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The Taxonomic Status of *Alloscopus* and Redescriptions of its Two Species

(Collembola: Entomobryidae)

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The taxon *Alloscopus* was erected by Börner in 1906 although the first author to study a member of this group was probably Oudemans (1890). This author studied a specimen which he identified as *Templetonia* (= *Heteromurus*) sp. The specimen was very deteriorated but Oudemans noted the presence of scales, a single eye on each side of the head and the relative lengths of the third and fourth abdominal segments. Oudemans probably had before him a specimen of *Alloscopus tenuicornis* Börner (1906) as his sample came from the type locality of that species.

Alloscopus was established by Börner (*supra cit.*) as a subgenus of *Heteromurus* Wankel to house two Javan species: *Heteromurus* (*Alloscopus*) *tenuicornis* and *H. (A.) tetracanthus*. Handschin (1928) in a list of the Collembola of Indonesia, gave *Alloscopus* full generic status. The latter action has gone unchallenged to this day.

For sixty years *Alloscopus* harbored only the two original species until 1966 when Winter described *Alloscopus strebeli* from Peru and Izarra (1972) added *Alloscopus platensis* from Argentina.

I have studied a series of specimens of this taxon from several islands of Micronesia and the results of this study coupled with a review of the literature has allowed me to arrive at the following conclusions regarding the taxonomic status of *Alloscopus* and the species heretofore placed therein. First, *Alloscopus* is, *de novo*, regarded as a subgenus of *Heteromurus*; second, the Philippine specimens reported as *Alloscopus tetracanthus* by Gapud (1971) actually are *Heteromurus* (*Alloscopus*) *tenuicornis*. Third, *Alloscopus strebeli* Winter is transferred to the genus *Indoscopus* Prabhuo on account of the presence of a postantennal organ in this species; and

finally, *Alloscopus platensis* Izarra is moved to the genus *Dicranocentrus* Schött.

The evidence that lead to these conclusions will be treated below and under the discussion of the particular species. Specimens reported upon in this paper have been distributed among the following institutions: United States National Museum of Natural History, Washington, D.C., the Field Museum of Natural History, Chicago, Illinois; the Bernice P. Bishop Museum, Honolulu, Hawaii; and the Illinois Natural History Survey, Urbana.

The author wishes to thank Dr. Peter F. Bellinger for kindly reviewing the manuscript and for the loan of Hawaiian *Heteromurus* (*Alloscopus*) *tenuicornis*.

The Taxonomic Status of *Alloscopus* Börner. As noted earlier, *Alloscopus* was originally conceived as a subgenus of *Heteromurus*, to be separated from *Heteromurus* s. str. by the presence of dental spines in *Alloscopus*. Although Handschin (1928) gave no explanation for his action in raising *Alloscopus* to generic status, it is easy to infer that he regarded the presence or absence of dental spines as a character of generic rank. This, in fact, is the opinion of most present day workers (see discussion by Salmon 1964: 102) even though it is known that the closely related genus *Dicranocentrus* harbors species which either have or lack dental spines.

A second characteristic that has been invoked to separate *Alloscopus* from *Heteromurus* is the presence of large teeth (wing like teeth) on the unguis and unguiculus. This characteristic is not diagnostic because there are species of *Heteromurus* with wing like teeth on the unguis (e. g. *Heteromurus stannardi* Mari Mutt 1977) or on both unguis and unguiculus (e. g. *Heteromurus dubius* Delamare Deboutteville and Paulian 1952, Barra 1968). Ungual wing like teeth are also present in the genus *Indoscopus*.

I have found a feature that can be used to separate *Alloscopus* and *Heteromurus*. *Alloscopus* species lack macrochaetae on the posterior dorsal medial part of the head (Figs. 1 & 2). At least two macrochaetae are present on this area in the species of *Heteromurus* which I have seen to date (i. e. *Heteromurus diommatus*, *major*, *nitidus*, *peyerimhoffi*, *schoetti* (Fig. 3), *sexoculatus*, *stannardi*, *variabilis*, and three undescribed species).

In view of the above discussion and the fact that in the genus *Dicranocentrus* (Mari Mutt, in press) we find a group of Central American and Caribbean species which lack macrochaetae on the posterior portion of the head, I am considering *Alloscopus* a subgenus of *Heteromurus*. The head and body macrochaetotaxy of both subgenera is completely similar.

Heteromurus Subgenus *Alloscopus*

Alloscopus Börner 1906: 177, as subgenus of *Heteromurus* Wankel.
Type Species: *Heteromurus* (*Alloscopus*) *tenuicornis* Börner, l.c.,

subsequent designation by Salmon 1964: 478.

Member of the family Entomobryidae, subfamily Entomobryinae, tribe Orchesellini. Antennae five segmented due to the subdivision of the first segment (Ant. 1). Ant. 4 & 5 may be distinctly annulated or at least with many circular, evenly spaced, whorls of short setae along their length. Antennae about half the length of head and body combined. Postantennal organ absent.

Head with no more than one eye on each side or eyeless. When eyes are present they may or may not be surrounded by red-brown pigment. Head bears upon its anterior dorsal half many macrochaetae and a pair of lasiotrichia (Figs. 1 & 2). Medial posterior part of head without macrochaetae. Head and body covered with apically rounded or truncate scales. Antennae and legs possess scales but the number of these is dependent on age, increasing as the animal grows older. Scales absent from Ant. 4 & 5 and from tibiotarsi.

Tibiotarsi with or without rows of smooth setae along inner margin. Tibiotarsus of metathoracic legs with a smooth seta (supra empodial seta) opposite the tenent hair. Posterior pair of legs with a well developed trochanteral organ (Fig. 8).

Fourth abdominal segment dorsally about 1.5 times longer than the third. Dentes with a single row of spines, the number of which is variable. Mucrones always without a basal spine.

Diagnosis: The subgenus may be separated from *Heteromurus* s. str. by the presence of dental spines in *Alloscopus* and by the absence of macrochaetae on the posterior dorsal half of the head also in *Alloscopus*.

Key to the Species of the Subgenus *Alloscopus*

- Dorsal macrochaetotaxy of meso and metathorax as in figure 4; base of the labium devoid of scales (Fig. 6); inner margin of tibiotarsi with two rows of smooth setae; shape of inner ungual teeth as in figure 13 *tetracanthus* Börner
- Dorsal macrochaetotaxy of meso and metathorax as in figure 5; base of the labium on each side with a pair of scales (Fig. 7); inner margin of tibiotarsi devoid of smooth setae; shape of inner ungual teeth as in figure 14 *tenuicornis* Börner

Heteromurus (Alloscopus) tetracanthus Börner

Heteromurus (Alloscopus) tetracanthus Börner 1906: 177. Handschin 1925: 266.

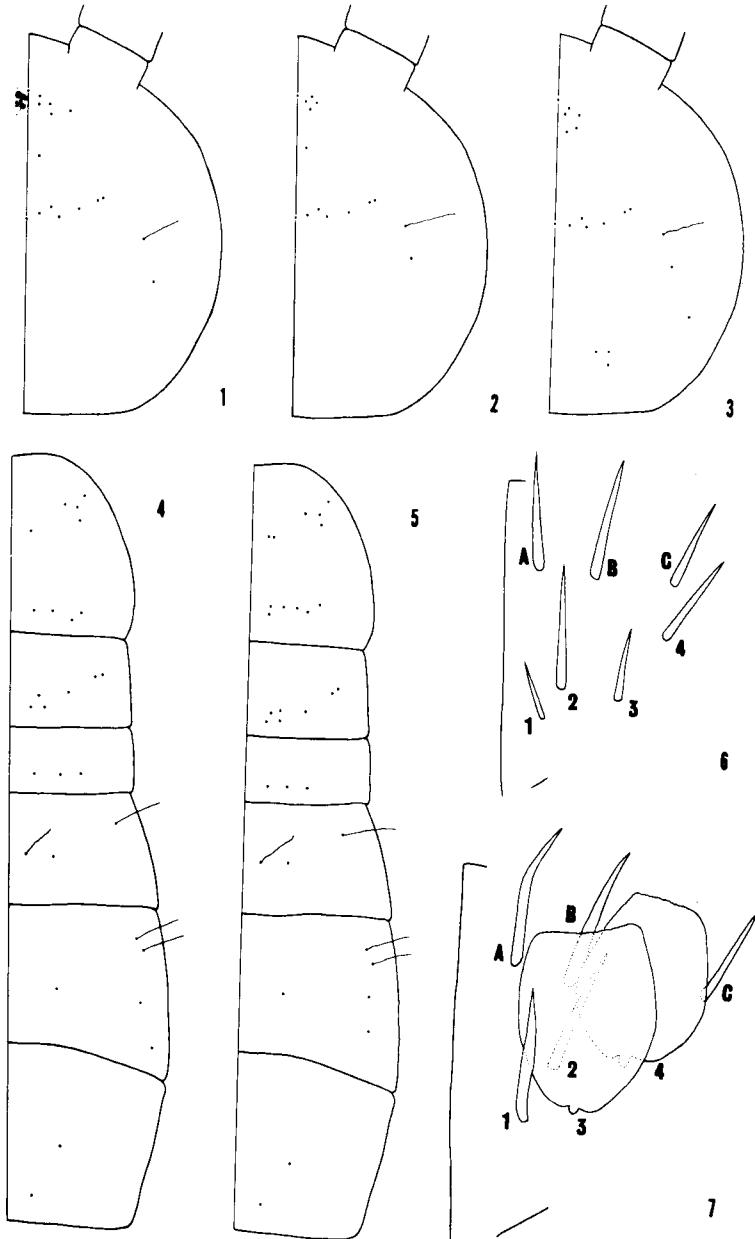
Heteromurus tetracanthus Börner. Imms 1912: 120.

Alloscopus tetracanthus Börner. Handschin 1928: 267. Yosii 1959: 38.

Yosii 1960: 27. Salmon 1964: 478. Yosii 1966a: 50. Yosii 1966b: 370.

Winter 1966: 167, 168. Prabhoo 1971: 33. Gapud 1971: 11. Izarra 1972: 539.

This species was redescribed by Yosii (1959) from Malaysian specimens. Prabhoo (1971) reported the species from India, discussed the dorsal body macrochaetotaxy and provided a habitus drawing and other drawings of the claw and mucro. Gapud (1971) reported the species from India, discussed the dorsal body



Figs. 1-7, *Heteromurus* sp. Fig. 1. *H. (Alloscopus) tetraacanthus*-Dorsal head macrochaetotaxy and distribution of lasiotrichia, each dot represents one seta. Fig. 2. *H. (A.) tenuicornis*-Dorsal head macrochaetotaxy and distribution of lasiotrichia. Fig. 3. *H. (Heteromurus) schoetti* Denis-Dorsal head macrochaetotaxy and distribution of lasiotrichia based on specimens from Guatemala. Fig. 4. *H. (A.) tetraacanthus*-Dorsal body macrochaetotaxy. Fig. 5. *H. (A.) tenuicornis*-Dorsal body macrochaetotaxy. Fig. 6. *H. (A.) tetraacanthus*-Chaetotaxy of base of labium. Fig. 7. *H. (A.) tenuicornis*-Chaetotaxy of base of labium.

macrochaetotaxy and provided a habitus drawing and other drawings of the claw and mucro. Gapud (1971) also redescribed the species based on Philippine specimens but it is now evident that he was referring to *Heteromurus (Alloscopus) tenuicornis*. Gapud (*supra cit.*) noted several differences between his specimens and Yosii's redescription but did not ascribe specific importance to these. The species is redescribed below based on specimens from Micronesia (Ponape). For a diagnosis see the key to the species.

Habitus typical of the genus. Length excluding antennae and furcula up to 2.1 mm. Body devoid of dark pigment, specimens in alcohol white, yellow or brown depending on condition of preservation. Head, body and appendages covered with scales. Apical two antennal segments, tibiotarsi and dorsal portion of furcula devoid of scales. Collophore with very few scales. Ant. 5 distinctly annulated, Ant. 4 not clearly annulated but with setae arranged in whorls as in Ant. 5, latter segment without apical bulb.

Prelabral setae four in number. Labral chaetotaxy follows formula 5,5,4; all prelabral and labral setae smooth. Labral papillae well developed into cone like bodies (Fig. 16). Differentiated seta of the outer labial papilla apically rounded, not surpassing the apex of its papilla. Chaetotaxy of labial base as in figure 6. Arrangement exhibits the following variability: Seta 1 may be smooth or ciliated. Seta 3 may be present or absent, when present it may be smooth or ciliated. Setae A-C and 1,2,4 are always present regardless of the size of the specimen. Setae of venter of head smooth. One eye on each side of the head or the eyes may be absent.

Head and body macrochaetotaxy and distribution of lasiotrichia as in figure 1. The arrangement of these setae is constant in all specimens examined. Metathoracic leg with trochanteral organ of about 15 setae (Fig. 8). All tibiotarsi with two rows of smooth setae along inner margin; the number of these setae varies with age, largest specimen has 15 setae. Claw structure as in figure 13. Shape of unguis teeth and tenent hair constant in all specimens examined for this character (N = 40). In one specimen the unguis of one of the mesothoracic legs bears a median unpaired tooth upon its inner surface. All other unguis of same specimen bidentate. Another specimen has all its unguis quadridentate. A smooth seta present opposite tenent hair of metathoracic legs.

Corpus of tenaculum with a single smooth seta. Rami four toothed.

Manubrium dorsally with four or five pairs of smooth setae (only three pair shown in figures 11 & 12). Proximal portion of dentes bears one of these setae and from 4-7 spines. Mucro bidentate, devoid of basal spine.

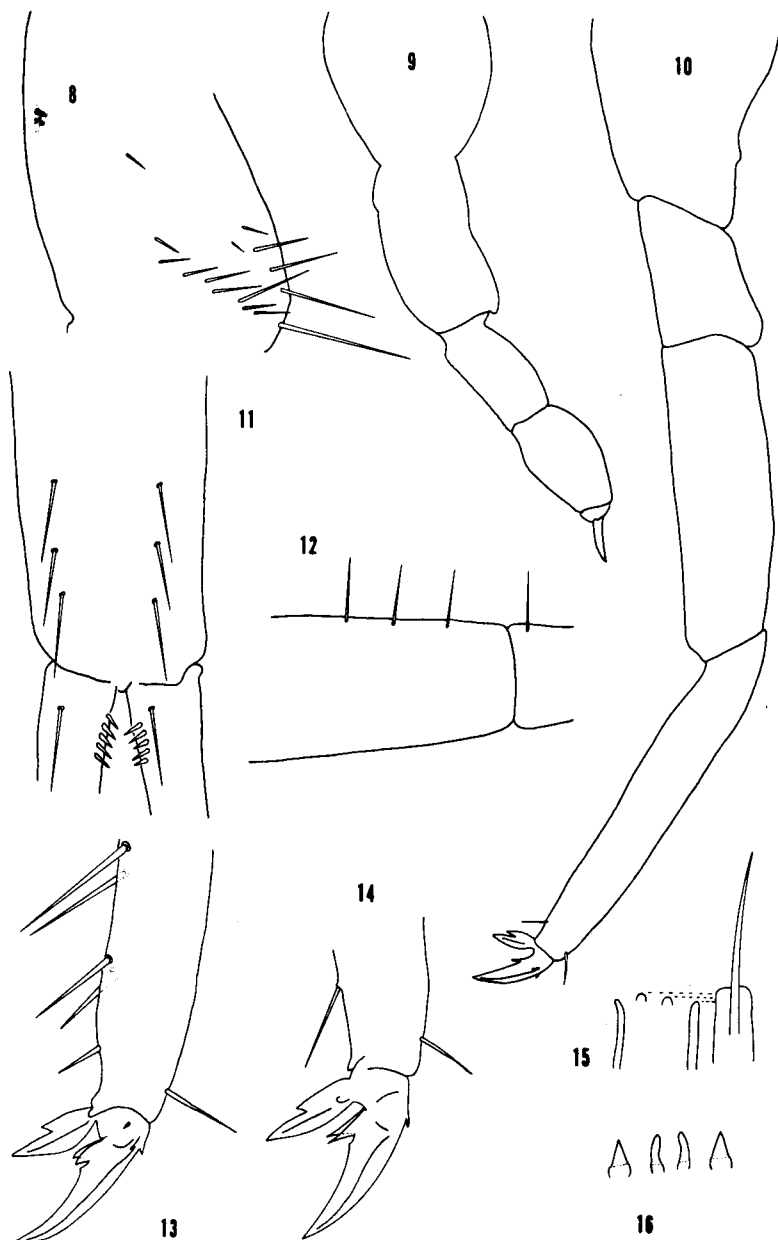
Material Examined: Micronesia, Caroline Islands, Ponape, Mt. Tamatansakir, 180 m., Jan. 16, 1953, on *Asplenium*, J. L. Gressitt. 1 specimen. Ponape, Colonia, Agr. Exp. Sta., Jan. 6-17, 1953, berlese from woody compost, coffee litter, coconut litter and rotten palm, J. L. Gressitt. Over 500 specimens. Both this species and *tenuicornis* occur sympatrically in Ponape. Since both can be separated only after specimens are mounted in slides, and since it is undesirable to mount all specimens, it is not possible to give the definite number of specimens belonging to this species collected in Ponape. Approximately 90% of the specimens mounted from Ponape are *tetracanthus*.

Geographic Distribution: Java (Börner 1906), Malaysia (Yosii 1959), Singapore (Yosii 1959), India (Yosii 1966b, Prabhoo 1971), New Britain (Yosii 1960), Micronesia (Ponape) (new record).

Heteromurus (Alloscopus) tenuicornis Börner

Heteromurus (Alloscopus) tenuicornis Börner 1906: 177. Handschin 1925: 244, 266. Handschin 1926: 460.

Heteromurus tenuicornis Börner. Imms 1912: 120.



Figs. 8-16. *Heteromurus* sp. Fig. 8. *H. (A.) tetracanthus*-Trochanteral organ present on metathoracic legs. Fig. 9. *H. (A.) tenuicornis*-Abnormal metathoracic leg. Fig. 10. *H. (A.) tenuicornis*-Normal metathoracic leg. Fig. 11. *H. (A.) tetracanthus*-Dorsal view of the distribution of smooth setae on manubrium and proximal portion of dentes. Fig. 12. *H. (A.) tetracanthus*-Lateral view of the distribution of smooth setae on manubrium and proximal portion of dentes. Fig. 13. *H. (A.) tetracanthus*-Claw morphology of metathoracic legs. Fig. 14. *H. (A.) tenuicornis*-Claw morphology of metathoracic legs. Fig. 15. *H. (A.) tenuicornis*-Variation in the relative position and shape of the external labial papilla and its differentiated seta. Fig. 16. *H. (A.) tetracanthus*-Labral papillae.

Alloscopus tenuicornis Börner. Handschin 1928: 267. Handschin 1930: 422. Salmon 1964: 478. Yosii 1966: 49. Winter 1966: 167. Gapud 1971: 12. Izarra 1972: 539.

Alloscopus tetracanthus Börner sensu Gapud 1971: 11, nec. Börner 1906: 177.

This species was redescribed by Handschin (1925) from Javan specimens and Gapud (1971) presented a translation of that redescription. Through the kindness of Dr. C. Baroni Urbani and the Naturhistorisches Museum, Basel, Switzerland, I have studied the three topotypical specimens upon which Handschin (1925) based his redescription. The latter were found to be conspecific with a series of Micronesian specimens and upon both sets of specimens I base the redescription presented below.

Habitus typical of genus. Length excluding antennae and furcula up to 1.7 mm. Coloration, distribution of scales, structure of Ants. 4-5, labral chaetotaxy, and structure of labral papillae as in *tetracanthus*. Relative position of external labial papilla and its seta as in figure 15. Chaetotaxy of base of labium as in figure 7. In this species setae 3 & 4 of *tetracanthus* have given way to a pair of scales. Setae of venter of head smooth. I was unable to locate eyes but Gapud (1971) found one eye on each side of head.

Head and body macrochaetotaxy and distribution of lasiotrichia as in figure 5. Trochanteral organ as in *tetracanthus*. Tibiotarsi devoid of smooth setae with the exception of the opposite seta to the tenent hair found on the metathoracic legs. Claw structure as in figure 14. Morphology of unguis teeth and tenent hair constant in 40 specimens examined for this character. Three specimens possess a third distal unpaired tooth upon the unguis of all legs. Another specimen had a tridentate unguis in only one of the mesothoracic legs. No quadridentate unguis were found.

Tenaculum, distribution of smooth setae on the dorsum of manubrium, dental spination, and mucronal morphology as in *tetracanthus*. Javan specimens with 6-10 dental spines. Micronesian specimens with no more than 7 spines.

It may be of interest to note here that two specimens were found with an abnormal metathoracic leg while the other member of the pair was completely normal (Figs. 9 & 10). For a diagnosis of this species see the included key.

Material Examined: Java, Tjibodas, under leaves in tropical rain forest, August 19, 1921. 2 specimens. Tjibodas, May 1922, 1 specimen. Material from Java deposited in the Naturhistorisches Museum, Basel, Switzerland. Micronesia, Mariana Islands, Guam, 1 km. S. E. of Asan, 200-250 m., Nov. 1, 1947, H. S. Dybas. 30 specimens. Palau Islands, Yap Group, Yap I., Gagil and Ruul districts and Kanif, leaf litter, Jun. 30-Aug. 21, 1950, R. J. Goss. 23 specimens. Yap I., Yap Hill, behind Yaptown, 50 m., Dec. 2-3, 1952, J. L. Gressitt. 5 specimens. Babelthup, E. Ngatpang, 65 m., Dec. 7-9, 1952, J. L. Gressitt. Over 1,000 specimens. N. W. Aulup Tagel, 25 m., Dec. 13, 1952, leaf litter, J. L. Gressitt. 1 specimen. Caroline Islands, Truk, Tol I., Mt. Unibot, Dec. 31-Jan. 24, 1952, leaf litter, J. L. Gressitt. 14 specimens. Ponape-see under material examined for *tetracanthus*. Kusaie, Mutunik, 22m., Jan. 26, 1953, rotten palm stump, J. F. G. Clarke. 30 specimens. Kusaie, Hill 1010, 300 m., leaves and trash from forest floor, J. F. G. Clarke. 2 specimens. Kusaie, 22 m., Feb. 1, 1953, rotting coconut log, J. F. G. Clarke. 1 specimen. Kusaie, Jan. 1953, rotting wood of breadfruit tree, J. L. Gressitt. 1 specimen. Hawaii, Oahu, Kuneuche banana plantation, Jan. 4, 1969, P. M. Lee. 5 specimens. Oahu, Pukijaga forest preserve, March 9, 1969, P. M. Lee 6 specimens.

Geographic Distribution: Java (Börner 1906, Handschin 1925), Sumatra (Handschin 1926), Philippine Islands (Handschin 1930, Gapud 1971, as *Alloscopus tetracanthus*), Micronesia (Ngatpang, Babelthup, Yap, Guam, Truk, Ponape, Kusaie) (new records), Hawaii (new record).

The Javan specimens at hand are not well preserved but it was possible to study the claw structure, tibiotarsal clothing, some aspects of the body chaetotaxy and the dental spine arrangement. It is the number of these spines which have been used to separate *tenuicornis* and *tetracanthus*.

The Micronesian *tenuicornis* never have more than seven dental spines. One of the Javan specimens of this species has six spines on one dens and nine on the other. A second specimen has nine and ten spines respectively. Following the lead of Gapud (1971) I regard this difference as geographic variation. Such intraspecific variation I have observed in several species of *Dicranocentrus*.

Handschin (1930) reported *H. (A.) tenuicornis* from the Philippine Islands but Gapud (1971) did not encounter the species there even though he collected in the area from where Handschin's specimens came. It is clear now that Gapud did collect *tenuicornis* but since his specimens had no more than seven dental spines they were called *tetracanthus*. Two of the three Javan specimens bear the label "more of *tetracanthus* Borner, V. Gapud '68".

Indoscopus strebeli (Winter), **new combination**

Alloscopus strebeli Winter 1966: 165. Izarra 1972: 539.

This species would fall within the definition of the subgenus *Alloscopus* were it not for the presence of a postantennal organ (PAO). Winter was aware of the significance of this being the first orcheselline species with such structure.

Prabhoo (1971) erected the genus *Indoscopus* for two Indian species (*I. spinosus* and *I. aspinosus*). The genus was to be separated from *Alloscopus* by the presence of a PAO and by the absence of wing like teeth on the unguiculus.

Winter's species differs from *Indoscopus* by possessing wing like teeth on the unguiculi. I feel that this difference is outweighed by the presence of the PAO in all three species. *I. strebeli* is known from Peru.

Dicranocentrus platensis (Izarra), **new combination**

Alloscopus platensis Izarra 1972: 537-539.

In a revision of the genus *Dicranocentrus*, now in press, I discuss in detail the reasons that justify the placement of this species in *Dicranocentrus*. Briefly these are: Antennae six segmented, claws without wing like teeth, and eight eyes on each side of the head. The species is known from Argentina.

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EDITORIAL NOTICE

The editors would like to acknowledge with our great appreciation the many entomologists who served as reviewers for the past year.