

COLLEMBOLA



McDonald Woods
Chicago Botanic Garden

The Collembola in this catalog were collected as part of a year long study of microarthropods in the leaf litter, soil surface, roots and moss of mesic, dry mesic, upland forest and buckthorn communities in Mary Mix McDonald Woods, Chicago Botanic Garden, Glencoe, Illinois and other nearby locations. The purpose of this catalog is to present the diversity of Collembola (known as springtails) in a way that is an aid to identification of many local springtails.

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Verification: Felipe Soto, Illinois Natural History Survey, Urbana, Illinois

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A diagram typical of each group is found at the beginning of each section. Many structures are too small to see in the photographs, so arrows or circles have been provided to indicate where study of slides under a microscope would be helpful. The top line of each page gives the family name. Genus and species if known, are on the next line. Terminology for identification has been simplified as much as possible. Also, much information available in more extensive taxonomic keys has been omitted. For further information, consult *The Collembola of North America*, K. Christiansen and P. Beringer, 1998, Grinnell College, Grinnell, Iowa, or Collembola.org

Abundance is estimated for those animals found in a pit trap study using the following terms: rare < 5 individuals, uncommon 6 -50, common 51 - 500, abundant > 500. Animals collected by another method or in another location did not have abundance estimated, so not all animals have these estimates.

Keys have been provided for the springtails in this catalogue, the first one to families, and subsequent ones to genus if there is more than one genus in the family, and to species within each genus if there is more than one species in the genus.

To navigate to different pages, right click; move cursor to go, then by title to see list of pages

Collembola in this catalog

Poduridae

Podura aquatica

Hypogastruridae

Hypogastrura concolor

Hypogastrura packardi

Hypogastrura sp.

Neanura muscorum

Ceratophysella sp.

Onychiuridae

Onychiurus

Tullbergia

Entomobryidae

Orchesella villosa

O. cincta

O. celsa ?

O. hexfasciata

Lepidocyrtus fernandi

L. paradoxus

Lepidocyrtus sp.

Pseudosinella violente

P. alba

Entomobrya nivalis

E. clitellaria

Homidia socia

Tomoceridae

Tomocerus flavescens

Tomocerus minor

Collembola Catalog

(continued)

Isotomidae

Folsomia sp.

F. variabilis

F. elongata

F. prima

F. stella

F. nivalis

Desoria flora

D. nigrifrons

Parisotoma notabilis

Isotoma viridis

I. subviridis

Proisotoma minuta

Isotomurus sp.

Isotomurus sp. 2

I. palustroides

I. tricolor

Isotomiella minor

Neelidae

Megalothorax minimus

Sminthuridae

Sminthurides malmgreni

S. occultus

Sphaeridia serratus

Sminthurinus elegans

S. macgillivrayi

S. henshawi

S. quadrimaculatus

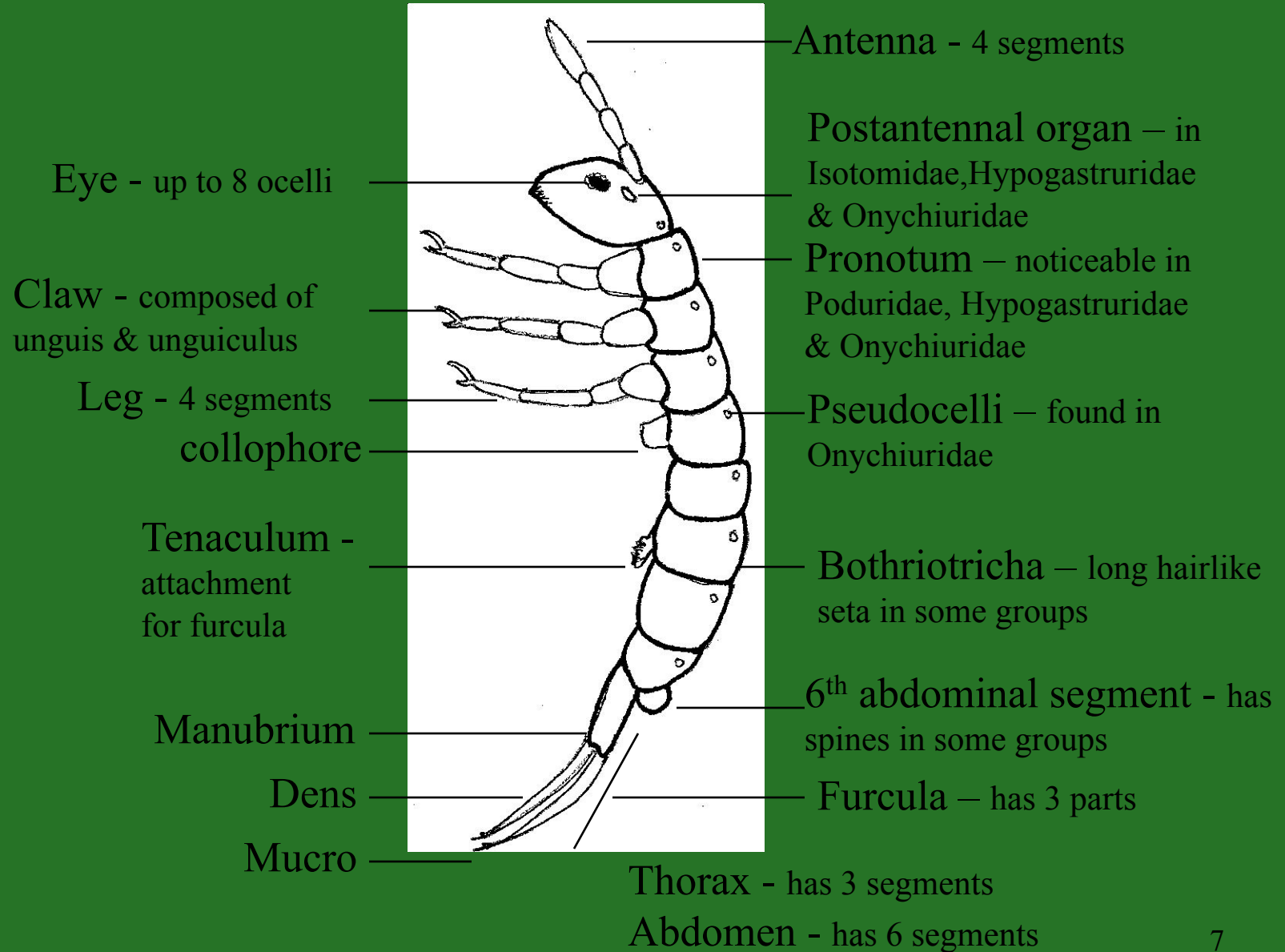
Ptenothrix atra

Deuterosminthurus russata

Arrhopalites sp.

Generalized Diagram of Springtail

Shape and Type of Structures Vary from Family to Family



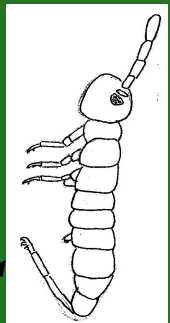
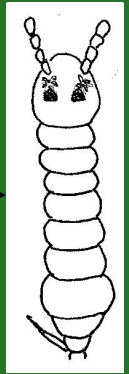
Key to Families

(adapted from Christiansen & Bellinger)

- 1a. Body elongate, segments mostly similar.....2 →
- 1b. First 4 abdominal segments fused.....7

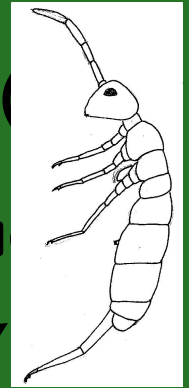
- 2a. Pronotum (1st thoracic segment) normal size, not reduced, has dorsal setae.....3

- 2b. Pronotum is reduced, lacks setae.....5
- 3a. Dens more than 3 times as long as manubrium, with distal rings of granules.....Poduridae p.10
- 3b. Dens absent or much shorter.....4
- 4a. Pseudocelli present.....Onychiuridae p. 17
- 4b. Pseudocelli absent.....Hypogastruridae p. 11
- 5a. Postantennal organ absent.....6
- 5b. Postantennal organ present....Isotomidae p.41



Key to Families, continued

6a. Has multilaterally ciliate macrochaetae (bristles) and/or scales (flattened modified setae), and/or 4th abdominal segment much longer than 3rd; Furcula always well developed.



.....Entomobryidae. p. 20

6b. 4th antennal segment much shorter than 3rd; both flexible and whorled; Detail seen at 450x, mucro elongate, hairy, with several teeth.



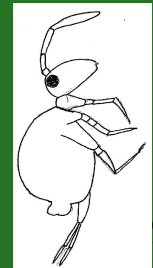
.....Tomoceridae, p. 40

7a. No eyes, antennae shorter than head.



..... Neelidae, p. 66

7b. With eyes; antennae longer than head.



.....Sminthuridae, p. 67

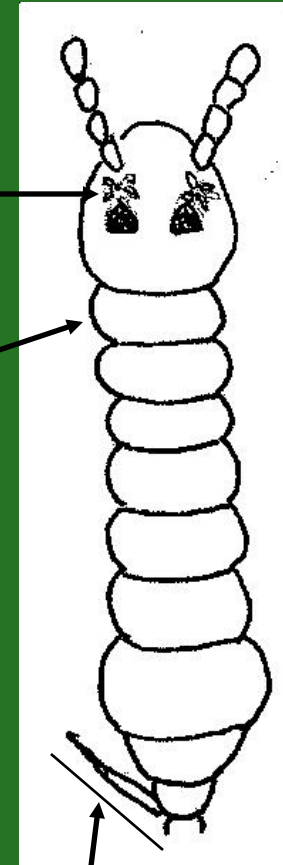
Poduridae

- Podura aquatica
- First thoracic segment distinct, with setae
- Dens more than three times as long as manubrium, with distal rings of granules
- Usually on quiet water surface



Hypogastruridae

- Body elongate, segments mostly similar
- Detail seen at 450x, PAO, (post-antennal organ) if present, is round or oval with few tubercles
- Pronotum (1st thoracic segment) normal size, not reduced
- Short or absent furcula (catapulting organ), does not reach beyond end of abdomen
- Note: all Isotomidae with a short furcula have no setae on prothoracic tergum, (dorsal side of segment)



Furcula

Key to Hypogastruridae

- 1a. 2 anal spines.....2
- 1b. 6th abdominal (last) segment bilobed.....Neanura muscorum
- 2a. Mucro pointed.....Hypogastrura
- 2b. Mucro spoon-shaped with lateral lobe.....
.....Ceratophysella

Hypogastruridae

- Hypogastrura concolor
- Dark gray blue
- 8 equally distinct eyes
- Detail seen at 450x, PAO subequal to nearest eye, posterior lobes smaller
- Detail seen at 450x, 2 anal spines
- Abundant



Hypogastruridae

- Hypogastrura sp.
- Eight eyes
- Post-antennal organ
- Furcula present



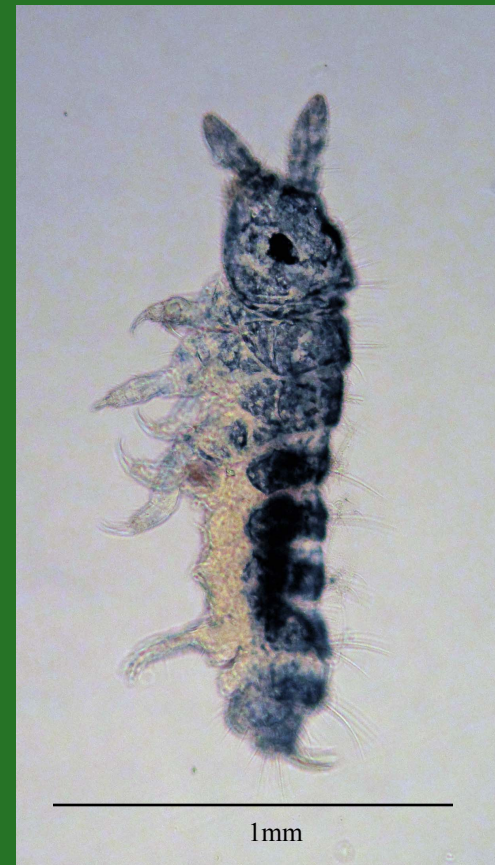
Hypogastruridae

- Hypogastrura packardi
- Blue to black
- Anal spines slightly longer than inner unguis and 1.5-2 times longer than papillae of spines
- Clubbed and ciliate abdominal setae



Hypogastruridae

- Ceratophysella
- Mucro spoon-shaped with lateral lobe



Hypogastruridae

- Neanura muscorum
- Dark blue-black
- Bilobed 6th (last) abdominal segment
- Detail seen at 450x, no molar plate (ridged organ at base of mandible)
- Furcula reduced
- No anal spines
- Detail seen at 450x, body tubercles well developed
- Common



photo mag. 40x

Max. length 3.0 mm

Key to Onychiuridae

- 1a. 2 sense clubs behind 4 – 6 papillae.....Onychiurus
- 1b. 1-3 exposed sense clubs.....
.....Tullbergia

Onychiuridae

- Tullbergia
- No eyes
- Has pseudocelli (small dorsal rings seen at 400x) on some segments
- No dark pigment
- Sense organ on 3rd antennal segment with 2-3 sense clubs behind 2 papillae (seen at 1000x)
- No furcula
- Postantennal organ elongate with many tubercles
- 2 anal spines



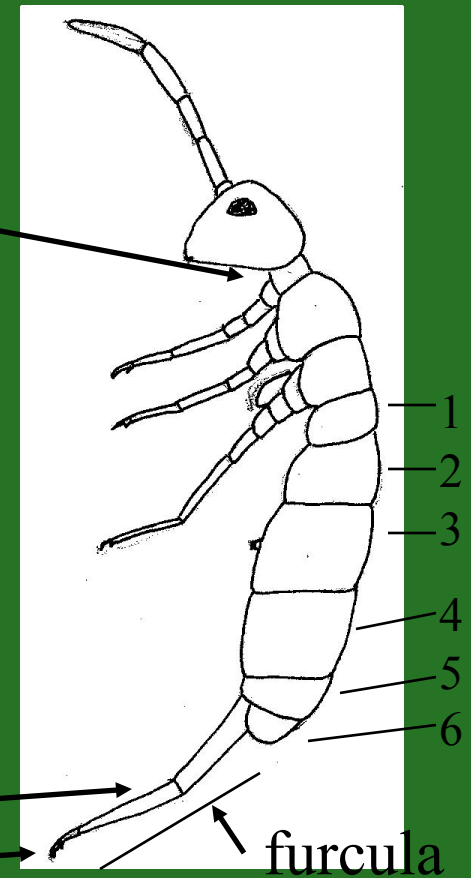
Onychiuridae

- Onychiurus
- No furcula
- No pigment
- No eyes
- 4 or more papillae in apical organ on 3rd antennal segment
- Elongate post antennal organ with many tubercles
- Pseudocelli on most segments



Entomobryidae

- Pronotum is reduced, lacks setae
- Has multilaterally ciliate macrochaetae (large bristles) and/or scales (flattened modified setae), and/or 4th abdominal segment much longer than 3rd
- Furcula always well developed
- Post-antennal organ (PAO) absent
- Dorsally crenulate (ridged) dens
- Short hook-like mucro



Key to Entomobryidae

- 1a. No scales; 4th abdominal segment less than 3 times as long as 3rd segment.....Orchesella
- 1b. 4th abdominal segment noticeably longer than 3rd abdominal segment.....2
- 2a. Greatly enlarge body setae that are apically truncate, bent or clavate.....3
- 2b. Scales on body.....4
- 3a. Dark longitudinal stripe from head through abdomen; dental spines in adult.....Homidia
- 3b. Pigment pattern not as in 3a. No dental spines.....Entomobrya
- 4a. 8 eyes (simple eyes in group of 8).....Lepidocyrtus
- 4b. Less than 8 eyes.....Pseudosinella

Key to Orchesella

- 1a. Pale blue pigment in several transverse bands.....*O.*
.....*hexfasciata*
- 1b. Dark pigment in patterns or covering most of body....2
- 2a. Diagonal marks on 2nd and 3rd abdominal segments;
pigment purplish brown.....*O. villosa*
- 2b. No diagonal marks on 2nd and 3rd abdominal segments.3
- 3a. Very dark, except 2nd abdominal segment very pale
dorsally.....*O. cincta*
- 3b. Dark cross band on 3rd abdominal segment.....*O. celsa*

Entomobryidae

- Orchesella villosa
- Pigment purplish-brown to purplish blue
- Anterior markings mostly longitudinal
- Chevron marks on 2nd and 3rd abdominal segments
- Abundant



photo mag. 40x

Max. length 5.5 mm

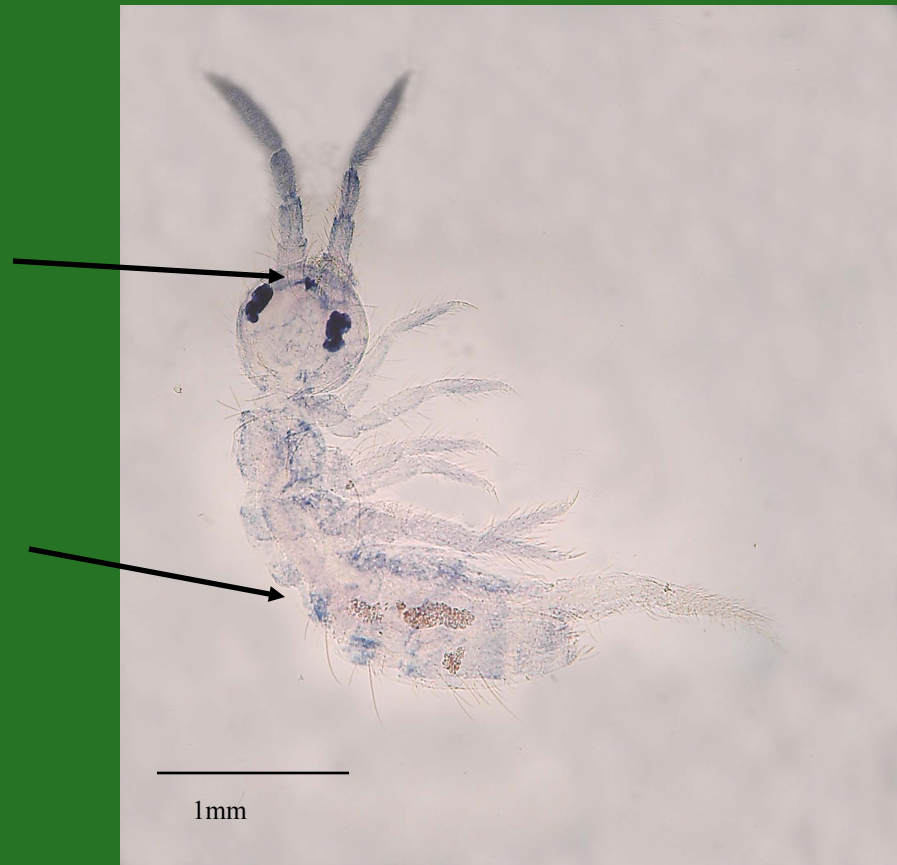
Entomobryidae

- Orchesella cincta
- Very dark
- 2nd abdominal segment very pale dorsally
- Uncommon



Entomobryidae

- Orchesella hexfasciata
- Interantennal eye patches dark
- Blue pigment in transverse bands
- Common



Entomobryidae

- Orchesella celsa ?
- Longitudinal stripes on thorax and sometimes on abdomen
- Dark cross band on 3rd abdominal segment



Entomobryidae

- Genus Entomobrya
- 4th abdominal segment 3+ times as long as 3rd segment
- Greatly enlarged body setae that are apically truncate, bent or clavate (knobbed).

Key to Entomobrya

1a. Pigment in a u-shaped band on 4th abdominal segment
.....*E. nivalis*

1b. Blue-black pigment in 3-4 dark bands on post-thoracic
and anterior abdominal segments.....*E. clitellaria*

Entomobryidae

Entomobrya nivalis

- Background yellowish
- Blue pigment with a U-shaped band on 4th abdominal segment, never with a transverse band on anterior part of segment
- Common



Entomobryidae

- Entomobrya clitellaria
- Background pale to yellow
- Blue-black pigment usually in 3-4 dark bands
- Uncommon



Entomobryidae

Homidia socia

- Blue-black pigment stripe on side of head and along most of abdomen
- Mid-dorsal pigment line
- Common



Key to *Lepidocyrtus*

- 1a. Body deep blue: head pushed downward by protruding mesothorax.....*L. paradoxus*
- 1b. Body medium blue or tannish.....2
- 2a. Body medium blue.....*Lepidocyrtus* sp.
- 2b. Body tan, antennae and leg bases washed with blue*L. fernandi*

Entomobryidae

- Lepidocyrtus paradoxus
- Deep blue, base of antennae and furcula pale
- Mesothorax (2nd thoracic segment) strongly enlarged and projecting, displacing elliptical head into ventral and more perpendicular position
- Common



Entomobryidae

- Lepidocyrtus fernandi
- Eyes on dark triangular to trapezoidal patches, dark interantennal band
- Antennae and leg bases washed with blue pigment
- Abundant



Entomobryidae

- Lepidocyrtus sp.
- Medium blue
- Rare



photo mag. 40x

Max. length 1.5 mm

Entomobryidae

- Genus Pseudosinella
- Scales also on dens (2nd segment of furcula)
- Less than 8 eyes
- 4th abdominal segment at least 2.5 times as long as 3rd segment

Key to *Pseudosinella*

1a. No eyes; no pigment.....*P. violente*

1b. Two contiguous eyes; pigment very pale.....*P. alba*

Entomobryidae

- Pseudosinella
violente
- No eyes
- No pigment
- Macrochaetae of 2nd
thoracic segment
long and clavate
- Mesothorax narrower
than metathorax
- Abundant



Entomobryidae

- Pseudosinella alba
- Two contiguous eyes
- Large macrochaetae on mesothoracic collar
- Pale, with scattering of blue pigment granules
- Common



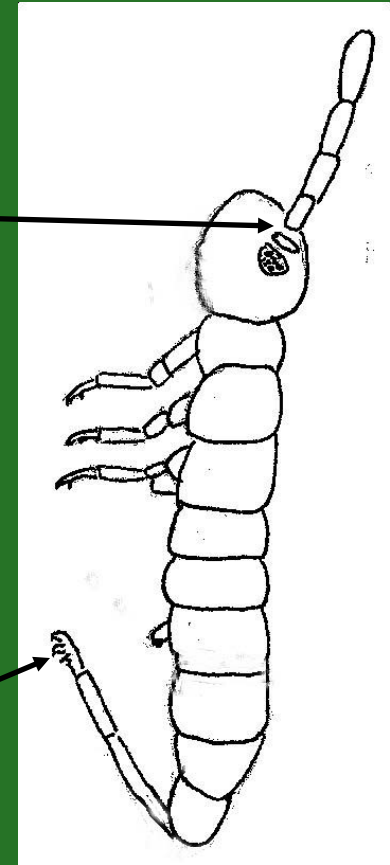
Tomoceridae

- Tomocerus flavescens
- 4th antennal segment much shorter than 3rd, both flexible and whorled
- Detail seen at 450x, coarsely ribbed scales
- Detail seen at 450x, mucro elongate, hairy, with several teeth
- Detail seen at 450x, has 2 spine-like scales at inner base of dens
- Abundant



Isotomidae

- All antennal segments distinct
- Has post antennal organ (P.A.O.)
- 3rd and 4th abdominal segments similar in length
- No scales or flexed setae on body or multidentate spines on dens
- Detail seen at 450x, mucro usually has 3 or more teeth



Key to Isotomidae

- 1a. Postantennal organ present.....2
- 1b. No eyes, no postantennal organ.....Isotomiella
- 2a. Abdominal segments 4,5 and 6 fused.....Folsomia
- 2b. Abdominal segments separate.....3
- 3a. Ventral manubrial setae 9 or less.....Proisotoma
- 3b. Ventral manubrial setae 10 or more.....4
- 4a. Bothriotrichae present, abdominal macrochaetae usually multilaterally ciliate.....Isotomurus
- 4b. Bothriotrichae absent, abdominal macrochaetae smooth.....5
- 5a. 4 eyes.....Parisotoma
- 5b. 8 eyes.....6
- 6a. Median apical setae of venter of manubrium spinelike.....Isotoma
- 6b. No spinelike ventral manubrial setae.....Desoria

Isotomidae

- Isotoma subviridis
- Segments narrowly lined with purple
- View features below at 450x:
- PAO subequal to nearest eye
- Apical mucronal tooth large, basal teeth unequal in size
- Longest body setae coarsely unilaterally serrate
- Common



Isotomidae

- Isotoma viridis
- Color and pattern variable; view details below at 450x:
- PAO oval, $\frac{1}{2}$ - $\frac{7}{8}$ diameter of nearest eye
- Manubrium (basal segment of furcula) with 10 small spines at ventral apex
- Dens 2 – 2 $\frac{1}{2}$ times as long as manubrium
- Mucro tridentate, teeth subequal
- Longest body setae strongly serrate, 3.5 – 4 times length of inner unguis
- Common



Key to Desoria

- 1a. Mucro quadridentate.....D. nigrifrons
- 1b. Mucro tridentate.....2
- 2a. Longest posterior setae subequal to or shorter than inner edge of hind unguis.....D.flora
- 2b. Longest posterior setae 1.5 – 2 times as long as inner edge of hind unguis.....D. uniens

Isotomidae

- Desoria flora
- Blue-black with paler head, sometimes with reddish tint
- At 400x, mucro tridentate often with minute apical tooth
- Longest posterior setae about as long as inner unguis



Isotomidae

- Desoria uniens ?
- Head with dark interantennal marks
- Longest posterior setae 1.5 – 2 times as long as inner unguis



Isotomidae

- Desoria nigrifrons
- Anterior head dark
- May have dark bands on some body segments
- Unguis with inner tooth
- Mucro quadridentate, basal teeth at different level



Isotomidae

- Parisotoma notabilis
- Pale to medium gray
- PAO broadly oval
- 4 eyes
- Details seen at 450x, unguis and unguiculus toothless
- Mucro tridentate, with subequal teeth, basal tooth lateral and outstanding
- Common



Isotomidae

- Proisotoma minuta
- White, often with scattered black granules
- Details at 450x:
- 9 or fewer manubrial setae
- PAO 3 – 4 times as long as diameter of nearest eye
- Pronotum membranous and unpigmented, 5th and 6th abdominal segments clearly separated
- Well-developed furcula with distinct segments
- 2 tenent hairs per foot
- Common



Key to Folsomia

- 1a. Without pigment or eyes.....2
- 1b. Has eyes.....3
- 2a. Longest abdominal setae unilaterally cillate.
F. nivalis
- 2b. Longest abdominal setae smooth. F. stella
- 3a. 2 or fewer eyes.....F. diplophthalma
- 3b. 3 or more eyes.....4
- 4a. Unguis with inner tooth.....F. prima
- 4b. Unguis without tooth.....5
- 5a. 8 eyes.....F. variabilis
- 5b. 6 eyes.....F. elongata

Isotomidae

- Folsomia sp.
- No eyes
- Abdominal segments 4,5 and 6 fused
- Elongate PAO



Isotomidae

- Folsomia elongata
- Gray-blue with scattered pale spots
- Manubrium 1.1 x as long as dens
- Dens 5x as long as mucro; 5 dorsal and 8-9 ventral setae
- Bidentate mucro with short apical tooth



Isotomidae

- *Folsomia stella*



Isotomidae

- *Folsomia diplophthalma* ?



Key to Isotomurus

- 1a. Normal small body setae ciliate.....l. palustroides
- 1b. Normal small body setae smooth; middorsal longitudinal line.....l. tricolor

Isotomidae

- Isotomurus sp.
- More than 10 ventral manubrial setae
- Without smooth dens
- Has both bothriotricha and multilaterally ciliate body setae
- Common



Isotomidae

- Isotomurus sp. 2
- More than 10 ventral manubrial setae
- Without smooth dens
- Has both bothriotrichae and multilaterally ciliate large body setae



Isotomidae

- Isotomurus
palustroides
- Sometimes dark violet
with white spots
- Mucro with basal seta
- Body setae
multilaterally ciliate



Isotomidae

- Isotomurus tricolor
- Yellowish or greenish with middorsal longitudinal line
- Small body setae smooth



Isotomidae

- Isotomiella minor
- No eyes
- No post-antennal organ
- No pigment



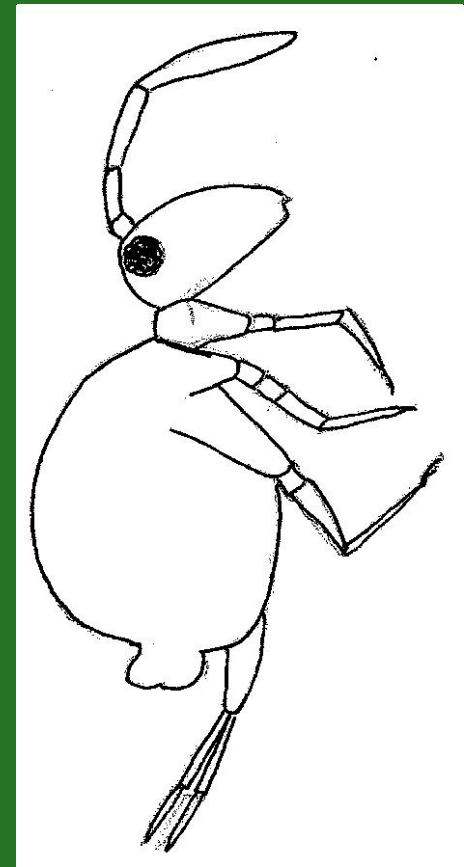
Neelidae

- Megalothorax minimus
- No eyes
- Posterior trunk segments form single mass
- Antennae shorter than head, 4th antennal segment fused to 3rd
- Usually no pigment
- Dens subdivided into two parts
- Rare



Sminthuridae

- Antennae longer than head
- 1st 4 abdominal segments fused
- Mucro elongate
- May have striking pigment pattern
- Usually 4 pairs of bothriotricha on trunk (often missing)



Key to Sminthuridae

- 1a. Eyes 2 on each side or less.....Arrhopalites
- 1b. Eyes 4 or more.....2
- 2a. Broad, pleated mucronal lamellae; male antennae modified for clasping.....3
- 2b. Mucro without pleats, male and female antennae similar.....4
- 3a. Seta on mucro.....Sminthurides
- 3b. Mucronal seta absent.....Sphaeridia

- 4a. 4th antennal segment subdivided.....
.....Deuterosminthurus
- 4b. 4th antennal segment not subdivided.....5
- 5a. Antennae long, bent between 2nd and 3rd segment; head long and pointed.....Ptenothrix
- 5b. Antennae shorter, not bowed; head somewhat rounded.....6
- 6a. Small bump anterior to 6th abdominal segment....
.....Katianna
- 6b. No such protuberance present.....Sminthurinus

Sminthuridae

- Sminthurides malmgreni
- Pigment blue to purple
- Male antennae modified for clasping
- Detail seen at 450x, broad pleated mucronal lamellae
- No clavate tenent hairs (prominent tarsal setae)
- Common



photo mag. 100x

Max. length 1.0 mm

Sminthuridae

- Sminthurides
occultus
- Pigment purple;
sometimes with
dorsolateral pale
patches
- Mucro with outer
lamella entire, inner
crenulate, distal
projection bulbous



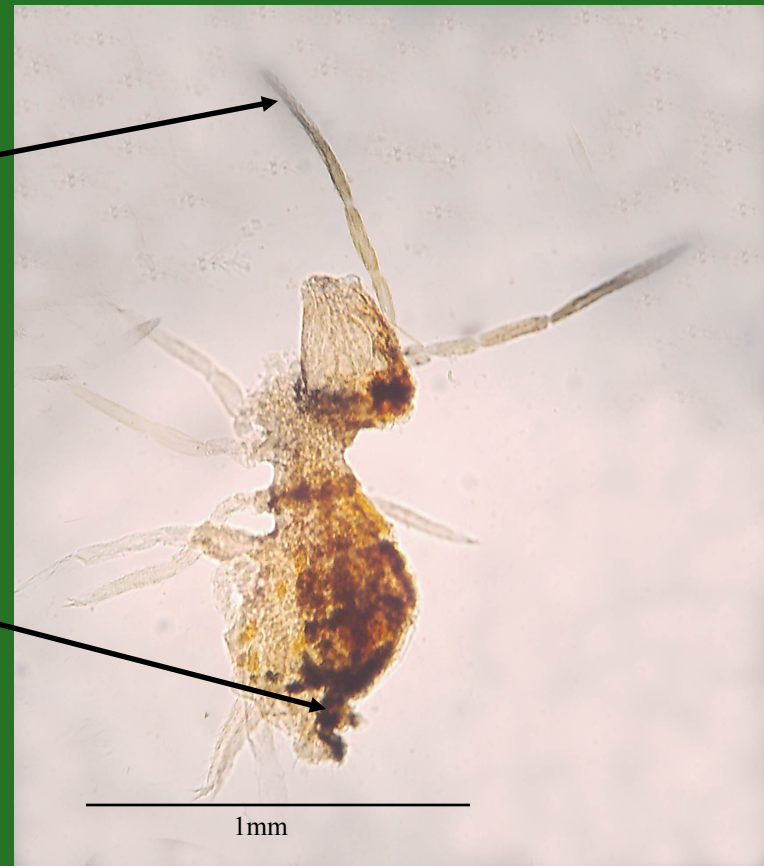
Sminthuridae

- *Sphaeridia serratus*
- Reddish brown
- 6 eyes
- Mucro narrowly elongate with 4 lamellae



Sminthuridae

- Katianna
macgillivrayi
- Detail seen at 450x, 4th antennal segment has 8 –10 oblique subsegments
- Brown lateral stripes and transverse bands
- Protuberance just in front of posterior end
- Abundant



Sminthuridae

- Sminthurinus henshawi
- Off white, blue pigment from faint wash on lateral margins to complete coverage
- Detail seen at 450x, usually several tenent hairs (prominent protruding setae) on distal part of foot
- Detail seen at 450x, 4 subapical dental setae
- Abundant



Sminthuridae

- Sminthurinus elegans
- Blue to black pigment, often 4 stripes on abdomen
- Detail seen at 450x, no sub-apical dental setae
- Abundant



Sminthuridae

- *Sminthurinus quadrimaculatus*
- Mucro with both edges serrate; basal tooth not pointing



Sminthuridae

- Deuterosminthurus russata
- Background yellow, dark saddle patches on back
- 2-3 heavy clavate tenent hairs parallel to leg
- 4th antennal segment subdivided
- Mucro with smooth margins



Sminthuridae

- Ptenothrix atra
- Pigment irregularly mottled brown to purple
- Antennae long, bowed between 2nd and 3rd segment
- Uncommon



Sminthuridae

Arrhopalites

- Antennae longer than head
- No clavate tenent hairs
- No eyes

