



Figure 1. Output of ROAM.

low-altitude areas the interventions could be: (i) minimizing forest fire, (ii) promotion of agri-horticulture, cultivation of medicinal, and aromatic plants, silvi-pasture promotion using multipurpose tree species for livelihood, and (iii) linking sacred groves/sites and Van Panchayats with people's livelihoods, such

as eco-tourism. These measures are likely to enhance community participation in the effective treatment of degraded land. It is expected that this comprehensive approach of FLR using ROAM would prove more pragmatic over the traditional approach of sectoral treatment of degraded land in Uttarakhand.

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Female gynandromorphy – a rare biological event in DABA bi-voltine *Antheraea mylitta* D. ecorace

The *Antheraea mylitta* D. (Lepidoptera: Saturniidae) is an important wild silkworm endemic to India and distributed in diversified ecological and geographical regions ranging from 12°N to 31°N lat. and 72°E to 96°E long., accordingly 44 eco-races have been reported¹. DABA bivoltine race has been reared extensively by the >3 lakh tribal and rural communities as a livelihood practice. The larvae of *A. mylitta* are polyphagous but, majorly it has been reared on *Terminalia tomentosa*, *T. arjuna* and *Shorea robusta*

in the forest patches and block plantations commercially.

A. mylitta is an oviparous insect which reproduces by laying fertilized eggs. Embryonic development occurs after oviposition and it requires about 8–9 days for the eggs to hatch under normal conditions. During embryogenesis, the cells divide mitotically and produce two daughter cells with identical copies of DNA from the parents. Any deviation in the distribution of chromosomes from normal results in sexual mosaics. Unlike

in other insects, the gynandromorph is also observed in the natural as well as semi-domesticated *A. mylitta*^{2,3}. Various factors like temperature, ultraviolet light, viral infections, mutations, nuclear power plant disaster and interspecific hybrid crosses are associated with the development of such irregularities^{4,5}. The present correspondence is on such a report on gynandromorphy in *A. mylitta*.

We have reported the female gynandromorphy in semi-domesticated DABA bivoltine race to an extent of 0.000012%.



Figure 1. A female gynandromorph in *A. mylitta*.



Figure 2. Ovipositing female gynandromorph.

Male characters were observed in the right side with large-feathered bi-pectinate antennae and female characters in the left side with feebler-feathered bi-pectinate antennae (Figure 1). Male and female characters are bilaterally symmetrical, with a colour marking of brown and yellow respectively. Forewing is

sub-triangular in both the male and female side. But, in female forewing, subcoastal region is curved, apical margin not extended, apical angle is pointed and termen is almost straight. Whereas in male forewing, subcoastal region is curved, apical margin is extended forward and curved, apical angle is promi-

nently curved and termen appears to be S-shaped. Size of both forewing and hindwing, as well as the eyespots on the respective wings, are more prominent and broad in the female part than male. Among four types of behavioural gynandromorph reported on *Bombyx mori*⁵, the present type was similar to schizophrenic kind, in which male and female behaviours expressed concurrently in their respective body parts. The gynandromorph female mated with a normal male and laid around 116 eggs, out of which 20 eggs hatched into larvae and the same were reared up to the third instar (Figure 2). It is a rare phenomenon and such specimens need to be studied in detail for better understanding of the developmental biology of tropical insect species.

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