

**PAPERS**  
OF  
**THE ROYAL SOCIETY OF TASMANIA**  
**1931**

---

TASMANIAN COLLEMBOLA OF THE FAMILY  
SMINTHURIDÆ.  
(GLOBULAR SPRINGTAILS)

By

H. WOMERSLEY, A.L.S., F.E.S.

Entomologist, Section of Pasture and Field Pests, Division  
of Economic Entomology, Council for Scientific and Industrial  
Research.

Plate I. and Six Text-figures.

(Read 13th July, 1931)

The Collembola, or Springtails, are one of the lesser known orders of the Insecta, differing from all others in possessing not more than six abdominal segments and in having in most species a peculiar forked spring by which they are able to leap with great agility.

They are a very primitive group of insects, entirely apterous, and have recently been shown to be the earliest fossil insects.

The Collembola have been divided by Börner into two suborders, (1) the ARTHROPLEONA, comprising the more elongate forms in which the segmentation of the thorax and abdomen is well defined, and (2) the SYMPHYPLEONA or globular forms with little or no segmentation.

The latter suborder contains two families, the NEELIDÆ, a group of peculiar insects with antennæ much shorter than the head and inserted low down on the face, and the SMINTHURIDÆ, with antennæ longer than the head and situated well up towards the vertex.

To this latter family belong most of the Collembola which are of serious economic importance. Owing to the immense numbers in which they usually occur the amount of damage caused to clover and other crops is often of very serious importance.

During the past twelve months I have received from Dr. R. J. Tillyard, Chief of the Division of Economic Entomology of the Australian Commonwealth Council for Scientific and Industrial Research, several collections of SMINTHURIDÆ made by himself, Mr. H. M. Nicholls, Microbiologist, Department of Agriculture, Hobart, and Mr. R. A. Scott, Agronomist, Department of Agriculture, Launceston, in various parts of Tasmania.

These collections proved to be of the greatest interest, and I desire to record my thanks to the collectors for the opportunity of studying the contents. Altogether, seven species were obtained, of which two are new to science, while of the remainder four are new to Australia. These four, together with the previously known and abundant *Sminthurus viridis*, Lin., have possibly been introduced from Europe. It is important to notice that, as in the case of the two new forms, which are probably indigenous to the continent, they may under suitable conditions become a pest.

Of the morphological characters used in the identification of these insects the furca or spring is one of the most important. This organ is attached to the fourth or fifth abdominal segment. It consists of a basal piece, the *manubrium*, from which arise two arms, the *dentes*, each of which carries a terminal piece called the *macro*. When the insect is in repose the spring is folded under the body, being held by a catch. Ventrally from the first abdominal segment arises an organ termed the *ventral tube*. From the basal portion of this two long filaments can be extruded at will. These may or may not have wart-like tubercles on the walls.

The feet exhibit many features of specific and generic value. Normally there are two claws, an upper or larger and a lower or smaller. The lower claw is sometimes regarded as an *empodial appendage* and may be wanting. The upper has the inner edge sometimes toothed or plain, and in some cases the claw is enclosed in a sheath or *tunica*. The lower claw may have both an inner and an outer lamella, and in most species of this family there arises apically or subapically a fine bristle. On the tibiotarsus just above the claw may be a number, usually three or four, of long clavate bristles.

The eyes when present consist of from one to eight simple ocelli on each side usually on a patch of black pigment.

The antennæ in the SMINTHURIDÆ are four jointed, although the apical joint is often secondarily divided.

Key to the Genera of SMINTHURIDÆ.

I. Ventral tube with smooth walls.

Subfam. SMINTHURIDÆ C.B.

- (a) Abdom. V. & VI. fused. Filaments of ventral tube shorter than basal part. Male antennæ morphologically different from that of female. Female without genital appendages.

Tribe SMINTHURIDINI C.B.

Genus *Sminthurides* C.B.

- (b) Abdom. V. & VI. distinctly differentiated. Filaments of ventral tube long. Antennæ alike in both sexes. Female with genital appendages.

Tribe KATIANNINI C.B.

1. Ant. IV. not subdivided. Genus *Sminthurinus* C.B.  
Ant. IV. distinctly subdivided. 2.

2. Ant. III. normal. Genus *Arrhopalites* C.B.  
Ant. III. with a peculiar outer peg-like organ; long and strong setæ on ant. I., II., and III., some of which lie flat. Strong spines also above and between eyes. Mucrones with three unequal lamellæ.

Genus *Katianna* C.B.

II. Ventral tube with warted walls.

- A. Antennæ bent between joints II. and III., IV. shorter than III.

Subfam. DICYRTOMINÆ C.B.

1. Upper claw without tunica. 2.  
Upper claw with tunica. Dentes without serrated setæ. Ant. III. and IV. not subdivided.

Genus *Dicyrtomina* C.B.

2. Ant. III. and IV. not subdivided, at most with slight indications of ringing. Dentes with or without serrated setæ.

Genus *Dicyrtoma* Bourl., C.B.

- Ant. III. and IV. or only IV. (distally) distinctly subdivided. Dentes with serrated setæ.

Genus *Ptenothrix* C.B.

- B. Antennæ bent between III. and IV., IV. longer than III.

Subfam. SMINTHURINÆ C.B.

- (a) Tibiotarsus with 2-3 short adjacent clavate hairs. Upper claw without tunica.

Tribe BOURLETIELLINI C.B.

1. Hind tibiotarsus with an inner series of 5-6 spines close together which may be serrated or not. These are termed by Börner "Rastraldornen."

Genus *Rastriopes* C.B.

Hind tibiotarsus without the above. 2.

2. With an abnormal protuberance, single or double, in the middle of the dorsum. Lower claw replaced by a modified clavate hair.

Genus *Corynephoria* Absolon.

Without the above dorsal protuberance. With or without a lower claw. 3.

3. Genital segments alike in both sexes.

Genus *Deuterosminthurus* C.B., Linnan.

Genital segments of male with a clasping organ of hooks and curved bristles.

Genus *Bourletiella* Banks.

- (b) Tibiotarsus without adjacent clavate hairs, or, if present, then outstanding. Upper claw with or without tunica.

Tribe SMINTHURINI C.B.

1. Ant. III. in proximal half with four strong bristles, stronger than the rest and in the form of a square. Also a fifth short bristle. 2. Ant. III. with three characteristic bristles but not stronger than the rest. Mucronal bristle absent. Claw with a distinct tunica. Tibiotarsus without clavate hairs.

Genus *Sphyrotheca* C.B.

2. Furcal segment dorsally with two roundish glandular papillæ. Mucronal bristle present. Claw with distinct outstanding tunica.

Genus *Allacma* C.B.

Furcal segment without papillæ. Mucronal bristle present or absent.

Genus *Sminthurus* (Linn.), Lubbock.

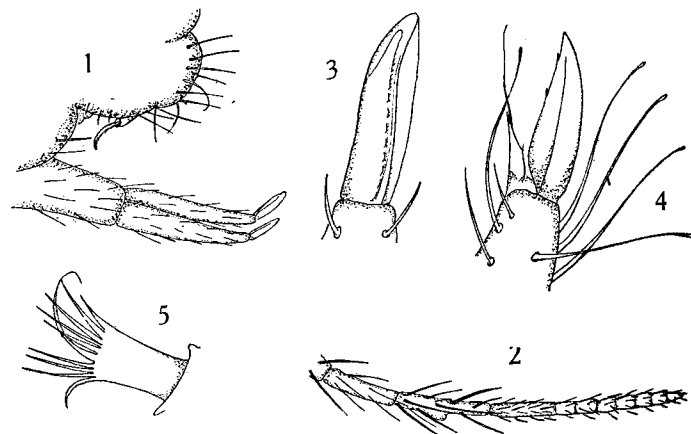
Description of the known Tasmanian species of SMINTHURIDÆ

Genus KATIANNA C.B.

KATIANNA AUSTRALIS n. sp.

(Plate I., fig. 1. Text-fig. I., 1-5.)

This species is closely allied to the type of the genus, *K. cobold*, described by C. Börner from S. America. From *K. oceanica*, the only other Australian species, which was described by Schött from North Queensland, it differs in colour and markings, in the ratio of antennal segments, in the number of clavate hairs on the tibiotarsus, and in the structure of the claws.



Text-fig. I.:—*Katianna australis* n. sp. 1, Anal segments and furca of female, showing genital appendage. 2, Antenna. 3, Mucro from side. 4, Tip of tibiotarsus, side view. 5, Female genital appendage from above.

From the specimens sent to me, this species appears to occur only in the Stanley Area of Tasmania.\*

Diagnosis: Length 1.75 mm. Colour yellowish with heavy dark mottling on dorsum and extending down the sides. Anal segments rather more yellow. Head and face with a dark patch between the antennal bases and another below extending to the mouth. Eye patches black. Antennæ dark

\*Since recorded as widespread on the mainland of Australia; hence the specific name.

blackish green, basal joints a little lighter. Venter, legs, and furca yellowish.

Eyes eight on each side on black patches, behind and between which are a number of strong curved spine-like setæ. Antennæ twice as long as head, diagonal, joints relatively 1 : 2½ : 2½ : 5½; last joint with 4-5 secondary divisions in distal half. Ant. III. with an outer peg-like organ at the middle. Ant. I., II., and III. with particularly long and strong setæ, the longest of which are half the length of joint and lie flat. Ant. IV. with the usual whorls of fine hairs.

Legs: Tibiotarsus with 4-5 clavate hairs. Upper claw strong, almost as long as the mucro, with two inner teeth, one just beyond the middle, the other near the tip. Lower claw about half the length of upper, with broad inner lamella and long subapical seta which reaches the tip of upper claw, inner angle with two fine teeth. Claws similar on all feet.

Furca comparatively short. Manubrium: dentes: mucro = 1 : 2 : ¾. Mucro with unequal lamellæ as in *Bourletiella*, the inner lamella with coarse flat teeth.

Genital appendages of female strongly branched.

Tenaculum with curved basal piece, at tip of which are two setæ, rami with three barbs.

Clothing of numerous strongly curved setæ.

#### Genus DEUTEROSMINTHURUS C.B.

#### DEUTEROSMINTHURUS BICINCTUS Koch,

form REPANDUS Agren.

(Plate I., fig. 2.)

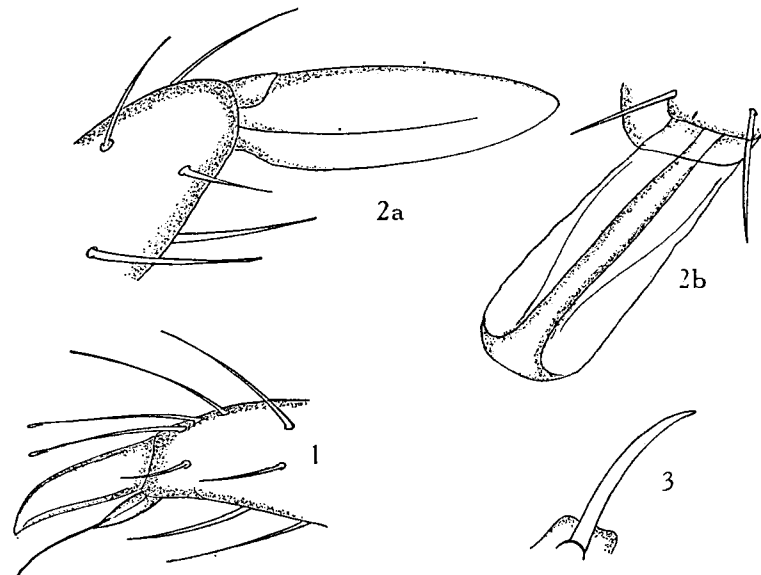
This small species was represented in the collections only by specimens from Glenorchy, Tasmania. It is a curious saddle-shaped insect, and on this account easily recognised.

It measures barely 1 mm. in length and varies very much in colour. The type form of the species is yellow with two broad blackish-brown cross bands. In *repanda* it is entirely yellow, tending to orange on the dorsum. The type as well as the entirely black form *pallipes* Lubbock, may be expected to occur in Australia. They are all common clover insects in Europe.

#### DEUTEROSMINTHURUS CINQUEFASCIATUS Krausbauer.

(Plate I., fig. 3. Text-fig. II., 1-3.)

This is a rather larger species which is very distinctive on account of the white cross bands. In Tasmania it appears to be already known as the "Banded Springtail." All the



Text-fig. II.:—*Deuterosminthurus 5-fasciatus* Krbr. 1, Tip of tibiotarsus from side. 2, Mucro (a) from side, (b) above. 3, Female genital appendage.

specimens of this species, except a solitary one from Gawler, were from the Forth Area.

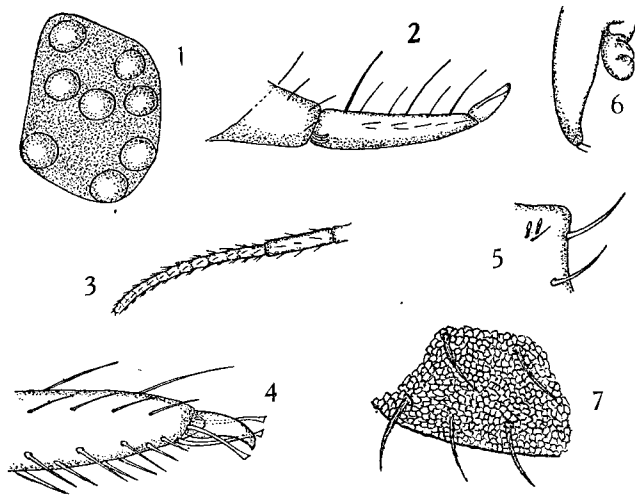
It is perhaps with some doubt that these specimens are referred to this species, which has only been recorded from the original locality at Weilburg a.d. Lahn in Germany by Krausbauer in 1898. It does not appear to have been observed since, but the somewhat brief account agrees in details with the Tasmanian material.

#### DEUTEROSMINTHURUS OBSCURUS n. sp.

(Plate I., fig. 4. Text-fig. III., 1-7.)

Four specimens of this new species were taken attacking the tops of young carrots at Scottsdale, Tasmania, 3/12/26.

It is a dark form in which the pigmentation is carried on to the furca and legs. In outward appearance it somewhat resembles *D. bicinctus* f. *pallipes* Lubbock. From other Tasmanian species of the genus it is easily separated by the absence of the lower claw.



Text-fig. III.—*Deuteromminthurus obscurus* n. sp. 1, Ocelli and eye patch. 2, Furca. 3, Antenna. 4, Tip of tibiotarsus. 5, Antennal III. organ. 6, Tenaculum. 7, Dorsal cuticle and setae.

Diagnosis: Size 1.3 mm. Colour entirely black except for the vertex of the head, antennae, legs, and furca which are only a shade lighter, still retaining a deep pigmentation.

Eyes eight on each side. Head: ant. I. : II. : III. : IV. = 17 : 2½ : 5 : 5 : 13; ant. IV. with 16-20 secondary rings and with a minute terminal knob. Ant. III. organ as in fig. III., 5.

Legs normal. Claws alike on all feet, without inner or outer teeth, one-third the length of mucro. Lower claw wanting. Clavate tibiotarsal hairs 3-3-2, broadly spatulate at tips.

Body hairs long, finely ciliated and numerous. A pair of sensory setae (bothriotrichia) are present on each side of the anal segment, and there are three others in a diagonal line on each side of the abdomen. The cuticle is strongly granular. Female genital appendages?

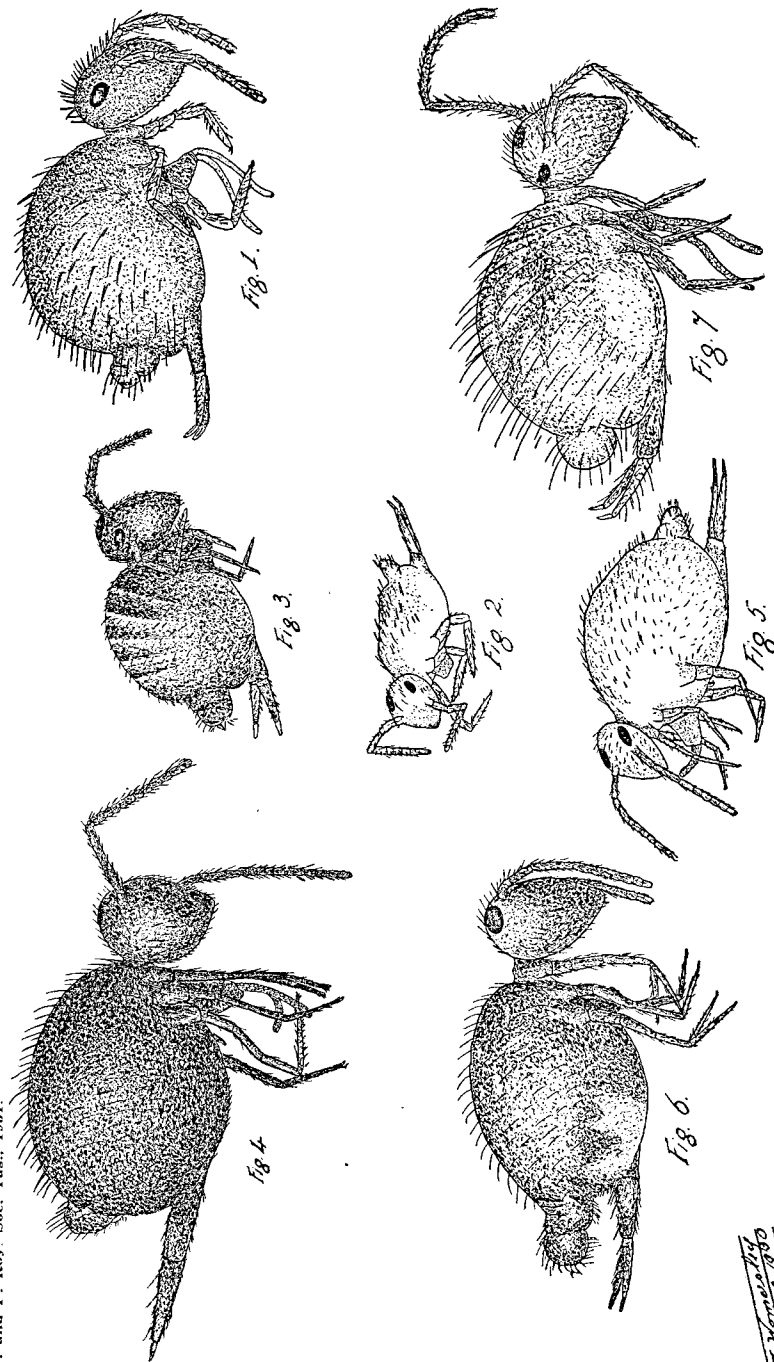


Fig. 5. *Bourletella arvalis* Fitch. Lateral view.  
Fig. 6. *Bourletella hortensis* Fitch. Lateral view.  
Fig. 7. *Sminthurus viridis* (Linn.) Lubbock. Lateral view.

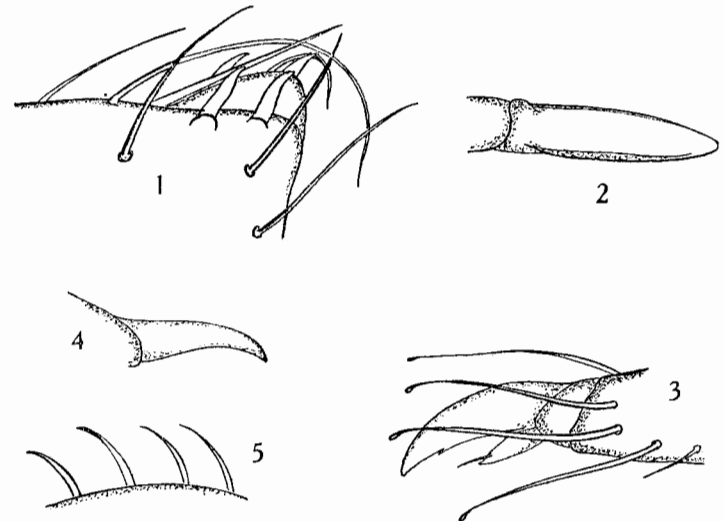
Fig. 1. *Katianna australis* n. sp. Lateral view.  
Fig. 2. *Deuteromminthurus bicinctus* f. *repandus* Arron. Lateral view.  
Fig. 3. *Deuteromminthurus cinquafasciatus* Krausbr. Lateral view.  
Fig. 4. *Deuteromminthurus obscurus* n. sp. Lateral view.

B. M. 1931  
1931

Genus *BOURLETIELLA* Banks.*BOURLETIELLA ARVALIS* Fitch.1863. Syn. *B. lutea* (Lubb.) Agren. (1867) 1903.

(Plate I., fig. 5. Text-fig. IV., 1-5.)

This is a very common species of clover springtail throughout Europe. Together with the next species it has been recorded from England and America as damaging young root crops, causing the effect known as "strangle neck."



Text-fig. IV. :—*Bourletiella arvalis* Fitch. 1, Spines on anal segment of male. 2, Mucro from side. 3, Tip of tibiotarsus. 4, Female genital appendage from side. 5, Dorsal setae.

It has only recently been shown by Dr. Folsom (*A List of the Insects of New York State*, Cornell Univ. Agric. Exper. Sta., Mem. 101, 1928) that this species, which has previously been known as *B. lutea* Lubbock, is synonymous with *B. arvalis* Fitch.

While differing in its lighter colouring from the following species it can be definitely separated in the male sex by the form of the clasp organ on the anal segments, and in the female by the form of the genital appendages (see text figures).

In Tasmania it occurs in the Stanley, Franklin, Longford, Forth, Gawler, and Forest Areas.

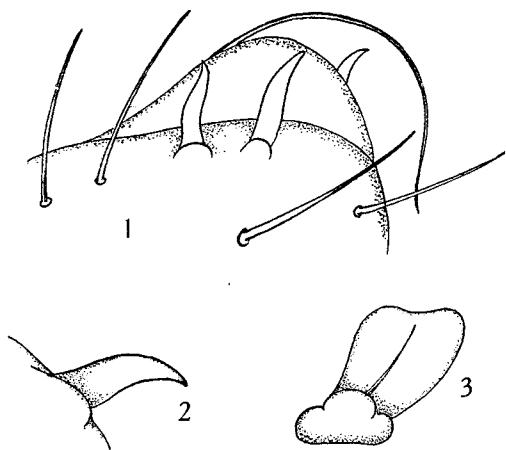
## BOURLETIELLA HORTENSIS (Fitch) Folsom.

Syn. *pruinosa* C.B.

(Plate I., fig. 6. Text-fig. V., 1-3.)

This species has been considered by some authors as only a dark form of the preceding, but, as stated above, it differs very markedly in the secondary sexual characters. It occurs on root crops in America and Europe, and has also been recorded from Japan.

In Tasmania it has been taken in the Forth, Gawler, and Stanley Areas.



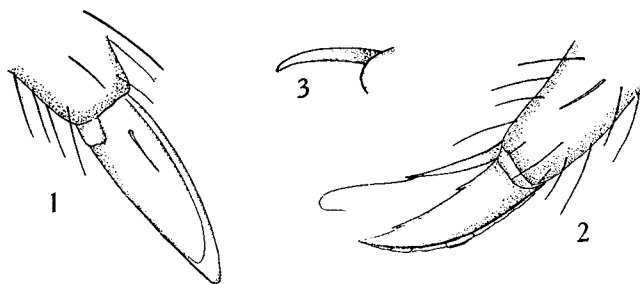
Text-fig. V.:—*Bourletiella hortensis* Fitch. 1, Spines on anal segments of male. 2, Female genital appendage from side. 3, Female genital appendage from above.

Genus SMINTHURUS (Linn.) Lubbock.

SMINTHURUS VIRIDIS (Linn.) Lubb.

(Plate I., fig. 7. Text-fig. VI., 1-3.)

This is the common Clover Springtail or Lucerne Flea, and everywhere appears to be the dominant springtail of grass and clover land. In Tasmania it is much more abundant than in Europe, as also where it occurs in other parts of Australia.



Text-fig. VI.: *Sminthurus viridis* Linn. 1, Mucro from side. 2, Tip of tibiotarsus. 3, Female genital appendage from side.

It is a species much given to colour variation, and many forms have been given varietal names. It can be definitely identified microscopically by the lack of clavate tibiotarsal hairs, the strong mucronal bristle, and the distinct beaded tunica on the upper claw.