

Key to the orders of the economically Important Insects .

- 1 -with wings -----2.
- 1'- Wing less-----13.
- 2(1) With 1pair of wings (flies,mosquitoes)--- ----- Diptera
- 2'-With two pair of wing,the front wing may be membranous,Hardened leathery or parchment --like).-----
- 3.3 (2')-- Front wings hardened, leathery , thickened , or parchment-like,at least at base, hind wings membranous, translucent, -----4
- 3'-Front and hind wings similar in textures, i.e. both membranous-----8.
- 4-- (3) Front wings hardened or leathery throughout , look like sclerites, without veins , front wings usually covering most of abdomen -----5
- 4'--Front wings thickened, or parchment - like but with veins visible ---6.
- 5--(4) Cerci enlarged to form pincers (earwigs) forewings short, do not cover abdomen -----Dermoptera .
- 5'--Cerci absent, forewings (elytra) usually (not always) covering abdomen -----Coleoptera
- 6 (4') Chewing mouthparts , hind wings usually folded fan --wise when at rest (grasshoppers, crickets, roaches,etc),.----- Orthoptera .
- 6' --- sucking mouthparts -----7.
- 7 (6') Beak arising from front part of head, front wings leathery at base But with membranous outer part, the membranous portions overlap. (True bugs), -----Hemiptera.
- 7'---Beak arising from hind part of underside of head, front wings of uniform texture throughout (Leafhoppers, froghoppers, spittlebugsTreehoppers). -----Homoptera.
- 8 (3')---Wings long, narrow,strap like ,and fringed on front and hind margins with long hairs, last tarsal segment is leaf 00like, no claws(Thrips,all tiny1--3 m) -----Thysanoptera.
- 8'-Wings not as above -----9.
- 9(8') ---Wings largely or entirely covered with scales mouthparts in form of coiled proboscis (butterflies and moths) -----Lepidoptera.
- 9'--- Wings without scales, mouthparts not coiled .-- -----10.

10 (9') ---Mouthparts of sucking type, the back arising from the hind part of the head (cicadas, aphids). ----- Homoptera.

10' ---- Chewing mouth parts -----11.

11 (10') ---Front and hind wings similar in size and shape, veins hard to see, wings silvery (reproductive termites) -----Isoptera

11'-- wings not as above ----- 12.

12(11')--Wings with many cross veins giving the wings a net – like appearance, hind wings as large as front wings, or nearly so-----

-Neuroptera .12' --Hind wings much smaller than front wing, abdomen may be narrowed at base, i.e. " wasp--waist "(sawflies,parasitic wasps,wasps,ants,bees).

Hymenoptera.

13 (I') ---3 feelers at end of abdomen (chewing mouthparts are concealed by cheeks) (silverfish and firebrats). ----- Thysanura.

13' ---Lacks 3 abdominal feelers, but with visible chewing mouth parts ----14.

13*---Lacks 3 abdominal feelers, but with sucking Mouth parts----- 18.

References

Daly, H.V., J.T. Doyen, P.Q. Ehrlich. (1978) Introduction to Insect Biology and Diversity. McGraw-Hill. New York.

Borror, D.J., D.M. DeLong, and C.A. Triplehorn, (1981) An Introduction to The Study of Insects. 5th ed. Saunders. Philadelphia

Pfadt, R.E., (1985) Fundamentals of Applied Entomology. 4th Ed. McMillan Publishing Company. New York.

