Insect Nomenclature & Classification

Scientific Nomenclature

- Caroles Linnaeus (1707 – 1778) in his 10th edition of systema nature published in 1758 used the binomial system of nomenclature for the first time.
- This double naming in Latin one for the genus and the second for the species.
- In 1842, Strickland published a code of nomenclature in English Strickland code.
- Another code called ‘Dall code” was evolved by the Americans in 1877.
- 1901 at Berlin, an international code of zoological nomenclature was evolved.
- At the 16th session of International congress of Zoology in Washington, the latest international code of Zoological nomenclature was approved.
- The same was revised and published in 1964.
**Holotype**: The descriptions of unrecorded species should be based on a single specimen whether it be a male or female.

**Allotype**: The opposite sex specimen which is described along with the holotype.

**Neotype**: A specimen later designated to replace a holotype, if the latter can be documented as lost or destroyed.

**Syntype**: A group of specimens thought to represent a species, as designated or indicated by the author(s) of the original description.

**Paratype**: Other specimens of the species kept along with the holotype and allotype.

**Topotype**: Specimen(s) collected from the same location as the holotype.

If the same name is given by different scientists to different organisms, it is called **Homonymy**.

- The names are to be given in **Latin**.
- **Authors name** in full should be written at the end of species name without any punctuation.
- The generic name has to be a simple or compound word.
- The supraspecific categories ends with:
  - Tribe: -ini
  - Sub family: -inae
  - Family: -idae
  - Super family: -oides.
Linnaean Hierarchy in 10th Edition of Systema Naturae (1758)

Categories Used in More Modern Classifications
Classification of insects:
The basic biological unit in the classification is species

**Species:** These are a group of individuals which are similar in their structure, capable of interbreeding and producing fertile offspring, but at the same time reproductively isolated from other groups

**Subspecies:** is an aggregate of phenotypically similar populations of a species, inhabiting a geographic subdivision of the range of a species and differing taxonomically from other populations of the species

**Genus:** A group of species having some definite similar characters or relationships is called a genus

**Subfamily:** is a group of allied genera to form a subfamily

**Family:** is a taxonomic category containing a single genus or a group of genera of common phylogenetic origin which is separated from related families by a decided gap. Such families showing similar characters form order.
The classification of animals was first started by Aristotle (384-322BC) Linnaeus is considered as the father of the classification of animals and plants, classified insects into only seven orders viz Coleoptera, Hemiptera, Lepidoptera, Neuroptera, Diptera, Hymenoptera and Aptera

• Jeannel recognized 40 orders
• Brues, Melander and carpenter recognized 27 orders
• Imms and pruthi gave 29 orders
• Essig and Mani listed 33 orders
• Ross 28 orders

Sub Class: Apterygota - Primitive wingless insects with pregenital abdominal appendages, with no or slight metamorphosis, malpighian tubules are rudimentary, no pleural suture in the thoracic region and monocondylic mandibles

Sub class: pterygota- Insects with developed wings and showing definite metamorphosis, pregenital appendages are absent, A pleural suture divides the thoracic pleura in to episternum and epimeron and dicondylic mandibles

Division 1: Exopterygota (Hemimetabola). Metamorphosis simple, wings develop externally, Immature stages (nymphs) usually resemble adults in structure and habits

Division 2: Endopterygota (Holometabola). Metamorphosis complex accompanied by a pupal instar, wings develop internally. Immature stages (larvae) differ from adult in structure and habit.
Characters of Phylum Arthropoda (Arthro-Joint, Poda –Foot)

a. The segmented body
b. Bilateral symmetry
c. Paired jointed appendages usually terminates in a class
d. Chitinous exoskeleton
e. Ventral nervous system and
f. Dorsal heart
g. Haemocoelic body cavity
h. Muscles are composed of striated fibres, ciliated epithelium absent
i. Open type of circulatory system

It is the largest phylum in the animal kingdom. Besides insects, many creatures like crayfish, crabs, lobsters, centipedes, millipedes, spiders, mites, ticks, scorpions etc come under this category
Phylum arthropoda is classified into

1. Crustacea (crusta-shell):
   eg: prawns, crabs, wood louse

2. Arachnida (Arachine-spider):
   eg: scorpion, spider, ticks, mites

3. Chilopoda (chilo-lip, poda-legs):
   eg: centipedes

4. Diplopoda (diplo-two, poda-legs):
   eg: millipedes

6. Trilobita (an extinct group)

7. Hexapoda (hexa-Six; poda-legs)
   eg: insects
Characters of Class *insecta*

1. Body divided into head, thorax and abdomen
2. Possess three pairs of legs, hence the name Hexapoda
3. Presence of one or two pairs of wings
4. A pair of antennae
5. Respiration by means of internal air tubes known as trachea
6. Genital opening situated at the posterior end of the body
7. Presence of metamorphosis (incomplete/complete) during development
8. Possess exoskeleton made up of hard cuticle
9. Excretion is mainly by malpighian tubules which help in maintaining ionic balance
Class Insecta
(Imm's classification)

Sub class Aptyrygota
(Ametabola) Wingless
1. Protura – Telson tails
2. Diplura – Diplurans
3. Collembola – Spring tails, snow fleas etc
4. Thysanura – Bristle tails, silver fish etc

Sub class Pterygota (Metabola)
(winged insects)

Division: Exopterygota (Hemi metabola)
(wings develop externally)
5. Ephemeroptera - May flies
6. Odonata - Dragon flies and Damsel flies
7. Plecoptera - Stone flies
8. Dictyoptera - Cockroaches and mantids
8. Grylloblattodea - Grylloblattids
9. Orthoptera - Grasshoppers, locusts,
Crickets, mole crickets etc.
10. Phasmida - Stick insects
11. Dermaptera - Earwigs
12. Embioptera - Web spinners
13. Isoptera - Termites
14. Zoraptera - Zorapterans
15. Pscoptera - Book lice
16. Mallophaga - Bird lice
17. Siphunculata (Anoplura) - Sucking lice
18. Hemiptera - Plant bugs
19. Thysanoptera - Thrips
20. Neuroptera - Ant lions and lace wings
21. Mecoptera - Scorpion flies
22. Trichoptera - Caddis flies
23. Lepidoptera - Moths and butterflies
24. Diptera - Flies, mosquitoes
25. Siphonoptera - Fleas
26. Hymenoptera - Ants, bees, wasps
27. Coleoptera - Beetles, weevils
28. Strepsiptera - Stylopids
## Characters of Sub Classes:

<table>
<thead>
<tr>
<th>Apterygota (Ametabola)</th>
<th>Pterygota (Metabola)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small and primitive insects</td>
<td>Developed insects</td>
</tr>
<tr>
<td>Primarily wingless</td>
<td>Winged and secondarily wingless</td>
</tr>
<tr>
<td>Mouth parts are hidden in the head</td>
<td>Mouthparts are exposed</td>
</tr>
<tr>
<td>Mandibles articulate with head at single point - Monocondyle</td>
<td>Mandibles articulate with head at two points - Dicondyle</td>
</tr>
<tr>
<td>Malphigian tubules are absent or rudimentary</td>
<td>Malphigian tubules are present</td>
</tr>
<tr>
<td>Adults have pregenital abdominal appendages</td>
<td>Adults without pregenital abdominal appendages</td>
</tr>
<tr>
<td>Pleural suture in thorax is absent</td>
<td>Pleural suture divides thoracic pleuron into episternum and epimeron</td>
</tr>
<tr>
<td>Metamorphosis is simple or absent</td>
<td>Metamorphosis is present and variable</td>
</tr>
<tr>
<td>Abdominal segments are more in number (11 or 12)</td>
<td>Abdominal segments are secondarily reduced (8 to 10)</td>
</tr>
<tr>
<td>Adults moult several times</td>
<td>Adults do not moult</td>
</tr>
</tbody>
</table>
### Characters of divisions of Sub class Pterygota

<table>
<thead>
<tr>
<th>Exopterygota (Hemimetabola)</th>
<th>Endopterygota (Holometabola)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wings develop externally</td>
<td>Internally</td>
</tr>
<tr>
<td>Metamorphosis simple and incomplete</td>
<td>Complete and complex</td>
</tr>
<tr>
<td>Immature stages (nymphs) resemble adults in structure and habits</td>
<td>Immature stages (lava) differ adults in structure and habits</td>
</tr>
<tr>
<td>No pupal instar</td>
<td>Pupal instar present</td>
</tr>
</tbody>
</table>
Mecoptera

Trichoptera

Nueroptera

Strepsiptera

Sipahnaptera

Ravy

Raaz