

LECTURE 8. Insect wing:

structure and its modifications

WINGS

Insects have evolved many variations of the wing. Wing venation is a commonly used

taxonomic character, especially at the family and species level.

Membranous wings are thin and more or less transparent. This type of wings is found

among the Odonata and Neuroptera.

Halteres are an extreme modification among the order Diptera (true flies), in which the

hind wings are reduced to mere nubs used for balance and direction during flight.

HALTERE

Elytra (sing. elytron) are the hardened, heavily sclerotized forewings of beetles (Order

Coleoptera) and are modified to protect the hind wings when at rest.

A variation of the elytra is the **hemelytra**. The forewings of Hemipterans are said to be

hemelytrous because they are hardened throughout the proximal two-thirds

(approximately), while the distal portion is membranous. Unlike elytra, hemelytra

function primarily as flight wings. In both cases, the membranous hind wings (when

present) are used in flight and are folded beneath the forewings when at rest.

ELYTRA

HEMELYTRA

Membranous

hind wing

The wings of butterflies and moths are covered with scales, and mosquitoes possess

scales along wing veins.

NEOPTEROUS VS PALEOPTEROUS WING CONDITIONS

In most living insects (the Neoptera), there are three axillary sclerites that articulate with

various parts of the wing. In the Neoptera, a muscle on the third axillary causes it to pivot about the posterior notal wing process and thereby to fold the wing over the back of the insect. (In some groups of Neoptera, such as butterflies, the ability to fold the wings over the back has been lost.) Two Orders of winged insects, the Ephemeroptera and Odonata, have not evolved this wing-flexing mechanism, and their axillary sclerites are arranged in a pattern different from that of the Neoptera; these two orders (together with a number of extinct orders) form the Paleoptera.

Sources

Qaddo, Ibrahim Al-Jubouri, Hussein Abbas Ali, Mustafa Kamal.1980. Book of General Entomology. University of Baghdad. Number of pages 395.

Nadu Tamil. General entomology. Government arts college (Autonomons) Coimbatore-641018.122 page.

Definition of entomology. <https://www.rvskvv.net>

Richards,O.W.and R.G.Davies.1977.Imms,general textbook of entomology.Imperial college.University of London.934 page.