Keys for the identification and segregation of Noctuid subfamilies

Jagbir S. Kirti and **Mudasir A. Dar**
Division of Entomology
S. K. University of Agricultural Sciences and Technology Kashmir
Shalimar Srinagar-191121, India
mudasir753@rediffmail.com

The insects included under the family Noctuidae are of universal distribution throughout the world and exhibit among themselves in the imago stage immense variety in size, shape and coloration, but are all alike differentiated from other families by their neuration. The large majority are, as the name implies, night fliers, hiding by day in convenient shelters among trees, shrubs and low-plants or resting with closed wings on the trunks of trees or on rocks to which their colouration is assimilated and coming forth at dusk to feast upon the juices of flowers and fruits and to search for their mates. The damage caused by these insects to various kinds of vegetation is enormous. Plants belonging to Mimosaceae, Malvaceae, Euphorbiaceae, Graminae, Anacardiaceae, Leguminoceae, Myrtaceae, Apocynaceae, Verbenaceae, Coniferae, and Moraceae are frequently found attacked. Of the great bulk of the species the larvae also feed by night and conceal themselves by day under foliage close to the ground and in some cases by actually burrowing beneath it, these are, as a rule, dull coloured and difficult of differentiation, on the other hand, those which feed by day, as *Heliothis*, and some *Cucullia* are of brighter colouration and more easily distinguished.

The labial palpi are of moderate dimensions, more or less upturned, with the second segment densely scaled, the third generally short; in the *Hypeninae* they are generally very long, porrect horizontally or upcurved before face (Fig.). The hind tibia always bears two pairs of spurs; the tongue, frenulum and ocelli are present. The eyes are generally smooth; but in some groups hairy or smooth but fringed with cilia, they also vary in shape being usually globose; but in certain cases narrowed. In many cases the tibia bear spines and claws as well as scales and tufts of hair.

Lepidoptera is probably one of the most suitable groups for most quantitative comparisons between insect faunas to be valid, for the many reasons elaborated by Holloway (1980, 1984 and 1985) especially their abundance, species richness, response to vegetation and climate, their ease of sampling using light traps and relatively advanced

taxonomy. Although light trapping of macrolepidoptera has been, carried out widely in temperate and tropical regions throughout the world but generally results are not directly comparable between areas because of different light sources, trap design, trapping periods and taxonomic coverage. Class Insecta represents more than 56% of total biodiversity Groombridge (1992) and therefore, plays a very important role in the overall understanding of it.

Among insects one of the family i.e. Noctuidae is the largest family of order Lepidoptera and can be easily identified on the basis of venation of the hind wing, where $S_C + R_1$ is separated from R_S and is connected with discal cell at the base. Another identifying feature is number of tibial spurs i.e. 0-2-4 {foreleg-midleg-hindleg} and epiphysis present in foreleg.
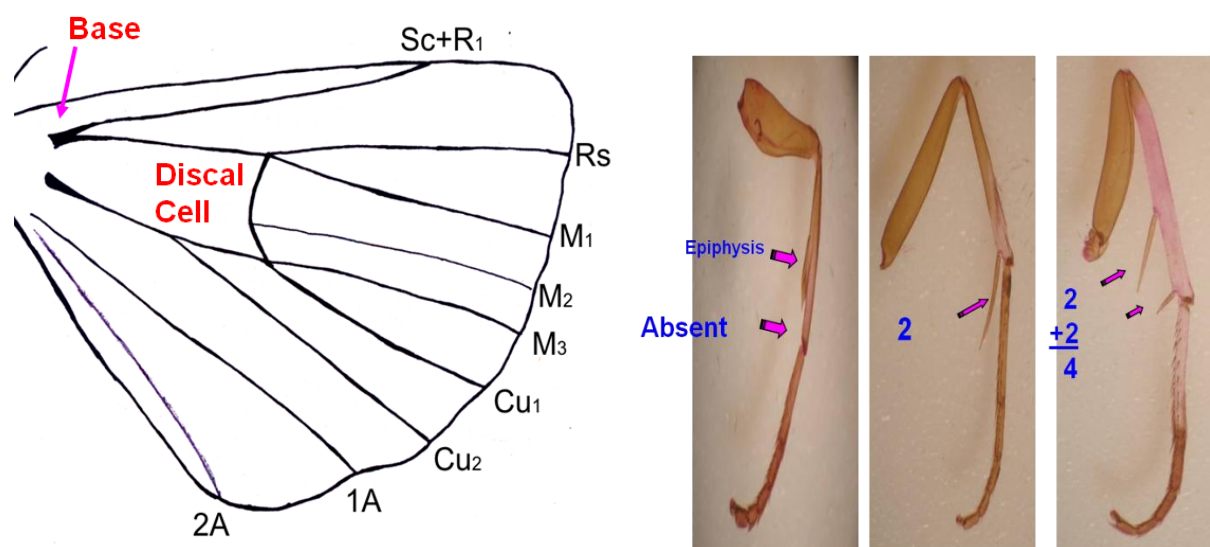
Family Noctuidae is the largest family of order Lepidoptera and is divided into 16 subfamilies viz., Rivulinae, Hypenodinae, Hypeninae, Catocalinae, Acontiinae, Nolinae, Chloephorinae, Sarrothripinae, Plussiinae, Pantheinae, Acronictinae, Amphipyrinae, Cucullinae, Hadeninae, Noctuinae and Heliothinae (Kristensen, 1985). This group of moths is of immense economic importance as many of its species are serious pests. Important subfamily characters/keys for fourteen subfamilies are presented for easy and quick identification.

1. Hindwing with vein M2 weak or vestigial 2
-   Hindwing with vein M2 well developed 6
2. Fore tibia with multiple claws 3
-   Fore tibia without multiple claws 5
3. Rows of spines present on hind tibia. Male genitalia without penicular hair on tegumen .... Noctuinae
-   No rows of spines on the hind tibia. Male genitalia with penicular hair on tegumen …... 4

4. Uncus simple. Valva with four rows of spines .... Heliothinae

-   Uncus well developed and curved. Valvae without spines .... Acronictinae

5. Eyes hairy. Uncus long and curved .... Hadeninae

-   Eyes not hairy. Uncus short .... Cucullinae

6. Vein M2 of the hind wing arising from the lower angle of the cell, running parallel to M3. Tympanal organ present .... Hypeninae

-   Vein M2 of the hind wing arising not from the lower angle of the cell and not parallel but more or less approximated to M3 at base. Tympanal organ absent 7

7.   Frenulum of female simple 8

-   Frenulum of female multiple 9

8.   Abdomen with lateral anal pencils of hair. Forewing without tufts of raised scales in the cell. Uncus short .... Euteliinae

-   Abdomen without lateral anal pencils of hair. Forewing with tufts of raised scales in cell. Uncus long and slender .... Stictopterinae

9. Retinaculum of male bar shaped, Forewing without tufts of raised scales in the cell .... Acontiinae

-   Retinaculum of male not bar shaped, Forwing with tufts of raised scales in the cell... 10

10. Tibiae spined ....……11

-   Tibiae not spined 12

11. Eyes with long overlapping cilia. A secondary hood present................................ Plusiinae

-   Eyes without cilia. Secondary tympanel hood absent 13

12. Mid tibiae spined, labial palpi of second segment not thickened. Valva asymmetrical ………………………………………………………… Catocalinae

-   Mid tibiae not spined, labial palpi of second segment thickened. Valva symmetrical   ....Calpinae

13. Male genitalia without corona .... Chloephorinae

-   Male genitalia with corona .... Aganinae

Groombridge, B. (1992). Global biodiversity, World Conservation Monitoring Centre. 1-752, *Chapman and Hall, London.*

Holloway, J. D., 1980. Insect surveys – an approach to environmental monitoring. Atti XII Congresso Nazionale Italiano Entomologia. Roma, **1**: 231-261.

Holloway, J. D., 1984. The larger moths of the Gunung Mulu National Park; a preliminary

assessment of their distribution, ecology and potential as environmental indicators. The Sarawal Museum Journal XXX, **51** : 150-191.

Holloway, J. D., 1985. Moths as indicator organisms for categorizing rain forest and monitoring changes and regeneration processes. Tropical Rain Forest: The Leeds Symposium, pp. 235-242.

Kristensen, N.P. 1985. The higher classification of Lepidoptera. Cataloque of the Lepidoptera of Denmark, 6-20.