Redefinition of the Clusiinae and Clusiodinae, description of the new subfamily Sobarocephalinae, revision of the genus Chaetoclusia and a description of Procerosoma gen. n. (Diptera: Clusiidae)

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Abstract. The higher classification of the Clusiidae is reviewed, and the family is divided into the subfamilies Clusiinae, Clusiodinae, Sobarocephalinae, Chaetoclusia, Trichoclusia, Chaetoclusiella, Procerosoma, Sobarocephaloides, Sobarocephala, revision

INTRODUCTION

Frey (1960) divided the Clusiidae into two subfamilies, Clusiinae (with one or more inclinate fronto-orbital bristles) and Clusiodinae (all fronto-orbitals reclinate). Later authors narrowed the Clusiidae to include only those genera with the anterior fronto-orbital bristle inclinate (Sasakawa, 1977; Pitkin & Evenhuis, 1989; Figs 7, 11–13). Male and female genitalia, however, as well as previously unrecognized external morphological characters, suggest alternative subfamilial divisions of the Clusiidae. We here redefine the existing subfamilies, erect the new subfamily Sobarocephalinae, and revise Chaetoclusia Coquillett, 1904 and Procerosoma gen. n., which are the sobarocephaline genera other than Sobarocephala Czerny, 1903.

Most previous treatments of the New World tropical Clusiidae have focused on the immense sobarocephaline genus Sobarocephala, a frequently encountered genus of well over 200 Neotropical species. Chaetoclusia, in contrast, has received very little attention, because of the apparent rarity of species other than C. bakeri Coquillett. Six of the thirteen species of Chaetoclusia are described as new below, but the group’s biology or immature stages remain unknown. Procerosoma is the least frequently encountered New World genus of Clusiidae, with its two species known from only three specimens collected in Mexico and Brazil.

MATERIALS AND METHODS

Approximately 180 specimens were examined from the following institutions: University of Guelph Insect Collection (DEBU); British Museum of Natural History, London (BMNH); Canadian National Collection, Ottawa (CNCI); Carnegie Museum of Natural History, Pittsburgh (CMNH); Entomological Museum of Utah State, Logan (EMUS); National Museum, Washington, D.C. (USNM); Zoological Museum für Tierkunde, Dresden (SMTD); United States National Museum, Washington, D.C. (USNM); Zoological Museum, University of Moscow (ZMUM).

Most specimens were pinned, either air-dried or prepared in a critical-point drier. FBUB specimens were stored in alcohol. Male and female genitalia were prepared by macerating abdomens in hot potassium hydroxide (10% solution) for 12–13 min, followed by washing in glacial acetic acid and deionized water. Terminology follows that in Caloren & Marshall (1998), with the exception of the pregonite and postgonite, which are illustrated in Figs 4 and 5. The M1+2 ratio is defined as the length of the ultimate section of vein M divided by the length of the penultimate section.

Representatives of all clusiid genera were examined (excluding the fossil genus Electroclusiodes Hennig, 1965), as were representatives of all recognized sobarocephaline species (defined below) and a range of exemplars from possible out-group families, including all families in the superfamilies Opomyzoidea (in sense of McAlpine, 1989) except Xenasteiidae (cf. Papp, 1998). A phylogenetic hypothesis for the species of Chaetoclusia (Fig. 58) was generated through analysis of a morphological character matrix (Table 2) using PAUP version 4.0b10 [Phylogenetic Analysis Using Parsimony (Swofford, 2003)], using a simple heuristic search with all characters unweighted.

To polarize characters, the lineage made up of Sobarocephala and Procerosoma was treated as the sister group to Chaetoclusia; this allowed for the construction of a hypothetical ancestor characterized by plesiomorphic states. Trees were drawn with the aid of Winclada (Nixon, 2002).
RESULTS

Redefinition of the subfamily Clusiiodinae

Most members of the Clusiiodinae (all genera excluding the basal genus Allometopon Kertesz, 1906) form a strongly supported clade defined by an antenna that arises at or below the midpoint of the head, a blunt and obtuse angulate extension on the outer surface of the pedicel, a reduced or absent extension on the inner surface of the pedicel, a scutellum that is flat and longitudinally wrinkled dorsally, an extremely reduced phallapodeme, an enlarged ejaculatory apodeme, fusion of the components of the phallus, loss of the epiphallus, loss of the postgonite, loss of the lateral lobe of the distiphallus, articulation of the hypandrial complex to the epandrium and annulus (and less so to the subependrial sclerite), and fusion of the pregonite (which is lengthened and enlarged) to the hypandrium. Outside of this group, the pregonite is well defined and separate from the hypandrium (Fig. 5), with membranous or stronger sclerotized connections seen in only a few derived lineages. This group includes the genera Clusiodes Coquillett, 1904, Craspedochaeta Czerny, 1903, Hendelia Czerny, 1903, Heteromeringia Czerny, 1903, Prohendelia Frey, 1960, Tranromeringia Sasa-kawa, 1966 and Xenochusia Frey, 1960.

The entire subfamily, comprised of the above genera plus Allometopon, is less well supported. Synapomorphies of the entire subfamily include longitudinally segmented (not spherical and undifferentiated) spermathecae, loss of the ventrolateral lobes of the hypandrium, entirely reclinate fronto-orbital bristles and loss of the presutural intra-alar bristle. The latter two characters are of equivocal polarity. Presutural intra-alars have also been lost in Chaetotrichia richardfresyi (Soós, 1962), Sobarocephala (regained in several species) and most Apiochaeta Czerny, 1903, and they also reappear in several species of Craspedochaeta. This character is also subject to frequent homoplasy in related families, as these bristles are often reduced in the Anthomyzidae, and are lost in the Acartopthalmidae and most Asteioinea sensu McAlpine (1989). The Acartopthalmidae was treated as the sister group to the Clusiidae by McAlpine (1989), but this family is probably more closely related to the Carnidae, Chloropidae and Milichiidae (Griffiths, 1972; Brake, 2000). The fossil genus Electroclusiodes also lacks presutural intra-alar bristles (Hennig, 1965), providing some evidence for inclusion of this genus in the Clusiidae. The placement of Electroclusiodes in the Clusiidae is further supported by its possession of entirely reclinate fronto-orbital bristles, although this is another homoplastic character providing relatively weak additional support for the subfamily.

Redefinition of the subfamily Clusiinae

Incline anterior fronto-orbital bristles have previously been used to define the Clusiinae, but similar bristles appear independently in the clusioidine lineage containing Heteromeringia and Tranromeringia. As discussed above, a large suite of synapomorphies support the placement of Heteromeringia and Tranromeringia in the Clusiidae, indicating that this character has evolved at least twice in the family. Furthermore, although entirely reclinate fronto-orbitals were treated as the ancestral state for the Opozyzoidea by McAlpine (1989), inclinate anterior bristles appear frequently throughout the superfAMILY, being entirely absent only in the Opozyzoidea (Opomyzidae + Anthomyzidae) (McAlpine, 1989). Incline anterior fronto-orbitals are most notably present in the Agromyzidae and Odiiniidae, which are possibly the closest relatives of the Clusiidae, suggesting that these bristles are in the groundplan of the family.

Given the above uncertainties regarding the polarity and homology of the character previously used to define the Clusiinae (incline anterior fronto-orbital bristles), it is not surprising to find that the subfamily as previously defined does not withstand scrutiny, and we were unable to find any other reliable synapomorphies that would support its monophyly. Within the Clusiinae, however, we have found two well-supported clades that we here treat as the Clusiinae in a narrowed sense and the new subfamily Sobaroccephalinae. The relationships between the subfamilies of Clusiidae are currently unresolved.

The redefined Clusiinae includes Clusia Haliday, 1838, Paraclusia Czerny, 1903, Apiochaeta, Allocusia Hendel, 1917, Phylloclusia Hendel, 1917, Tetramerigina McAlpine, 1960, Amuroclusia Mamaev, 1987, and at least two undescribed genera. The Clusiinae in this revised sense is supported by six synapomorphies: the M$_{1+2}$ ratio of the wing is less than 2.7 (reversed in several species); the fore femur has several outstanding bristles on the posterior dorsal surface; the pleuron has a subnotal stripe (obscured or lost in several genera); the surstylus has developed an internal spur (lost in several species, possibly absent in the ancestor of Phylloclusia and Tetramerigina); the distiphallus is elongate and bent or jointed medially; the vertex has a posteromedial truncate notch behind the ocelli (also found in Allometopon).

Sobaroccephalinae subfam. n.

The new subfamily Sobaroccephalinae includes the genera Sobaroccephala, Chaetoclusia and Procerosoma, the latter two of which we revise below. Sobaroccephaloides Soós, 1964 is synonymized with Sobaroccephala, and the monotypic Chaetoclusia Soós, 1962 and Trichoclusia Soós, 1962 are synonymized with Chaetoclusia (see below). This subfamily is defined by male genitalic characters: loss of the sixth spiracle (otherwise left lateral on the annulus), a ventral lobe of the hypandrium that is usually at least as long as the hypandrial arm (secondarily reduced in several species of Chaetoclusia and Sobaroccephala), and a relatively large surstylus (usually more than 0.67 times the length of the epandrium, but smaller in Procerosoma alini (Shatalkin, 1991) and several species of Sobaroccephala). Large surstyli are also found in Allocusia, Allometopon, and certain clades within several clusioidine genera.

Procerosoma and Sobaroccephala share a number of synapomorphies, including an open cell bm (confluent with cell dm), a small pregonite, and (possibly) a loss of the presutural intra-alar bristle. Procerosoma, however,
lacks the basal shield on the distiphallus and the thumb-like process on the lateral lobe of the distiphallus, both of which characterize Sobarocephala. Although Procerosoma and Sobarocephala are sister groups, Procerosoma is here given generic status for practical reasons. It would have been extremely difficult to provide a definition for Sobarocephala including Procerosoma because there are no apparent synapomorphies of both genera that have been retained in every species of Sobarocephala. Furthermore, Procerosoma lacks dorsal preapical tibial bristles, similar to Heteromerinia and most genera of Clusiinae, and Procerosoma is easily recognized in that the head is relatively wide with the mouthparts situated more ventrally and posteriorly, most dimensions of the body are elongate with respect to those of Sobarocephala, and the scutellum and metatergites have become distinctly convex, slightly shortened, and angled dorsally.

Status of the genus Sobarocephaloides

Sobarocephaloides discolor Soós, 1964 (the type species of Sobarocephaloides by monotypy; Holotype label data: Costa Rica. La Suiza, 26.x [year not given], P. Schild (1♂, USNM)) belongs to the Sobarocephala plumat clade of the S. flaviseta species group (which will be revised in an upcoming paper) on the basis of a frons that is strongly narrowed posteriorly, minute occellar bristles, a slight protuberance on the face below and between the antennal bases, a distinct brown spot on the first flagellomere and a densely plumose arista. The first character is a synapomorphy of the S. flaviseta species group, and the latter four are synapomorphies of the S. plumat clade. Sobarocephaloides is therefore synonymized with Sobarocephala.

Soós (1964) erected the genus Sobarocephaloides for Sobarocephala discolor based on a reduction of the postvertical, fronto-orbital and anterior dorsocentral bristles. It is now apparent that a reduction of the bristles on the head and thorax is characteristic of most species in the S. plumat clade, of which S. discolor is an extreme example. A second species, Sobarocephaloides alini Shatalkin, 1991, was described as a Sobarocephaloides on the basis of a similar reduction of the bristles on the head and thorax (Shatalkin, 1991), but it is only remotely related to S. discolor. Sobarocephaloides alini is discussed below as the type species for the new genus Procerosoma.

Key to the clusiid subfamilies and sobarocephaline genera

1 Anterior fronto-orbital bristle reclinate. Mid and hind tibiae with dorsal preapical bristles; tibial bristles absent in Oriental genus Allometopon. ............................................... Clusiidae (excl. Heteromerinia and Tranomerinia)
2 Triangular projection on outer margin of pedicel acute and blunt; inner projection absent. Scutellum flat and longitudinally wrinkled dorsally. One pair of hair-like lateral scutellar bristles. Mid tibia without dorsal preapical tibial bristle. Middle fronto-orbital bristle well developed and head without wide truncate notch. M₁₋₂ ratio variable, but rarely less than 3.0–4.0. Epandrium small and usually much narrower than tergite 5. Distiphallus extremely long, coiled, dark and with one pair of well sclerotized lateral ribs. ........... Clusiidae (Heteromerinia and Tranomerinia)

Procerosoma gen. n.

Diagnosis

Cell bm narrowly open, confluent with cell dm (Fig. 1). Vein R1 bare. Scutum bivittate. Face with one pair of lateral stripes. Two pairs of postsutural dorsocentral bristles (anterior bristle 0.6 times length of posterior bristle). Presutural dorsocentral and presutural intra-alar bristles absent. Acrostichal, ocellar, and postvertical bristles absent. Mid fronto-orbital bristle 0.8 times length of remaining fronto-orbitals or extremely reduced and setula-like (Fig. 6). Preapical tibial bristles absent.

Etymology. The generic name is Latin for “slender-bodied”; gender female.

Generic description

Adult. General. Length 4.0–5.3 mm. Body elongate, with thorax, abdomen and legs long and slender; colour yellow with brown pattern (scutum bivittate and face with one pair of lateral stripes) (Figs 1, 7 and 8). Angular extensions on pedicel producing 90° angle, with apex broadly rounded. Arista black with base white; sparsely or densely plumose. Gena and parafacial shiny to microsetulose or silvery tomentose. Frons shiny with sides parallel. Halter white to light yellow. Wing length 3.0 times width. Subcostal break distinct. R, bare. Cell bm narrowly open. M₁:z ratio 1 : 3 or 1 : 4.6. Wing hyaline with faint distal (and sometimes medial) clouding.

Chaetotaxy. Bristles yellow. Anterior and mid fronto-orbital bristles close to each other on anterior margin of frons, with hind bristle on posteromedial margin; mid fronto-orbital bristle 0.8 times length of remaining fronto-orbitals or extremely reduced and setulae-like (Figs 1, 6 and 7). Acrostichal, ocellar, and postvertical bristles absent. Pedicel with one outstanding dorsal bristle. Two postsutural dorsocentral bristles with anterior bristle 0.6–0.8 times length of posterior bristle, sometimes with small bristle in front of anterior dorsocentral. Presutural dorsocentral and presutural intra-alar bristles absent. Scutellum wide, short and angled dorsally, with one pair of strong cruciate apical bristles and 0–2 pairs of weak lateral bristles. One strong anepisternal and katepisternal bristle; proepisternal bristle small. Preapical tibial bristles absent. Male mid femur with at least six stout setenial bristles basally. One postpronotal and two notopleural bristles; two postsutural intra-alar bristles; intra post-alar bristle absent.

Male abdomen. Males only known for Procerosoma alini. Tergites 1 and 2 fused; sternite 1 reduced to thin, weakly sclerotized strip; tergites 3–6 and sternites 2–5 complete. Spiracles in membrane below tergites 1–5 and ventrally between sternites 6 and 8. Abdomen encircled by an annulus comprised of sternites 6–8 (Fig. 3); sternite 8 setose, and dorsal (with right lateral extension); sternite 7 on left side between sternites 6 and 8 and heavily sclerotized anteriorly; sternite 6 fused to sternite 7 laterally, membranously attached to sternite 8 ventrally, and heavily sclerotized anteriorly. Epandrium dome-shaped; length 0.75 times height; width and height subequal. Surstylius small and rounded, with width slightly less than half that of epandrium; bristles on distal half of inner face stout and pointed. Cerci projecting and evenly rounded apically; bristles short and of equal length. Hypandrium with one pair of arms articulating with subependrial sclerite, which in turn articulates with epandrium; hypandrium with one pair of parallel ventrolateral lobes (“ventral lobe of hypandrium”) that lie on either side of phallapodeme, becoming arched medially and strongly tapered distally; ventral lobe of hypandrium with two central bristles (strong and closely spaced) and one small distal bristle; hypandrial arm shorter than lobe and projecting from long axis of phallapodeme at 45° (Fig. 5). Phallapodeme long.

Fig. 1. Procerosoma alini (Shatalkin, 1991), female habitus with male head inset.
and thin, articulating with basiphallus and thin anterior-transverse portion of hypandrium to form lever; articulation with hypandrium facilitated by suspended ventral plate (“nedaegal guide” of Soós, 1987) confluent with anterior margin of phallapodeme and entirely separate from hypandrium. Pregonite with three small bristles on expanded apex. Postgonite small and lobate; two (of four) bristles on right postgonite and one (of four) bristles on left postgonite long, wide, and darkly pigmented. Basiphallus well developed, “C” shaped and setose laterally. Epiphallus well developed and fin-like. Distiphallus triangular, 0.4 times length of phallapodeme, with one pair of short, hyaline basal lobes. Ejaculatory apodeme half length of phallapodeme.

**Female abdomen.** Tergites 1 and 2 fused; sternite 1 reduced to thin, weakly sclerotized strip; tergites 3 to 6 and sternites 2 to 6 complete. Abdomen past segment 6 narrowed into long, thin tube; segments separated by long membranous area nearly equaling segment length. Sternite 8 bifid on distal fourth and divided lengthwise by median desclerotized line. Length of cercus approximately 0.67 times that of sternite 8. Spiracles in membrane below tergites on segments 1 to 7. Spermathecae (two) weakly sclerotized, spherical, smooth-surfaced and almost 0.33 times length of sternite 8 (Fig. 9). Spermathecal ducts thin, weakly sclerotized and eight times length of spermatheca. Ventral receptacle weakly sclerotized, sac-like and recurved ventrally. Ventral receptacle and reproductive ducts opening close together into anterior end of genital chamber.

**Egg.** (Fig. 10) (Based on examination of single known female of *P. prominens* with two eggs in abdomen): Width 0.3 times length, length 0.7 mm. Tapered at ends with micropyyle distinct. Surface minutely tuberculate and longitudinally wrinkled.

**Procerosoma alini** (Shatalkin, 1991) comb. n.
(Figs 1–5)


Redescription (Fig. 1)

**Male.** Body length 4.0 (female) – 5.3 mm (male). Arista sparsely short-plumose. Small bristle in front of anterior dorsocentral. Mid fronto-orbital bristle 0.8 times length of remaining bristles. One pair of lateral scutellar bristles. Scutum yellow with one pair of stripes extending presuturally along dorsocentral line, thinned medially behind suture on outer face. Scutellum yellow. Metatergites yellow with one pair of faded stripes lateral to scutellum and one faded stripe below. Pleuron yellow. Legs yellow with fore tibia brown (darkest basally) and fore tarsi brown. Head predominantly yellow; sides of face with wide brown stripes; ocellar tubercle brown; bulbous distal portion of genal process white. Head strongly swollen and 1.2 times width of scutum; gena with prominent process (swollen distally); face not produced. Abdomen black with epandrium and surstylus dark yellow to orange. Wing yellowish/dusky with distal fifth lightly clouded. M1+2 ratio 3.0.

**Female.** As described for male except as follows: head and notum subequal in width; genal process absent; tergites 1–4 black; tergite 5 with wide central stripe (narrowing anteriorly); remainder of abdomen yellow; wide truncate notch present behind ocelli; frons and face bulging; lateral scutellar bristle absent.

**Male terminalia** (Figs 2–5). See generic description.

**Female terminalia** not dissected.

**Distribution.** Brazil (São Paulo).

**Holotype.** Brazil. São Paulo, 29.xi.1971, B. Alin (1♀, ZMUM).

**Paratype.** Same collection as holotype (1♂, ZMUM).

**Comments.** Shatalkin (1991) described *Procerosoma prominens* as a *Sobarocephaloides* (now a synonym of *Sobarocephala*) on the basis of a single pair of dorsocentral bristles. We have, however, found two pairs of dorsocentral bristles in the paratype female and a second pair of sockets in the holotype male where the anterior dorsocentrals had broken off.

See comments for *Procerosoma prominens*.

**Procerosoma prominens** sp. n.
(Figs 6–10)

Description (Figs 6–8)

**Female.** Body length approximately 5.3 mm. Arista densely plumose. No small bristle in front of anterior dorso-central. Mid fronto-orbital bristle minute; hind fronto-
Figs 6, 7: Procerosoma prominens sp. n., head. 6 – outline drawing, left lateral (arista and bristles removed, excluding vibrissa and fronto-orbital bristles); 7 – habitus.

orbital bristles broken off (reconstructed in illustrations based on diameter of sockets). Two pairs of weak lateral scutellar bristles. Scutum yellow with one pair of stripes extending presuturally along dorsocentral line, with stripes thinned medially behind suture on outer face; posterior margin of notopleuron with brown line reaching longitudinal dorsocentral stripe. Scutellum yellow with lateral margin brown. Metatergites yellow with katatergite and anatergite below scutellum brown (faded medially). Pleuron yellow with thin line extending from postpronotum along anterior suture of anepisternum to lateral diagonal suture of katapisternum. Legs yellow except as follows: fore tarsi brown excluding basal 2/3 of first tarsomere; mid and hind tarsi brown distally on all tarsomeres. Head predominantly yellow; sides of face with one pair of wide dark yellow stripes; gena white and silvery-tomentose; stripe on outer-dorsal surface of first flagellomere; back of head with one pair of large lateral spots; ocellar tubercle brown. Gena relatively high with posterior angle distinctly produced. Vertex projecting and face strongly carinate. Head as wide as scutum. Abdomen yellow except as follows: posterior-lateral corners of tergite 1 brown; tergites 2–6 with large spot along posterior margin (wide apical emargination on tergites 2 and 3); tergite 7 with light brown, transverse, lateral stripe. Wing narrowly infuscated around dm-cu and darkly clouded apically. M₁₋₂ ratio 4.6.

Male unknown.

Female genitalia (Fig. 9). See generic description.

Etymology. The specific name refers to the characteristic structure of the face (L. “to stand out”, “to extend”).

Distribution. Mexico.


Comments. Procerosoma prominens is most easily separated from P. alini as follows: the arista is densely plumose, the first flagellomere has a dorsolateral stripe, the mid fronto-orbital bristle is minute, there are two pairs of lateral scutellar bristles, the gena is silvery-tomentose and a brown vertical stripe is present anteriorly on the pleuron. Furthermore, the face of this species is strongly carinate dorsally and deeply recessed ventrally, and the gena is high and acutely projecting on the posterior angle.

Two eggs (Fig. 10) were found in the abdomen of the holotype and are described above in the generic description.

Chaetoclusia Coquillett, 1904


Diagnosis


Generic description

Adult. General. Length 3.0–5.4 mm. Body slender, colour yellow with brown to black pattern. Angular extension on outer face of pedicel acute and longer than wide; inner face with angular projection acute to 90° and broadly rounded at apex. Arista black with base white; usually sparsely long or short-plumose (sometimes densely long-plumose). Gena and parafacial shiny to microtomentose or silvery tomentose. Frons shiny with sides parallel to slightly divergent anteriorly. Halter white to light yellow. Wing length 2.5–3.0 times width. Sub-

Chaetotaxy. Bristles yellow to black. Anterior and mid fronto-orbital bristles close to each other on anterior margin of frons with hind bristle on posteromedial margin; sometimes with additional reclinate bristle between mid and hind bristles; bristles subequal in length. Ocellar and postvertical bristles divergent and strong to minute or (occasionally) absent. Pedicel with one outstanding dorsal bristle. Prescutellar acrostichal bristle usually absent. Two postsutural dorsocentral bristles with anterior bristle usually 0.6–0.8 times length of posterior bristle, sometimes with small bristle in front of anterior dorsocentral. Prescutellar acrostichal bristles usually absent. One postpronotal and two notopleural bristles; two intra-alar bristles; one minute intra post-alar bristle. One strong anepisternal and katepisternal bristle; proepisternal bristle small. Scutellum with one pair of long cruciate apical bristles and one pair of short lateral bristles (sometimes with one pair of additional minute bristles anteriorly). Mid tibia with dorsal preapical bristle; fore and mid femora of male with posteroventral row of ctenidial bristles.

Male abdomen. Tergites 1 and 2 fused; sternite 1 reduced to thin, weakly sclerotized band; tergites 3 to 6 and sternites 2 to 5 complete. Spiracles in membrane below tergites 1–5 and ventrally between tergites 6 and 8. Abdomen encircled by annulus comprised of sternites 6–8; sternite 8 setose and dorsal (with right lateral extension); sternites 6 and 7 forming narrow, heavily sclerotized ventral band with membranous attachment between sternites 6 and 8. Epandrium dome-shaped. Surstylus at least 0.75 times height of epandrium and usually rounded apically; tubercles on inner face along apex and at least distal half of posterior margin. Cerci setulose, rounded, lobate, and slightly projecting. Hypantrium with one pair of arms articulating with subependial sclerite, which in turn articulates with epandrium; hypantrium with one pair of parallel ventrolateral lobes (“ventral lobe of hypantrium”) that lie on either side of phallapodeme; medial two bristles on ventral lobe often close and long and third bristle distal and small to absent. Phallapodeme long and thin, articulating with basiphallus and thin anterior-transverse portion of hypantrium to form lever; articulation with hypantrium facilitated by suspended ventral plate on phallapodeme. Pregonite usually large, setulose, and round or clavate (small and rectangular with two setulae in one species). Postgonite usually round and small with several distal setae. Basiphallus “C” shaped, smooth and often curved medially. Epiphallus absent or small; fin-like and occasionally lengthened. Distiphallus never longer than phallapodeme. Ejaculatory apodeme 0.33 times length of phallapodeme; width approximately 0.2 times length.

Female abdomen. Tergites 1 and 2 fused; sternite 1 reduced to thin, weakly sclerotized strip; tergites 3 to 6 and sternites 2 to 6 complete. Abdomen past segment 6 narrowed into long, thin tube; segments separated by long membranous area sometimes equaling segment length. Sternite 8 bifid on distal fourth and divided lengthwise by weakly sclerotized line. Mid tibia with dorsal preapical bristle; fore and mid femora of male with posteroventral row of ctenidial bristles.

Chaetoclusia, as defined above, includes the five species previously described as Chaetoclusia, six new spe-
cies and two species formerly placed in the monotypic genera Chaetoclusiella and Trichoclusia. Melander & Argo (1924) listed the absence of the postvertical bristles in their definition of Chaetoclusia, but they apparently overlooked the presence of these bristles in C. nigromaculata Melander & Argo, 1924 and C. xanthops (Williston, 1896). We here redefine *Chaetoclusia* on the basis of setulae on vein R₁ (character 3), the reduction or absence of the anterior lateral scutellar bristle (character 2; independently evolved in some *Procerosoma* and *Sobarocephala*) and the reduction of sternites 6 and 7 of the annulus ventrally into a thin, but well-sclerotized ventral band (character 12). Black bristles (character 1) are also a synapomorphy of *Chaetoclusia*, but this state has been retained in only the four most ancestral species (*C. richardfreyi*, *C. sabroskyi* (Soós, 1962), *C. nigromaculata*, and *C. quadrivittata* Melander & Argo, 1924).

Of the synapomorphies listed above (characters 1, 2, 3 and 12), the presence of setulae along vein R₁ is the most easily observed and does not appear to have become reversed in any species. The presence of these setulae also appear to be a unique synapomorphy within the Clusiidae, although *Craspedochaeta novaeguineae* Soós, 1962 (Bismarck Islands, New Guinea) has two or three setulae on R₁ near its junction with the costa. The reduction of the annulus and the anterior lateral scutellar bristle are good diagnostic characters, but these states occur independently in a number of *Sobarocephala*, occasionally in tandem.

**Key to the species of Chaetoclusia**

1. Four fronto-orbital bristles (Fig. 11). Acrostichal bristle strong. Anterior lateral scutellar bristle relatively well developed, but still much smaller than anterior bristle. Presutural intra-alar bristle absent. Brazil .................. *C. richardfreyi* (Soós)

2. Three fronto-orbital bristles (Figs 12, 13). Acrostichal bristle absent. Anterior lateral scutellar bristle minute to absent. Presutural intra-alar bristle present .................. 2

3. Postvertical bristle minute to absent (Fig. 12). Arista sometimes densely plumose with hairs dark and flattened. Mainland Central and South America including Trinidad .................. 3

4. Postvertical bristle well-developed (Fig. 13). Arista sparsely plumose with hairs thin. West Indies .................. 9

5. Anepisternum brown, at least in part .................. 4

6. Pleuron entirely light yellow .................. 5

7. Arista densely plumose with hairs dark and flattened (Fig. 12). Ocellar bristle minute. First flagellomere with infuscation at base of arista. Fore legs entirely yellow. Scutum with two pairs of longitudinal stripes joined anteriorly and posteriorly (Fig. 18). Mexico to Brazil and Peru; Trinidad .......................... *C. bakeri* Coquillett

8. Arista sparsely plumose with hairs thin. Ocellar bristle well-developed. First flagellomere white. Fore tibia and tarsi light brown to brown. Scutum brown with wide transverse yellow stripe (Fig. 21). Costa Rica, Panama, Peru .................. *C. transversa* sp. n.

9. Notum with central brown stripe and supra-alar spot (Fig. 17). Frons with several brown spots. Scutellum with wide central brown stripe. Male terminalia short, never reaching past midpoint of abdomen (Fig. 43). Ecuador .................. *C. centrofasciata* sp. n.

10. Notum bivittate; sometimes with additional markings. Frons yellow. Scutellum yellow, at least medially. Male terminalia elongate, extending almost to sternite 2 (males of *C. quadrivittata* unknown) (Figs 34, 37, 40).

11. Metatergites brown, at least laterally. First flagellomere dark brown on dorsal half. Scutellum brown with thin yellow stripe medially (Fig. 22). Costa Rica .......................... *C. inbionella* sp. n.

12. Metatergites yellow. First flagellomere with infuscation at base of arista or with dorsal stripe. Scutellum yellow .................. 7


14. Gena shiny. One strong and one weak lateral scutellar bristle. Wing clouded along anterior margin of wing, excluding base .................. 8

15. Bristles yellow. Scutum yellow presuturaally (Fig. 20). Back of head yellow to white. Tergites 1 and 2 yellow. Panama .......................... *C. longifilata* Melander & Argo
SPECIES DESCRIPTIONS FOLLOW PHYLOGENETIC ORDER (FIG. 55)

Chaetoclusia richardfreyi (Soós, 1962) comb. n.
(Figs 11, 14, 29, Map 1)


Male.

Female terminalia (Fig. 29). Spermaphee unpigmented and lightly sclerotized. Spermaphcal duct 5 times length of spermatheca and also lightly sclerotized. Ventral receptacle approximately 0.8 times length of spermathecal duct and not recurved ventrally; gradually constricted to base.

Distribution. Brazil (Map 1).

Holotype. Brazil. Teresopolis, Rio de Janiero, iv.1938 (1♀, USNM).

Additional material examined. Brazil. Para: Rio Xingu camp (52°22´ W, 3°39´ S), ca. 60 km S Altamira, 2–8.x.1986, P. Spangler and O. Flint, jungle stream trail, Malaise trap, day and night coll. (1♀, USNM).

Comments. This distinctive species is known from two females collected from widely separated localities in Brazil. Chaetoclusia richardfreyi is relatively large and robust, characterized by strong acrostichal, ocellar, lateral scutellar, and postvertical bristles, as well as an additional reclinate bristle inserted between the mid and hind fronto-orbitals (Fig. 11). Furthermore, the presutural intra-alar bristle is absent (at least weakly developed in all other
species of *Chaetoclusia*) and the ventral receptacle is not small and recurved, but elongate, straight and only gradually constricted towards the base (Fig. 29).

*Chaetoclusia sabroskyi* (Soós, 1962) comb. n.  
(Figs 13, 15, Map 1)


Redescription (Figs 13 and 15)

**Male.** Body length 5.3 mm. Bristles black. One strong bristle in front of anterior dorsocentral. Acrostichal bristle absent. Anterior lateral scutellar bristle small but well developed. Arista sparsely plumose. Postvertical and ocellar bristles well developed. Anterior genal bristle strong and vibrissa-like; remaining genal bristles small and thin. Two short, but strong bristles in front of presutural intra-alar bristle. Thorax yellow. Coxae and legs yellow with hind tibia brown. Head yellow with ocellar tubercle brown and frons brownish-orange centrally. Abdomen dark brown. Wing with band from CuA$_1$ to R$_{2+3}$, curving distally to meet costa; band extending along wing tip to R$_{4+5}$ posteriorly.

**Male terminalia** not dissected.

**Female.** Externally as described for male except stripe on frons wider and abdominal segment 8 and terminalia yellow.

**Female terminalia** not dissected.

**Distribution.** Cuba (Map 1).

**Holotype.** Cuba. Las Animas, Sierra Rangel, 1500', 28.iv.1933, S.C. Brunner and A.R. Otero (1 ♂, USNM).


**Comments.** *Chaetoclusia sabroskyi*, like *C. richardfreyi*, is relatively large and robust with well-developed bristles, but it is further characterized by a yellow thorax (Fig. 15), one pair of short, strong bristles in front of the presutural intra-alar bristle and a strong anterior genal bristle (Fig. 13).
and postpronotum light brown; lateral brown margin thinnest behind suture. Scutellum and metatergites yellow. Pleuron and legs yellow. Head predominantly yellow; first flagellomere with brown dorsolateral stripe; back of head brown above foramen; ocellar tubercle brown. Abdomen brown on tergites 1–6 and brown on anterior and lateral margins of tergite 7; remainder of abdomen yellow. Wing pattern as described for C. longifilata.

Male unknown.

**Distribution.** Costa Rica (Map 2).

**Holotype.** Costa Rica. La Suiza, vii.1922, P. Schild (1♀, USNM).

**Paratypes.** Costa Rica. “Costa Rica” (1♀, USNM), La Suiza, iv.1922, P. Schild (1♀, USNM).

**Comments.** We have not seen the holotype, but its description agrees entirely with the paratypes examined.

**Chaetoclusia transversa** sp. n. (Figs 21, 30–32, Map 2)

**Description** (Fig. 21)

**Male.** Body length 3.3–4.8 mm. Cephalic bristles light brown with remaining bristles dark brown. Acrostichal bristles absent. Anterior dorsocentral bristle 0.75 times length of posterior bristle, or if small additional bristle present anteriorly, that bristle half length of anterior dorsocentral, which is half length of posterior dorsocentral. Presutural intra-alar bristle weak. Arista sparsely plumose. Postvertical bristle minute. Ocellar bristle small and thin. Anterior lateral scutellar bristle absent. Scutum brown with wide transverse yellow stripe at level of suture; postpronotum sometimes yellow. Scutellum and metatergites brown. Pleuron mostly yellow, with posterior half of anepisternum brown. Legs yellow with tip of hind femur, fore and hind tibiae, and fore tarsi brown. Head yellow with first flagellomere white, ocellar tubercle brown, and back of head with one pair of stripes and one spot below ocellar tubercle. Abdomen yellow with tergites 3–6 brown. Wing clouded lightly along apex and in first radial cell. One male and one female paratype from Peru with brown spot reduced on anterior margin of scutum and with large yellow spot on apex of scutellum; additional male paratype from Peru with brown anterior spot nearly absent and posterior brown stripe widely emarginate anteriorly. One male from Costa Rica (INBC) differing as follows: stripes behind head attached dorsally and extending around base of reclinate orbital and hind fronto-orbital bristles; transverse yellow stripe thin; tergites 2–6 dark brown.

**Female.** Externally as described for male.

**Male terminalia** (Figs 30–32). Length of epandrium 0.6 times height; width 0.9 times height. Surstylus curved inwards in cross-section; truncate with anteroventral corner projecting; tubercules on inner anteroventral face. Ceri slightly elevated; bristles short and subequal in length. Hypandrial arm curved medially, narrow basally, and bulbous distally; one short and one minute bristle distally on ventral lobe of hypandrium. Basiphallus small and thin. Epiphallus as long as basiphallus, well sclerotized basally and curved distally. Pregonite elongate-globose with two minute basal bristles. Postgonite well developed. Distiphallus 0.75 times length of ejaculatory apodeme; medially with one pair of bulbous, spinulose
Chaetoclusia xanthops (Williston, 1896) and C. flava sp. n., male genitalia. Figs 48, 49: C. xanthops. 48 – ventro-lateral detail of distiphallus tip; 49 – dorso-lateral detail of basiphallus tip. Figs 50–54: C. flava. 50 – ventro-lateral detail of distiphallus tip; 51 – dorso-lateral detail of basiphallus tip; 52 – internal genitalia, left lateral; 53 – terminalia, left lateral (internal spur shaded); 54 – terminalia, posterior.

lateral swellings; lateral lobe widest distally and nearly half length of distiphallus.

Female terminalia not dissected.

**Etymology.** The specific name refers to the transverse yellow stripe on the scutum.

**Distribution.** Costa Rica, Panama, Peru (Map 2).

**Holotype.** Peru: Madre de Dios, Manu, Diamante, 400 m, 12°25’S, 70°57’W, R. Alto, Madre de Dios, 7.ix.1988, A. Friedberg (1♂, USNM).


**Comments.** The yellow transverse stripe on the scutum of Chaetoclusia transversa is unique within Chaetoclusia and a good diagnostic character (Fig. 21). The male terminalia is distinct in that the apex of the surstylus is truncate and strongly curved in cross-section and the pregonite is reduced in size with only two bristles (a similar pregonite is found in Procerosoma and most Sobarocephala) (Figs 30–32).

*Chaetoclusia amplipenis* sp. n.

(Figs 19, 33–35, Map 2)

**Description.** (Fig. 19)


**Female unknown.**

**Male terminalia** (Figs 33–35). Terminalia elongate, with apex of surstylus nearly reaching sternite 2 in repose. Epandrium as wide as high and length 0.6 times height. Surstylus 1.2 times height of epandrium, posteriorly lobate and tapered distally. Cerci projecting, rounded, as wide as long and with one longer pair of bristles medially. Hypantrum complex relatively elongate. Phallapodeme well developed with distal head relatively bulbous. Hypantrum arm highly reduced; ventral lobe of hypantrum situated on anterior and posterior faces and with one pair of minute bristles medially and distally. Progonite ovate with numerous setulae on distal half. Postgonite elongate, nearly perpendicular to long axis of complex with minute bristles along length. Distiphallus 0.6 times length of phallapodeme and curved distally; lateral lobes short, pointed and joined to distiphallus by membranous enclosure.

**Etymology.** The specific name refers to the size of the male terminalia.

**Distribution.** Southern Mexico (Map 2).


**Paratypes.** Mexico. Morelos, Cuernavaca, vii.1945, N.L.H. Krauss (1♂, USNM).

**Comments.** Chaetocclusa amplipenis, *C. longefilata* and *C. inbionella* are monophyletic on the basis of characters of the male genitalia: the terminalia are elongate, almost reaching sternite 2, and the arms of the hypantrum are strongly reduced. These species also have a dark dorsal stripe on the first flagellomere, but this can be found in *C. quadrivittata* as well. *Chaetocclusa amplipenis* can be separated from the above species by a largely piceous abdomen, one lateral scutellar bristle and no additional process on the lateral lobe of the distiphallus. It is also the only species, aside from the widespread *C. bakeri*, to be found in Mexico.

*Chaetocclusa longefilata* Melander & Argo, 1924

(Figs 20, 36–38, Map 2)

*Chaetocclusa longefilata* Melander & Argo, 1924: 8–9.

**Redescription.** (Fig. 20)

large brown dorsal spot on first flagellomere; ocellar tubercle brown. Abdomen yellow except as follows: tergites 3, 4, 6, annulus, and epandrium brown; tergite 5 with posterior margin brown centrally. Wing infuscated in first and second radial cells (excluding base) and very lightly clouded in third radial cell and along apex.

Female unknown.

Male terminalia (Figs 36–38). Terminalia elongate, with apex of surstylus nearly reaching sternite 2 in repose. Width of epandrium 0.7 times height; length 0.6 times height. Surstylus height 0.9 times height of epandrium; widest basally, thin medially and rounded distally; tubercles on inner face along ventral margin (excluding base). Cerci small and emarginate. Hypandrial arm small and projecting at 90° from long axis of phallapodeme; ventral lobe of hypandrium triangular (small truncate projection apically with two small bristles). Phallapodeme well developed. Basiphallus small. Epiphallus absent. Pregonite elongate, clavate and densely setose distally. Postgonite subrectangular with two distal bristles. Distiphallus 0.4 times length of phallapodeme; lateral lobe bifid with inner branch rounded and serrate.

Distribution. Costa Rica, Panama (Map 2).

Holotype. Panama. Alhajuela, A. Busck, 12.iii.1912 (1♂, USNM).


Comments. While it appears as though Chaetoclusia longefilata and C. inbionella have a “thumb” on the lateral lobe of the distiphallus (Figs 36, 39), it is more likely that the lateral lobe has become split medially. A “thumb” on the lateral lobe of the distiphallus is considered to be a synapomorphy restricted to the species of Sobarocephala.

Chaetoclusia inbionella sp. n.
(Figs 22, 39–41, Map 2)
Description (Fig. 22)

Male. Body length 3.4–4.1 mm. Bristles light brown. One small bristle in front of anterior dorsocentral. Acrostichal bristle absent. Arista sparsely pubescent. Presutural intra-alar bristle weak. Ocellar bristle present. Postvertical bristle absent. Anterior lateral scutellar bristle minute. Scutum yellow with anterior margin, postpronotum, and bristle absent. Anterior lateral scutellar bristle minute. Ocellar and presutural intra-alar bristles weak. Ocellar bristle present. Postvertical arm short and projecting at 90° from long axis; ventral tubercles along distal 3/4 of posterior margin. Hypandrium broad, with apex of surstylus nearly reaching sternite 2 in repose. Width of epandrium 0.7 times height and length with apex of surstylus nearly reaching sternite 2 in repose. Width of epandrium 0.7 times height and length with apex of surstylus nearly reaching sternite 2 in repose. Width of epandrium 0.7 times height and length with apex of surstylus nearly reaching sternite 2 in repose. Width of epandrium 0.7 times height and length with apex of surstylus nearly reaching sternite 2 in repose. Width of epandrium 0.7 times height and length with apex of surstylus nearly reaching sternite 2 in repose. Width of epandrium 0.7 times height and length with apex of surstylus nearly reaching sternite 2 in repose. Width of epandrium 0.7 times height and length with apex of surstylus nearly reaching sternite 2 in repose. Width of epandrium 0.7 times height and length with apex of surstylus nearly reaching sternite 2 in repose.
Scutellum brown with lateral corners yellow. Metatergites yellow. Pleuron light yellow. Legs yellow with hind tibia brown. Head largely yellow; frons with one median transverse and one lateral pair of stripes; first flagellomere with infuscation at base of arista; face with brownish-orange tint; lower margin of gena with shiny orange strip; face pilose; back of head with one pair of light brown stripes; upper half of gena silvery tomentose. Abdomen yellow except as follows: posterior half of tergites 2 and 3 brown; tergite 4 to annulus brown; epandrium with large brown basal spot. Wing dark along anterodistal margin from costa to vein M₁ (excluding basal half of spot along costal margin); additional spot present along distal half of CuA₁.

**Female unknown.**

**Male terminalia** (Figs 42–44). Epandrium as wide as high and length 0.8 times height. Height of surstylus 1.2 times that of epandrium; tubercles along inner-distal margin. Cerci projecting, deeply emarginate and pointed distally; bristles subequal in length. Hypandrial arm longer than ventral lobe of hypandrium and truncated distally; ventral lobe of hypandrium with one minute distal and two long medial bristles. Phallapodeme and basiphallus well developed. Pregonite membranous with three central bristles. Postgonite elongate and thin with two distal and three medial bristles. Epiphallus level with anterior face of basiphallus, well sclerotized, and with distal and posterior margins irregular. Distiphallus absent (see comments).

**Etymology.** The specific name refers to the characteristic brown longitudinal stripe on the scutum.

**Distribution.** Ecuador (Map 2).


**Comments.** The spots on the frons and the complete median stripe on the scutum are unique within *Chaetoclusia*, and can be used as reliable diagnostic features to...
identify this species (Fig. 17). Chaetoclusia centrofasciata also appears to be unique in that it has lost the distiphallus (Fig. 42), although this should be verified with the examination of more males. Elongation and elaboration of the postgonite possibly serves as a functional adaptation associated with this loss.

Chaetoclusia bakeri Coquillett, 1904

(Figs 12, 18, 27, 45–47, Map 3)


Redescription (Figs 12 and 18)

**Male.** Body length 3.6–5.4 mm. Bristles yellow. One small bristle in front of anterior dorsocentral. Acrostichal bristle absent. Arista densely plumose with hairs black and flattened. Anterior lateral scutellar bristle minute. Postvertical and ocellar bristles minute. Presutural intraalar bristle weak. Scutum yellow with two pairs of thin lateral stripes (outer stripe continuous with lateral margin), each pair joined anteriorly and posteriorly; sometimes enclosed yellow stripe faded medially, particularly around transverse suture; sometimes brown pattern faded around area of notopleuron and postpronotum (particularly in those specimens collected in Venezuela and Central America); specimen from Mexico with inner pair of stripes broken medially. Scutellum yellow with one pair of lateral brown stripes. Metatergites brown, sometimes yellow below scutellum. Pleuron light yellow with anepisternum, anepimeron, and proepisternum brown; anepisternum centrally with yellow longitudinal stripe, sometimes bordered ventrally by brown longitudinal stripe (variably faded). Legs light yellow with hind tibia brown on (at least) basal half, excluding extreme base. Head mostly yellow; first flagellomere white with brown infuscation around base of arista; clypeus and lower half of face sometimes brown; ocellar tubercle brown. Abdomen brown with surstylus and lateral third of epandrium yellow; tergite 1 sometimes yellow. Wing clouded on distal third and lightly infuscated around cross veins.

**Female.** Externally as described for male except as follows: face and clypeus always yellow; proepisternum sometimes yellow; tergite 1 rarely yellow; anterior half of tergite 4 yellow; tergite 6 sometimes yellow laterally; tergite 7 light brown; tergite 8 and terminalia yellow.

**Male terminalia** (Figs 45–47). Length of epandrium 0.6 times height; width 0.7 times height. Height of surstylus 0.6 times that of epandrium with anterior surface straight and posterior surface tapering distally; inner-posterior margin tuberculate (excluding basal third); apex of surstylus sometimes thin and tapered. Cerci rounded, emarginate and setose with one pair of slightly longer bristles medially (sometimes small or folded backwards, appearing absent, as in figure). Ventral lobe of hypandrium with transverse wrinkles along anterior margin; hypandrial arm perpendicular to long axis of ventral lobe of hypandrium basally and parallel distally; three minute bristles present distally. Phallopode well developed with anterior face fused to hypandrium (separate in all other Chaetoclusia). Pregenite large, minutely setose and somewhat fused to hypandrium basally. Postgonite small. Basiphallus and epiphallus well developed. Distiphallus not much longer than basiphallus; wide basally and strongly tapered distally (appearing “spade”-shaped).

**Female terminalia** (Fig. 27) Spermatheca pale and weakly sclerotized. Spermathecal duct long, poorly sclerotized and four times length of spermatheca.

**Distribution.** Brazil, Costa Rica, Ecuador, Mexico, Nicaragua, Panama, Peru, Trinidad, Venezuela (Map 3).

**Holotype.** Costa Rica. La Suiza de Turrialba, P. Schild (1♀, USNM).

**Holotype** (C. bakeri peruana). Peru. Mesagua, Urbam-bufluss, 4.x.1903, Schnuse (coll.) (1♀, SMTD).

Description (Fig. 26)

**Male.** Body length 3.0–3.5 mm. Bristles yellow. One small bristle in front of anterior dorsocentral. Arista sparsely plumose. Ocellar bristle minute. Anterior lateral scutellar bristle minute or absent. Thorax yellow except as follows: notopleuron with dark central spot; one posterior pair of wide stripes on scutum (sometimes atrophyed); proepisternum, katepisternum and meron white. Head predominantly yellow with ocellar tubercle light brown, first flagellomere light yellow to white, and face, gena and parafacial white. Legs yellow with coxae, basal half of femora and tarsi white. Abdomen yellow except as follows: tergite 2 brown posteriorly; tergite 3 to annulus brown with central yellow spot sometimes present on tergite 3; one pair of spots present laterally on epandrium.

**Female.** Externally as described for male except tergite 7 light brown and tergite 8 and terminalia yellow.

**Male terminalia** (Figs 50–54). Epandrium as wide as high; length 0.67 times height. Surstylus 0.67 times height of epandrium and elongate triangular (broadly rounded apically); distal third of inner-posterior margin with stout, pointed tubercles; inner-basal face with short pointed spur. Cerci triangular with apical emargination; setose with one pair of longer central bristles. Hyandrium with ventral lobe and arm subequal in length; arm narrow medially and ventral lobe of hypandrium with one minute distal and two short medial bristles. Pregonite and epiphallus well developed. Basiphallus saddle-shaped with slight dorsal arch. Base of distiphallus produced ventrally with ventral section 0.67 times length of dorsal section (from intersection with basiphallus); ventral section strongly curved; one pair of lateral spinulose swellings present medially; distally bifid and truncate; lateral lobe absent.

**Female terminalia.** As described for C. bakeri except spermathecal duct 2.5 times length of spermatheca.

**Etymology.** The specific name refers to the yellow colouration of this species relative to a similar species, *C. furva*.

**Distribution.** British Virgin Islands, Grand Cayman, U.S. Virgin Islands (Map 1).


Comments. See comments for Chaetoclusia furva.

Chaetoclusia xanthops (Williston, 1896)

(Figs 24, 48, 49, Map 1)

Heteroneura xanthops Williston, 1896: 386 (in part); Czerny, 1903: 100.


Redescription (Fig. 24).


Female. Externally as described for male except abdomen entirely brown excluding yellow terminalia. Holotype with tergite 1 yellow.

Male terminalia (Figs 48, 49). As described for Chaetoclusia flavva except as follows: distiphallus deeply emarginate with tips rounded (not square); basiphallus more linear than saddle-shaped.

Female terminalia. As described for C. flavva except spermatheca lightly pigmented.

Distribution. St. Vincent (Map 1).

Holotype. St. Vincent. W.I. Leeward side, H.H. Smith (1♀, BMNH) [head missing].

Additional material examined. St. Vincent. W.I., 7.iii.–19.vii.1957, W.B. Heed (1♀, USNM), Maranggo, 28.iii.1989, A. Freidberg (1♂, USNM), Majorica, 1500’, vii.–viii.1972, A.D. Harrison (1♀, CNCI), Malaise trap (1♀, CNCI).

Comments. Chaetoclusia xanthops is the only known species of Sobaroccephalinae with pigmented spermathecae.

Chaetoclusia flavva sp. n.

(Figs 25, 28, Map 1)

Description (Fig. 25).


Female. Externally as described for male except as follows: colour often darker; sometimes anterior half of tergite 5 yellow; tergite 8 and terminalia yellow.

Male terminalia. As described for C. flavva.

Female terminalia (Fig. 28). Spermatheca poorly sclerotized and with minute transverse wrinkles on basal third. Spermathecal duct up to half as wide as spermatheca and divided into two sections: basal section no more than 0.3 times width of spermatheca and approximately three times length of spermatheca; distal section wide, membranous and 1.2 times longer than spermatheca. Ventral receptacle approximately 1.5 times length of spermatheca; wide distally, sac-like and recurved ventrally.

Etymology. The specific name refers to the dark colouration of this species (L. “dark”) relative to a similar species, C. flavva.

Distribution. Barbados, Dominica, Dominican Republic, Puerto Rico (Map 1).

Holotype. Dominica. Pont Casse, 22.xi.1964, P.J. Spangler (1♂, USNM).


Comments. Chaetoclusia furva is similar in appearance to C. flavva, but it is distinguished by the derived female genitalia (Fig. 28) and differences in cephalic and notal colouration (see key) (Figs 25, 26). These two species appear to be most closely related to C. xanthops, which is also Caribbean in distribution, on the basis of chaetotaxy, colouration, and numerous derived characters of the male genitalia (see Discussion).

PHYLLOGENETIC DISCUSSION

Cladistic analysis of the character matrix in Table 2 using PAUP produced three equally parsimonious trees (22 steps in length, CI = 0.82, RI = 0.89), one of which
synapomorphies of Chaetoclusia include a reduction or absence of the anterior lateral scutellar bristles (character 2), setulae along most of vein R1 (character 3), a reduction of sternites 6 and 7 of the annulus (character 11) and black bristles (character 1; reversed in most species). Excluding C. richardfreyi, Chaetoclusia is further characterized by the absence of prescutellar acrostichal bristles (character 6), three fronto-orbital bristles and weak to well-developed presutural intra-alar bristles.

The Caribbean species Chaetoclusia xanthops, C. flava, and C. furva comprise a well-supported clade related to the Central American and Ecuadorian species. These three species all have the ocellar bristles minute to absent (shared with C. bakeri), a weak presutural intra-alar bristle (also found in several other species of Chaetoclusia), a pleuron that is white to yellowish-white, a basal spur on the inner face of the surstulus, a pregonite that is lobate dorsally and somewhat fused to the hypandrium, a curved basiphallus and a distiphallus that is strongly lobate dorsally and somewhat fused to the hypandrium, a curved basiphallus and a distiphallus that is strongly lobate dorsally and somewhat fused to the hypandrium, and a reduction or absence of the anterio lateral scutellar bristles (character 13, 14 and 16, respectively). The consensus tree suggests the Caribbean species plus C. bakeri (Central and South America) form a monophyletic group based on a reduction of the ocellar bristles (character 5), and together form the sister-group to C. centrofasciata (Ecuador) (Fig. 55), with which they share a loss of the lateral lobes of the distiphallus (character 17). This, however, is poor support for the clade because both of these characters reappear regularly throughout the Clusiidae, particularly within the Sobarocephalinae. We prefer a slightly less parsimonious arrangement in which C. xanthops, C. flava, and C. furva form a monophyletic group with the widespread Central and South American species C. transversa based on the presence of minutely spinulose, mediolateral swellings on the distiphallus (character 15), a novel character within the Clusiidae. The latter phylogeny (Fig. 56) is 1 step longer (24 steps) than the most parsimonious trees. Chaetoclusia longefilata appears to be most closely related to C. amplipennis and C. inbionella, as the males share extremely elongate terminalia (character 9) and a minute hypandrial arm (character 12).

**DISTRIBUTION**

Most species of Chaetoclusia appear to have narrow ranges within confined regions of Central America and the Caribbean (maps 1 and 2). Aside from C. transversa, which extends from Costa Rica and Panama to Peru, C. bakeri is the only species of Chaetoclusia to exhibit an extensive neotropical range (map 3).

The phylogenies outlined above (Figs 55, 56) suggest either a Caribbean or South American origin for Chaetoclusia, because all Central American taxa belong to a single clade for which Caribbean species form the first two outgroups. Furthermore, it appears as though once Chaetoclusia reached Central America from the Caribbean, the genus experienced a successful localized radiation with one lineage extending into Ecuador (C. centrofasciata), and one lineage subsequently returning to the Caribbean (C. xanthops, C. flava and C. furva).

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