

LECTURE 9. 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.

Types of insect wings

Among invertebrate animals, only insects possess wings. Wings are present only in adult stage. Number of wings vary from two pairs to none. Certain primitive insects like silverfish and spring tail have no wings (apterous). Ectoparasites like head louse, poultry louse and flea are secondarily wingless. Wings are deciduous in ants and termites. There is only one pair of wings in the true flies. Normally, two pairs of wings are present in insects and they are borne on pterothoracic segments viz., mesothorax and metathorax.

Wings are moved by thoracic flight muscles attached to their bases. Wing is a flattened double-layered expansion of body wall with a dorsal and ventral lamina having the same structure as the integument. Both dorsal and ventral Paleopterous

laminae grow, meet and fuse except along certain lines. Thus a series of channels is formed. These channels serve for the passage of tracheae, nerves and blood. Wing is nourished by blood circulating through veins. Later the walls of these channels become thickened to form veins or nervures. The arrangement of veins on the wings is called venation which is extensively used in insect classification. The principal longitudinal veins arranged in order from the anterior margin are costa (C), sub costa (Sc), radius (R), median (M), cubitus (Cu) and anal veins (A). Small veins often found interconnecting the longitudinal veins are called cross veins. Due to the presence of longitudinal veins and cross veins, the wing surface gets divided into a number of enclosed spaces termed cells. In insects like dragonfly and damselfly, there is an opaque spot near the costal margin of the wing called pterostigma.

Margins and angles: The wing is triangular in shape and has therefore three sides and three angles. The anterior margin strengthened by the costa is called coastal margin and the lateral margin is called apical margin and the posterior margin is called anal margin.

The angle by which the wing is attached to the thorax is called humeral angle. The angle between the coastal and apical margins is called apical angle. The angle between apical and anal margins is anal angle.

Wing regions: The anterior area of the wing supported by veins is usually called remigium. The flexible posterior area is termed vannus. The two regions are separated by vannal fold. The proximal part of vannus is called jugum, when well

developed is separated by a jugal fold. The area containing wing articulation sclerites, pteralia is called axilla.

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.