AgriCos e-Newsletter
ISSN: 2582-7049
Volume : 01 Issue : 04 August 2020 Article No: 18

Post Genital Appendages in Insects

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SUMMARY

Appendages of the abdomen are practically always on the terminal segments. These post genital appendages are important to taxonomist for identification of new species of insect They are primarily tactile organs are provided with the trichoid hairs or they may function as sound receiver or defensive devices in dermaptera. These may serve as clasping organ in embioptera. Feeding organ (raptorial) for capturing the prey as in japygidae. May modify into lateral gills performing respiration and ionic exchange in zygoptera Swimming organs in ephemeroptera nymphs. It represent sexual dimorphism in calliptamus (orthoptera) female have simple conical cerci, while males bear long, flattened lobulated structures.

INTRODUCTION

Appendages are an external body part or natural prolongation, that protrudes from an organisms body. Appendages may become uniramous, as in insects and centipedes, where each appendage comprises a single series of segments. It may be biramous, as in many crustaceans, where each appendage branches into two sections.

Types of Appendages

- Antennae
- Gills
- Mouthparts
- Legs
- Wings
- Sexual organs (Gonopods)
- Elytra
- Part of tail (uropods)

Appendages of the abdomen are practically always on the terminal segments. These are divided roughly into those not associated with reproduction and those developed for reproductive activities, such as mating and oviposition. Non-reproduction appendages such as post genital appendages such as ***cerci*** **(**tactile organs) on the eleventh segment, are found in many insects.

Post Genital Appendages

These are the modifications of post genital sclerites frequent as adaptations associated with copulation and oviposition.

- Some modifications include fusion of tergum, sternum, pleuron to form a contineous sclerotised ring.
- E.g. fusion of eleventh segment occur in machilidae (Thysanura) and fusion of terga 9-10 occurs in Acrididae (Orthoptera).
- Sometimes fusion restricted to one sex (male odonata, ephemeroptera, dermeptera and female panorpoid mecoptera).
- Eleventh abdominal segment last true somite of insect body.
- Frequently this segment occurs in embryonic stage of primitive insects when it cannot be located in post emergent stages.
- Segment eleventh forms a conical terminus that bears an anus at apex and lateral cerci.
- Dorsal surface segment eleventh is epiproct and ventral surface paraproct.
- Post genital appendages present in Hemimetabola (Except hemiptera).
- In holometabola only one post genital segment is retained in both larval and adult insect.
- In apterygote insect it is present in all the insect orders.
- In holometabola the tenth post genital segment bears appendicular process such as socii (lateral appendicular processes of the tenth segment homologous with the cercus like appendages).
- The tenth segment appendages may be termed collectively the pygopods, since the tenth segment is the pygidial.

- In ephemeroptera (may fly) dorsal part of the eleventh segment or true epiproct lies beneath the lobe of the tenth tergum and carries the median caudal filament likewise in plecoptera, embiidae and blattidae.

List of Insect orders

- Trichoptera
- Ephemeroptera
- Mecoptera
- Oorthoptera
- Dictyoptera
- Phasmida
- Odonata
- Plecoptera.

Characteristics of different insect order possesses the post genital appendages

Characteristics of order Dermaptera

- Strong forceps like cerci.
- Cerci modified into unjoined forceps, cerci differ in the two sexes of a species and they may play a role in copulation in earwings.
- In female they are short straight and undented while male they are curved, toothed and armed. in male.
- Cerci are unjointed styliform hairy appendages in (*Hemimerus spp*)
- Family Pygidicranidae: cerci of male are asymmentrical forceps Earwing male and female cerci

Characteristics of order odonata

- Unsegmented cerci while eleventh segment is greatly reduced.
- In larvae of anisopterans the epiproct and paraproct form the three tapering valvular processes that close the large anal opening.
- In zygopterous larvae each lobe of the eleventh segment bears gill plate, the median gill being a process of epiproct and latral gills processes of the paraproct.
- Cerci modified as clasper.

Characteristics of order Ephemeroptera

- The cerci is long, feather-like and together with the median caudal filament.
- Dorsal part of the true epiproct, lies beneath the lobe of the tenth tergum and carries the median caudal filament.
- It can be used to drive the insect forward by beating against the water.

Characteristics of order Embioptera

- Eleventh segment represented by pair of asymmentrical cerci.
- Family embiidae: two segmented left cercus in females and single segmented cercus in males both are asymmentrical. E.g. *Embia, Leptembia*.
- Family oligotomidae: left cercus of males is two segmented.
- These cerci are highly sensitive to touch, and allow the animal to navigate while moving backwards through the gallery tunnels.

Characteristics of order Dictyoptera

- Post genital appendages are cerci which are short, annulated many segmented except Panethia spp.
- Family blattidae: cerci well developed
- Family cryptoceridae: cerci is reduced

Characteristics of order Thysanura

- A pair of long, filamentous cerci and median long caudal filament in silverfish.
- Family machilidae: each cercus is supported on a large pleural lobe of the eleventh segment

Characteristics of order Mecoptera

- A pair of short single segmented cerci in male while two segmented in female.

- E.g. in suborder neomecoptera cerci is absent, and present in suborder protomecoptera and eumecoptera.

Characteristics of order orthoptera

- Cerci is short unsegmented except Grylloidea where they are the elongated structures e.g. Crickets have particularly long cerci.

Characteristics of order protura

- Cerci is absent while telson is present. e.g. telsontail.

Characteristics of order plecoptera

- The tenth and eleventh segment greatly reduced and possess a pair of long slender cerci.
- Family nemouridae: single segmented cerci.

Characteristics of order Trichoptera

- Larvae have a pair of large claw bearing appendages on the tenth abdominal segment, though they have no appendages on the other segments of the abdomen.
- These appendages are long, freely movable, cylindrical organs projecting posteriorly, each bearing a large decurved claw on its distal end.

Appendages in larval stages

- The appendages of the tenth abdominal segment of the caterpillar known as anal legs, or postpeds.
- The anal legs are adapted to grasping the edges of leaves.
- These are resemble the appendages of the preceding segments but their musculature differs from that of the others.
- In that basal muscles are largely eliminated, while the muscles of the planta are much larger.

Characteristics of order Diptera

- The genital and post-genital segments are often referred to as the terminalia. Post genital segment commonly known as proctiger
- In many families of the lower Diptera a functional ovipositor is made up of the cerci.
- In this study, however, proctiger is interpreted in the narrow sense, i.e. as consisting only of the parts behind segment 10. Segment 10 and the proctiger will thus be treated separately Saether (1977) and Soli (1997)
- In most female lower diptera cerci is two segmented but in some families it may single segmented.
- Two-segmented cerci are considered the most primitive state in both the lower Diptera and Brachycera (McAlpine 1981).

Family Ptychopteridae:

- The cerci are one-segmented, fused to about the middle of their length.
- The cerci are tapering and pointing downwards and the apex of each bears a small cluster of setae.

Family Trichoceridae:

- The cerci are curved downward and each cercus has a distinct area with minute setae at the ventral base.

Family Tipulidae:

- The cerci are one-segmented, slightly bent upwards and the posterior-lateral sides are jagged.
- Saether (1977) described the cerci of Ptychopteridae as two-segmented with the last segment reduced, this is not the case, an interpretation that is in accordance with Peus (1958) and Andersson (1997).
- (Yeates and Wiegmann 1999) Described the one segmented cerci in Tipulidae and trichoceridae, while two segmented cerci in Ptychopteridae.

Characteristics of order Lepidoptera

- The tenth segment may be simple membranous tube, usually it presents a variously modified tergal structure called uncus and mandible like ventral lobe, the gnathos.
- A pair of lateral processes, termed the socii (lateral appendicular processes of the tenth segment homologous with the cercus like appendages).
- They are membranous hairy appendages and there is some evidence that they are derived from the pygopods of the tenth segment of the larvae.

Characteristics of order Hymenoptera

- Only one post genital segment is present in suborder symphyta which juding from the larva is the tenth abdominal segment.
- In some of the lower families it bears a pair of cercus like appendages which, since they occur on the tenth segment.

Characteristics of order Diplura

- Cerci is present but varies with different families like
- Family japygidae: stout hard forcep like organs, single segmented cerci. E.g.japyx. Used for capturing the prey.
- Family campodeidae: filamentous elongated cerci may be segmented without apical glandular opening e.g. campodea
- Family projapygidae: short and robust. A pair of cerci with apical gland orifice e.g. projapyx.

Characteristics of order Neuroptera

- Family sialidae: larvae having long tapering appendages on the sides of terminal pair (pygopods) on the tenth segment.
- Each appendage is hollow process of intugment and is supported on a lateral lobe of the body wall.
- These tenth appendages are differ from preceding segments in that the basis of each projects from the body as a short, free cylindrical lobe bearing stylus laterally.

CONCLUSION

The post genital appendages are important in insects. Their structure, position and function varies with insect to insect.

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