



جامعة البصرة كلية التربية \القرنة

قسم علوم الحياة

علم الحشرات المرحلة الثالثة

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CLASSIFICATION OF HEXAPODA (INSECTS)

Apterygota

- * These are all relatively small insects.**
- * They are all land animals, though a few live near the ocean and are occasionally found in tide pools.**
- * Ametabola**

The subclass Apterygota has 4 orders namely:

Order Thysanura	silver fish- <i>Lepisma saccharina</i> Firebrat- <i>Thermobia domestica</i>
Order Diplura	<i>Campodea sp</i> <i>Japyx sp</i>
Order Protura	Proturans
Order Collembola	Springtails

Order Thysanura

(*Thysan-ura*, from Greek *thusanos* = fringe, *oura* = tail)

e.g; Silverfish - *Lepisma saccharina*

Firebrat - *Thermobia domestica*

* Domestic species such as silverfish and firebrats may cause extensive damage to household goods.

* They often feed on wallpaper paste, bookbindings, and the starch sizing of some textiles.

General Characteristics:

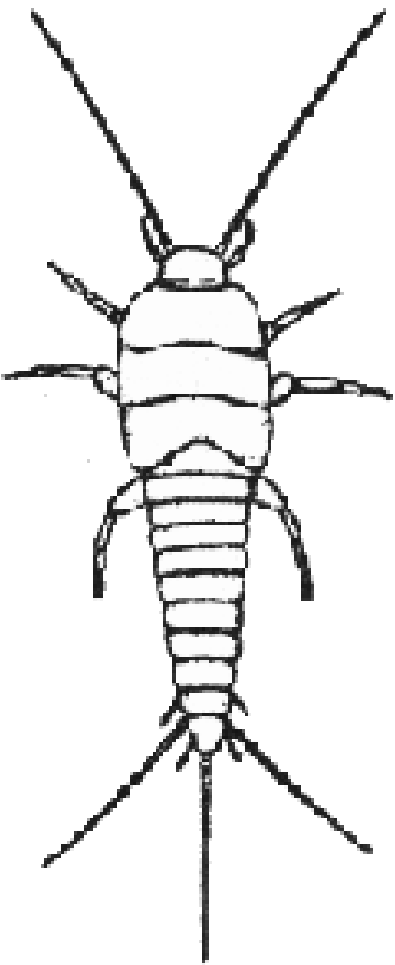
- * Small insects with compound eyes and very long, thread-like antennae.**
- * Mouthparts for biting and chewing.**
- * Tarsi 2-4 segmented.**
- * Body often covered with scales.**
- * Abdomen with 10 complete segments.**
- * Have long cerci and a median tail filament.**
- * The Order contains about 600 known species.**



Common Silverfish

Lepisma saccharina





Common name: Firebrat

Thermobia domestica



Order Diplura

(Dipl-ura, from Greek *diplos* = double, *oura* = tail).

e.g; *Campodea* sp, *Japyx* sp.

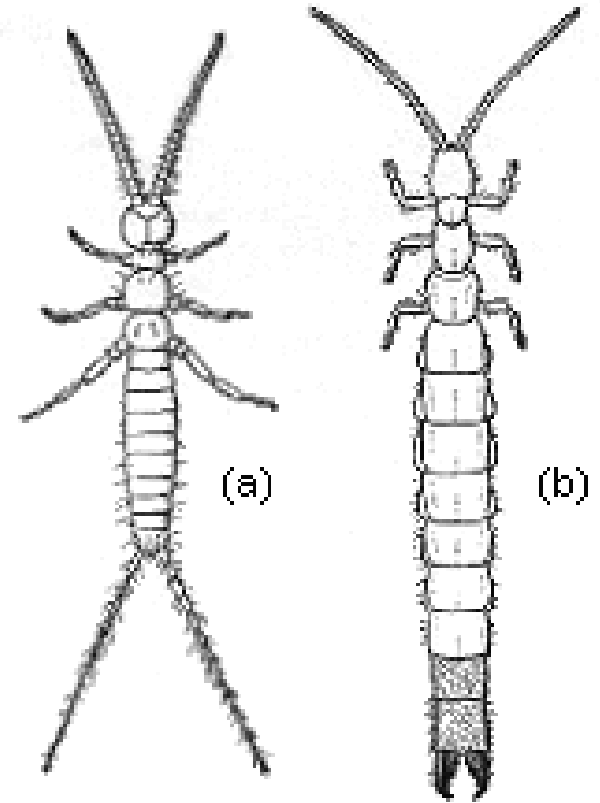


*** Live in concealed, damp situations in the soil, under stones, in dead wood and among leaf litter, where they feed on decaying vegetable matter.**



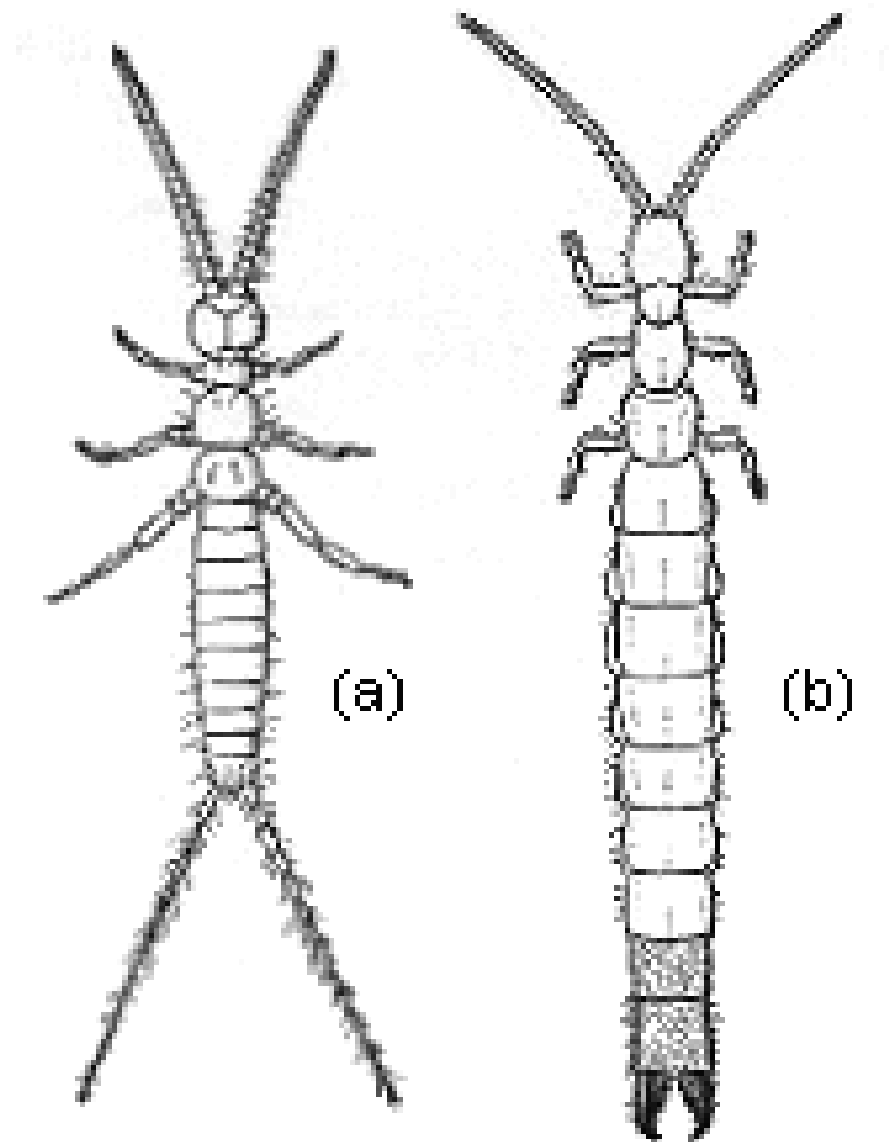
General Characteristics:

- * Small wingless insects, lacking eyes.**
- * Antennae long, with many segments (filiform)**
- * Mouthparts for biting.**
- * Abdomen with 11 segments.**
- * Tarsi are 1-segmented.**
- * The Order contains about 400 known species.**



a. *Campodea* sp.

b. *Japyx* sp.



Campodea sp





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Order Protura

(*Prot-ura*, from Greek *protos* = first, *oura* = tail)

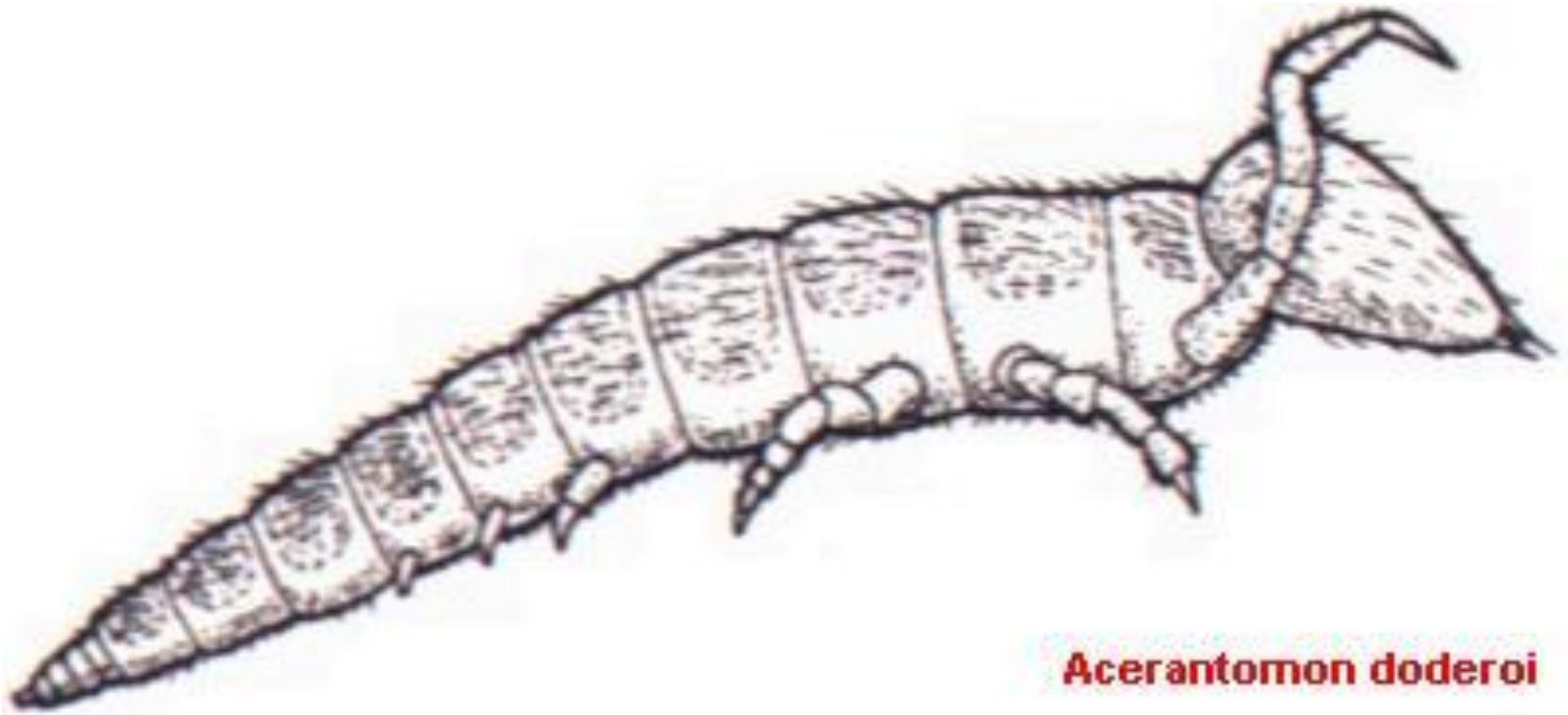
* Proturans live chiefly in soil, moss and leaf litter of moist temperate forests, but have also been found beneath rocks or under the bark of trees, as well as in animal burrows.

General Characteristics:

- * Proturans are white and lack eyes. They have cone-shaped heads.**
- * Antennae: Not present.**
- * Mouthparts: piercing and sucking.**
- * Legs: Three pairs, first pair larger and held up to sense surroundings and tarsi with 1-segmented**
- * Abdomen with 12 segments.**
- * Cerci is absence.**

Acerentomon sp.





Acerantomon doderoi

Order Collembola

(“colla”, glue, “embolon”, bar)=springtails

*** They live just about everywhere, in the canopy of tropical rain forests, on the beach, in tidal rock pools, on the surface of fresh water ponds and streams, in the deserts of Australia and in the frozen wastes on Antarctica.**



***The species which live in caves or deep in the leaf litter and or the soil tend to be white, have a reduced or no eyes. The species that live in more open environments are more coloured and are often very beautiful.**



General Characteristics:

- * Ventral tube ("collophore") on segment 1 of abdomen (adhesive in some groups, but primarily involved with excretion and water transport).**
- * Springing mechanism formed from retinaculum on segment 3, furcula on segment 4.**
- * 4-segmented antennae (segments sometimes subsegmented, giving the appearance of more than 4 segments).**



- * 6 abdominal segments.**
- * Adults continue moulting throughout life (up to 50 moults)**
- * Eyes are either simple ocelli or absent.**
- * Mouthparts: Chewing, feed primarily on _fungus.**



Springtails



The subclass Pterygota has 2 divisions namely:

Exopterygota	insects with a simple metamorphosis, without pupal stage
Endopterygota	with a complete metamorphosis, including a pupal stage

Exopterygota

Palaeopteran orders

1-Ephemeroptera

2-Odonata

Orthopteroid

1-Orthoptera

2- plecoptera

3-Dermaptera

4-Dictyoptera

5-Isoptera

Hemipteroid Orders

1-Mallophaga

2-Siphonculata

3-Hemiptera

4-Homoptera

5-Thysanoptera



Order Ephemeroptera

(“ephemera”, short-lived, “ptera” wings)

- * They survive only a few hours or at most a few days.
- * They eat nothing. They only fly and mate within dancing swarms, usually in late afternoon or evening.

General Characteristics:

- * Naiads - chewing mouthparts (they are predacious or herbivores).**
- * Wings: two pair.**
- * Metamorphosis: hemimetabolus with a unique subadult (=subimago); a winged adult emerges from water, climbs on vegetation and then molts to adult stage.**

Adults:

- * 2 or 3 terminal tails on abdomen.**
- * Long legs; body thin and elongate.**

Naiads:

- Abdominal gills and 3 feathery gills at end of abdomen.**
- * Naiads in fresh water and adults very close to water.**

- * They have long cerci.**
- * They have large eyes and very short antenna.**
- * 10 abdominal segments**





حوريات



حشرة كاملة



ذبابه مابه (حوربه مائنه)



ذبابه مابه (حشيره بافعه)

Mayflies



Marlin



Schimming



Order Odonata

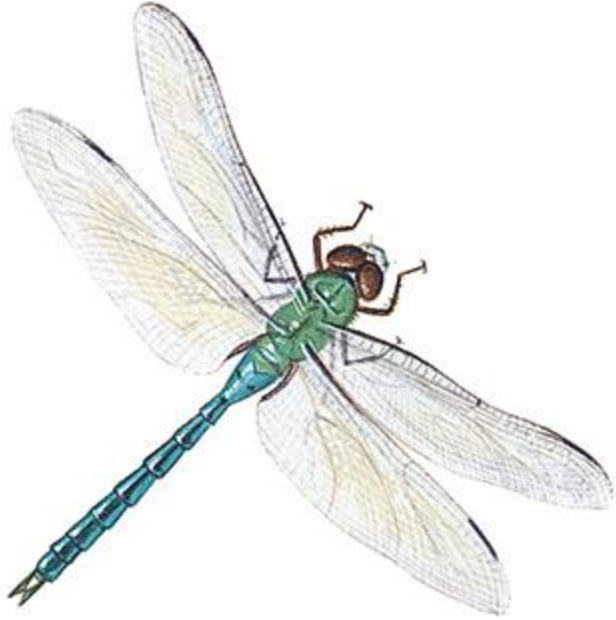
Greek “odon” = tooth (referring to teeth on their mandibles).

General Characteristics:

- * Long, transparent, showy wings with visible pattern.**
- * Long, slender bodies.**
- * Antennae: setaceous.**
- * Eyes very large in proportion to head size.**
- * Mouthparts: chewing.**
- * Well developed compound eyes.**

- * **Cerci modified for claspers.**
- * **Tarsi with 3-segmented.**
- * **Complex wing venation, with many cross veins.**
- * **Copulatory organ of the male located on the ventral anterior side of the 2nd abdominal segment.**
- * **Metamorphosis: Hemimetabolous.**

e.g; Dragonflies and Damesflies



Dragonflies





DRAGONFLISE



DAMESFLY



ANISOPTERA



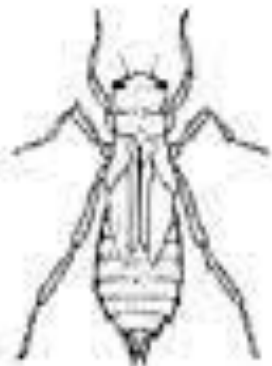
NAIAD ZYGOPTER

NAIAD ANISOPTERA

الرغاش الكبير

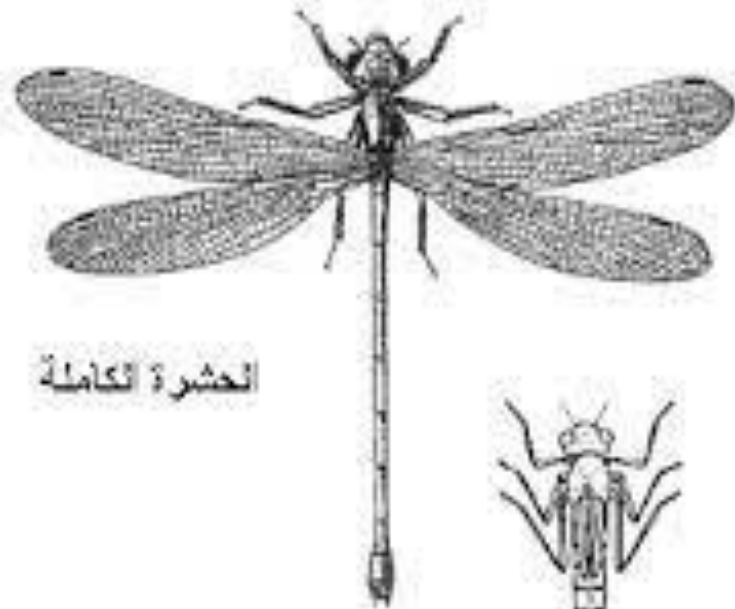


الحشرة الكاملة

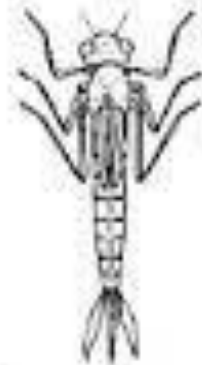


الحورية المائية

الرغاش الصغير



الحشرة الكاملة



الحورية المائية

Order Plecoptera

Plecoptera: from the Greek "plektos" (twisted) + "pteron" (wing); refers to the folded posterior region of the resting hind wing

- * Plecoptera are an order of insects, commonly known as stoneflies.**
- * Plecopteran nymphs are restricted to cool, clean streams with high dissolved oxygen content.**
- * This is a small group of aquatic insects, often referred to as Stoneflies.**

General Characteristics:

- * Small to medium size.**
- * Body soft and somewhat flattened, usually relatively pale in color.**
- * Transparent wings, of which the hind wings are broader than the forewings. wings held flat when at rest.**
- * Two long tail filaments.**
- * Mouthparts are mandibulate, although non-functional generally in adults**

- * Tarsi all with 3 segments.**
- * Abdomen with 10 segments.**
- * They have long and segmented cerci.**
- * Metamorphosis: Incomplete.**

Larvae: 2 caudal filaments.

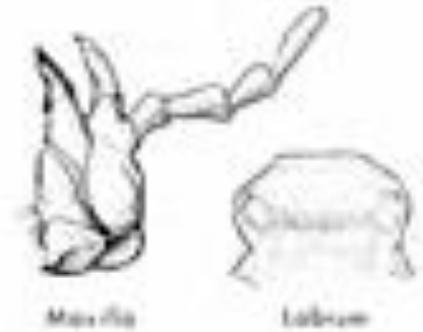
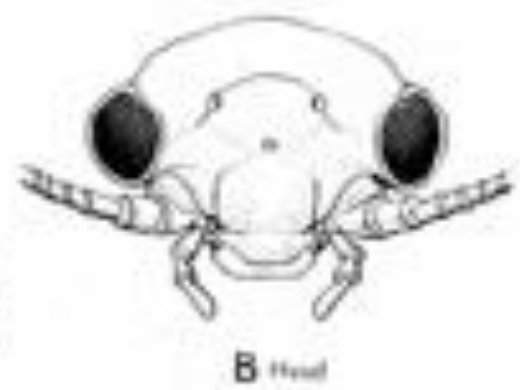
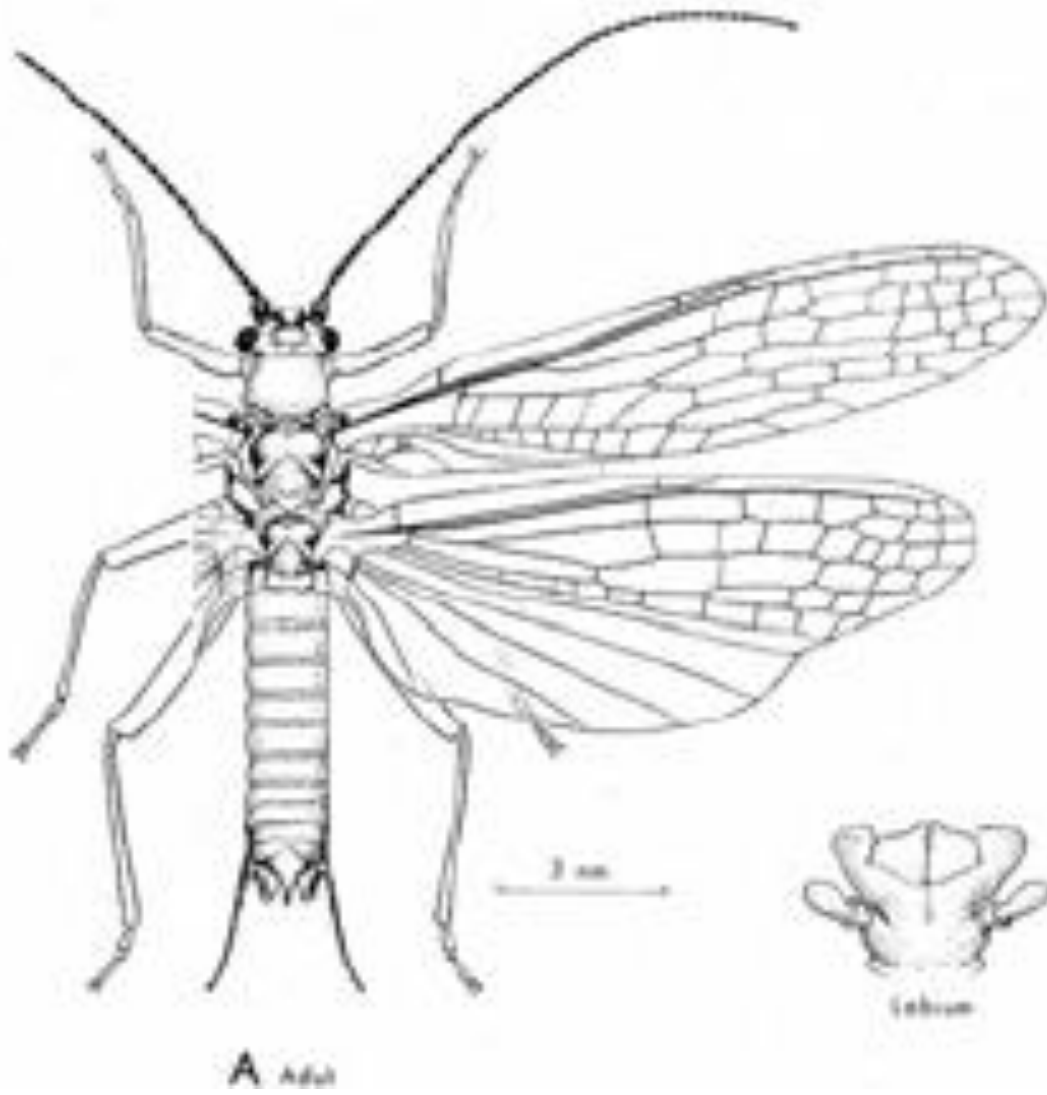
Gills on thoracic

All legs with 2 claws.

Stonefly nymph







C Mouth parts





Order Orthoptera

Orthoptera: from the Greek "orthos" (straight) + "pteron" (wing).

General Characteristics:

- * Hind legs long, modified for jumping.**
- * Forewings (tegmina) hardened, leathery, spread in flight, covering membranous.**
- * Cerci (appendages at tip of abdomen) unsegmented.**
- * Strong chewing mouthparts.**
- * Metamorphosis: Hemimetabolous.**



Family – Grasshoppers Acrididae

*** Feed almost exclusively on plants, though some will scavenge dead plant and animal material at times.**

General Characteristics:

*** Back legs large, modified for jumping.**

Antennae usually shorter than body.

Auditory organ (tympanum) if present, is on the abdomen (typically on front tibiae in Ensifera).

SCHISTOCERCA GREGARIA



LOCUSTA MIGRATORIA



Doclostaurus maroccanus



Cratypedes lateritius



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Family- Long-horned Tettigoniidae Orthoptera

*** Many are herbivores; some are carnivores.**

General Characteristics:

*** Hind femora usually only somewhat enlarged (compare large femora of Caelifera).**

*** Antennae thread-like, with more than 30 segments (fewer than 30 in Caelifera).**

*** Ovipositor long, sword-like (sometimes needle-like), internally has 6 valves--4 in Caelifera.**

*** Tarsi with 3-4 segments.**

*** Tympanum (hearing organ) on the front tibia in those groups that sing.**

Orchelimum - Longhorned grasshopper





Conocephalus strictus



Scudderia septentrionalis

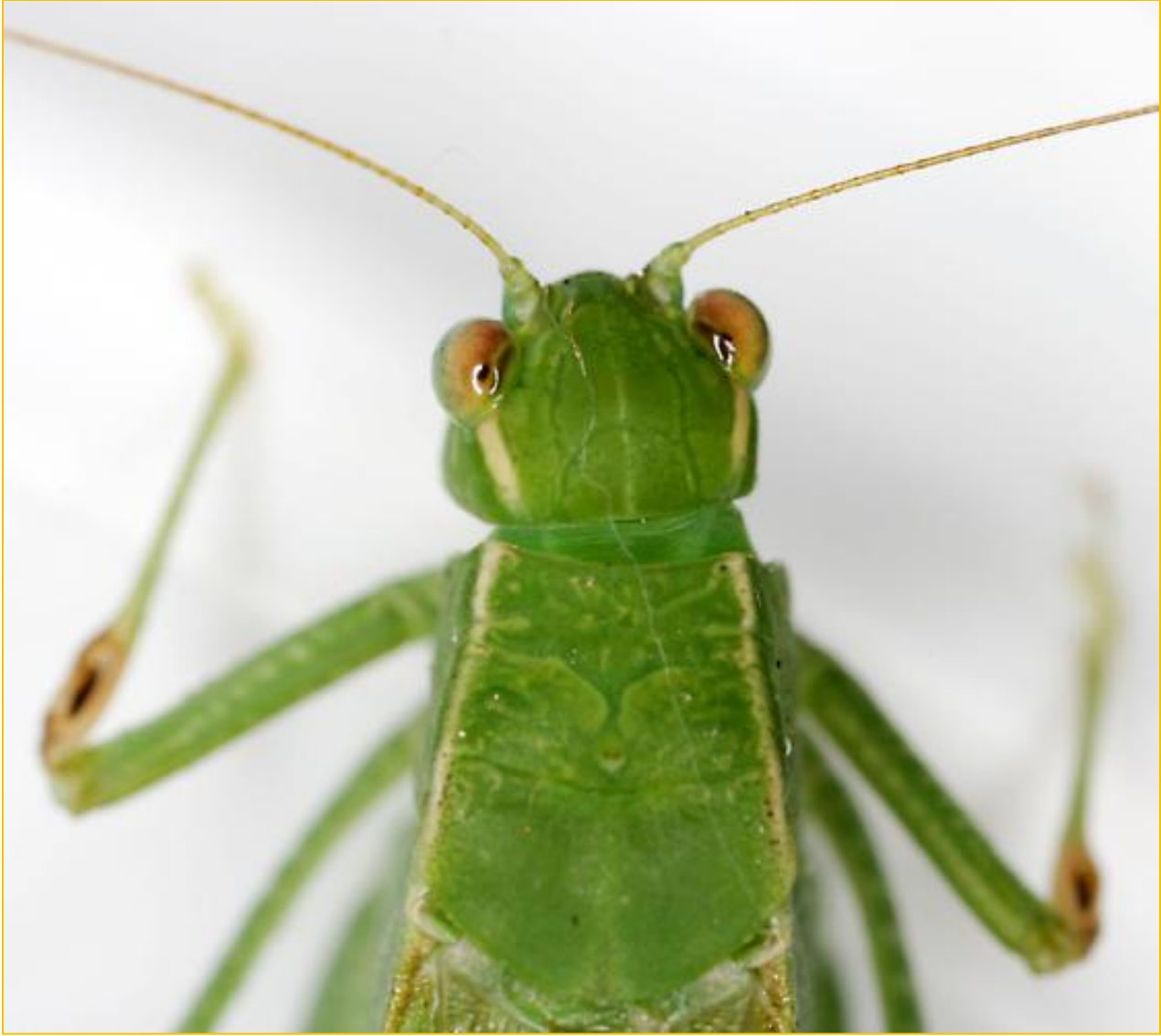




Microcentrum retinerve









Family :Gryllotalpidae :*Neocurtilla hexadactyla*









Gryllidae

- الجناح
- قرن الاستشعار
- آلة وضع البيض
- الذكور تحدث الاصوات

Gryllus domestica



Gryllus bimaculatus



Zoom

Joseph Berger, Bugwood.org

To be continue.....