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E. C. Bernard  
*Michigan State University*

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## A NEW GENUS AND SPECIES OF ISOTOMIDAE (COLLEMBOLA), AND A REDESCRIPTION OF *CRYPTOPYGUS EXILIS* (GISIN) N. COMB.<sup>1</sup>

E. C. Bernard<sup>2</sup>

### ABSTRACT

A new genus and species of Collembola in the family Isotomidae are described from Michigan: *Micranurophorus musci* n. g., n. sp. A redescription of *Cryptopygus exilis* (Gisin) (= *Isotomina exilis* Gisin) is also given, based on specimens from Michigan. The new genus is characterized by the lack of a furcula and by abdominal chaetotaxy similar to *Isotomodes*. It is related to *Pseudanurophorus*.

### INTRODUCTION

During the examination of soil and moss samples from Michigan, two unusual series of specimens were recovered. One series represents a new genus and species allied to *Pseudanurophorus* Stach and *Isotomodes* Axelson, and the other represents a little known European species described as *Isotomina exilis* by Gisin (1960). Current concepts of collembolan systematics require that this species be removed to *Cryptopygus* Willem.

### *MICRANUROPHORUS*, NEW GENUS

Anurophorinae. Eyes absent, postantennal organ small and oval; mandible toothed with a well-developed molar plate, maxilla head with fringed lamella and several teeth. Unguis and unguiculus simple. Furcula and tenaculum absent. Abdominal segments V and VI fused, the setae confined to the anterior and posterior margins. Setae simple except for a bifurcate group caudally. Anus ventro-terminal. Type species: *Micranurophorus musci* n. sp.

This new genus is similar to *Pseudanurophorus* Stach, 1922, but differs by the fusion of Abd. V and VI, the basic pattern of chaetotaxy (cf. Stach, 1947), and the lack of a caudal protuberance. The chaetotaxy of Abd. V+VI resembles that of *Isotomodes* Axelson (cf. Da Gama, 1963), but this new genus lacks furcula and tenaculum, and possesses a very dissimilar sense organ on Ant. III.

### *Micranurophorus musci*, new species

(Figs. 1-11)

COLORATION: Whitish-translucent.

MORPHOLOGICAL DESCRIPTION: No males seen. N = 30. Mean length = 343  $\mu$ m (293-376); mean diagonal of head = 72  $\mu$ m. Integument finely granulate.

Eyes absent. Postantennal organ (Fig. 2) broadly oval with an irregular narrow rim. Antennae shorter than head, the ratio of segments I:II:III:IV as 8:17:19:38. Ant. III (Fig. 8) with two obovoid sensory rods, with one sensillum on each side. Ant. IV (Fig. 8) with about eighteen sensory setae, of various thicknesses; subapically, Ant. IV with a curving, acuminate sensory seta set in a shallow depression; no sensory peg seen.

Mandible (Fig. 4) with three or four terminal to subterminal teeth, the molar plate well-developed. Maxilla head (Fig. 5) with two smooth external teeth, an inner lobed tooth, and an apical fringed lamella extending beyond the maxilla head. Labrum (Fig. 3) with five anterior setae, a middle row of three setae, and a posterior row of five setae.

<sup>1</sup>Michigan Agricultural Experiment Station Journal Article No. 7887.

<sup>2</sup>Department of Entomology, Michigan State University, East Lansing, MI 48824. Current address: Department of Plant Pathology and Plant Genetics, University of Georgia, Athens GA 30602.

Unguiculus well-developed, untoothed. Unguis slightly curved, without lateral or inner teeth. Tenent hairs absent (Fig. 10).

Ventral tube (Fig. 9) with 4+4 setae on the corpus and 2+2 setae near the posterior edge. Furcula and tenaculum completely absent. Female genital plate (Fig. 11) linear with two small setae anteriorly and two longer setae posteriorly. Abd. V. and VI fused; anus directed ventro-terminally (Fig. 1).

CHAETOTAXY: Cephalic chaetotaxy (Fig. 6) consisting of short, sparse setae.

Thoracic and abdominal chaetotaxy (Fig. 7) reminiscent of *Isotomodes*: Abd. V+VI with a posterior row of long, strong setae, some of these weakly bifurcate, and anteriorly, with 4+4 dorsal microchaetae.

Sensilla arranged as follows: Th. II, two sensilla and a tiny spine laterally, one sensillum middorsally near the posterior edge; Th. III, two laterally and one posteriorly in a mid-dorsal position; Abd. I-III, one posteriorly as in Th. II-III; Abd. IV, three along the posterior edge. Ventral sensilla present on Abd. I-III.

DIAGNOSIS: Of the described species of *Pseudanurophorus*, *Micranurophorus musci* appears to fall closest to *P. cassagnai* Winter, 1963, by the fusion of Abd. V and VI, the presence of conspicuous antennal sensory setae, and small size. However, the setal arrangement of Abd. V+VI is totally different, Abd. V+VI is much shorter in *musci*, and the large dorsal sensilla on Abd. V+VI of *cassagnai* are lacking in *musci*. Due to the fusion of Abd. V and VI, *cassagnai* does not easily fit the diagnosis of *Pseudanurophorus*, and it may be necessary to assign it to some other genus.

COLLECTION DATA: Holotype female and 14 paratypes, Monahan Lake, Livingston County, Michigan, 14 October, 1973, and four females, same locality, 19 May, 1974, in moss growing on stumps or soil in a mixed hardwoods forest; eight individuals from the Michigan State University campus, East Lansing, Ingham County, Michigan, 3 December, 1973, from soil; one specimen from Benzie County, Michigan, 16 July, 1974, from soil; and two individuals from Berrien County, Michigan, late March, 1974, from soil in a jack pine (*Pinus banksiana* Lamb.) woods. The holotype and paratypes are deposited in the United States National Museum (holotype—slide no. 74000).

*Cryptopygus exilis* (Gisin), new combination

(Figs. 12-24)

*Isotomina exilis* Gisin, 1960. Rev. Suisse Zool. 67:320, figs. 12, 13.

A group of specimens from several localities were identified as this species despite some noticeable, although variable, differences in the abdominal chaetotaxy. The species has apparently been reported only once, in the original description, and it thus seems advantageous to present a fuller description based on this recent collection. Through the kindness of Dr. W. Hütner I have been able to examine a paratype of the species.

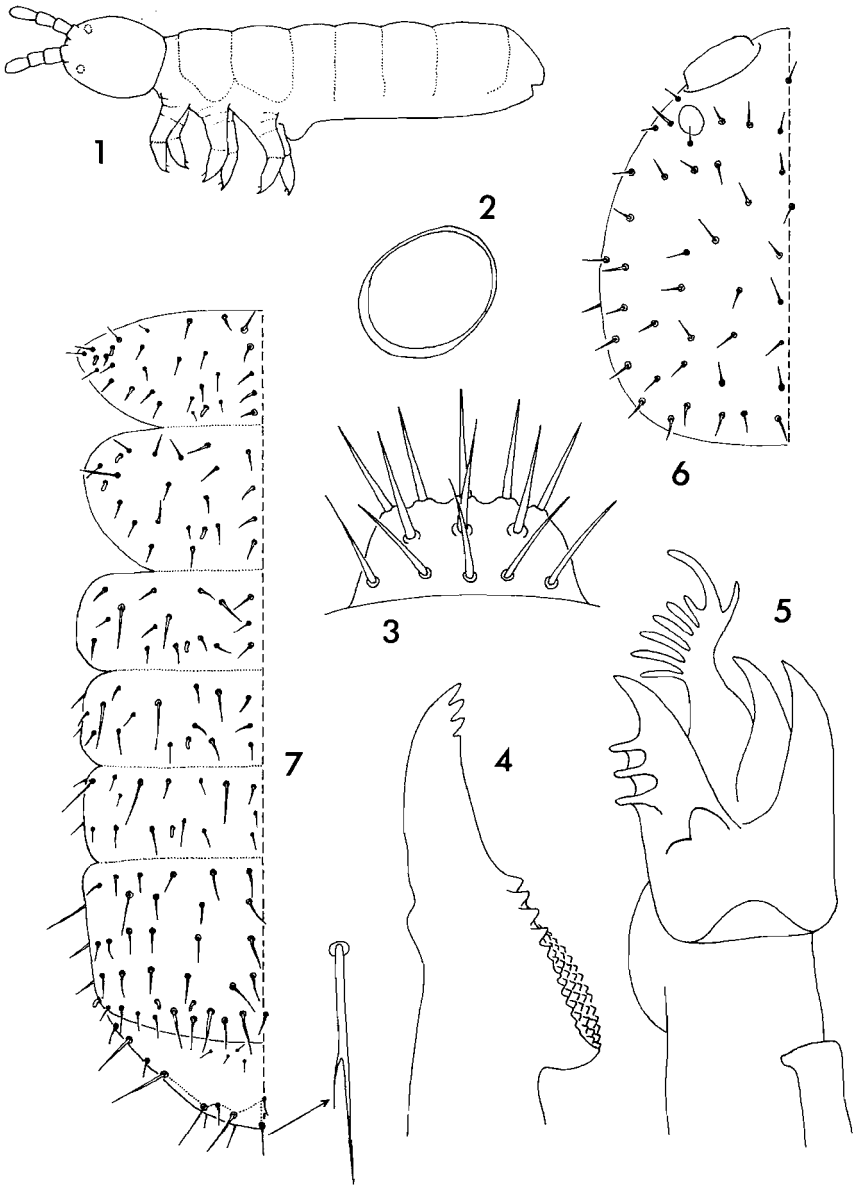
COLORATION: White.

MORPHOLOGICAL DESCRIPTION: No males seen. N = 11. Mean length = 512  $\mu$ m (457-585); mean diagonal of head = 55.4  $\mu$ m. Integument finely granulate.

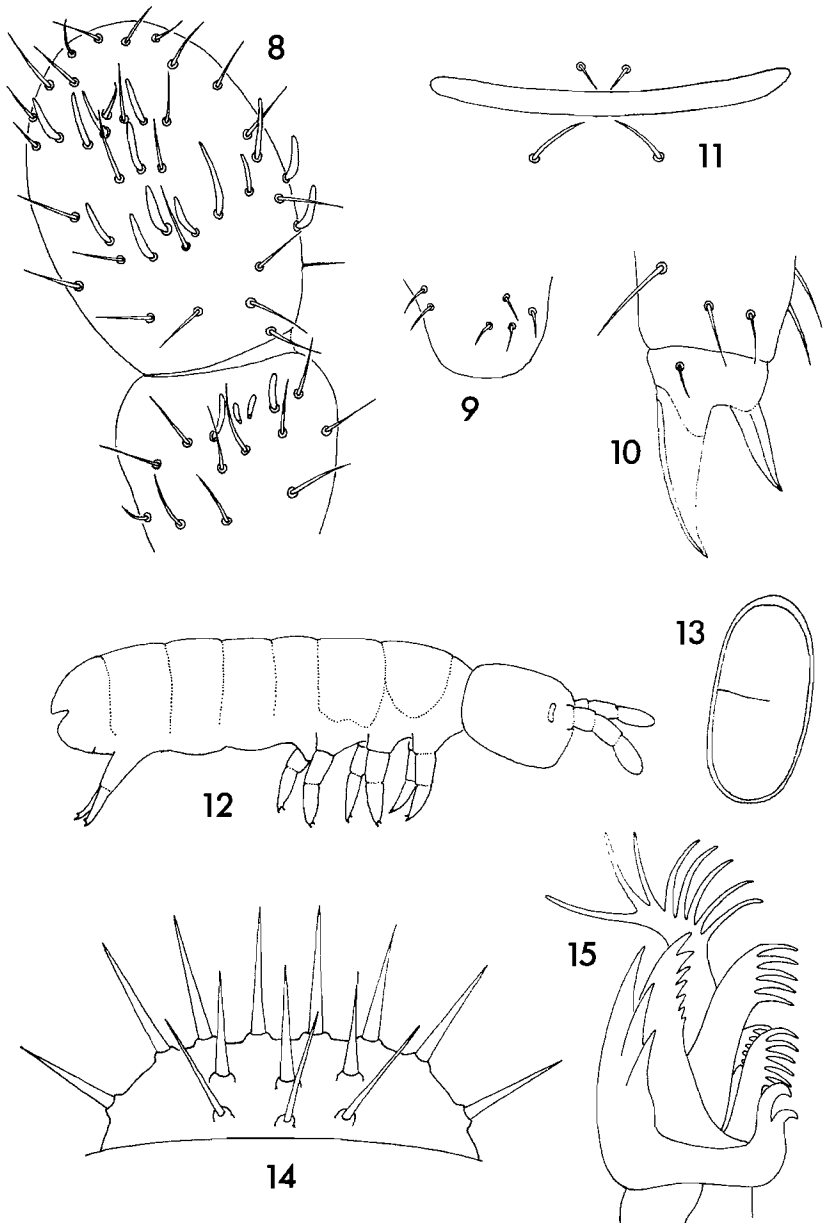
Eyes absent. Postantennal organ (Fig. 13) elliptical, partially divided, sometimes completely divided, by a fine, transverse line. Antennae about as long as the head, the ratio of segments I:II:III:IV as 5:12:14:24. Ant. III (Fig. 19) with two slender sense rods flanked on either side by a slender sensillum. Ant. IV (Fig. 19) with about fifteen blunt sensory setae of various thicknesses, subapically with a hooked seta, this seta rarely absent; no sensory peg or terminal sensory tubercle seen.

Mandible (Fig. 16) with four terminal to subterminal teeth and a large molar area. Maxilla (Fig. 15) with three exterior teeth, a serrated middle tooth, three comb-like inner lamellae, a basal tooth with two hook-like processes, and a fringed lamella extending beyond the maxilla apex. Labrum (Fig. 14) with eight anterior setae, and middle and posterior rows of three setae each.

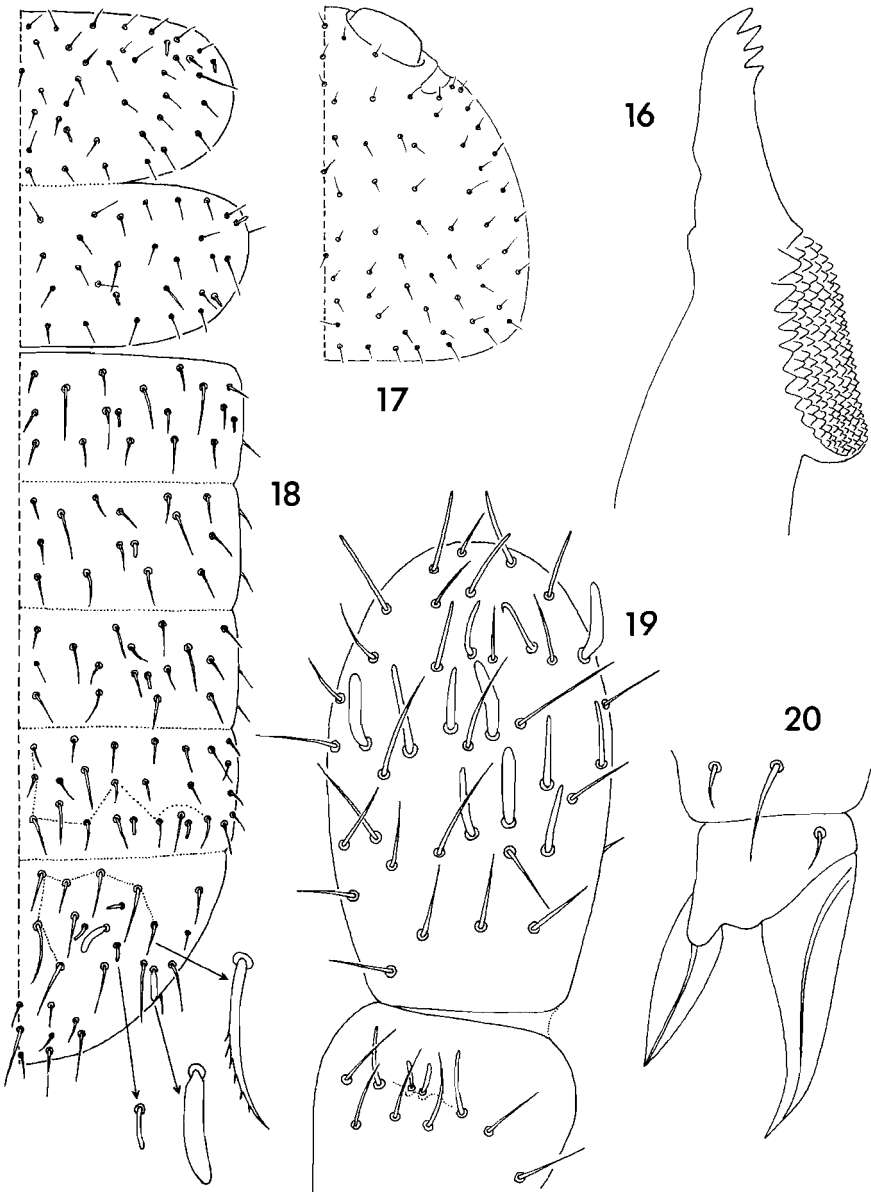
Unguis and unguiculus (Fig. 20) untoothed, the unguiculus large and lanceolate. Tenent hairs absent.



Figs. 1-7. *Micranurophorus musci*, n. sp. Fig. 1, Lateral habitus. Fig. 2, Postantennal organ. Fig. 3, Labrum. Fig. 4, Mandible. Fig. 5, Head of maxilla. Fig. 6, Dorsal chaetotaxy of head. Fig. 7, Chaetotaxy of thoracic and abdominal terga. Setae connected by a dotted line are bifurcate.



Figs. 8-11. *Micranurophorus musci*, n. sp. Fig. 8, Third and fourth antennal segments. Fig. 9, Ventral tube. Fig. 10, Foot of third leg. Fig. 11, Female genital plate. Figs. 12-15. *Cryptopygus exilis* (Gisin). Fig. 12, Lateral habitus. Fig. 13, Postantennal organ. Fig. 14, Labrum. Fig. 15, Head of maxilla.



Figs. 16-20: *Cryptopygus exilis* (Gisin). Fig. 16, Mandible. Fig. 17, Dorsal chaetotaxy of head. Fig. 18, Chaetotaxy of thoracic and abdominal terga. Setae connected by a dotted line are serrate. Fig. 19, Third and fourth antennal segments. Fig. 20, Foot of third leg.

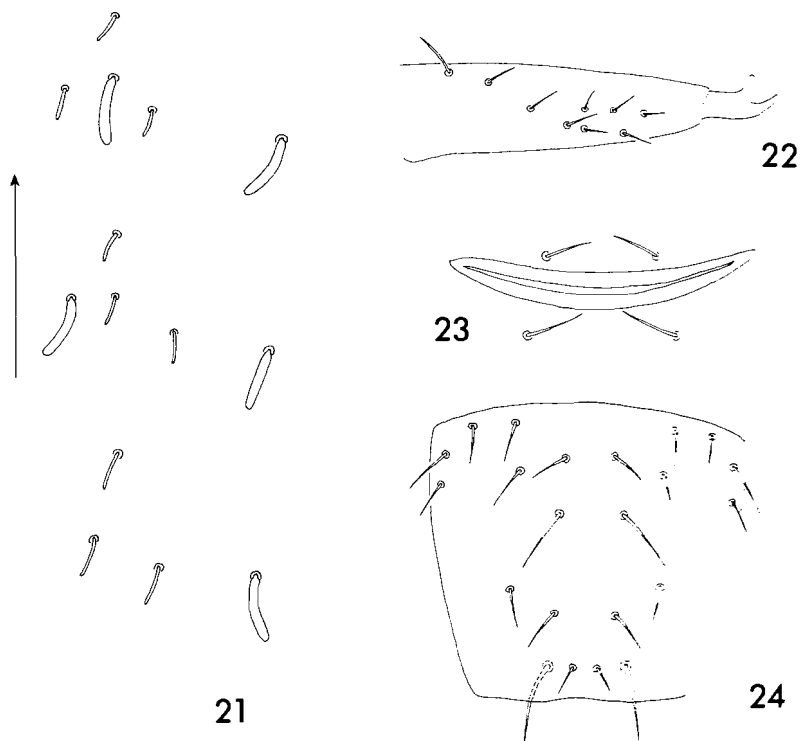
Ventral tube with 4+4 setae on the corpus and 2+2 setae posteriorly. Corpus of the tenaculum with one seta, each ramus tridentate.

Furcula short, all parts well-developed; ratio of manubrium:dens:mucro as 16:18:3. Manubrium (Fig. 24) with 1+1 anterior setae. Dens with two setae basally on the posterior face and seven setae arranged antero-laterally (Fig. 22). Mucro bidentate. Female genital plate simple, with two setae anteriorly and two posteriorly (Fig. 23). Abdominal segments V and VI fused, the anus directed caudally.

CHAETOTAXY: Cephalic chaetotaxy consisting of short, smooth setae (Fig. 17). Thoracic and abdominal chaetotaxy arranged as shown in Fig. 18.

Sensilla arranged as follows on each side: Th. II, two sensilla and a small spine laterally, one sensillum dorsally; Th. III, two sensilla laterally and one dorsally; Abd. I, one laterally and one dorsally; Abd. II-III, one dorsally; Abd. IV, two sensilla in the posterior row of setae; and Abd V+VI, a group of five, rarely four sensilla consisting of both plump and slender sensilla. The most anterior sensillum is always thin; the most median is occasionally missing; the most lateral is always plump; and the most median is, when present, sometimes plump and sometimes slender, as is the sensillum next to it (Fig. 21). Some of the setae of Abd. IV-VI unserrate.

DISCUSSION: *Isotomina exilis* was originally described by Gisin (1960) from three specimens, and characterized by the presence of a cylindrical, elongate sensillum on either



Figs. 21-24: *Cryptopygus exilis* (Gisin). Fig. 21, Three variations in dorsal sensillum arrangement on Abd V+VI, right side. Fig. 22, Dens and mucro. Fig. 23, Female genital plate. Fig. 24, Manubrium, posterior surface.

side of Abd. V+VI. Specimens found in Michigan fall closest to this species, but possess four or five sensilla on each side, of which almost always two are large and swollen. However, examination of a paratype shows three small sensilla in the approximate positions they occupy in the Michigan specimens. Since the two collections are quite similar in every other characteristic, the Michigan specimens are considered to be identical to Gisin's species.

Massoud and Rapoport (1968) were of the opinion that *Isotomina* Börner was a junior synonym of *Cryptopygus* Willem, but they did not offer synonymies for most of the species then placed in *Isotomina*. Rapoport (1971) asserted that the name *Isotomina* was still valid on the subgeneric level, *Cryptopygus* s. str. possessing dentes shorter than or equal to the manubrium, and *Isotomina* having (presumably) longer dentes. But *I. exilis* cannot be maintained in *Isotomina* even at the subgeneric level under Rapoport's definition, since Gisin's illustration of the furcula clearly shows the dens equal to the manubrium. The following combination is therefore proposed: *Cryptopygus exilis* (Gisin, 1960) (= *Isotomina exilis* Gisin, 1960).

COLLECTION DATA: One specimen from soil at the edge of a mixed hardwoods stand, 13 October, 1968, Belle Isle, Wayne County, Michigan, E. Bernard and M. J. Calice, Jr., collectors; nine specimens in soil from the west edge of Pond #4 at the Belding sewage treatment facility, Belding, Ionia County, Michigan, 25 June, 1972; and one specimen from a weedy field, 15 May, 1974, Gratiot County, Michigan.

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I am very grateful to Dr. P. N. Lawrence for his valuable suggestions regarding *Cryptopygus exilis*. I also wish to thank Dr. W. Hütther for kindly loaning a paratype of *C. exilis*, and Drs. K. A. Christiansen and R. J. Snider for their careful review of the manuscript.

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