

APTERYGOTA
REQUIRED TAXA

I. Class Hexapoda

A. Subclass Entognatha

1. Order Protura
2. Order Collembola
 - a. Family Sminthuridae
 - b. Family Hypogastruridae
 - c. Family Onychiuridae
 - d. Family Entomobryidae
 - e. Family Isotomidae
3. Order Diplura
 - a. Family Japygidae
 - b. Family Campodeidae

B. Subclass Insecta

Monocondylia

1. Order Microcoryphia
 - a. Family Meinertellidae

Dicondylia

2. Order Thysanura
 - a. Family Lepismatidae

PROTURA

Common Name: Proturans, tselontails.

Etymology: Prot- = first; -ura = tail.

Metamorphosis: Ametabolous.

CHARACTERISTICS

Body: Minute, elongate, whitish.

Head: Prognathous, somewhat conical.

Mouthparts: Entognathous, sucking.

Eyes: Eyes and ocelli absent.

Antennae: Absent; "pseudoculi" may be vestigial antennae. Forelegs carried in an elevated fashion and serve a sensory function.

Wings: Absent.

Legs: One segmented tarsus with a single post-tarsal claw and a bristle-like terminal pad.

Abdomen: Styli on first 3 segments; 12 segmented, 1 segment added at each molt ($9 + 3 = 12$); cerci lacking.

Comments: Respiration is primarily cutaneous. Feeds on organic matter. Best way to collect them is with Berlese funnel.

FAMILIES

Eosentomidae: Tracheae and 2 pair thoracic spiracles; abdominal appendages with a terminal vesicle.

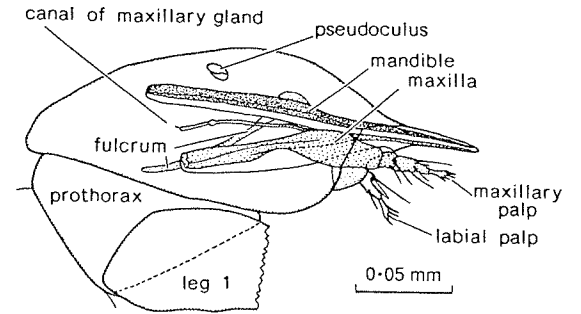
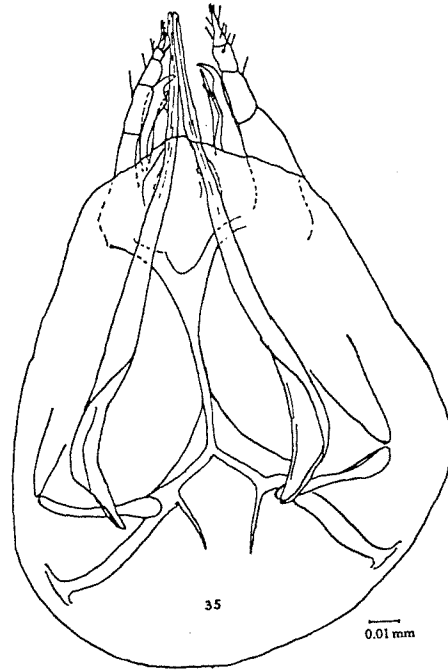
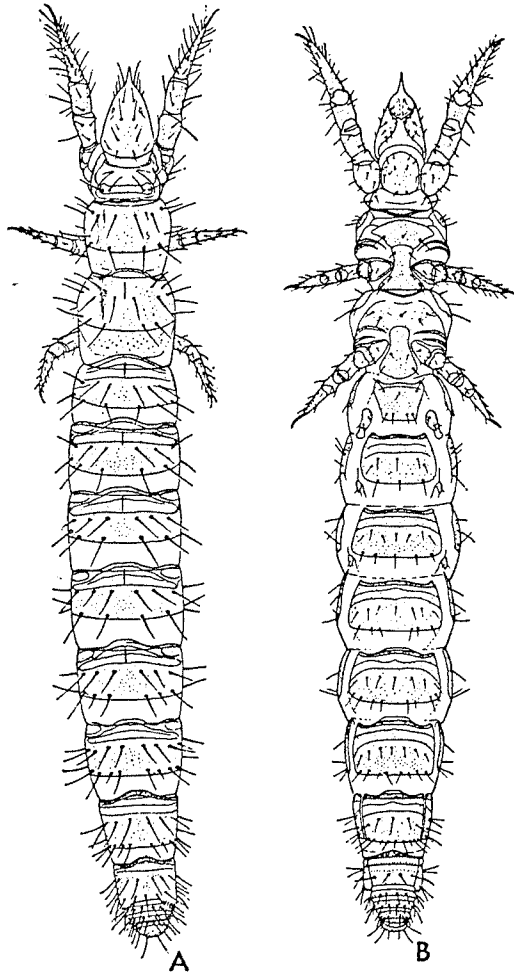
Protentomidae: Tracheae and spiracles absent; at least 2 pair of abdominal appendages with vesicles.

Acerentomidae: Tracheae and spiracles absent; only 1st pair of abdominal appendages with a terminal vesicle. Most common forms.

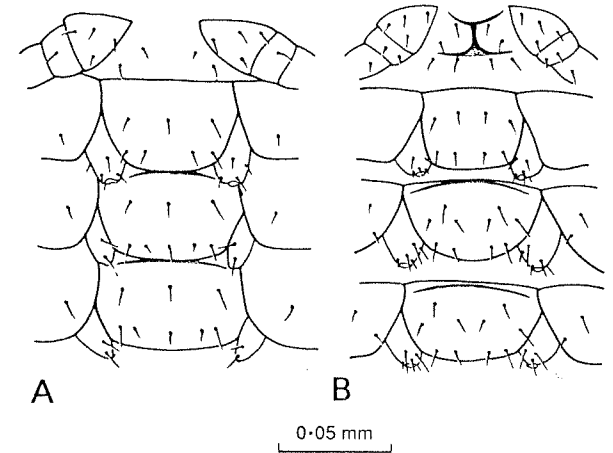
Subclass Entognatha

Order Protura

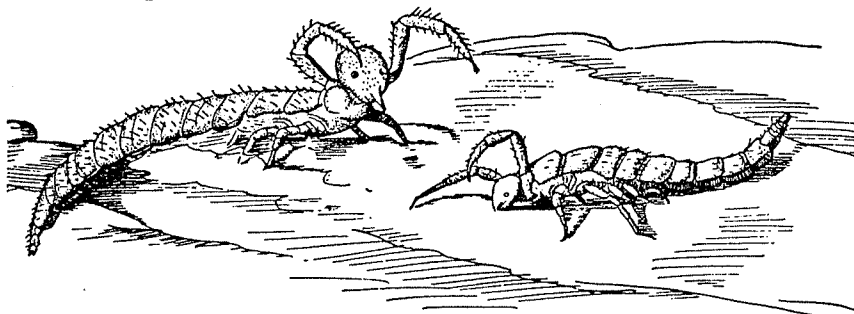
Proturans



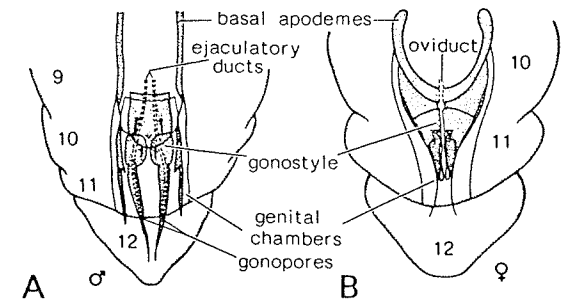
Head of *Acerentomon* sp., Acerentomidae, in lateral section.
[After Tuxen 1959]



Basal abdominal segments, ventral, showing rudimentary legs (abdominal appendages) of: A, *Australentulus tillyardi*, Acerentomidae; B, *Eosentomon swani*, Eosentomidae.
[A. Hastings]



Natural aspects of proturans. Left, *Acerentomon doderoi* Silvestri; right, *Eosentomon transitorium* Berlese. The forelegs function as antennae. (Redrawn from Berlese.)



Genital armature of *Eosentomon* sp., Eosentomidae.

[After Tuxen 1970c]

COLLEMBOLA

Common Name: Springtails, collembolans.

Etymology: Coll- = glue; -embol = wedge.

Metamorphosis: Ametabolous.

CHARACTERISTICS

Body: Minute; somewhat tubular or globose.

Head: Labrum, gena, and labium fused to form "pouched" head.

Eyes: Eye patches made up of 1 to several lateral ocelli.

Antennae: Short, filiform, usually 4-segmented.

Wings: Lacking.

Legs: Pair of claws at end of tibio-tarsus; tarsi fused to tibia or one-segmented.

Abdomen: 6 segments; collophore on first; tenaculum on third; furcula on fourth.

Comments: Trachea present, but respiration cutaneous.

FAMILIES

Sminthuridae: Abdomen globular; basal abdominal segments fused; antennae longer than head; eyes present.

Neelidae: Abdomen oval or globular; basal abdominal segments fused; antennae shorter than head; eyes absent.

Poduridae: Abdomen elongate; prothorax visible from above; antennae longer than head; eyes usually present.

Hypogastruridae: Abdomen elongate; prothorax visible from above; antennae shorter than head; eyes variable;
furcula variable.

Onychiuridae: Abdomen elongate; prothorax visible from above; antennae shorter than head; eyes absent; furcula
absent; cuticle with pattern of clear circles (pseudocelli).

Entomobryidae: Abdomen elongate; prothorax reduced, not visible from above; 4th abdominal segment at least
twice as long as the 3rd. Most common.

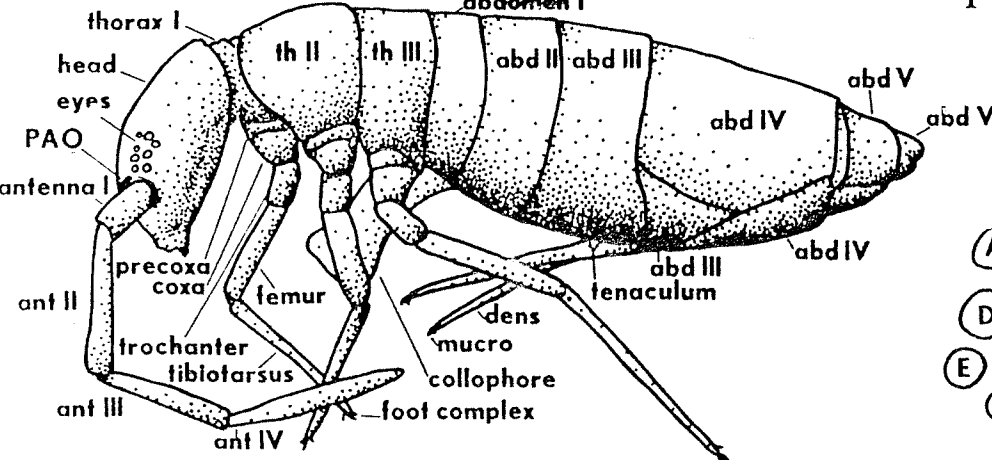
Isotomidae: Abdomen elongate; prothorax reduced, not visible from above; 4th abdominal segment about same
length as 3rd.

Subclass Entognatha

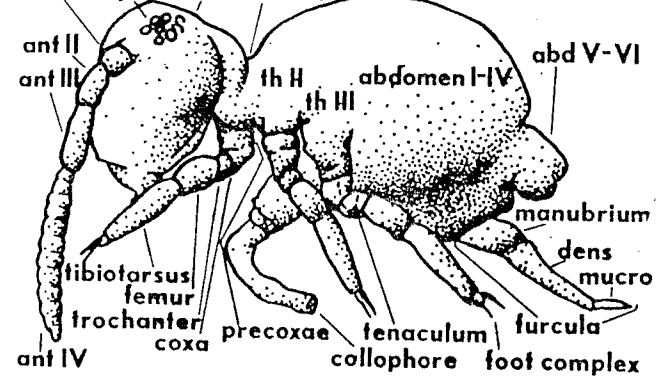
Order Collembola

Springtails

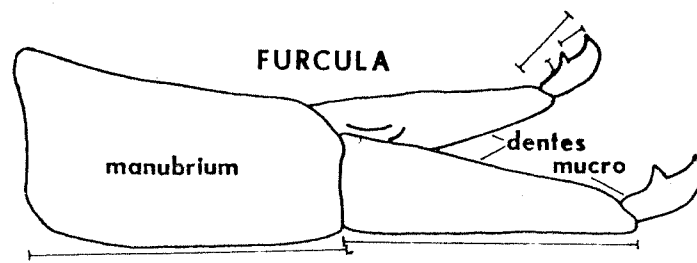
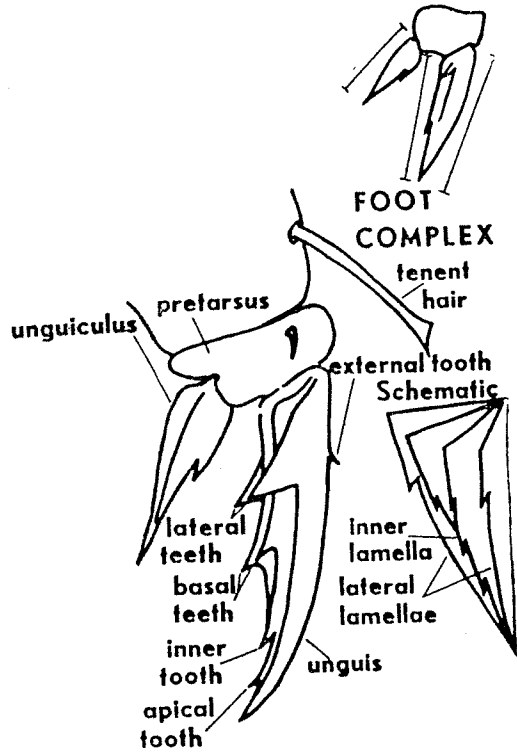
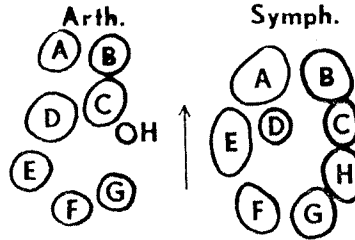
ARTHROPLEONID
abdomen I



antenna I SYMPHYPLEONID
eyes head thorax



LEFT EYES

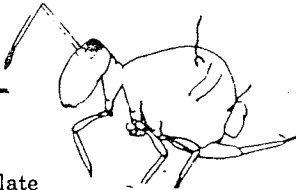
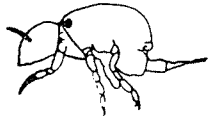


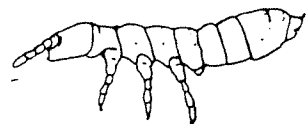




- 1 smooth body seta
- 2 unilaterally ciliate body seta
- 3 angulate seta of ♂ genital plate
- 4 clavate tenent hair
- 5 strongly clavate tenent hair
- 6 blunt seta (sensilla)
- 7 pin seta
- 8 scale (Entomobryidae)
- 9 unilaterally ciliate macrochaeta
- 10 multilaterally ciliate macrochaeta
- 11 clavate collar seta (Entomobryidae)
- 12 bothriotrichum

Subclass Entognatha

Order Collembola

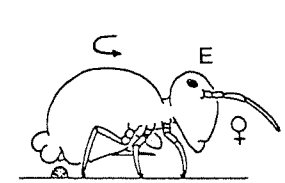
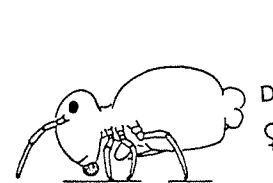
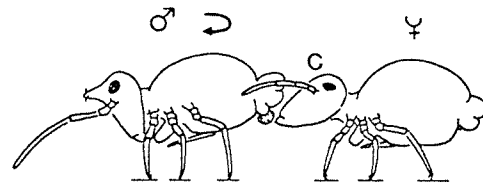
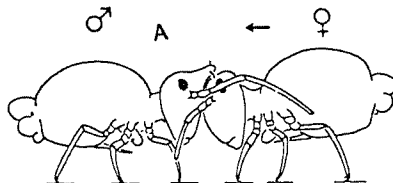
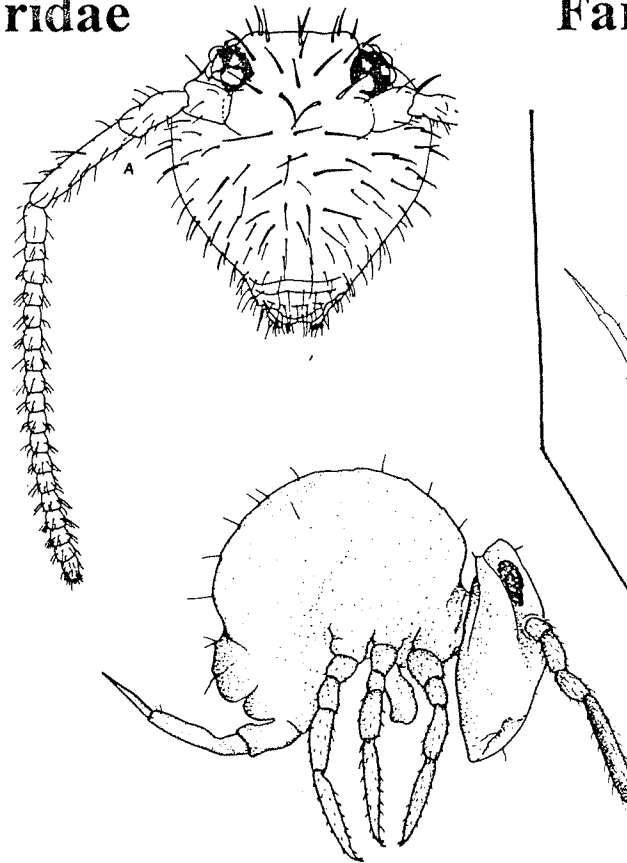
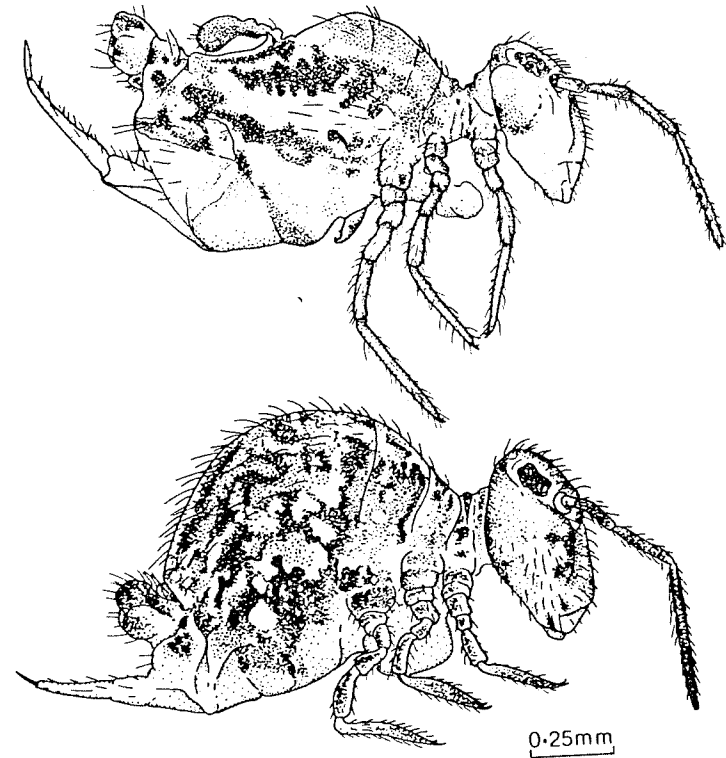
Identification characters of Collembola

	Antennae	Post-antennal organ	Eyes	Abdominal segmentation	Furcula	Anal spines	Other characters	
<hr/>								
Abdomen globular								
<i>Sminthuridae</i>	longer than head	absent	present	fused	present	absent	distal antennal segment annulate	
<i>Neelidae</i>	shorter than head	absent	absent	fused	present	absent		
Abdomen elongate								
Pronotum with a sclerite and dorsal setae								
<i>Poduridae</i>	longer than head	absent	present	6 segments all subequal	present	absent	dentes more than three times length of manubrium, aquatic habitat-- "neustonic"	
<i>Hypogastruridae</i>	shorter than head	present--oval, or absent	present or absent	6 segments all subequal	present or absent	almost always present		
<i>Onychiuridae</i>	shorter than head	present--rectangular	almost always absent	6 segments all subequal	almost always absent	almost always present	cuticle with a pattern of clear circles-- "pseudocelli"	
Pronotum membranous, without dorsal setae								
<i>Isotomidae</i>	usually longer than head	almost always present	present or absent	4, 5, or 6 segments, all subequal	present, reduced, or absent	almost always absent		
<i>Entomobryidae</i>	longer than head	almost always absent	present	6 segments, 4th twice length of 3rd	present	absent	usually with scales, distal antennal segment often annulate	

Subclass Entognatha
Order Collembola
 Suborder Symphypleona

Family Sminthuridae

Family Neelidae

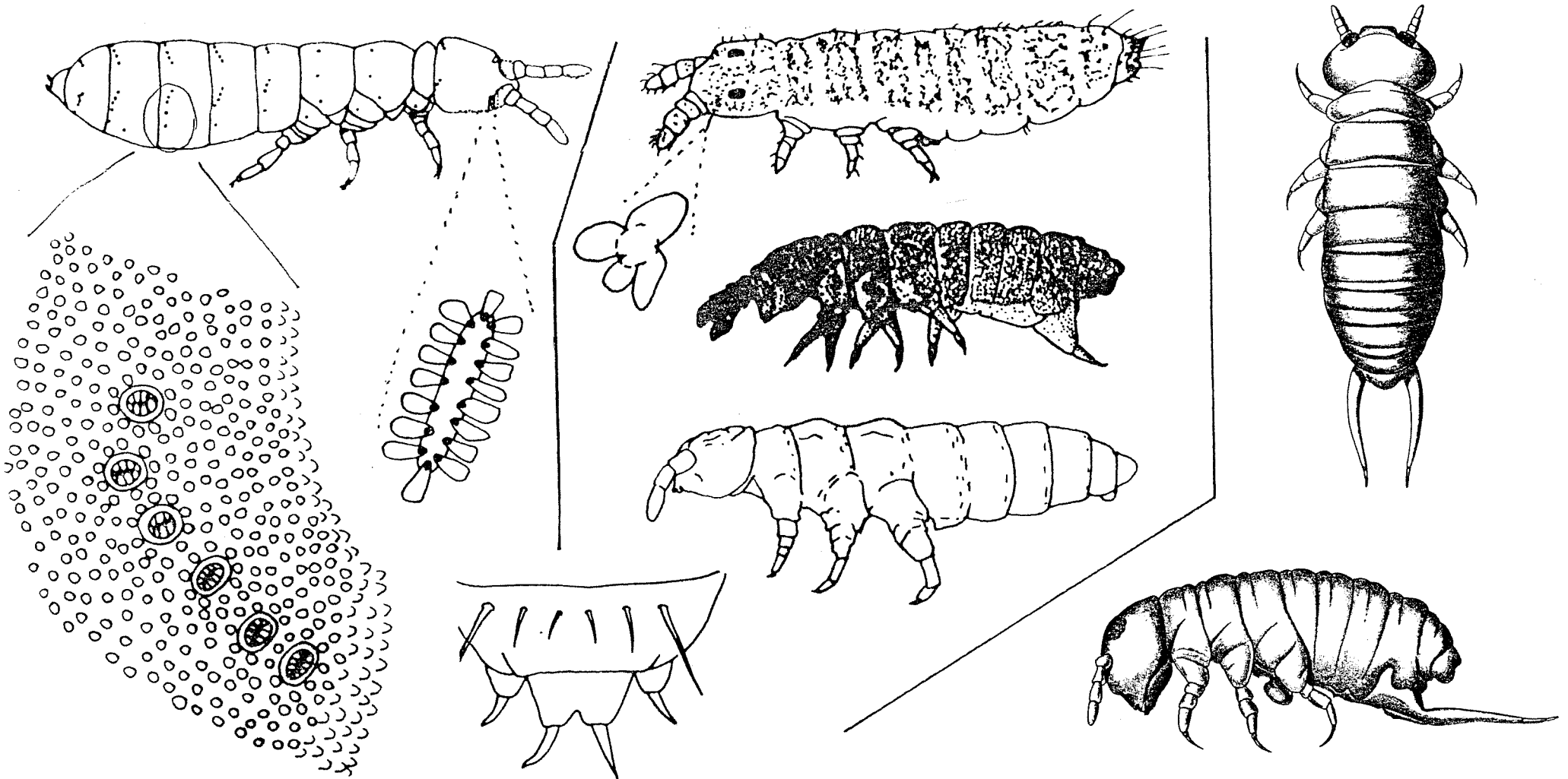


Subclass Entognatha
Order Collembola
Suborder Arthropleona

Family Onychiuridae

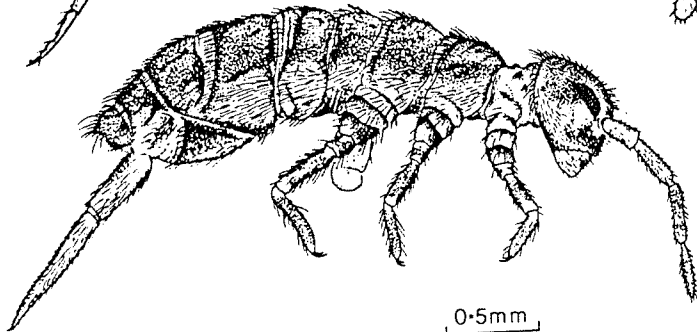
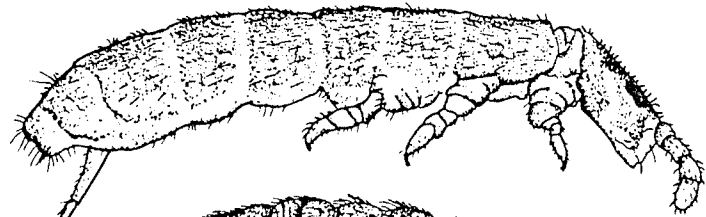
Family Hypogastruridae

Family Poduridae

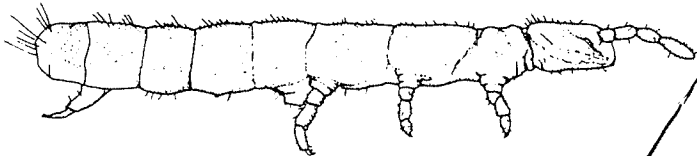
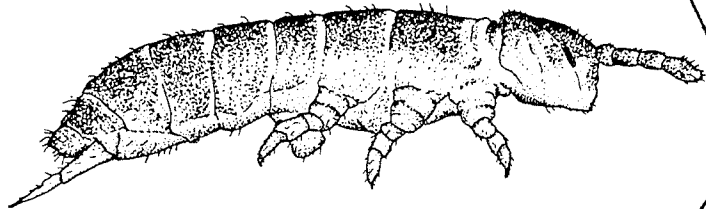


Subclass Entognatha
Order Collembola
Suborder Arthropleona

Family Isotomidae

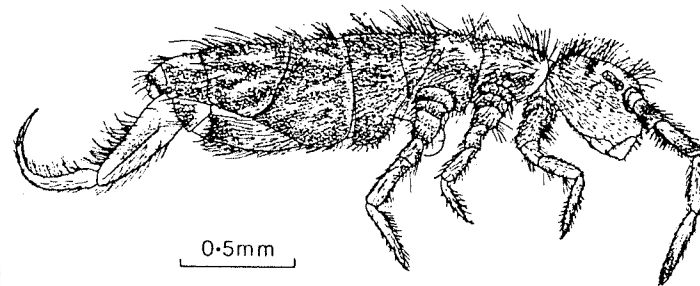


0.5mm

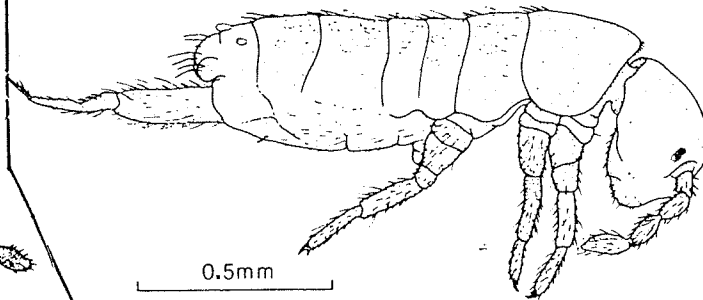


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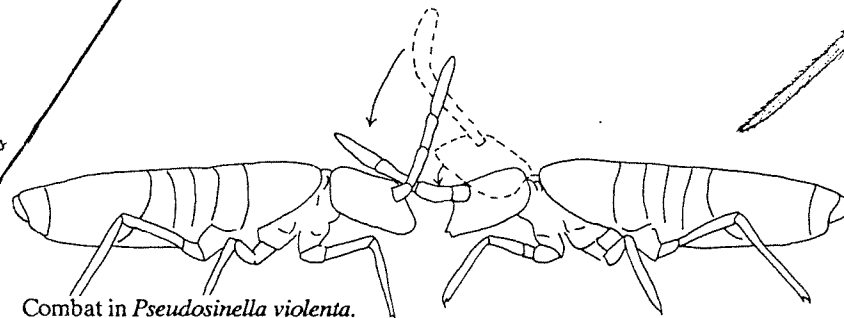
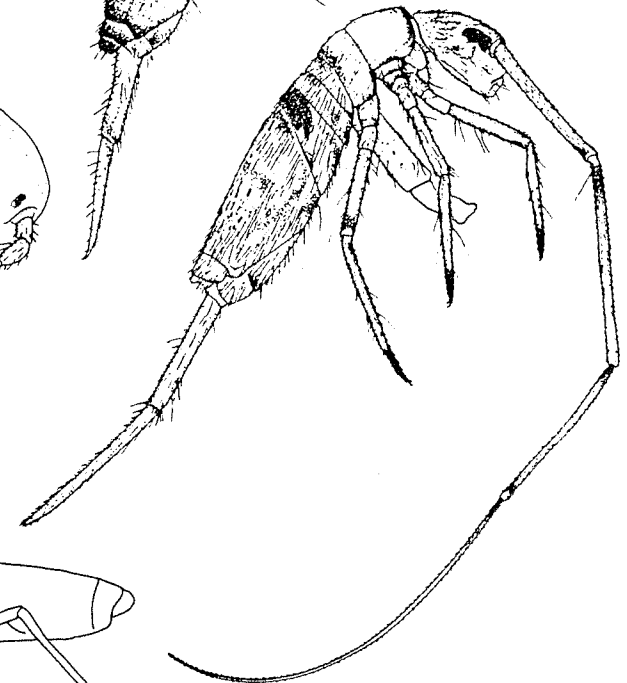
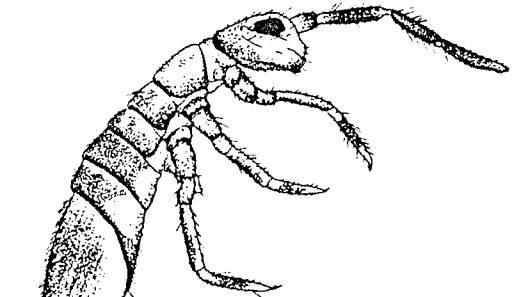
Family Entomobryidae



0.5mm



0.5mm



Combat in *Pseudosinella violenta*.

DIPLURA

Common Name: diplurans, japygids, campodeids.

Etymology: Dipl- = two; -ura = tail.

Metamorphosis: Ametabolous - immatures resemble adults.

CHARACTERISTICS

Body: Minute to small; slender; whitish; without scales.

Head: "Pouched" head; genal area fused to labrum and labium.

Mouthparts: Entognathous; chewing.

Eyes: Compound eyes absent.

Antennae: Long and filiform; many segmented.

Wings: Lacking.

Legs: Tarsi one-segmented.

Abdomen: 10 visible segments; cerci forcep-like or with 2 long caudal filaments; styli present on ventral surface of abdominal segments.

Comments: Diplurans are found in damp situations, in caves, under bark and rocks, and in the soil.

FAMILIES

Japygidae: cerci are forceps-like.

Campodeidae: cerci not forceps-like, about as long as the antennae, each about one half the length of the body.

Anajapygidae: cerci not forceps-like, but are shorter than antennae; styli on abdominal segments 1-7; antennal trichobothria beginning on 5th antennal segment.

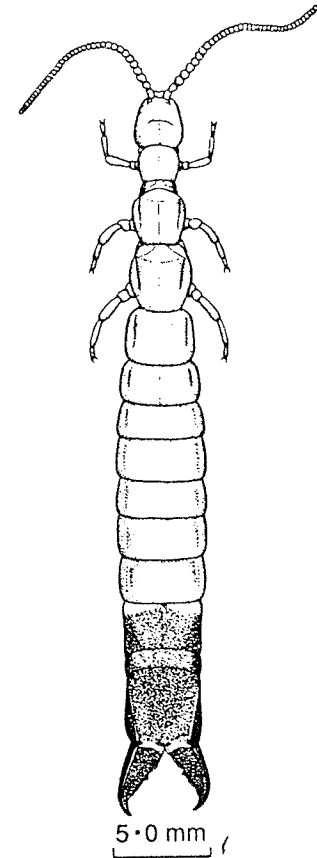
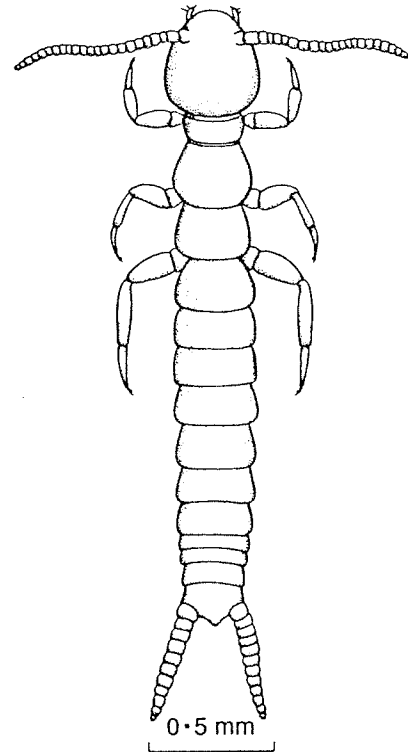
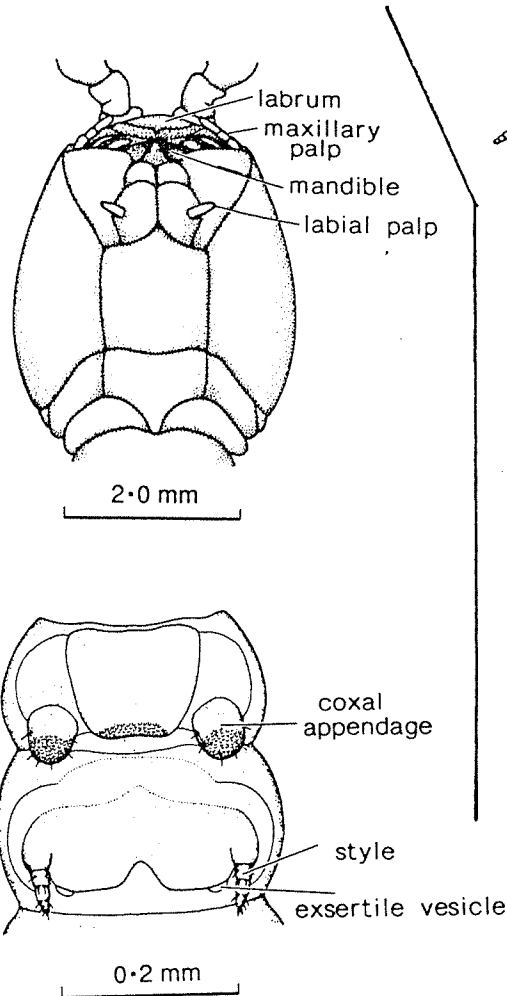
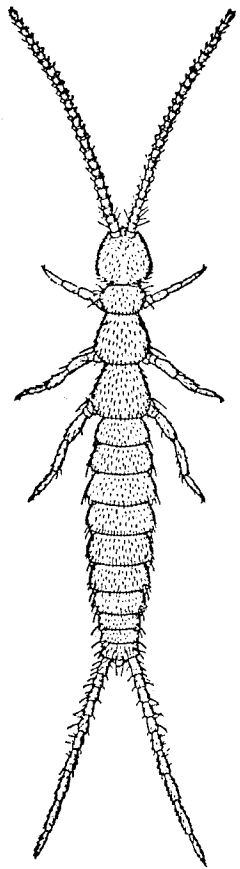
Procampodeidae: cerci not forceps-like, but are shorter than antennae; styli on abdominal segments 2-7; antennal trichobothria beginning on 3rd antennal segment.

Subclass Entognatha
Order Diplura
Diplurans

Family Campodeidae

Family Anajapygidae

Family Japygidae



MICROCORYPHIA

Common Name: Jumping bristletails.

Etymology: Micro- = small; -coryphia = head.

Metamorphosis: Ametabolous.

CHARACTERISTICS

Body: somewhat cylindrical with the thorax arched.

Head: relatively small.

Mouthparts: ectognathous; each mandible with only a single point of articulation with the head [a primitive condition for which the order is sometimes called the Archeognatha].

Eyes: compound eyes large and contiguous, ocelli always present.

Antennae: relatively long and filiform.

Wings: absent.

Legs: middle and hind coxae bear styli; tarsi are 3-segmented.

Abdomen: pair of styli on segments 2-9; segments 1-7 usually bear 1 or 2 pairs of eversible glands.

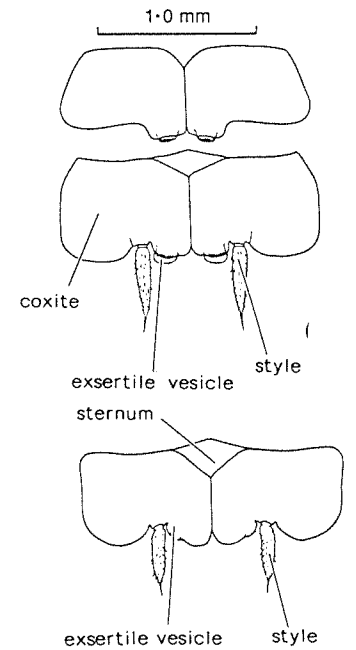
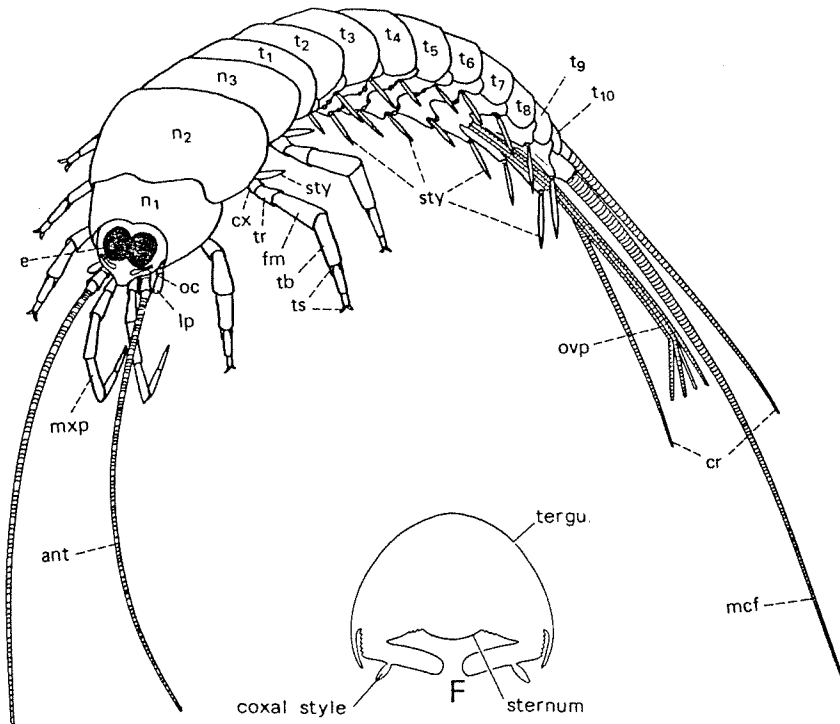
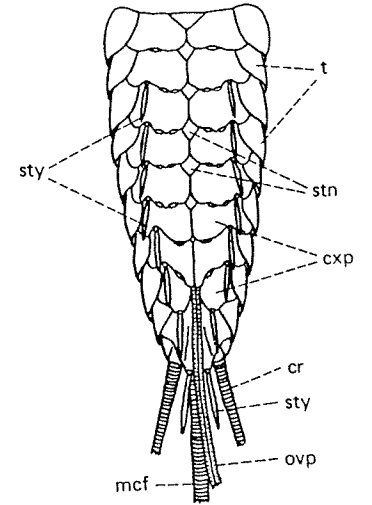
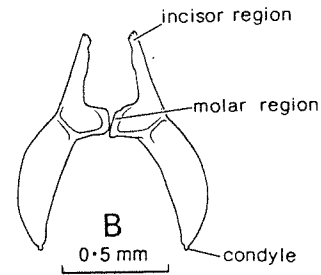
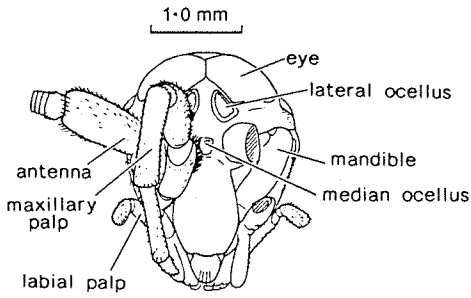
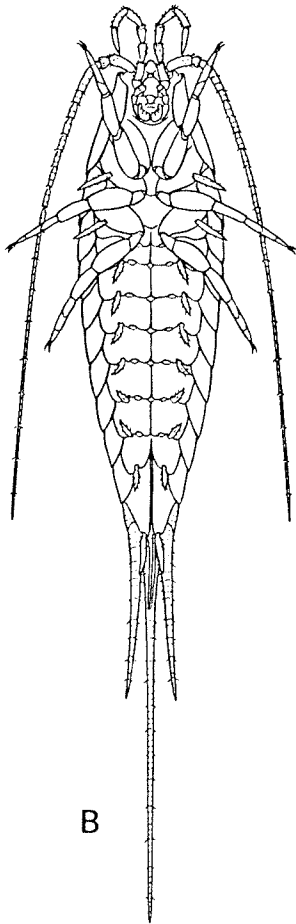
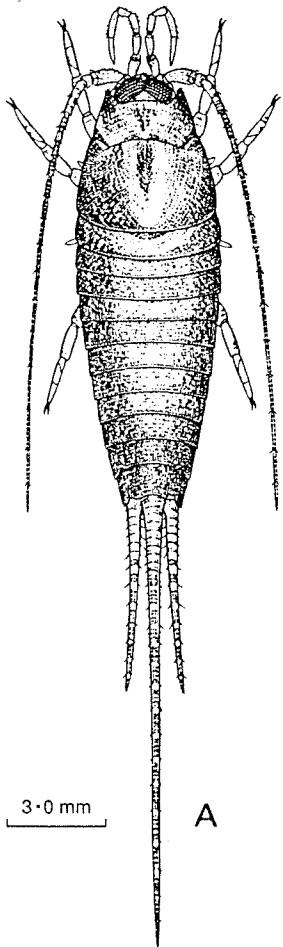
Comments: This order used to be included within the Thysanura, but is separated mainly due to the single point of articulation of the mandibles. They are quite active and will readily jump when disturbed.

FAMILIES

Machilidae: first 2 segments of antennae heavily scaled; abdominal sterna large; abdominal segments 2-7 with at least 1 pair of eversible glands, maybe 2 pairs.

Meinertellidae: antennae lacking scales; abdominal sterna reduced; abdominal segments with at most 1 pair of eversible glands, sometimes none.

Subclass Insecta
 Infraclass Aptera
Order Microcoryphia
 Jumping bristletails



THYSANURA

Common Name: silverfish, firebrats.

Etymology: Thysan- = bristle or fringe; -ura = tail.

Metamorphosis: Ametabolous; may continue to molt after becoming an adult.

CHARACTERISTICS

Body: somewhat flattened, usually covered with scales.

Head: Prognathous.

Mouthparts: ectognathous, chewing.

Eyes: compound eyes absent or present, but relatively small; ocelli present or absent.

Antennae: Elongate, filiform, many segmented.

Wings: lacking.

Legs: Tarsi 3-5 segmented; middle and hind coxae without styli.

Abdomen: eleven abdominal segments; styli on most abdominal segments; 3 caudal appendages: 2 cerci and 2 median caudal filament.

Comments: Most species live in soil and leaf litter or rotting wood. Others prefer heated areas. They have an open tracheal system. The styli are probably vestiges of locomotor appendages. Will continue to molt after reaching adulthood; there are at least 6 instars, but may be as many as 45-60. Female will have to mate after each molt.

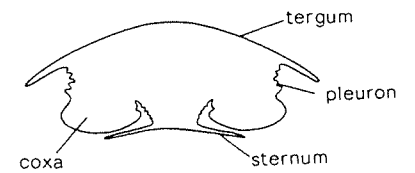
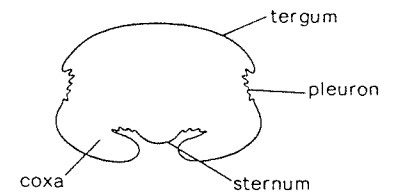
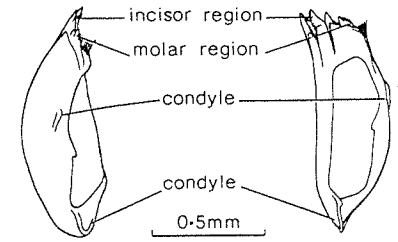
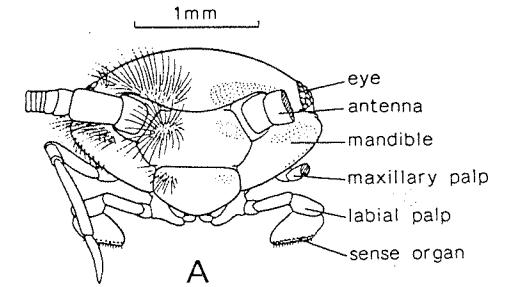
FAMILIES

Lepidotrichidae: Tarsi 5-segmented; ocelli present; body not covered with scales.

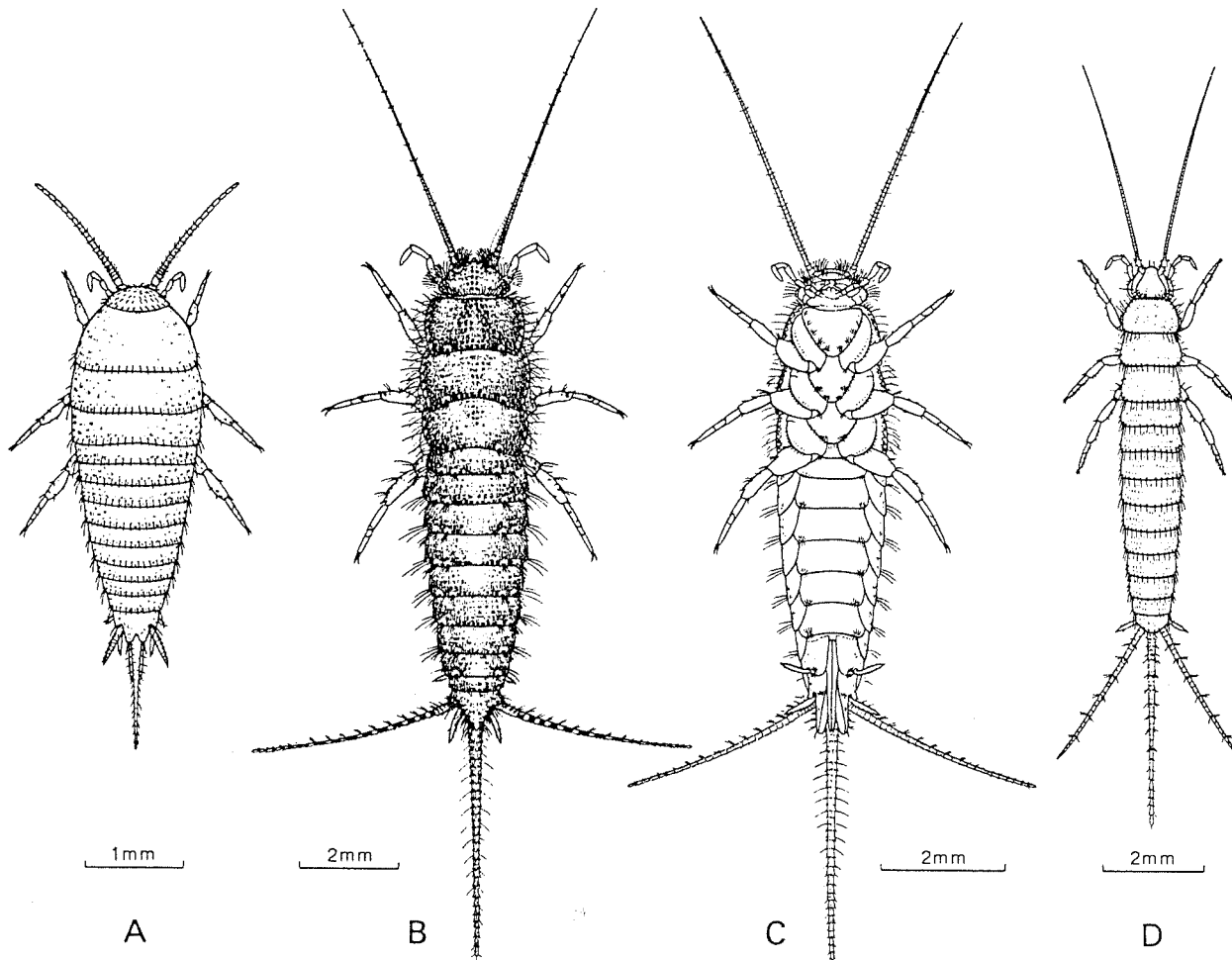
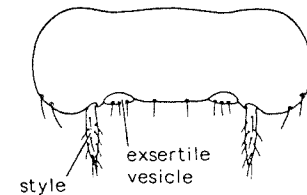
Nicoletiidae: Tarsi 3 or 4-segmented; ocelli absent; body with or without scales; compound eyes absent.

Lepismatidae: Tarsi 3 or 4-segmented; ocelli absent; body always covered with scales; compound eyes present.

Subclass Insecta
 Infraclass Aptera
Order Thysanura
 Silverfish and Firebrats



0.5mm



A, *Atopatelura michaelseni*, Nicoletiidae-Atelurinae, ♀ dorsal; B, C, *Acrotelsella devriesiana*, Lepismatidae, ♂ dorsal and ♀ ventral; D, *Trinemura excelsa*, Nicoletiidae-Nicoletiinae, ♂ dorsal.