtaca* Cramer (mm).

| **Stages** | | **Min** | **Max** |
|---|---|---|---|
| Egg Diameter | | 1.106 | 1.270 |
| Larva I instar | Length | 4 | 5 |
| | Width | 1.0 | 1.2 |
| II | Length | 14 | 15 |
| | Width | 2.3 | 2.8 |
| III | Length | 27 | 30 |
| | Width | 3.7 | 4.2 |
| IV | Length | 38 | 40 |
| | Width | 4.5 | 5.0 |
| V | Length | 53 | 60 |
| | Width | 8 | 9 |
| VI | Length | 67 | 70 |
| | Width | 8 | 10 |
| Pupa<br>Male | Length | 20 | 22 |
| | Width | 6 | 6 |
| Female | Length | 23 | 25 |
| | Width | 8 | 11 |
| Adult<br>Male | Length | 21 | 25 |
| | Width | 4 | 6 |
| | Wing expanse | 39 | 41 |
| Female | Length | 21 | 30 |
| | Width | 8 | 10 |
| | Wing expanse | 67 | 71 |

Figures are mean of 10 samples.

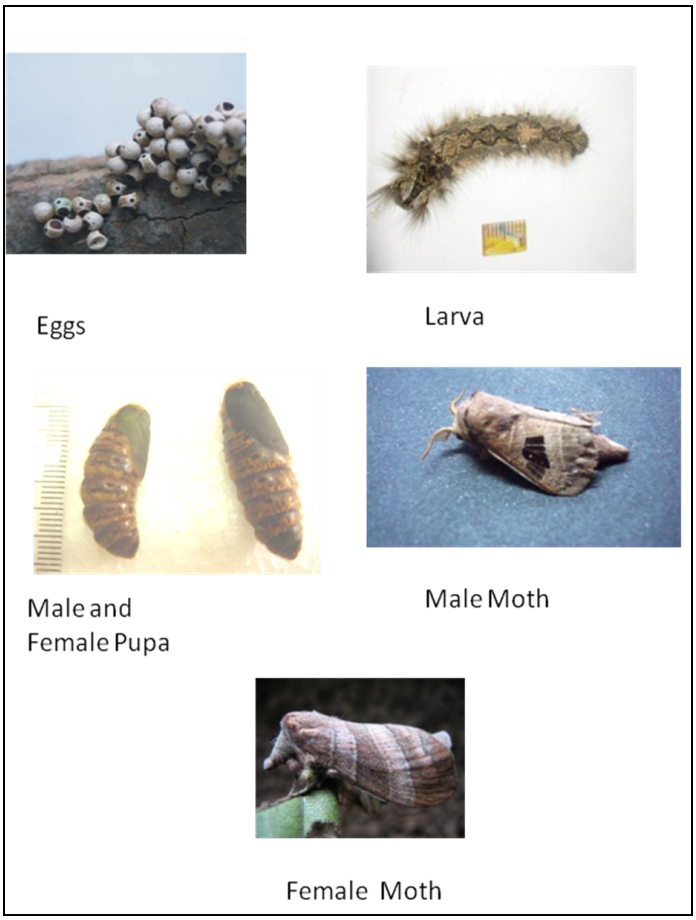


**Plate 1:** Biology of *Metanastria hrytaco* cramer

## Conclusion

The overall information available on the *M. hyrtaca* reveals that it feed on 10 different plants. From South India, in Kerala it was frequently reported from the cashew plantations and on *S.cuminii* in Tamil Nadu. It was also reported on *S. cuminii* from Madhya Pradesh, Uttar Pradesh, Bihar and other northern states of India.

The studies on the flora of Pandharpur revealed that it found on *Tamarindus indica*, *Acacia nilotica* in the area of Pandharpur district. However *M. hyrtaca* infests only *S.cuminii* Pandharpur area. Serious infestations were observed in post winter and summer season.

As *S. cuminii* is common and beneficial tree of this region situated along road sides and around the agricultural area. There is need to investigate the other insect pests, their status, extent of herbivory and seasonal abundance. It will help in the protection and sustainable utilization of this plant resource.

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## References

1. Abraham EV. Pests of Cashew. (*Anacardium occidentale* L.) In South India. India J. Ent. Entomological Society of India, New Delhi, 1958.
2. Ananthakrishnan. Biological control of Social area and Plantation Crops insects. Oxford and IBH Publishing House, 1965.
3. Arrora GS. Some field observations on a lepidopterous pest *Metanastria hyrtaca* Cramer (Family: Lasiocampidae). *Rec. Zool. Surv.* India, 1986, 83(3-4).
4. Ayyar TVR. Handbook of Economic Entomology for South India. Governmet Press, Madras, 1940, 228.
5. Basheer M, Jayaraj S. Cashew nut Pests. In Entomology in India, Silver Jublee Number, Indian J. Ent. Entomological Society of India, New Delhi, 1964, 261-266.
6. Butani DK. Insects and Fruits. Periodical Book Agency, New Delhi, 1979.
7. Browne FG. Pests and diseases of area and plantation trees. Oxford, Clarendon Press, 1968, 1330.
8. FAO. Overview of area pests. People's Republic of China. Working Paper FBS/ 13 E FAO, Rome, Itlay, 2007, 30.
9. Fletcher TB. Some south Indian Insects. Government Press,Madras, 1914, 565
10. Hampson GF. The Fauna of British India including Ceylon and Burma, London,1892:23:1:527.
11. Lefroy MH. Indian Insect Life. Today and Tommorrows Printers and Publishers, New Delhi, 1909.
12. Nair CPR, Abraham VA, Pillai GB. Biology of Metanastria hyrtaca Cram. a defoliater of Cashew, Journal of Plantation Crops,1974:2(2):32-33.
13. Premchand. Agricultural and area Pests and Their Management, Oxford Publishing House Co. Pvt. LTD, New Delhi, 1995.
14. Paul AVN. Insect Pests and their management. IARI, New Delhi, 2007, 68.
15. Sivagami R, David BV. Some insect pests of moringa (Moringa *oleifera* Linn.) in South India. South Indian Hort,1968:16:69-71.
16. Regupathy A, Chadrashekharan T Manoharan, S Kuttalam. Guide to area enntoology. Sooriya Desktop Publ. Coimbatore.