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Four new species of *Puliciphora* DAHL (Diptera, Phoridae) from Nigeria

Abstract: *Puliciphora ibadanensis* n. sp., *P. nigeriae* n. sp., *P. parvulunarum* n. sp. and *P. russellsmithi* n. sp. are described from series of females from Nigeria. *Coridophora* SCHMITZ is synonymised with *Puliciphora* DAHL, a species is rescued from synonymy and a new synonym is proposed.

Key words: Phoridae, *Puliciphora*, *Coridophora*, new species, synonyms, Afrotropical.

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INTRODUCTION

This paper was prompted by the collection of series of four new species of *Puliciphora* DAHL in pitfall traps operated by Dr A. Russell-Smith in Nigeria. While both males and females were collected, it was not possible to associate the correct males with their corresponding females. The recognition of the species in this genus, which currently includes nearly one hundred species, is based on the female sex in the first instance. I therefore describe and name the females of the four species and indicate how they run down in the most recent key to the females of the Afrotropical species (DISNEY & KISTNER 1998). The genus *Coridophora* SCHMITZ is re-evaluated.

METHODS

This study is based on slide mounted specimens, in so-called Berlese Fluid (see DISNEY 1994). The superiority of this medium for many small Diptera has been recently defended (DISNEY 2001). Females of *Puliciphora* are best mounted whole with their dorsal sides uppermost. In some cases the legs may be detached and mounted under separate coverslips.

RESULTS

Puliciphora DAHL

Puliciphora DAHL 1897: 410.

Coridophora SCHMITZ 1951: 157. **Syn. n.**

Edaphomyia BORGMEIER, 1959: 194. DISNEY 1982: 9.

I have previously synonymised *Edaphomyia* BORGMEIER with the genus *Coridophora* SCHMITZ, a genus only known in the female sex. The availability of further good series of the latter genus has provided the opportunity for a further critical re-evaluation. Under low magnifications *Coridophora* females resemble unusually large *Puliciphora*, but seemingly without the gland opening associated with a crescent shaped anterior flap demarcated from the anteromedian region of abdominal tergite 5. This is a characteristic feature of *Puliciphora*, although the flap is reduced or lost in a few species. It was this reported lack of the T5 gland opening and its associated flap that convinced SCHMITZ (1951) that these females belonged to a distinct genus. This conclusion was reinforced by the unusually wide abdominal tergites whose lateral margins extend onto the ventral face of the abdomen. A few species of *Puliciphora* possess this feature, but with the ventral extensions being much narrower. However, in these species, as in the rest of the genus, T6 is always restricted to the dorsal face of the tergum and is typically much reduced in size. Otherwise the general morphology of *Coridophora* closely resembles *Puliciphora*, even in matters of fine detail. For example the relatively unusual feature of the most dorsal spinule of most of the transverse combs of the hind metatarsus is bifurcated.

Slide preparations of the fresh material of *Coridophora* females have revealed that the anterior flap of T5 is present, albeit being relatively small (Fig. 1) and permanently concealed beneath the rear quarter of T4. The question can be posed as to whether the small flap of the T5 in *Coridophora* represents a plesiomorphic state or an apomorphic state with respect to the typically far larger flap of most species of *Puliciphora* (e.g. Figs 2–4). In *Puliciphora borinquenensis* WHEELER this flap is repeatedly raised during courtship, possibly in association with the release of a pheromone (MILLER 1984). Comparative studies of *Puliciphora* species suggest that a reduced flap, or its loss altogether, is a derived state in a few species; as it tends to be associated with other trends, such as a reduction in the frontal chaetotaxy from six bristles between the supra-antennal bristles and those on the vertex to 4, 2 or 0 bristles in this position. In *Coridophora* there are no such bristles and in one species the ocellar bristles are also missing.

We now perceive that the only essential peculiarities of *Coridophora* species are the large size and laterally extended abdominal tergites, and especially the inclusion of T6 in this transformation. I suggest that these are adaptations to their reported association with driver ants (*Dorylinae*) (SCHMITZ 1951). While there may be a case for treating *Coridophora* as a subgenus of *Puliciphora*, such a proposal would render the rest of *Puliciphora* paraphyletic. In our present state of knowledge, especially with the males of most species being still unknown, such a proposition would be premature. I therefore formally propose the synonymy of *Coridophora* with *Puliciphora*.

Puliciphora ibadanensis sp. n.

In the key to Afrotropical species *P. ibadanensis* will run to couplet 2. However, its frontal chaetotaxy of 4SAs-2-2-6 will distinguish it from the 4-0-0-6 of *P. jeanssoni* TRÄGARDH or from the 4-4-2-6 of *P. rhodesiana* SCHMITZ. In the keys to Oriental species (DISNEY 1999) it will run to couplets 14 and 15 but differs in having T6 only a little wider than long and lacking anterolateral apodemes. The same character and the distinct wing rudiment will distinguish it from the Palaearctic species covered by DISNEY & MICHAILOVSKAYA (2001). It resembles the Nearctic *P. nuttingi* DISNEY (1998), but differs in having a larger anterior flap of T5. It also resembles the Neotropical *P. sobria* BORGMEIER (1960), which, however, has a broader T5 and the pre-ocellar bristles more widely separated. The subsequently described *P. cavatica* DISNEY (1995) also resembles these two species, but its T5 and T6 are clearly paler than T2–T4 and T6 has well developed anterolateral apodemes.

Female only. Frons brown and with antial and pre-ocellar bristles present, the latter being level with or slightly below anterior ocellus and a little further apart than posterior ocelli. Each eye with only 26 ommatidia. Brown third antennal segment with about ten SPS vesicles, of which six are subequal to or slightly larger than sockets of supra-antennal bristles. The rest are much smaller. Palps pale straw yellow very lightly tinged brown and with about five differentiated bristles and twice as many hairs. The yellowish brown labrum about 1.3x as broad as third antennal segment. With six strong bristles at rear of thoracic notum, but also progressively stronger hairs towards rear, plus a strong bristle by the prothoracic spiracle. Alar bristle borne on a distinct wing rudiment (Fig. 9). Abdominal tergites brown and progressively narrower from T1 and T2 (which are completely separate) onwards. T4–T6 as Fig. 2. Venter pale straw yellow lightly tinged brown and with numerous hairs above adjacent to T2–T5, on sides of segments 5 and 6 and ventrally on 3–6. The pale cerci about 3.6x as long as broad and near apical seta as long as cercus. Legs with yellowish brown femora and tibiae, otherwise pale yellow.

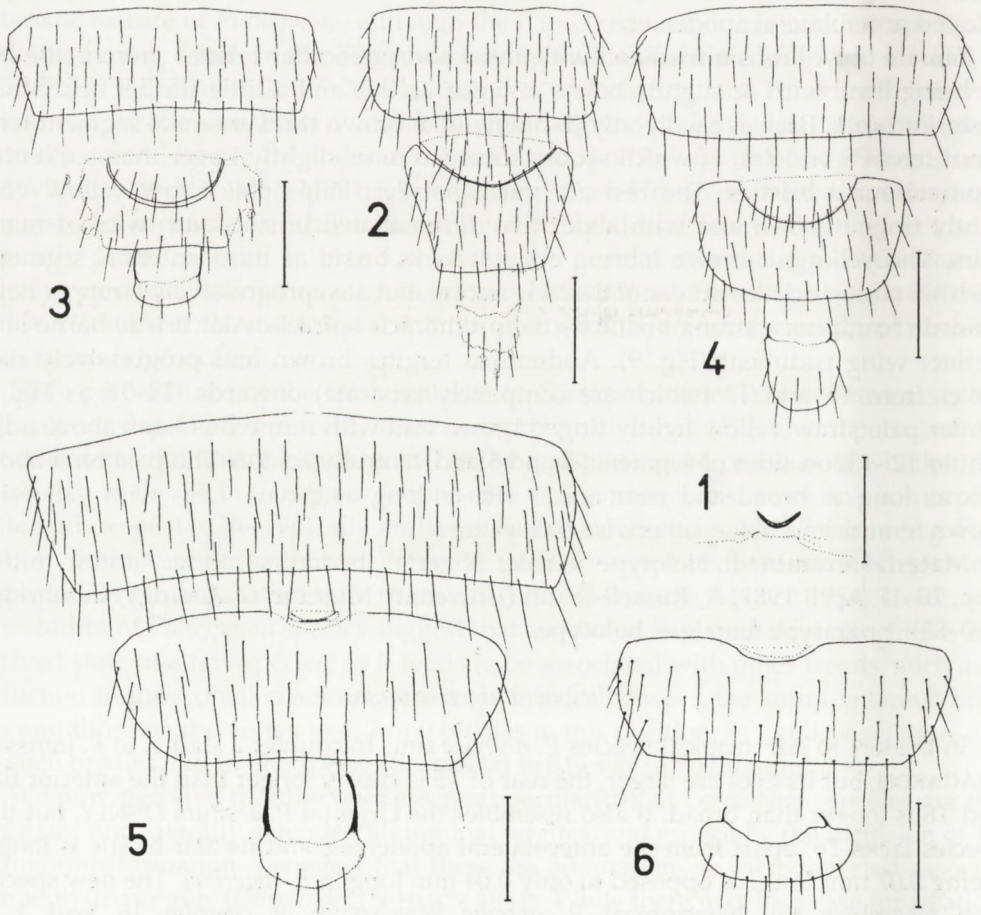
Material examined. Holotype female, Nigeria, Ibadan, secondary forest, pitfall trap, 10–17 April 1981, A. Russell-Smith (University Museum of Zoology, Cambridge – 20–83). 1 paratype female as holotype.

Puliciphora nigeriae sp. n.

In the key to Afrotropical species *P. nigeriae* runs to couplet 2 lead 1, to *P. jeanssoni* TRÄGARDH, but its eyes are larger, the rear of T5 is clearly longer than the anterior flap and T6 is longer than broad. It also resembles the Oriental *P. desituta* DISNEY, but this species lacks T6, apart from the anterolateral apodemes, and its alar bristle is longer (being 0.07 mm long, as opposed to only 0.04 mm long in *P. nigeriae*). The new species also resembles the Neotropical *P. gracilis* BORGMEIER at couplet 16 lead 1 of BORGMEIER's (1960) key, but differs in having the posterior part of T5 longer and less tapered and in having the alar bristle situated on a distinct wing rudiment. It also resembles the Nearctic *P. nuttingi* DISNEY (1998), but differs in its frontal chaetotaxy of 4SAs-0-0-6 as opposed to 4-2-2-6 in the latter species.

Female only. Frons brown with 4SAs-0-0-6 bristles. Eyes variable in size, each with 18-42 ommatidia. Palish brown third antennal segment with 8-10 SPS vesicles about as large as sockets of SAs. Palish brown palps with seven bristles, of which three are longer and more robust, and as many hairs. The yellowish brown labrum about 1.3x as broad as third antennal segment. Thoracic chaetotaxy as *P. ibadanensis*, but with weaker hairs on notum. Wing rudiment as Fig. 10. Abdominal tergites brown. T1 distinct from T2. T2-T5 only gradually progressively narrower. T5-T6 as Fig. 4. Venter, cerci and legs similar to *P. ibadanensis*.

Material examined. Holotype female, Nigeria, Ibadan, secondary forest, pitfall trap, 10-17 April 1981, A. Russell-Smith (University Museum of Zoology, Cambridge - 20-83). 14 paratype females, 11 as holotype and 3 as holotype except 17-24 April 1981 (20-84).

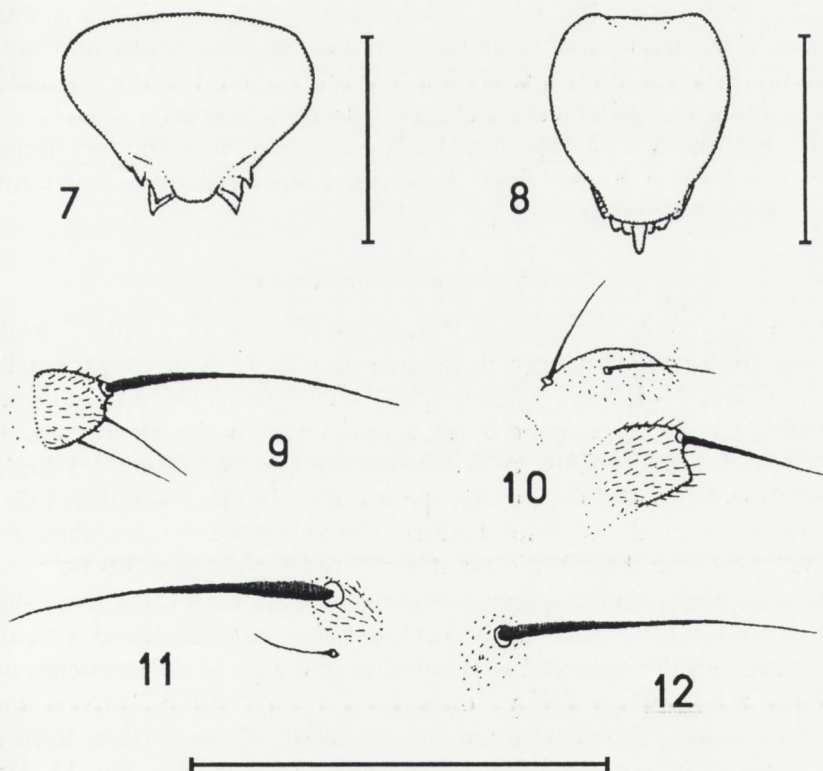


Figs 1-6. *Puliciphora* females. 1 - *P. semicimex*, anterior flap of abdominal tergite 5; 2-5: Abdominal tergites 4-6: 2 - *P. ibadanensis*, 3 - *P. russelsmithi*, 4 - *P. nigeriae*. 5 - *P. parvularum*; 6 - *P. sedecemsetarum*, T5-T6. Scale bars = 0.1 mm.

Puliciphora nigriventris (BORGMEIER) **comb. n.***Edaphomyia nigriventris* BORGMEIER 1959: 194.*Coridophora nigriventris* (BORGMEIER). DISNEY 1982: 10.

The range of variation in the females assigned to *Coridophora*, and with only a few specimens being then available, caused this species to be erroneously synonymised with *P. convexa* (DISNEY 1994: 272). With better series now being available it is evident that despite the length of the pre-ocellar bristles being variable they are always longer and more robust than the other bristles on the vertex. By contrast in *P. semicimex*, with which *P. convexa* is now synonymised (see below), the POs are represented by undifferentiated hairs only. This distinction correlates with other constant differences; for example the relative breadths of the labrum (Figs 7 and 8). I therefore formally reinstate *P. nigriventris* as well as transferring it to *Puliciphora*.

Material examined. 1 female, Cameroon, Nkoemvon, pitfall trap, 17–30 August 1980, D. A. Jackson (University Museum of Zoology, Cambridge – 6–77). 6 females, Nigeria, Mambila Plateau, Ngel Nyaki, floor of montane forest, c. 5500', 28 November – 3 December 1968 (University Museum of Zoology, Cambridge – 5–65).



Figs 7–12. *Puliciphora* females. 7–8: Labrum. 7 – *P. nigriventris*, 8 – *P. semicimex*. Scale bars = 0.1 mm. 9–12: Wing rudiments. 9 – *P. ibadanensis* (right sight), 10 – *P. nigeriae* (right sight), 11 – *P. parvularum* (left sight), 12 – *P. russellsmith* (right sight). Scale bars = 0.1 mm.

Puliciphora parvulunarum sp. n.

This species is unusual in that the mediolateral bristles of the frons are either present or absent. This means the frontal bristle formula is either 4(SAs)-2-4-6 or 4-2-2-6. In the key to Afrotropical species the first option takes *P. parvulunarum* to couplet 6 lead 2, to *P. sedecemsetarum*. However, examination of the holotype of the latter has revealed an error in the original description, which means it should really run to couplet 5 (see below). At couplet 6 the vestigial anteromedian flap of abdominal tergite 5 immediately distinguishes the new species from *P. melania* SCHMITZ, but resembles that of *P. sedecemsetarum*. The latter, plus some specimens of the new species will run to couplet 5 lead 2. Both species are distinguished from *P. borinquenensis* WHEELER by their vestigial flaps of T5. They differ from each other by the smaller T6 with longer anterolateral apodemes in the new species (cf Figs 5 and 6).

Female only. Frons brown with 4-2-4-6 or 4-2-2-6 bristles and the pre-ocellars situated below the anterior ocellus and about as far apart as posterior ocelli. All three ocelli are small and weak. The eyes are large, with at least 40 ommatidia in each. Third antennal segment pale brown with half a dozen SPS vesicles, which are about as large as sockets of lower SAs. Palps pale straw yellow tinged brown, with 5-7 bristles and up to twice as many hairs. The pale brown labrum almost 1.3x as wide as third antennal segment. Thoracic chaetotaxy similar to *P. nigeriae*. Alar bristle and rudiment as Fig. 11. Abdominal tergites brown, similar to *P. nigeriae* but broader and anterior flap of T5 vestigial (Fig. 5). Venter, cerci and leg similar to *P. nigeriae*.

Material examined. Holotype female, Nigeria, Ibadan, secondary forest, pitfall trap, 17-24 July 1981, A. Russell-Smith (University Museum of Zoology, Cambridge - 20-84). 2 paratype females as holotype.

Puliciphora russellsmithi sp. n.

In the key to Afrotropical species *P. russellsmithi* runs to couplet 5 lead 2, to *P. borinquenensis* WHEELER. However, its anterior flap of T5 is distinctly smaller. It resembles two Oriental species, *P. collinsi* DISNEY and *P. fosteri* DISNEY (see DISNEY 1999). But the former has T6 represented by its anterolateral apodemes only and the latter has the median third of T1 fused to T2. The new species also resembles the Neotropical *P. sobria* BORGMEIER (1960), but this species has a broader T4 and its POs situated further forward from the anterior ocellus. The subsequently described *P. cavatica* DISNEY (1995) also resembles *P. sobria*, but has T5 much paler than T2-T4.

Female only. Frons brown with 4-2-2-6 bristles and POs level with or slightly below anterior ocellus and further apart than posterior ocelli. Each eye with at least 30 ommatidia. Brown third antennal segment with half a dozen SPS vesicles, which are about as large as SA sockets. Pale yellowish brown palps with 5-7 bristles and almost twice as many hairs. Yellowish brown labrum about 1.3x as wide as third antennal segment. Thoracic chaetotaxy similar to *P. nigeriae*. Alar bristle as Fig. 12. Abdominal tergites similar to *P. nigeriae*, but T4-T6 as Fig. 3. Venter, cerci and legs similar to *P. nigeriae*.

Material examined. Holotype female, Nigeria, Ibadan, secondary forest, pitfall trap, 10–17 April 1981, A. Russell-Smith (University Museum of Zoology, Cambridge – 20–83). 8 paratype females as holotype, except 17–14 July 1981 (20–84).

Puliciphora sedecemsetarum SCHMITZ

Puliciphora sedecemsetarum SCHMITZ 1958: 29

I have borrowed the holotype of this species (from the Musée Royale de l'Afrique Centrale, Tervuren). It is mounted on two slides, with abdomen on one and the head and thorax on the other. The use of an excessively large (15 mm diameter) coverslip and clumsy handling has resulted in a tilted and badly distorted head. The result is some difficulty in the interpretation of the chaetotaxy. Schmitz gives the frontal bristle formula (and illustrates it in his Fig. 9) as 4(SAs)-2-4-6. However, if the slide is turned over and examined from the underside, as well as from above, it becomes evident that the true formula is 4-2-2-6. Schmitz's figured mediolaterals do not exist. He misinterpreted an inner bristle of the right side of vertex, probably because it is visually separated from the outer bristle by an infolding of the head capsule above the eye that has been caused by the distortion. With this amendment to the diagnosis of this species, it will now run to couplet 5 lead 2, instead of couplet 6 of the recent key. It is immediately distinguished from *P. borinquenensis* WHEELER by its vestigial anteromedian flap of T5 (Fig. 6).

Puliciphora semicimex (SCHMITZ) **comb. n.**

Coridophora semicimex SCHMITZ 1951: 158.

Coridophora convexa SCHMITZ 1954: 14. **Syn. n.**

Schmitz's detailed measurements of the unique holotypes of *C. semicimex* and *C. convexa* are now seen to both lie within the ranges of variation for the series of specimens now available for study. Furthermore these specimens clearly belong to a single variable species. I therefore propose the synonymy of *C. convexa* with *C. semicimex*, which is also transferred to the genus *Puliciphora*.

Material examined: 6 females. Cameroon, Nkoemvon, pitfall traps, 17–30 August 1980, D. A. Jackson (University Museum of Zoology, Cambridge – 6–76, 6–77). 2 females, Nigeria, Ibadan, pitfalls, 10–24 July 1981, A. Russell-Smith (University Museum of Zoology, Cambridge – 20–83, 20–84).

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STRESZCZENIE

[Tytuł: Cztery nowe gatunki rodzaju *Puliciphora* DAHL (Diptera, Phoridae) z Nigerii]

Z nigeryjskich materiałów samic *Phoridae*, zebranych w pułapki glebowe, opisano cztery nowe gatunki: *Puliciphora ibadanensis*, *P. nigeriae*, *P. parvulunarum* i *P. russellsmithi*. Zsynonimizowano rodzaj *Coridophora* SCHMITZ, 1951 z rodzajem *Puliciphora* DAHL, 1897, w wyniku czego w nowej kombinacji zestawiono gatunki *Puliciphora nigriventris* (BORGM.) i *P. semicimex* (SCHMITZ). Synonimem *P. semicimex* okazał się *Coridophora convexa* SCHMITZ.