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Rediscovering the old from new: two curious species of *Coenosia* Meigen (Diptera: Muscidae) from South Africa

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ABSTRACT

Coenosia macrotriseta sp. n. is described from the Western Cape, South Africa, with *C. globuliseta* Pont being redescribed and new illustrations provided. As judged by external morphological characters, particularly the presence of globular setae, the two species are very closely related. They are, however, very widely separated geographically and differ clearly as regards genital structure.

KEY WORDS: Muscidae, Coenosiinae, Coenosiini, *Coenosia*, Afrotropical, new species, redescription, taxonomy.

INTRODUCTION

Coenosia is one of the most speciose genera of muscids in the world, with more than 111 species occurring in the Afrotropical Region (Couri 2007). They are distributed throughout all biogeographic regions and the adults are considered to be obligate carnivores (Skidmore 1985).

A single representative of the new species *Coenosia macrotriseta* was collected by Mr Greg Davies, former curator at the KwaZulu-Natal Museum, on Moeras River Farm, south-west of Oudtshoorn, South Africa. So far, no other specimens have been found in any other collections. *C. globuliseta* Pont was originally described as *C. longiseta* Zielke, 1971. Pont (1980) subsequently renamed it, due to it being a junior homonym of *C. longiseta* Stein, 1906. *Coenosia globuliseta* is redescribed herein, as the original description by Zielke lacked any illustrations and very few details were given concerning the type specimen, with the terminalia having been ignored completely.

MATERIAL AND METHODS

Keys to the Coenosiini of the world (Couri & Pont 1999) and to the Afrotropical (Couri 2007), Namibian (Couri *et al*. 2012) and Madagascan (Couri *et al*. 2006) genera of Muscidae, were used in confirming that *C. macrotriseta* does indeed belong to *Coenosia.* The holotype has been deposited in the KwaZulu-Natal Museum, Pietermaritzburg, South Africa (NMSA). Morphological terminology follows that of McAlpine (1981), except for the 3rd antennal segment, which is referred to as the "postpedicel" as in Stuckenberg (1999) and not as antennal flagellomere 1. Additional information on material examined is given, where possible, in brackets. Vegetation type information was derived from Mucina and Rutherford (2006). Photographs were taken using a Zeiss Stemi 2000-C stereo microscope with an attached camera. Images were then stacked using Adobe Photoshop CS5. The line drawings were made using a Wild M5 microscope with drawing tube. Scanning electron microscopy was done on a Zeiss Evo LS 15.

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TAXONOMY

Genus *Coenosia* Meigen, 1826

Coenosia macrotriseta sp. n.

Figs 1A, 2A, 3A, 4, 5, 6A, 7A, 8A, 9A

Etymology: From Greek *macro* (large, long), Latin *tri* (three) and Latin *seta* (bristle), which refers to the presence of two pairs of frontal setae and one pair of orbital setae that are greatly enlarged and have globular apexes.

Diagnosis: A grey fly with very striking, apically globular, 2nd and 4th pairs of frontal and 1st pair of orbital setae. The frontal plate and parafrontalia of the head are silver-white-dusted. The 1+3 (with the exception of the most posterior pair) dorsocentral setae are reduced, making them difficult to distinguish from the preceding and surrounding setulae. The trochanters are dark amber in colour.

Description:

Male.

Measurements (mm): ♂ length: 2.92, wing: 2.95; ratios (length/width): head 0.8, thorax 1.4, abdomen 1.6.

Head (Fig. 2A): Dichoptic. Eyes bare and somewhat reduced taking up a little more than ⅔ of head when viewed laterally. Antennal scape with two weak setulae, pedicel with one strong setula and one weak setula, and postpedicel not reaching past bottom third of eye; *ca* 2× length of pedicel. Arista located dorsally on postpedicel, with fine hairs never longer than half the diameter of aristal base, and only present on basal ⅔. Palpus with slight apical dilation, no more than twice the palpal base width (Fig. 3A). Gena wide, with face projecting forwards. Head grey-dusted throughout, with exception of silver-white-dusted frontal plate and parafrontalia. One pair of ocellar setae. Four

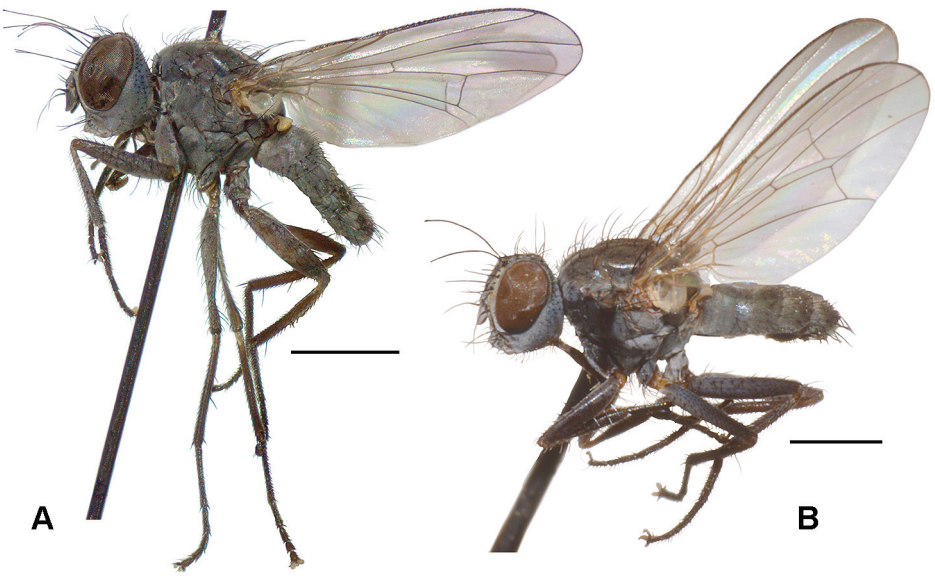
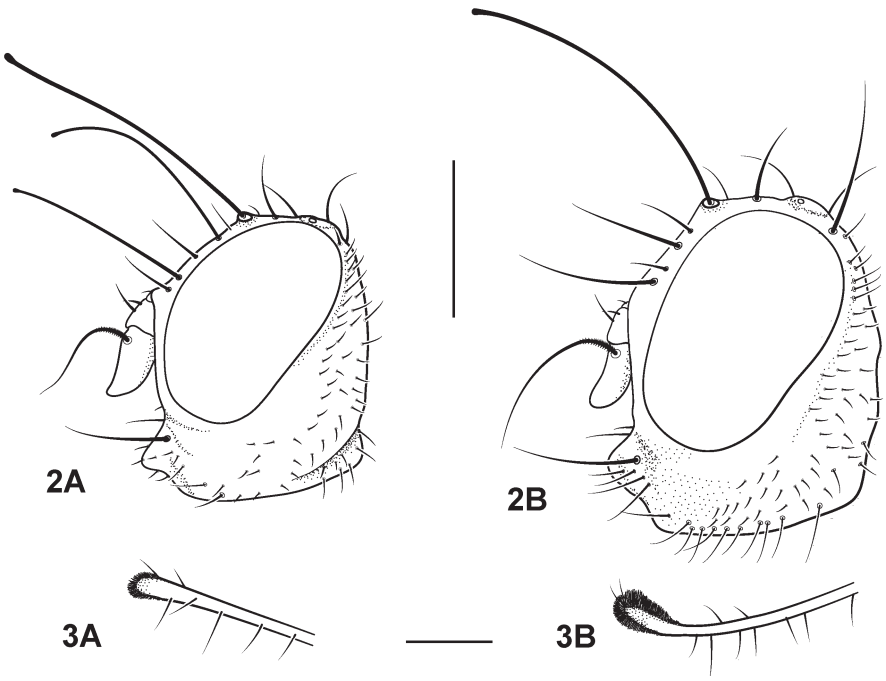


Fig. 1. Lateral habitus: (A) *Coenosia macrotriseta* sp. n., ♂; (B) *C. globuliseta* Pont, ♂. Scale bar = 1 mm.

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Figs 2, 3. (2) Head in lateral view: (A) *C. macrotriseta* sp. n., ♂; (B) *C. globuliseta* Pont, ♂. Scale bar = 0.5 mm; (3) palpi: (A) *C. macrotriseta* sp. n., ♂; (B) *C. globuliseta* Pont, ♂. Scale bar = 0.2 mm.

pairs of frontal setae, 1st and 3rd pairs undifferentiated, 0.25× as long as 2nd and 4th pairs, which are very strongly developed and apically globular with vertical ridges (Fig. 4A). Two pairs of orbital setae, the first 1.3× as long as two pairs of globular frontal setae, proclinate and elevated on separate, raised glossy tubercles (Fig. 4B); second pair reclinate, ¼ length of first globular-tipped orbital pair. One pair of post-ocellar setae, one pair of paravertical setae. One pair of inner vertical and one pair of outer vertical setae. Inner verticals undifferentiated from outer verticals and paraverticals. One row of postocular setae. Three rows of occipital setae. Two pairs of supravibrissal setae. One pair of vibrissae. Five pairs of subvibrissal setae.

Thorax (Fig. 5A): Grey-dusted throughout, with three dark brown vittae running along the dorsocentral and acrostichal setae, diffusing over scutellum. Six postpronotal setae. Two notopleural setae of equal length. Two postalar setae with one setula, posterior postalar seta 2× length of anterior postalar seta and thrice the length of intrapostalar seta. One pair of supra-alar setae. No strongly differentiated intra-alar setae. Dorsocentral setae 1+3; one strongly differentiated presutural pair, with two weaker preceding setulae, and one strongly differentiated apical postsutural pair preceded by two smaller pairs of dorsocentral setae approximately half the length of the former. Acrostichal setae poorly differentiated compared to the weak pairs of postsutural dorsocentral setae. Scutellum (Fig. 5B): One pair of apical setae, one pair of strongly developed subbasal setae, ⅔ the length of apical setae. One pair of weak basal setulae. No subapical setae, and discal setal area restricted to six weak setulae. Subscutellum bare. Two proepisternal setae. Two

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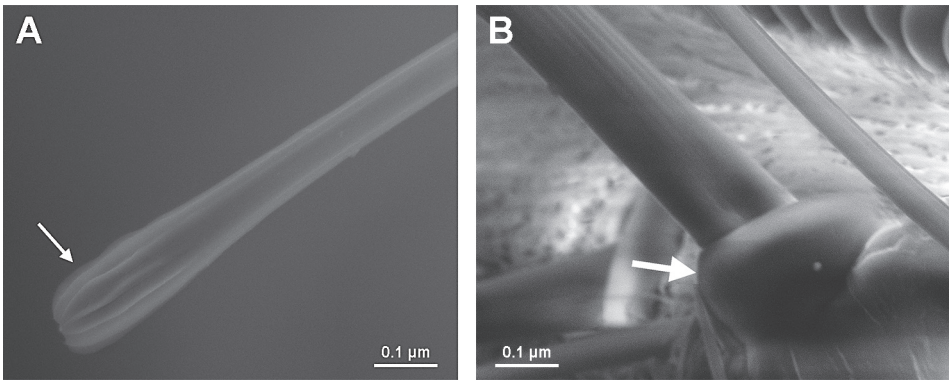


Fig. 4. First pair of orbital setae of *Coenosia macrotriseta* sp. n., ♂: (A) apex, (B) base.

proepimeral setae, lower proepimeral setae slightly upcurved. Three strongly developed katepisternal setae of approximately the same length, forming an equilateral triangle (1:1:1) with three weak setulae inside the triangle. Anepimeron, meron and katepimeron bare, katatergite with fine hyaline hairs, anatergite bare. Wing hyaline and bare, with no conspicuous chaetation or suffusions. Haltere yellow.

Legs: Grey. Fore femur with one posterodorsal seta at least 2× as long as any other fore femoral setae; three preapical dorsal setae, four basal posteroventral setae, six evenly spaced posterior setae. Fore tibia with one preapical dorsal seta, one median and one preapical posterior seta. Mid femur with one strong supramedian anterior seta and two

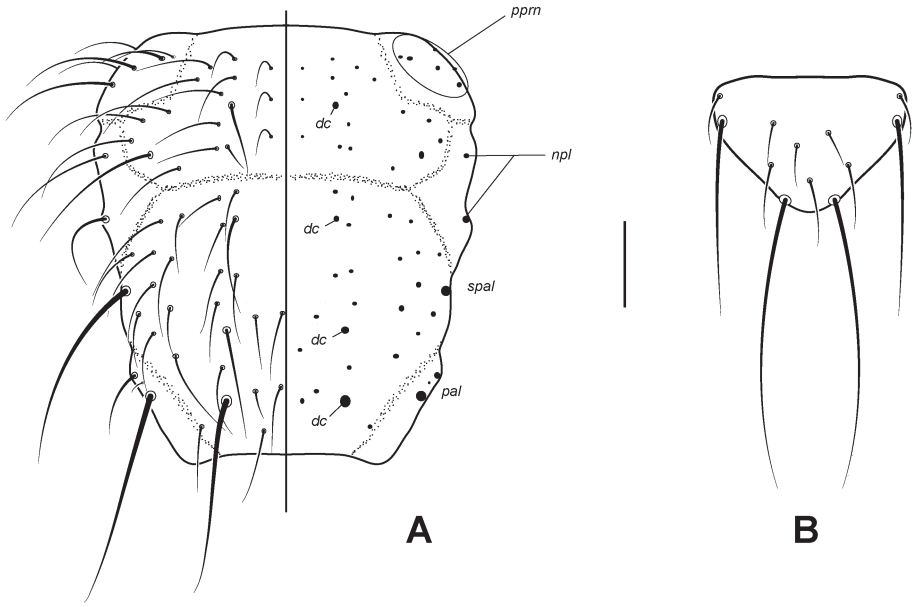


Fig. 5. *Coenosia macrotriseta* sp. n., ♂, dorsal view: (A) thorax and (B) scutellum. Abbreviations: *dc* – dorsocentral seta, *pprn* – postpronotal seta, *npl* – notopleural seta, *spal* – supra-alar seta, *pal* – postalar seta. Scale bar = 0.2 mm.

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preapical posterodorsal setae. Mid tibia with one supramedian and one median posterodorsal seta. Hind femur with one dorsal seta basally and two anteroventral setae: one situated postmedially and the other preapically. Five evenly distributed anterodorsal setae on hind femur. Hind tibia with one median anterodorsal seta, one preapical posterodorsal seta, and one apical ventral seta. Trochanters are dark amber in colour.

Abdomen and terminalia: Grey-dusted throughout. Sternite 1 bare. Sternite 5 triangular in shape, with setae mainly on lobes (Fig. 6A). Sternite 6 with left and right arms forming ring, right arm interrupted before articulation; two pairs of dorsal setae, innermost pair crossing. Cercal plate rectangular in general shape with clear apical notch, two small dark processes apically (Fig. 7A). Surstylus fused with epandrium (Fig. 8A). Hypandrium tubular, with two flap-like structures on either side, hypandrial apodeme reduced, forming a sharp ridge. Aedeagus (Fig. 9A) with distiphallus slightly bent. Postgonite claw-shaped.

Holotype: ♂ SOUTH AFRICA: *Western Cape*: Oudtshoorn district, Moeras- // River Farm (209) // 33°48'S: 22°03'E 525 m asl // Early September 2007 [ix.2007], G.P.B. Davies, Dry Karoo scrub with flowers; [red label, red ink] Holotype // ♂ // 1806; *Coenosia* // *macrotriseta* sp. n. // det. B. Muller 2013; NMSA-Dip. 70333. NMSA type no. 1806. Genitalia dissected, with abdomen in vial under specimen.

Coenosia globuliseta Pont, 1980

Figs 1B, 2B, 3B, 6B, 7B, 8B, 9B

Coenosia globuliseta: Pont 1980: 755 [replacement name].
Coenosia longiseta Zielke 1971: 301 [junior homonym of *C. longiseta* Stein, 1906].

Diagnosis: A grey fly with a very striking, apically globular, 1st pair of orbital setae. The frontal plate and parafrontlia of the head are golden silver-dusted. The trochanters and knees of all the legs are orange.

Redescription:

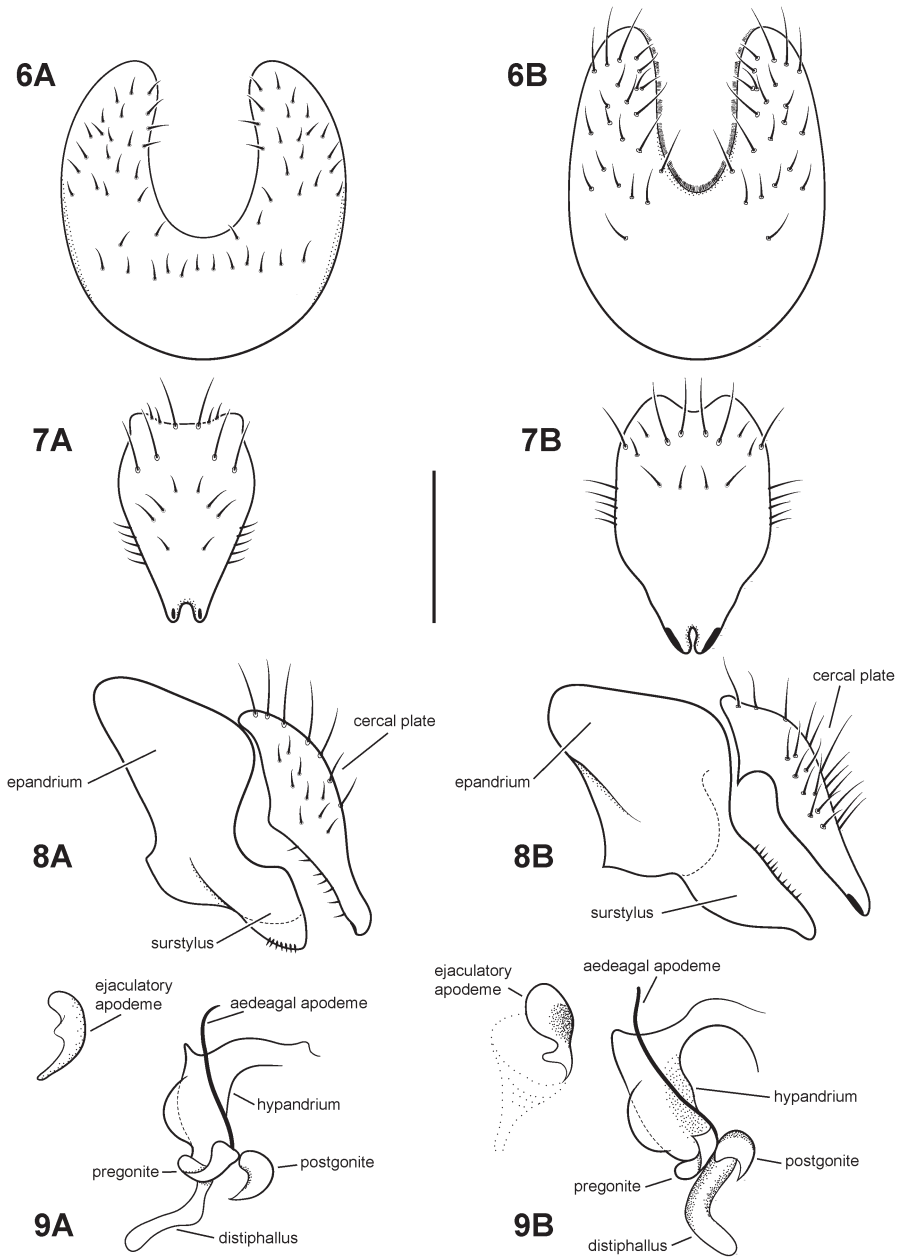
Male.

Measurements (mm): ♂ length: 4.10, wing: 3.97; ratios (length/width): head 0.9, thorax 1.5, abdomen 1.4.

Head (Fig. 2B): Dichoptic. Eyes bare and somewhat reduced, taking up just over ⅔ of head when viewed laterally. Antennal scape with one weakly developed setula, pedicel with one robust setula, one weak setula, and two even weaker lateral setulae. Postpedicel not reaching past bottom third of eye; *ca* 2× length of pedicel. Arista placed dorsally on postpedicel, bears fine hairs never longer than half the diameter of aristal base, and only present on basal ⅔. Palpus apically dilated, 3× width of palpal base (Fig. 3B). Gena wide, with face projecting forwards. Head grey-dusted all over, with the exception of the golden silver-dusted frontal plate and parafrontalia. Two pairs of ocellar setae. Four pairs of frontal setae, the 1st and 3rd pairs strongly developed, 2nd and 4th pairs weak and shorter. Two pairs of orbital setae, the first proclinate and elevated on separate, raised glossy tubercles; second pair reclinate, ¼ as long as first terminally globular pair. One pair of post-ocellar setae, one pair of paravertical setae. One pair of inner vertical setae, highly differentiated from paraverticals, being equal in size to 1st pair of frontal setae. No outer verticals (or indistinguishable from postocular setae). One row of postocular setae. Two poorly defined rows of occipital setae. Two pairs of supravibrissal setae. One pair of vibrissae. Five pairs of subvibrissal setae.

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Thorax: Grey-dusted throughout except for scutum, which is brown-grey-dusted, with three dark brown vittae running along the dorsocentral and acrostichal setae, clearly converging over scutellum. Six postpronotal setae. Two notopleural setae of equal



Figs 6–9. *Coenosia macrotriseta* sp. n., ♂ (A) and *C. globuliseta* Pont, ♂ (B): (6) sternite 5, dorsal view; (7) cercal plate, dorsal view; (8) epandrium, surstylus and cercal plate, lateral view; (9) phallic complex, lateral view. Scale bar = 0.2 mm.

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length. Two postalar setae with one setula, posterior postalar seta twice the length of anterior postalar seta and 4× length of intrapostalar seta. One pair of supra-alar setae. No strongly differentiated intra-alar setae. Dorsocentral setae 1+3; equal in size. Acrostichal setae weakly differentiated, 3.5× shorter than dorsocentral setae. Scutellum: One pair of apical setae, one pair of equally strongly developed subbasal setae. One pair of weakly developed basal setulae. No subapical setae, and discal setal area restricted to five poorly differentiated setulae. Subscutellum bare. Two proepisternal setae. Two proepimeral setae, lower proepimeral setae slightly upcurved. Three strongly developed katepisternal setae of approximately the same length, forming an equilateral triangle (1:1:1) with three weak setulae inside the triangle. Anepimeron, meron and katepimeron bare, katatergite with fine hyaline hairs, anatergite bare. Wing hyaline and bare, with no conspicuous chaetation or suffusions. Haltere yellow.

Legs: Grey, with exception of orange trochanters and knees. Fore femur with three strongly developed posterodorsal setae, median seta being considerably stronger than supramedian and posteromedian setae; three preapical dorsal setae, two median dorsal setae, 10 posteroventral setae evenly spaced on femur, no differentiated posterior setae. Fore tibia with one preapical dorsal seta, one median and one preapical posterior seta. Mid femur with two supramedian anterior setae, one preapical posterodorsal seta, and one median posteroventral seta. Mid tibia with one median posteroventral seta and one apical ventral seta. Hind femur with one dorsal seta basally and two anteroventral setae: one situated postmedially and the other preapically. Seven evenly distributed anterodorsal setae. Hind tibia with one preapical posterodorsal seta, and without median anterodorsal seta.

Abdomen and terminalia: Grey-dusted throughout. Sternite 1 with setulae on lateral edges. Sternite 5 triangular, with setae mainly on lobes (Fig. 6B). Sternite 6 with left and right arms forming ring, right arm interrupted before articulation; two pairs of dorsal setae, innermost pair crossing. Cercal plate rectangular in general shape, with clear apical notch and two small dark processes apically (Fig. 7B). Surstylus fused with epandrium (Fig. 8B). Hypandrium tubular, with two flap-like structures on either side, hypandrial apodeme reduced, forming a shallow ridge. Aedeagus (Fig. 9B) with distiphallus angular in profile, sclerotized and unfuscate both dorsally and ventrally. Postgonite claw-shaped.

Holotype: ♂ SOUTH AFRICA: *KwaZulu-Natal*: Cathedral Peak area [28.9502°S 29.2053°E, max. uncertainty 2.5 km]// Natal Drakensberg // Alt. 7700 ft, 20 Mar. 1955 [20.iii.1955], B. Stuckenberg; [red label] Holotype; *Coenosia* // *longiseta* n. sp. // det. E. Zielke 1969; NMSA-Dip. 37487; NMSA type no. 1750. Genitalia dissected, with abdomen in vial under specimen.

DISCUSSION

The discovery of *Coenosia macrotriseta* was a blessing in disguise for recognition of the type specimen of *C. globuliseta. Coenosia longiseta* Zielke was originally deposited in the collection of the South African Institute for Medical Research. The entire collection was later donated to the KwaZulu-Natal Museum. Unfortunately, due to what was probably the result of poor curatorial practices, the specimen was accessioned as *Coenosia longiseta* Stein, with the museum type catalogue as well as database reflecting it as such. It was assigned a type number and for all intents and purposes, the museum now possessed the "holotype" of *C. longiseta* Stein, at least on paper. To make matters worse, *C. longiseta* Stein had been synonymized with *C. pachypoda* Bigot, 1891. The

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TABLE 1
Key differences between *C. macrotriseta* and *C. globuliseta*.

***Coenosia macrotriseta* sp. n.**	***Coenosia globuliseta* Pont, 1980**
2nd and 4th pairs of frontal setae apically globular	2nd and 4th pairs of frontal setae weakly developed, not apically globular
Inner vertical setae weakly developed	Inner vertical setae well developed
Dorsocentral setae (except for posterior pair) weakly developed, difficult to separate from surrounding setulae	All dorsocentral setae strongly differentiated, at least 3× more robust than the surrounding setulae
Fore femur with one posterodorsal seta	Fore femur with three posterodorsal setae
Mid tibia with one supramedian seta	Mid tibia with two supramedian setae
Hind tibia with one median anterodorsal seta	Hind tibia without a median anterodorsal seta
Sternite 1 bare	Sternite 1 with lateral setulae
Distiphallus only slightly bent	Distiphallus angular in profile

name *C. longiseta* Zielke was now very deeply buried in the collection. Pont (1980) subsequently renamed *C. longiseta* Zielke as *C. globuliseta*, but the specimen was never updated with the correct labels. It was only when the authors were comparing the new species of *C. macrotriseta* with characters of other *Coenosia* types in the KwaZulu-Natal Museum that they stumbled upon a strange specimen with similar globular orbital seta. Upon inspection of the determination label, *C. globuliseta* was "rediscovered", even though nobody knew that it had been "lost". This highlights the importance of recording every piece of information contained on the label(s) with a specimen and ensuring that proper quality control practice is in place as well. The error in the type catalogue was propagated into the database, and from there it could have, because of data-sharing agreements, very easily ended up with global aggregators such as GBIF; all because details on the determination label had not been not recorded properly.

Unfortunately, as is the case with many other dipterans, both species' females are unknown. This discussion will, therefore, only deal with the males of the two species. Interestingly, the distribution of the species is quite disjunct, with *C. globuliseta* having been collected in uKhahlamba Basalt Grassland (vegetation type occurring at 1820–3300 m above sea level) around the Cathedral Peak area in KwaZulu-Natal, as compared to *C. macrotriseta*, which was collected in Northern Outeniqua Sandstone Fynbos (vegetation type occurring at an altitude of 300–1579 m) southwest of Oudtshoorn. Both *C. globuliseta* and *C. macrotriseta* are very similar as regards external morphological characteristics, and these species key to the *Coenosia semifumosa* group as defined by Van Emden (1940). However, neither of the two species key past couplet 5 of the group: hind tibia with either three preapical or two preapical setae. Both of the species possess only one preapical posterodorsal seta. The two species are further unique in having a pair of apically globular orbital setae, and in the case of *C. macrotriseta*, also two pairs of globular frontal setae. Thus, the two species can easily be separated from the rest of the *semifumosa* group as well as from other species of *Coenosia* on the basis of the aforementioned characteristics. *C. macrotriseta* has strikingly reduced dorsocentral setae

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compared to most other *Coenosia*, especially *C. globuliseta*, together with having two pairs of its frontal setae globular in nature, which *C. globuliseta* does not. The main differences between *C. globuliseta* and *C. macrotriseta* are summarized in Table 1.

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