Phylogeny and taxonomic revision of the genus *Euryomma* Stein (Diptera: Calyptratae: Fanniidae)

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Abstract

The species of genus *Euryomma* is revised, and 16 valid species are recognized. Redescriptions for all species are provided, except for six species recently described from Colombia and Costa Rica for which only differential diagnoses are provided. Illustrations of the male genitalia have been added to Stein’s descriptions of *E. rufifrons*, *E. longicorne* and *E. nigrifemur*. The following synonyms are proposed: *Euryomma erythrogaster* Séguy = *E. longicorne* Stein; *Euryomma tahami* Grisales, Wolff & Carvalho = *E. carioca* Albuquerque; *Euryomma cornutatum* Grisales, Wolff & Carvalho = *E. nigrifemur* Stein; *Euryomma steini* Grisales & Carvalho = *E. palpingens* Wendt. New distribution records are added and maps showing the known distribution of each species are provided, except for the cosmopolitan *E. peregrinum*. An identification key to the species of *Euryomma* is also provided. We propose the first phylogenetic hypothesis for the genus *Euryomma* based on a cladistic analysis using characters from male adult external morphology and male and female terminalia.

Key words

*Euryomma*, taxonomic revision, distribution, maps, cladistic analysis.

1. Introduction

*Euryomma* Stein is a small genus of the family Fanniidae that contains a total of 20 mostly Neotropical species, with the exception of one Nearctic species and the cosmopolitan *Euryomma peregrinum* Meigen (Chillcott 1961; Carvalho et al. 2003; Grisales et al. 2012a; Grisales et al. 2012b).

Little is known about the biology of *Euryomma*. The larvae of the cosmopolitan *E. peregrinum* have been recorded in rotting plant material, leaf litter or compost, also in living plants already attacked by other invertebrates (Rozkosný et al. 1997). They have been also recorded in vertebrate carrion and the adults of this species have been found on pig carrion (Aballay et al. 2012).

*Euryomma rettenmeyeri* Chillcott and *Euryomma pana-mensis* Chillcott were collected in association with colonies of the ant *Eciton burchelli* (Westwood), flying above refuse heaps and both the adults and the larvae were described by Chillcott (1958). Grisales et al. (2012a,b) described several new species from Colombia and Costa Rica, that were collected on decomposing organic matter, mostly dung and fish traps.

**Taxonomy.** Stein (1899) erected the genus *Euryomma* for a single nominal species: *Euryomma hispaniense* Stein. Stein (1907) subsequently synonymised *Euryomma hispaniense* Stein with *Anthomyia peregrina* Meigen, 1826.
Consequently, the type species of the genus *Euryomma* is *Anthomyia peregrina* Meigen, by typonymy.

Among the earliest contributions to the taxonomy of *Euryomma* were the original descriptions of four Chilean and Peruvian species by Stein (1911) and Séguy (1941). Albuquerque (1956) described a species from Brazil, and a single North American and two species from Panama were later described by Chillcott (1958, 1961). Carvalho & Pamplona (1979) published the first key to the species of *Euryomma* and described a species from Brazil. Wendt & Carvalho (2007) also presented the description of a new species along with a key for the species occurring in Southern Brazil. The most recent contributions are those of Grisales et al. (2012a,b) in which nine new species from Colombia and Central America were described.

**Phylogeny.** There are no previous hypotheses for the relationships among the species of *Euryomma*. However, the position of this genus within Fanniidae was discussed by Chillcott (1961), who suggested a sister group relationship with the *Fannia canicularis* species group. Hennig (1965) presented a list of apomorphies of the family Fanniidae (treated at that time as Fanniniae, a subfamily of Muscidae), and described and discussed many of these characters and their states for the known genera of Fanniidae. Hennig (1965) considered *Euryomma* a primitive representative of the family more closely related to the *F. canicularis* species-group which he considered a monophyletic group. Similarly, Chillcott (1961), who presented a dendrogram (obtained by cluster analysis) that classified the Fanniidae of the Holarctic region into five genera (*Fannia* Robineau-Desvoidy, *Euryomma*, *Piezura* Rondani, *Platycoenosia* Strobl and *Coelomyia* Haliday) and also showed *Euryomma* at a basal position (*Platycoenosia* was subsequently considered to be a synonym of *Piezura*, and *Coelomyia* a synonym of *Fannia* [Pont 1965; HucKett & VogErOth 1987; Rozkosny et al. 1997; MooreS & Savage 2005]). In a phylogenetic analysis of the family, Domínguez & Roig-Juñent (2008), in which only *E. peregrinum* was included as representative of the genus *Euryomma*, recovered the latter as the sister group of *Fannia*; both of these genera being apical to all the other genera of the family and this result also agrees with Hennig’s (1965) and Chillcott’s (1961) hypotheses.

**Aims.** The main aims of this study were: 1) to review the species of the genus *Euryomma*. We were especially interested in the earlier species described by Stein (1911) and Séguy (1941) for which only the original descriptions (without male terminalia illustrations) are available; 2) to develop a hypothesis of phylogenetic relationships among the species of *Euryomma* by means of a cladistic analysis, using male adult external morphological characters and female and male terminalia.

## 2. Methods

### 2.1. Taxonomic work

All known synonyms are provided for each species, as well as a list of generic combinations for the currently valid names.

Species distributions are based on examined material and reliable published records. Countries and localities are given in full for examined specimens.

Measurements are expressed as follows: body length; anterior margin of head (frons), excluding antennae, to apex of abdomen.

For genitalic examination, we followed O’Hara (2002). The abdomen was removed from a dry specimen and heated in 10% KOH for 10–15 minutes. The abdomen was then transferred to acetic acid, and then to glycerine. The postabdominal structures were separated from the rest of the abdomen. Examination and illustration of genital structures were done using a compound microscope equipped with a drawing tube. After examination, the genitalia and the rest of the abdomen were placed in glycerine in a plastic microvial and pinned directly under the specimen.

Other illustrations were done using a stereomicroscope. The scale is indicated in each drawing.

### 2.2. Phylogenetic work

#### 2.2.1. Taxon sampling

The terminal taxa included 15 valid *Euryomma* species (see results of the revision); *E. campineira* was excluded from the data set since it is only known from the female holotype. The outgroup comprised five species of the genus *Fannia*: *Fannia scalaris* (Fabricius), *F. canicularis* (Linnaeus), *F. pusio* (Wiedemann), *F. femoralis* (Stein), *F. trimaculata* (Stein); one species each from the other genera of the family; *Zealandofannia mystacina* Domínguez & Pont, *Australofannia spiniculus* Pont and *Piezura graminicola* Zetterstedt; and *Calliphora vicina* Robineau-Desvoidy (Calliphoridae). These outgroup taxa were chosen because we wanted to test the monophyly of the genus *Euryomma*, we were especially interested in Chillcott’s (1961) hypothesis that grouped the genus *Euryomma* with species-groups of the genus *Fannia* such as the *canicularis* species-group; *C. vicina* was chosen because it is more distant from the members of the family Fanniidae than they are from each other, although it was not our aim to test the monophyly of the family.
2.2.2. Characters and character states

We coded 75 characters from the male and female adult stage. These were discrete characters, and included: from male head and its appendages (12), male thorax (11), male wings and halteres (3), male legs (22), male abdominal sclerites (4), male terminalia (21), and from the female adult we included characters of the ovipositor (2). Morphological terminology for the cladistics analysis as well as for the taxonomic revision follows McAlpine (1981), with the exception of ‘pregonite’ (paramere according to McAlpine 1981) and ‘postgonite’ (gonopod according to McAlpine 1981). The distribution of states in the terminal taxa is indicated in the data matrix in Table 1.

Male
0. Head of males: dichoptic = [0]; holoptic = [1].
1. Length of antennae relative to length of face: short, not reaching epistoma = [0]; long, reaching epistoma = [1].
2. Length of pubescence of the arista: longer than arista diameter = [0]; shorter than arista diameter = [1].
3. Pilosity of the eye: absent = [0]; present = [1].
4. Number of setae of posterior prealar area: absent = [0]; 1 = [1]; 2 = [2]; 4 = [3]; 4 or more = [3].
5. Lower orbital seta (Fig. 1A): absent = [0]; present = [1].
6. Number of rows of postocular setae: absent = [0]; 1 = [1]; 2 = [2].
7. Colouring of apex of scutellum: same as scutellum = [0]; brown = [1]; smoky brown = [2].
8. Posteroventral surface of hind femur: with 3 setae = [0]; with a row of setae = [1]; 1 basal seta and 4–5 setae at apical ¼ = [2].
9. Posterior surface of fore femur: with 1 complete row of short setae = [0]; with 2 complete rows of short setae = [1]; with 2 rows of short setae and a third of weak setulae in between = [2]; with 3 rows of setae = [3].
10. Shape of lower calypter: rectangular = [0]; rounded = [1].
11. Subapical posterodorsal setae of fore tibia: absent = [0]; present = [1].
12. Apical and submedian anterodorsal setae: absent = [0]; present = [1].
13. Anterodorsal row of setae of mid femur: absent = [0]; present = [1].
14. Posteroventral rows of setae of mid femur: 1 complete row = [0]; 1 row basally, 2 rows in apical half = [1]; 2 rows basally, 3 in apical half = [3]; 3–4 rows forming a ctenidium = [4].
15. Shape of mid tibia: cone shaped = [0]; constricted in first ¼ = [1]; constricted in first ½ and with a weak protuberance = [2].
16. Ventral pubescence of mid tibia: absent = [0]; short and less than ½ × width of mid tibia = [1]; long and more than ½ × width of mid tibia = [2].
17. Subapical anterodorsal setae of mid tibia: absent = [0]; present = [1].
18. Setae of anterior surface of mid tibia: absent = [0]; 1 submedian seta = [1]; 1 row of setae in apical half = [2].
19. Number of setae of submedian posterodorsal surface of mid tibia: absent = [0]; 1 = [1]; 2 = [2].
20. Setae at apex of posterior margin of hind coxa (Fig. 1D): absent = [0]; 1 = [1]; 2–3 = [2].
21. Ventral preapical protuberance of hind femur: absent = [0]; present = [1].
22. Anteroventral row of setae of hind femur: row of short setae at base with 2 longer and stronger setae at apex = [0]; row of short setae at base that is gradually longer towards apex = [1].
23. Shape of subcostal vein: bent = [0]; straight = [1].
24. Anal veins (Fig. 1C): Imaginary extension of anal veins meeting near wing margin = [1]; first anal vein reduced and second bow-shaped, their imaginary extensions meeting well before wing margins = [2].
25. Wing pattern: translucent = [0]; light brown tinted, with apical third, between C vein and apical half of vein R 2+3 , faintly darkened (Fig. 1C) = [1]; smoky brown = [2].
26. Number of rows of acrostichal setae: 2+2 = [0]; 1 complete row = [1]; 1 row in apical half = [2].
27. Posterior surface of fore femur: with 1 complete row of short setae = [0]; with 2 complete rows of short setae = [1]; with 2 rows of short setae and a third of weak setulae in between = [2]; with 3 rows of setae = [3].
28. Subapical posterodorsal setae of fore tibia: absent = [0]; present = [1].
29. Apical and submedian anterodorsal setae: absent = [0]; present = [1].
45. Median anterodorsal row of setae of hind tibia: present = [0]; absent = [1].
46. Submedian and apical anterodorsal setae of hind tibia (Fig. 1E): present = [0]; absent = [1].
47. Setae of median anteroventral surface of hind tibia: absent = [0]; 1 = [1]; 4 – 5 = [2]; entirely covered with curled and hair-like setae = [3].
48. Posteroventral row of hind tibia: absent = [0]; present = [1].
49. Shape of abdomen: all segments of equal length except for last that is smaller = [0]; segments short, abdomen truncated = [1]; segments elongated = [2].
50. Colouration pattern of abdomen: dark in central and posterior area of each segment forming a “T” = [0]; uniformly coloured = [1]; tergites 1 – 3 yellow translucent = [2]; trimaculate = [3].
51. Sternite 1: with few setae = [0]; bare = [1].

52. Sternite 5: divided longitudinally (Fig. 1F) = [0]; not divided = [1].
53. Shape of undivided sternite 5: formed by a single square plate = [0]; “U” shaped = [1]; weakly “U” shaped (apical portions or arms short) = [2].
54. Shape of divided sternite 5: formed by two thin plates with strong setae = [0]; U shaped (Fig. 1F) = [1].
55. Setae of sternite 5: directed towards anterior = [0]; directed inwards (Fig. 1F) = [1]; directed towards ventral = [2]; directed towards posterior = [3]; covering plate = [4].
56. Anterolateral areas of epandrium: longer than surstylus = [0]; median (Fig. 1G) = [1]; short = [2].
57. Cerci of cercal plate: strongly fused, cerci strongly connected along internal margin forming plate = [0]; weakly fused (Fig. 1G) = [1].
Table 1. Data matrix for taxa included in phylogenetic analysis.

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Characters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Euryomma aburai</td>
<td>0010111111 2111111111 0110111111 0001211110 0010211110 110-001000 1110000111 011030</td>
</tr>
<tr>
<td>Euryomma americanum</td>
<td>0010101111 2111111111 0110111111 0010211110 0010211110 110-001000 1110000111 011030</td>
</tr>
<tr>
<td>Euryomma carica</td>
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<td>Euryomma chilicoto</td>
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</tr>
<tr>
<td>Euryomma chilicote</td>
<td>0001111111 2121011111 7101111111 0102101111 0102101111 110-111111 1110201111 011020</td>
</tr>
<tr>
<td>Euryomma guine</td>
<td>0101211111 2126311111 0110111110 0104101111 0104101111 110-111111 1110000111 111030</td>
</tr>
<tr>
<td>Euryomma longicorniae</td>
<td>0110001111 2101111111 0110110111 0002101110 0002101110 110-111111 1110000111 111030</td>
</tr>
<tr>
<td>Euryomma musica</td>
<td>0011111111 2101111111 0110111111 0011011111 0011011111 110-111111 1110000111 111030</td>
</tr>
<tr>
<td>Euryomma nigrofemur</td>
<td>0010111111 2021011111 0110111111 0012101111 0012101111 110-111111 1110000111 111030</td>
</tr>
<tr>
<td>Euryomma palangii</td>
<td>0010011100 2120111111 0110111111 0011011111 0011011111 110-111111 1110000111 111030</td>
</tr>
<tr>
<td>Euryomma paranorma</td>
<td>0000011110 2020211110 0110111111 0011101111 0011101111 110-011111 1110000111 010-03</td>
</tr>
<tr>
<td>Euryomma peregrinum</td>
<td>0010111111 2121011111 0110111111 0010111111 0010111111 110-011111 1110000111 010-03</td>
</tr>
<tr>
<td>Euryomma reticulatia</td>
<td>0000011110 2101111111 0110111111 0111021011 0111021011 1110120111 1110300111 011040</td>
</tr>
<tr>
<td>Euryomma rufifrons</td>
<td>0000001110 2101111111 0110111111 0011011111 0011011111 110-111111 1110000111 011030</td>
</tr>
<tr>
<td>Euryomma rettenmeyerei</td>
<td>0010011100 2120111111 0110111111 0111021011 0111021011 1110000111 0110300111 011040</td>
</tr>
<tr>
<td>Euryomma rufifrons</td>
<td>0000001110 2101111111 0110111111 0011011111 0011011111 110-111111 1110000111 011030</td>
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<tr>
<td>Euryomma rettenmeyerei</td>
<td>0010011100 2120111111 0110111111 0111021011 0111021011 1110000111 0110300111 011040</td>
</tr>
</tbody>
</table>

58. Length of cercal plate: short (Fig. 1G) = [0]; reaching first ¼ of surstylus = [1]; long, as long as stygus = [2].
59. Cercal plate with a thin posterior prolongation: absent = [0]; present = [1].
60. Pregonite (gonopods): present = [0]; absent = [1].
61. Postgonites: inconspicuous = [0]; reduced to tiny stubs at side of phallus = [1]; slender and free moving = [2].
62. Baciliform sclerite: present = [0]; absent = [1].
63. Shape of surstyli with epandrium: separate = [0]; connected or continuous with epandrium = [1].
64. Shape of surstylus: triangular (Fig. 1G, H) = [0]; elongated thin = [1]; elongated broad = [2]; oblong = [3]; broad at base, then pointed and curved = [4]; both processes elongated and tapering towards apex = [5].
65. Number of processes forming surstylus: 1 = [0]; 2 = [1].
66. Length of surstylus: shorter than epandrium (Fig. 1G, H) = [0]; as long as epandrium = [1]; longer than epandrium = [2].
67. Ejaculatory apodeme: present = [0]; absent = [1].
68. Medial division of hypandrium: absent = [0]; present = [1].
69. Apex of hypandrial arms (Fig. 11): directed outwards = [0]; directed inwards = [1].
70. Shape of basal area of arms in divided hypandrium: broad = [0]; thin = [1].
71. Phallus: membranous = [0]; sclerotized = [1].
72. Phallus basally broad and tapered towards apex: absent = [0]; present = [1].
73. Epiphallus: absent = [0]; present = [1].
74. Sternite VIII: complete, formed by a rectangular plate = [0]; absent = [1]; formed by 4 small plates = [2]; formed by 2 small plates = [3]; formed by two elongated structures = [4].
75. Number of spermathecae: 2 = [0]; 3 = [1].

2.2.3. Phylogenetic analysis

Characters were treated as unordered and non-applicable characters were coded as ‘ – ’, whereas unknown character states were coded as '?' (STRONG & LIPSCOMB 1999). We used the program TNT 1.0 (GOLDBOFF et al. 2003) to search for optimal trees using implied weights with a weighting strength of K = 3. We conducted heuristic, unconstrained searches for optimal trees using tree bisection reconnection (TBR) branch swapping in each of 1000 replications of random taxon addition sequences, maintaining up to 10 trees per replication. A second TBR round was applied to each of the optimal trees, to increase confidence of finding all minimum-length topologies. Zero length branches were collapsed and strict consensus trees were generated. Bremer values, both absolute (BREMER 1994) and relative (GOLDBOFF & FARRIS 2001), were used to test the support of groups; we
also used symmetric resampling using 500 replicates ($P = 0.33$) (GOLBOFF et al. 2003). Bremer supports were calculated by obtaining suboptimal trees in 10 successive stages, saving up to 2000 sub-optimals in each stage. In every stage, we searched for suboptimal trees 0.1 units of fit (the fit is a concave function of homoplasy [GOLBOFF 1993]) longer than the optimal tree (i.e. we searched for trees 0.1 – 1 units of fit longer than optimal tree). Finally, as recommended by GOLBOFF & FARRIS (2001), relative support values were calculated by considering only those trees within the absolute Bremer support for each group. Values of group support are indicated at each node. Characters in the text are referred to as numbers with states as superscript (i.e. 2').

4. **Key to species of Euryomma**

Seven females of the 16 recognized species of *Euryomma* are unknown (see taxonomic revision). Among the nine species in which the female is known, three do not present sexual dimorphism, five present slight differences with the male (in characters that are not used to separate species in the key, but are indicated in the description section) and in one the male is unknown.

### Institutions

- CEI – Colección Entomológica, IADIZA, CCT Mendoza, Mendoza, Argentina
- CNC – Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, Canada
- DZUP – Museo de Entomología Pe. Jesus Santiago Moure, Universidad Federal do Paraná, Curitiba, Brazil
- MACN – Museo Argentino de Ciencias Naturales, Bernardino Rivadavia, Buenos Aires, Argentina
- MEL – Museo Entomológico de León, León, Nicaragua
- MNHN – Muséum National d’Histoire Naturelle, Paris, France
- MNRJ – Museu Nacional de Rio de Janeiro, Rio de Janeiro, Brazil
- SMTD – Senckenberg Museum für Tierkunde, Dresden, Germany

### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Institution</th>
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<tbody>
<tr>
<td>fr</td>
<td>fr: frontal seta; pocl: postocular seta; orb: orbital seta; acr: rows of acrostichal setae; acr s: acrostichal seta; dc: dorsocentral seta; intra-alar seta; notopleuron; prepm: proepimeral seta; pre: prealar seta; postgonites; supraalar seta.</td>
</tr>
<tr>
<td>Legs</td>
<td>C: coxa; F: femur; T: tibia; a: anterior seta; ad: anterodorsal seta; av: anteroventral seta; d: dorsal seta; p: posterior seta; pd: posterodorsal seta; v: ventral seta</td>
</tr>
</tbody>
</table>

### Taxonomic revision

#### 4.1. Genus Euryomma Stein

*Euryomma* Stein, 1899: 19. Type species: *Euryomma hispaniense* Stein, 1899 [= *Anthomyia prevegina* Meigen, 1826], by monotypy.

**Diagnosis.** All species of the genus are dichoptic in both sexes, they present very little or no sexual dimorphism; the first of the two presutural *dc* is reduced and hardly distinct from the ground-setulae; always more than 1 row of setae on posterior surface of fore femur; imaginary extensions of first (A1+CuA2) and second (A2) anal veins meeting before wing margin; cercal plate weakly fused; postgonites reduced to tiny stubs at side of phallus; hypandrium divided medially.
10’ Femora yellow .................................................. 15
11 Arista long pubescent, length of setulae more than
4 × the width of arista at base
........................................... Euryomma rettenmeyeri Chillcott
11’ Arista short pubescent .............................................. 12
12 Abdomen grey with faint golden yellow pollinosity
..... Euryomma muisca Grisales, Wolff & Carvalho
12’ Abdomen dark in posterior and median area of each
segment forming a “T” ........................................... 13
13 Three frontal setae (Fig. 1A); mid femur with apical
2 ad setae; pv surface of mid femur with two irregular
rows of setae from basal third to apex, forming a
cetenidium on apical half
... Euryomma chitarera Grisales, Wolff & Carvalho
13’ Two frontal setae; anterodorsal surface of mid fe-
mur with a row of setae in basal half; pv surface of
mid femur with two rows of setae, one longer and
one shorter ......................................................... 14
14 Cercal plate reaching first ¼ of surstyli with an
antero pointed prolongation
................................. Euryomma carioca Albuquerque
14’ Cercal plate not reaching first ¼ of surstyli, with
weaker anterior pointed prolongation

4.3. Redescriptions

Full redescriptions are provided for all recognized spe-
cies of the genus Euryomma, except for the seven recent-
ly described species from Colombia and Costa Rica by
Grisales et al. (2012a) and Grisales et al. (2012b), for
which only differential diagnoses are provided. Distribu-
tion of all species, except for E. peregrinum, are shown
in Figs. 2–4.
Euryomma aburrae  
Grisales, Wolff & Carvalho, 2012

Euryomma aburrae  Grisales et al., 2012b: 808; Grisales et al. 2016: 2.
Full description in Grisales et al. (2012b).

Differential diagnosis. Frontal vitta brownish with anterior margin reddish, covered with golden yellow pollinosity, particularly on anterior region; length of postpedicel twice the length of pedicel; scutum with three brown vittae, median vitta more conspicuous, vittae following dc setae inconspicuous up to the posterior portion of scutum; male terminalia with cercal plate enlarged, concave and slightly pointed apically.

Distribution. Colombia: department of Antioquia (Fig. 2).

Remarks. This species was described based on a single specimen, and it is identical to E. carioca except for a slight difference in the shape of the cercal plate. In the cladistic analysis performed in this study, this difference is coded in character 59 where the cercal plate of E. aburrae was described as short (Grisales et al. 2012b), and that of E. carioca as reaching first ¼ of surstylus. This species is most probably a synonym of E. carioca, but only the examination of more specimens will confirm this decision.

Euryomma americanum  Chillcott, 1961

Fig. 5A–E


Differential diagnosis. Scape and pedicel yellow; postpedicel yellow, apical half to third brownish. Postpronotal lobe and tip of scutellum yellow. T1 lacking median ad. Sternite 5 formed by a single undivided plate.

Redescription. Male. Body length 2.6–3.7 mm. Head. Eye bare. Frontal vitta pale orange, whitish pruinose. Two long fr, 1.3 × longer than postpedicel, with 5–6 interstitials in single row. Two orb, and 1 row of setulæ reaching first ¼ of parafacial. Ocellar tubercle grey pollinose. One row of poc. Fronto-orbital plate and facial ridge grey. Parafacial pale orange. Gena slender, depth below lowest eye-margin less than width of postpedicel. Facial carina yellow. Scape and pedicel yellow; postpedicel yellow, apical half to third brownish, 2 × as long as broad. Arista basally yellow, remainder brown, and short pubescent. Palpus yellow, slightly spatulate. Thorax. Greyish to yellowish brown pruinose, with three very faint brown vittae along bristle rows, and continuing onto anterior half of scutellum. Postpronotal lobe and tip of scutellum yellow. Acr biserial prescutellarly, triserial postsuturally. One pair of strong prescuteellar acr. Postpronotal lobe with few short setae. One strong pra near suture and another weaker next to spal; prealar area bare. Proepimeron lacking setulæ. Legs. Yellow except for black tarsi. F1 1 row of pd as long as femoral width, with 3 rows of very short p; 1 row of setulose pv except for 1 distinct preapical bristle. T1 with 1 subapical pd, 1 apical v and 1 apical pv; lacking median ad. F2 hardly narrowed at apex; with 1 row of short av, sparse near base but tighter in apical ¼; with 1 row of short pv, but these less evenly developed than row of av and partially duplicated in apical ½. T2 hardly narrowed on basal half; ventral pubescence poorly developed and thin, 0.2 × width of T2, semi-decumbent and more conspicuous in apical ½ than at base of T2, with 1 long subapical ad; 1 submedian a; 3 apical av (central seta longer); 1 long apical v; 1 submedian (apical of the submedian a) and 1 apical p. C3 with one weak seta on posteroventral
margin. F3: lacking preapical swelling ventral surface; with 1 row of very short av and 2 longer preapical av; pv setulose. T3 with 2 short subequal d; 2 ad (one next to submedian d and other subapical); and 1 submedian av. Wing: Clear to yellowish, wing veins very lightly yellowish. Calypter small and white, lower one well-developed (oval in shape), projecting beyond upper one. Knob of halter dark yellow. Abdomen: Bluish brown pruinose, with only faint traces of yellow integumental color, median vitta absent. Sternite 1 with very sparse setulae. Sternite 5 broad and with scattered setulae (Fig. 5A). Postabdomen: Epandrium (Fig. 5B–C) evenly setulose, setulae somewhat clustered at base of surstylus; cercal plate short and broad, not produced; surstylus distinctly fused to ninth tergum (epandrium), broad and not strongly tapering (Fig. 5B–C). Phallosome narrow and tubular in shape, strongly curving dorsad (Fig. 5D).

Female: Body length 2.4 mm. Differs from male as follows: Legs: As in male, but pv row of F2 weak and uniseri al. Abdomen: Coloured as in male, except two basal segments distinctly yellowish. Postabdomen: Sternite 8 completely absent; sternites 6 and 7 short and broader than long; two spherical spermathecae (Fig. 5E).

Distribution. United States of America: California, Arizona (new record) (Fig. 3).

Remarks. The male holotype is in very good condition, although the specimen was directly pinned, and some damage has been done to the thorax.


Euryomma campineira Carvalho & Pamplona, 1979


Differential diagnosis. Eye weakly setulose. Scape and pedicel dark brown, tip of pedicel yellow; postpedicel dark brown to grey pruinose. Thorax grey-brown, with one brown vitta along acr, scutellum with 2 lateral vittae. Head: posterior margin of hind coxa bare.

Redescription. Female: Body length 2.5–3.5 mm. Head: Eye with sparse and short setulae. Frontal vitta dark brown. Six fr, 2 of them 1.3 × longer than postpedicel, with 5–6 interstitials in single row. Two orb, and row of setulae reaching apex of pedicel. Ocellar tubercle grey pollinosity. One row of poc. Fronto-orbital plate, facial ridge, parafacial dark brown to grey pruinose. Gena 1/5 width of postpedicel. Facial carina dark brown. Scape and pedicel dark brown, tip of pedicel yellow; postpedicel dark brown to grey pruinose. Arista brown dark and short pubescent. Palpus dark brown, slightly spatulate. Thorax: Grey-brown, with 1 brown vitta along acr, scutellum with 2 lateral vittae. Postpronotal lobe and tip of scutellum grey brown. Acrosternal stripe throughout and 1 pair of strong prescutellar acr. Postpronotal lobe with few short setae. One strong pra near suture and another weaker next to spal; prealar area bare. Proepimeron lacking setulae. Legs: Dark brown, yellowish at articulation of femur-tibia and tibial base. F1 with 5 short and strong ad in apical 1/5, av row stronger towards apex. T1 with 1 subapical pd, 1 apical v and 1 apical pv; 1 median ad. F2 hardly narrowed at apex; with 1 row of short av, sparse near base but tighter in apical 1/5; with 1 row of short pv, but these less evenly developed than row of av. T2 hardly narrowed on basal half; ventral pubescence poorly developed and thin, 0.2 × width of T2, with 1 long subapical ad; 1 submedian a; 3 apical av (central seta longer); 1 long apical v; 1 submedian (apical of the submedian a) and 1 apical p. C3 bare on posteroventral margin. F3 with 1 row of very short av and 2 longer preapical av; 1 median ad. T3 with 2 short subequal d; 2 ad (1 next to submedian d and other subapical); and 1 submedian av. Wing: Clear to yellowish, wing veins very lightly yellowish. Calypter small and white, lower one well-developed (oval in shape), projecting beyond upper one. Knob of halter dark yellow. Abdomen: Greyish, with brown markings on I, II, and III segments. Postabdomen: Not examined.

Distribution. Brazil: São Paulo (Fig. 4).

Remarks. This species description was based on a female specimen, and it is supported by a strong diagnostic character: the absence of setae on the posterior margin of the hind coxa, which is autapomorphic within the genus.


Euryomma carioca Albuquerque, 1956


Differential diagnosis. Parafacial very slender, with a row of 3–4 very short setulae. Scape and pedicel yellow, postpedicel dark brown and covered. Thorax with a strong vitta along acr, and two thinner ones along dc. Legs brown except for trochanter and tibia that are orange-yellow, tarsi black.
Redescription. Male: Body length 2.8–3.2 mm. **Head:** Eye bare. Frontal vitta, fronto orbital plate, parafacialia, gena and face brownish grey. Two fr with setulae in between. Poct in single, regular row. Parafacialia very slender, with row of 3–4 very short setulae. Scape and pedicel yellow, postpedicel dark brown and covered with very thick grey pollinosity. Arista light brown at base, dark brown towards apex, pubescent. Palpus dark very thick silver grey pollinosity. Arista light brown at pedicel yellow, postpedicel dark brown and covered with slender, with row of 3–4 very short setulae. Scape and tibia orange-yellow; femur brown, light brown towards apex; tarsi black. Legs: Coxa brown, trochanter and tibia orange-yellow; femur brown, light brown towards apex; tarsi black. F1 with 1 row of long pd; 3 irregular rows of long and hair like p; 1 row of pv, long in apical ½, short and setulose towards basal area except for 1 distinct preapical bristle. T1 with 1 basal pd, 1 apical v and 1 apical pv; 1 short median ad. F2 hardly narrowed at apex; with 1 row of short av, sparse near base but tighter in apical ½; with 1 row of short pv, but these less evenly developed than row of av and partially duplicated in apical ½. T2 hardly narrowed on basal half; ventral pubescence poorly developed and thin, 0.2 × width of T2, semi-decumbent and more conspicuous in apical ½ than at base of T2; with 1 long subapical ad; 1 submedian a; 3 apical av (central seta longer); 1 long apical v; 1 submedian (apical of the submedian a) and 1 apical p. C3 with 1 weak bristle-hair on posteroverentral margin. F3 lacking preapical swelling ventral surface; with 1 row of very short av and 2 longer preapical av; pv very short. T3 with 2 short subequal d; 2 ad (one next to submedian d and other subapical); and 1 submedian av. **Abdomen:** Basal lateral half of each tergite grey, brown to dark brown in apical half. Sternite 1 bare. Sternite V reduced to two elongated plates bearing three to four strong and several weaker setae (Fig. 6A). **Postabdomen:** Epandrium 1.5 × as long as wide, with long lateral projections, longer than surstylus; surstylus triangular with strong short setae; cercal plate strongly concave, “U” shaped and with short anterior projection (Fig. 6B,C). Phallus and hypandrium as in Fig. 6D.

Female: Body length 3.0–3.2 mm. Identical to male in external morphology. **Postabdomen:** Sternite 8 reduced to two small oval plates with four setae; sternite 7 as long as broad, slightly protruding in posterior margin; sternite 6 broader than long and with small concavity in anterior margin, both sternites with setae on posterior margin; two semicircular and smooth surfaced spermathecae (Fig. 6E).

**Distribution.** Brazil: Rio de Janeiro, Paraná, Santa Catarina, Rio Grande do Sul; Colombia: Antioquia; Costa Rica: Punta Arenas; Argentina: Buenos Aires (Fig. 4).

**Remarks.** Although we were not able to see the type material of *Euryomma tahami* Grisales, Wolff & Carvalho, 2012, comparison of its original description (GRISALES et al. 2012b: 824–826) with the type material of *Euryomma carioca* Albuquerque, 1956 leaves no doubt that *Euryomma tahami* is a new synonym of the former species. We consider that the differences in the genital structures and in the colouration [which is a weak diagnostic character within Fanniidae, where many species of Fannia (such as *Fannia heydenii* Wiedemann) and Euryomma (such as *E. peregrinum*) show intraspecific colour variations] considered by GRISALES et al. (2012b) are not sufficient to sustain *E. tahami* as a separate species.

**Material.** *Euryomma carioca.* Holotype ♀, “Rio de Janeiro | Grajau S. Lopes 4-6-39″ (MNRR). – Paratypes (1♀, 1♂),” Rio de Janeiro | Grajau S. S lopes 4-6-39″ (MNRR). – ARGENTINA, Ciudad Autónoma de Buenos Aires, Reserva Ecológica Costanera Sur, 34°36’53”S 58°20’57”W, faeces, L. Patitucci leg. (1♀, 1♂, MACN); Ciudad Autónoma de Buenos Aires, Reserva Ecológica Costanera de Río Grande do Sul; Colombia: Antioquia; Costa Rica: Punta Arenas; Argentina: Buenos Aires (Fig. 4).
**Euryomma chillcotti** Grisales & Carvalho, 2012

*Euryomma chillcotti* Grisales et al., 2012a: 452–454.

Full description in Grisales et al. (2012a).

**Differential diagnosis.** Head with 2 *fr*; scutum with five vittae along *acr* and *dc*, and *ia* area; antenna with arista short-pubescent (hairs shorter than width of base of arista), scape brown with apical margin yellowish, pedicel brown and yellowish around suture; *F2* with two 2 rows of *pv*; hind tibia yellow with brownish ring on basal third; abdomen with sternite 5 with two sclerotized, curved, concave and elongated plates, plates with strong setae on apical area, and joined by another plate covered with strong spines.

**Distribution.** Costa Rica: Puntarenas, Cartago (Fig. 2).

**Remarks.** *Euryomma chillcotti* Grisales & Carvalho, 2012a and *Euryomma uwa* Grisales, Wolff & Carvalho, 2012a are very similar in their internal (although Grisales et al. 2012a consider a series of differences related to size of the epandrium and ceral plate) and external morphology, except for the number of frontal setae (2 in *E. chillcotti* and 4 in *E. uwa*) and the number of rows of setae on the *pv* surface of the mid femur: where *E. chillcotti* bears 2 rows, while *E. uwa* presents a ctenidium formed by 3–4 rows of hooked setae.

**Euryomma chitarera** Grisales, Wolff & Carvalho, 2012


Full description in Grisales et al. (2012b).

**Differential diagnosis.** Frontal vitta dark brown with greyish pollinosity, anterior margin yellowish; length of postpedicel 2.4 × length of pedicel; scutum with three dark brown, inconspicuous vittae; wing yellowish; halter yellow. Male terminalia long, straight and narrow surstylus curved at apex, articulated with epandrium and almost the same length as epandrium; sternite 5 wide, with two long, hook-shaped apical projections bearing four strong spines.

**Distribution.** Colombia: department of Santander (Fig. 2).

**Remarks.** *Euryomma chitarera* is identical in external morphology to *E. uwa*. Nevertheless, the male genitalia of *E. guane* differs from the latter species: the surstylus is much shorter and triangular.

**Euryomma longicorne** Stein, 1911

Figs. 1F–I, 7A–H

*Euryomma longicorne* Stein, 1911: 111; Stein 1919: 133; Séguy 1937: 180; Séguy 1941: 55; Ortiz 1946: 157; Albuquerque 1956: 5; Pont 1972: 2; Carvalho & Pamplona 1979: 603; Carvalho et al. 1993: 5; Pont 2001: 460; Pont 2013: 48.

**Euryomma erythrogaster** Séguy, 1941: 54, syn.n.; Albuquerque 1956: 5; Pont 1972: 2; Carvalho & Pamplona 1979: 603; Carvalho et al. 1993: 5.

**Differential diagnosis.** Frontal vitta light grey to yellow near lunule and reddish anteriorly; postpedicel grey, very long and slender, 4 × as long as broad almost surpassing lower oral margin. Scutum lacking vittae, yellow at tip. Legs yellow except for tarsi. Sternite 5 with strong and hooked setae.

**Redescription. Male:** Body length 3.15 mm. **Head:** Frontal vitta light grey to yellow near lunule. Frons silvery grey pruinose. Two long *fr*, with 3–5 shorter interstitials. One row of short orbital setae reaching parafacial. Eye bare. One row of *poel*. Facial ridge and parafacial grey, parafacial at base of postpedicel 1 × width of same and bearing 4–5 short setae. Gena slender, depth below lowest eye-margin less than width of postpedicel. Facial carina yellow. Scape and pedicel light brown; postpedicel grey, long and slender, 4 × as long as broad and covered with short pubescence. Arista dark-brown and short pubescent. Palpus brown, slender and spatulate. **Thorax:** Wholly grey dusted. Scutellum yellow at tip. Presutural *acr* biserial, postlaterally triserial. One pair of strong prescutellar *acr* s. Postpronotal
lobe with 2 setae and 8 setulae. One strong pra near susture and another weaker next to spal; prealar area bare. Proepimeron lacking setulae surrounding prepm.

**Legs:**
Yellow except for brown tarsi. F1 with 1 row of long pd; 1 row of strong p, and another row of short setulae; 1 row of pv very short in basal ½, much longer in apical ½. T1 with 1 subapical pd, 1 apical v and 1 apical pv; with 1 submedian and 1 apical ad. F2 hardly narrowed at apex; with 1 row of ad; 1 row of a; 1 row of av, sparse near base but tighter in apical ½; 1 row of short pv, but these less evenly developed than row of av and partially duplicated in apical ½. T2 hardly narrowed on basal half; ventral pubescence poorly developed and thin, 0.3 × width of T2, semi-decumbent and more conspicuous in apical ½ than at base of T2; with 1 long subapical ad; 1 submedian a; 3 apical av; 1 long apical v; 1 submedian (apical of the submedian a) and 1 apical p. C3 with 1 seta on postero-apical margin. F3 with 4 d at apex; 1 row of very short av except for 2 longer preapical av; pv surface bare. T3 with 2 short subequal to d; 2 ad (one in same position as submedian d, second below subapical d); 1 submedian av; 1 apical v. **Wing:** Clear to yellowish, wing veins very lightly yellowish. Calypter small and white, lower one well-developed (oval in shape), projecting beyond upper one. Knob of halter dark yellow.

**Abdomen:**
Ground colour grey-black. Sternite 1 setulose. Sternite 5 divided, with very strong hooked setae posteriorly, followed by strong straight setae (Fig. 1F).

**Postabdomen:**
Epandrium longer than broad, covered with short setulae, surstylus triangular and short, ⅛ of length of epandrium (Fig. 1G,H); hypandrium and associated structures as in Fig. 1(I).

**Female:**
Body length 3.25 mm. No morphological differences from male, and, as pointed out by Stein (1911), easily recognized by large antenna. Oviscapt not dissected.

**Remarks.**
Séguy (1941) apparently described this species based on a single specimen, the male holotype (Fig. 7A–H). This specimen was collected by Claudio Gay, a French naturalist who accepted a position as a researcher for the Chilean government to carry out a scientific survey of the country. He donated all of his collected material from Chile to the MNHN (Paris). There were four collections containing Muscoidea that Gay gave to the Paris Museum: 1836 (accession number 35.36, from Chile), 1837 (670.37, from Chile), 1843 (15.43, from Chile) and 1849 (59.49, from Cuzco, Peru) (A.C. Pont pers. comm.). The last of these entries from 1843 in Chile (15.43) coincides with one of the labels (Fig. 5F) of the holotype of *E. erythrogaster* (Séguy 1941). The holotype is in very poor condition: the head and thorax are glued to a paper rectangle (Fig. 12A), the abdomen and hind leg have also been glued to plastic rectangles (Fig. 7D,E). Unfortunately, the mid leg that according to Séguy’s description bears 2 rows of short and stout setae, a character used in the key to separate this species from the remaining *Euryomma* known at the time, is missing. The holotype also includes three slides, one of which contains sternite 5 (Fig. 7G), and the other two are empty of their content, possibly lost because of damage due to clearing with K(OH). In spite of the poor condition of the holotype of *Euryomma erythrogaster*, after illustrating the structures of the male postabdomen of *E. longicornem* we consider that *Euryomma erythrogaster* Séguy, 1941 is a new synonym of *Euryomma longicornem* Stein, 1911 based on the similarity of sternite 5, as well as the similarity in the description of the external morphology of both species.

**Distribution.**
Chile: IV region of Coquimbo, III region of Atacama (new record) (Fig. 4).

*Euryomma erythrogaster* Grisales, Wolff & de Carvalho, 2012

*Euryomma muisca* Grisales et al., 2012b: 821; Grisales et al., 2016: 2. Full description in Grisales et al. (2012b).

**Differential diagnosis.** Frontal vitta dark brown; scape and pedicel yellow; length of postpedicel 1.5 × the length of pedicel; arista with short pubescence, rays shorter than width of base of arista; scutum with three brown vittae, *dc* vitta not well-delimited due to pollinosity on scutum; sternite 5 with two long apical processes, with long setae and strong spines on inner apical region; cercal plate formed by cerci fused on apical half (V-shaped), apex square.

**Distribution.** Colombia: department of Cundinamarca (Fig. 2).

*Euryomma nigrifemur* Stein, 1911

Fig. 8A–D

*Euryomma nigrifemur* Stein, 1911: 110; Stein 1919: 133; Séguy 1937: 180; Séguy 1941: 55; Ortiz 1946: 157; Albuquerque 1956: 603; Garcia 1964: no pagination; Pont 1972: 2; Carvalho & Pamplona 1979: 603; Carvalho et al. 1993: 5; Pont 2013: 49, 124.


**Differential diagnosis.** Antenna and palpus dark brown. Thorax light grey dusted with thin brown vittae along *acr*, *dc*, and *ia* lines. Femora and tarsi dark brown, tibiae yellow. Sternite 5 “U” shaped, epandrium with very long and protruding surstylus.

**Redescription.** Male: Body length 3.1–3.3 mm. **Head:** Frontal vitta grey to brown-orange near lunule, frons grey pruinose. Two long *fr*, 1.5 × longer than postpedicel, with 3 shorter interstitials. One row of short orbital setulae reaching parafacial. Eye bare. One row of *pocl*. Facial ridge and parafacial grey, parafacial at base of flagellomere 0.9 × width of same and bearing 4–5 short setae. Gena slender, depth below lowest eye-margin less than width of postpedicel. Facial carina grey. Scape and pedicel light brown; postpedicel grey, 2 × as long as broad and covered with short pubescence. Arista dark-brown and short pubescent. Palpus dark brown, straight (same width throughout). **Thorax:** Light grey dusted with thin brown vittae along *acr*, *dc*, and *ia* lines. Scutellum grey at tip. Presutural *acr* biserial, postspiratorally triserial. One pair of strong prescutellar *acr*s. Postpronotal lobe with 2 setae and 8 setae. Two *pra* of equal length, 1 near suture and other next to *spal*; prealar area bare. Proepimeron lacking setae surrounding *prepm*. **Legs:** Femur and tarsi dark brown, tibia yellow. *F1* with 1 row of long *pd*; 1 row of strong *p*, and another row of short setae; 1 row of *pv* very short in basal ½, much longer in apical ½. *T1* with 1 subapical *pd*, 1 apical *v* and 1 apical *pv*; with 1 submedian and 1 apical *ad*. *F2* hardly narrowed at apex; with 1 row of very short *ad*, almost undistinguishable from ground setae; 1 row of *av*, sparse

Euryomma palpingens Wendt & Carvalho, 2007
Fig. 9A–E


Differential diagnosis. Head of male with only one orb. Scape brown with anterior margin slightly reddish, peduncle brown, slightly reddish around suture; arista brown, bearing long hairs, basal third brownish; palpus dark brown, flat and claviform, 4 × the width of base of palp. Abdomen with syntergite 1+2 and tergite 3 yellow translucent, sternite 5 of male formed by a single plate with strong setae on apical half.

Description. Male: Body length 2.5 mm. Head: Eyes bare; frontal vitta brownish, anterior margin reddish. Two fr, with intercalated weak setae; lower orb absent. Poc parallel. Fronto-orbital plate, parafacial and gena with silver pollinosity. Parafacial with short setae on
dorsal half. Scape brown with anterior margin slightly reddish, pedicel brown, slightly reddish around suture. Postpedicel dark brown with golden yellow pollinosity, $3 \times$ length of pedicel. Arista brown with basilar third brownish, bearing setae as long as aristal width. Palpus dark brown, flat and claviform. **Thorax**: Brownish with golden yellow pollinosity, scutum with three brown vitellae along acr and dc. Acr 3:3–2, in regular rows; de 2:3; pprn with 2 strong setae, and third weaker, postpronotal area with setulae; 2 pra; 1 strong and 1 weak prepm, proepimeral area without setulae; kepst 1:1, with 1 weakly developed seta between them, katepisternal area with short setulae. **Wing**: Yellowish. Calypters yellowish. Halter yellow. **Legs**: Brownish with tarsi dark brown; pulvilli yellowish. F1 with 1 row of short av; 1 series of long and strong d; 1 row of pd; posterior surface setulose, with thin setae; 1 series of long pv on apical half. T1 with 1 pre-apical d; 1 apical pv and 1 longer (than pv) apical v. Basal tarsomere of fore leg with strong basal v. F2 with 1 row of short av, setae close-set and hooked at apex on apical half; 1 row of ad on basal half, preapex with 2 short setae; 3 pre-apical strong p; 1 row of pv and v, both short, hooked; row of v near to pv. T2 ventrally setulose, with two preapical v, 1 short and 1 long; 1 apical seta and 1 submedian a; 1 apical av; 1 short apical pv. C3 with 1 setula on posterior margin. F3 with 2 ad on apical half; 2 strong preapical av; 2 preapical d. Pv and p surface without differentiated seta. T3 with 1 submedian seta and 1 preapical d; 1 median, 1 preapical seta and 1 apical a; 1 median and 1 strong apical av; 1 strong apical pv; 1 submedian pd. Hind first tarsomere strongly setulose on ventral surface. **Abdomen**: Light grey with sintergite 1+2 and tergite 3 yellow translucent. Sternite 1 bare. Sternite 5 (Fig. 9A): formed by single triangular plate with strong setae distributed on all its surface. **Postabdomen**: Epan- drium rounded, surstylos very long, curved and tapered towards apex (Fig. 9B,C). Hypandrium and associated structures as in Fig. 9D.

**Female**: Body length: 2.4 mm. Differs from male as follows: **Head**: Both orb, upper and lower present. **Legs**: lacking ventral pubescence of mid tibia. **Postabdomen**: sternite 8 formed by small circular plates bearing 3 setae; sternites 6 and 7 rectangular, broader than long; two spherical spermathecae (Fig. 9E).

**Distribution.** Brazil: state of Paraná; Costa Rica: Province of Limón (Fig. 4).

**Remarks.** The description of *E. steini* was based on a single specimen, therefore we consider that the differences found by Grisales et al. (2012a) in the size of the palpi, and of the size (and not the shape) of different structures of the male genitalia are due to intraspecific variations. Although we were not able to examine the type material of *Euryomma steini* Grisales & Carvalho comparison of its original description (Grisales et al. 2012a: 824–826) with the type material of *Euryomma palpingens* Wendt & Carvalho, 2007 leaves no doubt that *Euryomma steini* is a new synonym of the former species.
strong pre-apical d; 1 very weak submedian ad; 1 apical v; 1 apical pv; Basal fore tarsomere with short and strong setae on ventral surface. F2 with 1 row of av, less than half as long as femoral diameter, weak, becoming shorter and closer-set apically to form weak comb; 1 row of pv, stronger at apex, weakly duplicated ventrally on media third; 1 row of ad, short, longer and directed to anterior surface; 4 pre-apical p. T2 only weakly thicker apically; ventral pubescence short and multiserial; 1 apical pv; 1 long and strong apical v; 1 apical av; 1 submedian and 1 short, longer and directed to anterior ad; 1 long and strong apical ad; 1 submedian and 1 apical p. C3 with 1 setula on posterior margin. F3 with 1 row of long ad, directed to dorsal surface at apex; 1 row of av, setulose except for 2 setae at apex; posteroventral surface setulose. T3 with 1 submedian and 1 apical av; 1 submedian and 1 preapical ad; 2 long d. Ventral surface on hind tarsomere I strongly setulose. Wing: Clear, calypter and halter pale yellow.

**Abdomen:** Dark brownish and grey pollinose, laterally with pale grey anterior margins, grey pollinose expanded laterally to cover anterior half margin of each segment. Hypopygium weakly projecting. Sternite 1 bare. Sternite 2 only weakly thicker apically; surstylus partially fused to epandrium, narrow at base then rapidly broadening to form a triangle; cercal plate short and broad (Fig. 10B,C). Hypandrium slender, interrupted medially, with a long basal flange directed inwardly (Fig. 10D).

**Female:** Body length 3 mm. Differs from male as follows: **Abdomen:** Markings darker, grey evident only at lateral margins and on terminal segment. Legs: av and pv rows of F2 setulose apically, basally with 5 or 6 short but distinct setae on each surface, T3 with a strong av seta, dorsal setae shorter. **Postabdomen:** Sternite 8 reduced to two small plates bearing 3 setae; sternite 7 somewhat pointed in anterior margin. Sternite 6 rectangular, broader than long; with two spherical spermathecae (Fig. 10E).

**Distribution.** Panama: La Chorrera (Fig. 2).


**Euryomma peregrinum** (Meigen, 1826)

Fig. 11A – E


**Euryomma communis** Stein, 1901: 193; Aldrich 1905: 540. Homalomya schembrirondani Rondani, 1866: 127; Rondani 1877: 60; syn. teste Bezzi & Stein 1907: 666.

**Coenosia pseudomollicula** Frauenfeld, 1867: 450; syn. teste Stein 1919: 133.


**Euryomma hispaniense** Stein, 1899: 20; Jacobs et al. 1906: 71; Enderlein 1912: 101; Seguy 1937: 180; Ortiz 1946: 157.
with faint traces of 3 brownish vittae along grey to yellowish grey dusted. In posterior view, scutum Thorax slightly convex.

yellow, slightly spatulate. Inferior oral margin straight to broad. Arista dark-brown and short pubescent. Palpus pedicel yellow; flagellomere dark grey, 1.9 × as long as width of flagellomere. Facial carina yellow. Scape and slender, the depth below lowest eye-margin less than pocl. Facialia grey. Parafacialia yellow, and bare. Gena lomere, with several interstitials. Eye bare. One row of grey pruinose. Two long fr-, 1.2 × longer than flagellomere, apical point 2.8 × width of the anterior ocellus. Frons silvery Frontal vitta light grey to yellow near lunula, at narrow-pra near the suture and another weaker next to the spal; prealar area bare. Proepimeron lacking setulae surrounding prepm. Wing: Clear to yellowish, wing veins very lightly yellowish. Calypter small and white, lower one well-developed (oval in shape), projecting beyond upper one. Knob of halter dark yellow. Legs: Yellow except for black tarsi; F1 with 3 rows of p; 1 row of pv very short throughout, except for 2 longer pv at apex. T1 with 1 sub-apical pd, 1 apical v and 1 apical pv; with 1 submedian and 1 apical ad. F2 hardly narrowed at apex; with 1 row of short av, sparse near base but tighter in apical ⅓; with 1 row of short pv, but these less evenly developed than row of av and partially duplicated in apical ⅓. T2 hardly narrowed on basal half; ventral pubescence poorly developed and thin, 0.3 × width of T2, semi-decumbent and more conspicuous in apical ⅓ than at base of T2. C3 setulose on postero-apical margin. F3 with 1 row of very short av and 2 longer preapical av; pv surface bare. T3 with 2 short sub equal d; 1 ad (slightly basad of the submedian d); and 1 av. Abdomen: Ground colour black; hind margins of tergites and/or sides of tergites 1, 2 and/or corners of tergite 3 sometimes yellow. Sternite 1 setulose. Sternite 5 divided, with setae covering anterior margins (Fig. 11A). Postabdomen: Epandrium bell shaped; cercal plate very elongated and terminating in two spines. Surstylius simple, rounded at apex and shorter than epandrium (Fig. 11B,C); phallus sclerotized, basally broad tapering toward apex and curving dorsally (Fig. 11D).

Female: Body length 3.5 – 4.0 mm. Differs from the male as follows: Legs: F2 ventrally bare, except for a thin av at base and 1–2 short av beyond it. T2 bare ventrally. Abdomen: Ground colour as in male or wholly orange; dusting grey to yellowish grey, with a poorly developed dark median vitta on tergites 3 – 5. Postabdomen: Sternite 8 reduced to two small plates bearing short spines, two cup-shaped spermathecae (Fig. 11E).

Distribution. Worldwide in warmer areas, but apparently never abundant (Domínguez & Pont 2015).

Material. Anthomyia peregrina. Holotype ♀, ‘Holotype ♀ peregrina | Coll. Winthem’; ‘peregrina ♀; Euryomma hispaniense | ♀ | Stein; Holotype ♀ | Anthomyia | peregrina Mg.| det. A.C. Pont

Fig. 11. Euryomma peregrinum (Meigen): A: sternite 5, B: epandrium lateral, C: epandrium ventral, D: hypandrium, E: oviscapt and spermathecae. Redrawn from Pont (1977), except for hypandrium, which was redrawn from Chillcott (1961).

Hoplogaster dubia Grimshaw, 1901: 42; syn. teste Stein 1919: 133.

Differential diagnosis. Parafacial yellow, scape and pedicel yellow, postpedicel dark grey, 1.9 × as long as broad. Thorax ground colour black, wholly grey to yellowish grey dusted, in posterior view, scutum with faint traces of 3 brownish vittae along dc and acr rows, these more conspicuous anteriorly than posteriorly. Legs yellow except for black tarsi.

Redescription. Male: Body length 3.8 – 4.1 mm. Head: Frontal vitta light grey to yellow near lunula, at narrow-est point 2.8 × width of the anterior ocellus. Frons silvery grey pruinose. Two long fr, 1.2 × longer than flagellomere, with several interstitials. Eye bare. One row of pochl. Facialisia grey. Parafacialia yellow, and bare. Gena slender, the depth below lowest eye-margin less than width of flagellomere. Facial carina yellow. Scape and pedicel yellow; flagellomere dark grey, 1.9 × as long as broad. Arista dark-brown and short pubescent. Palpus yellow, slightly spatulate. Inferior oral margin straight to slightly convex. Thorax: Ground colour black; wholly grey to yellowish grey dusted. In posterior view, scutum with faint traces of 3 brownish vittae along dc and acr rows, these more conspicuous interiorly than posteriorly. Scutellum yellow at tip. Acr triseral throughout. One pair of strong prescutellar acr s. One strong presutural dc, the anterior one hardly distinct from the ground-setulae. Postpronotal lobe with few short setae. One strong pra near the suture and another weaker next to the spal; prealar area bare. Proepimeron lacking setulae surrounding prepm. Wing: Clear to yellowish, wing veins very lightly yellowish. Calypter small and white, lower one well-developed (oval in shape), projecting beyond upper one. Knob of halter dark yellow. Legs: Yellow except for black tarsi; F1 with 3 rows of p; 1 row of pv very short throughout, except for 2 longer pv at apex. T1 with 1 sub-apical pd, 1 apical v and 1 apical pv; with 1 submedian and 1 apical ad. F2 hardly narrowed at apex; with 1 row of short av, sparse near base but tighter in apical ⅓; with 1 row of short pv, but these less evenly developed than row of av and partially duplicated in apical ⅓. T2 hardly narrowed on basal half; ventral pubescence poorly developed and thin, 0.3 × width of T2, semi-decumbent and more conspicuous in apical ⅓ than at base of T2. C3 setulose on postero-apical margin. F3 with 1 row of very short av and 2 longer preapical av; pv surface bare. T3 with 2 short sub equal d; 1 ad (slightly basad of the submedian d); and 1 av. Abdomen: Ground colour black; hind margins of tergites and/or sides of tergites 1, 2 and/or corners of tergite 3 sometimes yellow. Sternite 1 setulose. Sternite 5 divided, with setae covering anterior margins (Fig. 11A). Postabdomen: Epandrium bell shaped; cercal plate very elongated and terminating in two spines. Surstylius simple, rounded at apex and shorter than epandrium (Fig. 11B,C); phallus sclerotized, basally broad tapering toward apex and curving dorsally (Fig. 11D).

Female: Body length 3.5 – 4.0 mm. Differs from the male as follows: Legs: F2 ventrally bare, except for a thin av at base and 1–2 short av beyond it. T2 bare ventrally. Abdomen: Ground colour as in male or wholly orange; dusting grey to yellowish grey, with a poorly developed dark median vitta on tergites 3 – 5. Postabdomen: Sternite 8 reduced to two small plates bearing short spines, two cup-shaped spermathecae (Fig. 11E).

Distribution. Worldwide in warmer areas, but apparently never abundant (Domínguez & Pont 2015).

Material. Anthomyia peregrina. Holotype ♀, ‘Holotype ♀ peregrina | Coll. Winthem’; ‘peregrina ♀; Euryomma hispaniense | ♀ | Stein; Holotype ♀ | Anthomyia | peregrina Mg.| det. A.C. Pont
Redescription. Male: Body length 3.4 mm. Head: Eye bare. Frontal vitta dark brown, dark reddish on anterior margin. Two fr, with two setulae in between. Poc divergent. Frontal-orbital plate, parafacial and gena grey pollinose. Parafacial with 4 short setulae on dorsal fourth. Scape and pedicel yellow, postpedicel 3 × length of pedicel, dark grey with heavy grey pollinosity; aristae yellow in basal ½, dark grey apically, bearing long pubescence 1.5 × width of base of arista. Palpus straight, apex as wide as base, basally yellow, extending along dorsal margin to apical fourth, remainder dark. Thorax: Pale yellowish-brown, with 3 brown stripes coinciding with acr and spal; scutellum pale yellowish brown with 2 subbasal dark brown spots. Acr 3:3–4 in irregular rows; 3 ppm, 2 strong and 1 weaker, postpronotal area with few setulae; 2 pra; 1 anterior, longer near suture, and 1 weaker and placed above first near spal; 2 prepm, that closest to spiracle longer; propeneral area bare; 2 kepst, with no distinct medial setulae, katepisternal area covered with short setulae. Legs: Dark brown, except for femoral apices and tibial bases. F1 with 1 row of strong pd, as long as femoral width; dorsal surface with 2 weak rows of setae almost indistinguishable from ground setulae and a third even weaker row in between; 1 row of pv formed by weak and short setulae basally and 2–3 strong setae at apex; anterior surface covered with short setulae. T1 with 1 strong subapical d; 1 submedian ad; 1 apical v; 1 apical pv. Basal parts of fore tarsomeres 1–5 with short and strong setulae on ventral surface. F2 with 1 row of short av, less than half as long as femoral width, weak, becoming shorter and closer-set apically to form a weak comb; 1 row of short pv, less than half as long as femoral width, weak, becoming shorter and and closer-set apically to form a weak comb; 1 row of ad, only present in median half, and 1 preapical seta separated from row. T2 only slightly thicker apicad; ventral pubescence short and multiserial; 1 apical pv; 1 long and strong apical v; 1 apical av; 1 submedian and 1 strong and long apical a; 1 long and strong apical ad; 1 submedian and 1 apical p. C3 with 1 p on anterior internal surface. F3 with 1 row of long ad, directed to dorsal surface at apex; 1 row of av, setulose except for two setae at apex; posteroventral surface setulose. T3 lacking av; 1 submedian and 1 preapical ad; 2 long d. Ventral surface on hind tarsomere 1 strongly setulose. Wing: Clear, calypter and halter pale yellowish-white. Abdomen: Dark brownish grey pollinose, laterally with pale grey anterior margins, grey pollen expanded laterad to cover anterior half of each segment at margin. Hypopygium weakly projecting. Sternite 5 transversally divided by membranous band, except at lateral margin, produced into short and thick processes bearing 4–5 apical and preapical setae; anterior margin sclerotized and bearing several weak setae, median line with 3 strong and several weak setae (Fig. 12A). Postabdomen: Epandrium shorter than broad, rounded, with 1 strong and several weaker setae; surstylus not fused to epandrium, basally...
broad with rounded dorsal expansion mediately, ventrally and mid dorsal margins bearing several bristle-like hairs; cercal plate elongate and slender (Fig. 12B,C); hypandrium broad, interrupted medially, basal flange broad, directed outwards (Fig. 12D).

**Female**: Body length 2.9 mm. Differs from male as follows: **Legs**: F2 with rows of av and pv setulose at apex, basally with 5–6 short setae on each surface; hind tibia with strong av; d shorter (0.5 and 0.7 mm).

**Abdomen**: Colour similar to male, except dorsocentral stripe apparent. **Postabdomen**: Sternite 8 strongly modified, with small median sclerite bearing setae and pair of curved processes directed apically enclosing cup shaped depression on each side; sternite 7 slightly produced in anterior margin, and sternite 6 indented in posterior margin; two semicircular and smooth surfaced spermathecae.

### Distribution
Panama: La Chorrera (Fig. 2).

### Material

### Euryomma rufifrons Stein, 1911
Fig. 13A–D

**Euryomma rufifrons** Stein, 1911: 110; Stein 1919: 133; Seguy 1937: 180; Seguy 1941: 55; Ortiz 1946: 157; Albuquerque 1956: 9; Pont 1972: 2; Carvalho & Pamplona 1979: 603; Carvalho et al. 1993: 6; Pont 2013: 50, 124.

**Differential diagnosis**: Frontal vitta orange to dirty red. Scape and pedicel reddish, postpedicel black. Thorax light brown, lacking vittae, first dorsocentral stronger than in the other species of the genus, and half as long as second dorsocentral; 3 short and strong pra. Legs red yellow.

**Redescription. Male**: Body length 3.7 mm. **Head**: Frontal vitta orange to yellow near lunule, broad, at narrowest point 5.33 × width of anterior ocellus. Frons grey pruinose, at uppermost fr 3.3 × width of anterior ocellus. Two long fr, 1.2 × length of postpedicel, with six shorter interstials. One row of short orbital setae. Eye bare. One row of pocl. Facial ridge and parafacial grey, parafacial at base of postpedicel 0.6 × width of same and setulose throughout. Gena slender, depth below lowest eye-margin less than width of postpedicel. Facial carina yellow-grey. Scape and pedicel yellow; postpedicel grey, 1.8 × as long as broad and covered with short pubescence. Arrista dark brown and short pubescent. Palpus brown, straight. Inferior oral margin straight. **Thorax**: Light grey dusted with thin and very light brown vittae along acr, dc, and ia lines. First dc longer than in other species, half as long as second dc. Scutellum grey at tip. Presutural acr biserial, post suturally triserial. One pair of strong prescutellar acr s. Postpronotal lobe with 2 setae and 10 setulae. Three pra of equal length, 1 near suture and other 2 next to spal; prealar area bare. Preepimeron lacking setulae surrounding prepm. **Legs**: Femora and tibiae light brownish, tarsi dark brown. F1 with 1 row of long pd; 3 rows of p; 1 row of pv short at base and longer in apical half. T1 with 1 subapical and 1 submedian pd, 1 apical v and 1 apical pv; with 1 submedian and 1 apical ad. F2 narrowed at apex; with 1 row of very short ad, almost indistinguishable from ground setulae except for apical seta; 1 row of av, sparse near base but tighter in apical ½; 2 rows of pv, these hooked at tip and partially tripled in apical ½. T2 narrowed on basal half; ventral pubescence well developed and thin, 0.3 × width of T2; with 1 long subapical ad; 1 submedian a; 3 apical av; 1 long apical v; 1 submedian pd (apicad of submedian a) and 1 apical p. C3 with 1 seta on postero-apical margin. F3: with 4 ad at apex; 1 row of very short av except for 2 longer preapical av; pv setulose. T3 with 2 short subequal d; 2 ad (one slightly basad of the submedian d and the other subapical); 1 submedian av; 1 apical v. **Wing**: Clear to yellowish, wing veins very lightly yellowish. Calypter small and...
white, lower one well-developed (oval in shape), projecting beyond upper one. Knob of halter dark yellow. **Abdomen:** Ground colour grey. Sternite 1 setulose. Sternite five formed by two plates, with strong bristles on posterior part (Fig. 13A). **Postabdomen:** Epandrium as long as broad, with very long lateral margins reaching first ¼ of surstylus, with 1 strong and several weaker setae; surstylus not fused to epandrium, basally somewhat thinner, broader and flat towards apex; cercal plate elongate and slender (Fig. 13B, C); hypandrium broad, interrupted medially, basal flange broad, directed outwards (Fig. 13D).

**Female:** Unknown.

**Distribution.** Chile: IV region of Coquimbo, V region of Valparaiso (new record) (Fig. 4).


**Euryomma uwa** Grisales, Wolff & Carvalho, 2012

*Euryomma uwa* Grisales et al., 2012b: 826; **GRISALES et al. 2016: 2.**

Full description in **GRISALES et al.** (2012b).

**Differential diagnosis.** Frontal vitta dark brown with golden yellow pollinosity; 4 fr; length of postpedicel 2.5 × the length of pedicel; arista with short pubescence, rays shorter than width of base of arista; scutum with five brown vittae, median vitta expanded from base to apex of scutellum, dorsoventral vitta reaching the basal scutellar setae; F2 with a ctenidium of 3–4 pv rows of hooked setae; calyptr whitish; wing faintly brownish, with apical third, between C vein and apical half of vein R₃, darkened; halter yellow; male sternite 5 wide, with two concave, elongate and sclerotized plates, plates bearing strongly developed setae.

**Remarks.** See remarks for *E. chillcotti.*

**Distribution.** Colombia: department of Santander (Fig. 2).
Table 2. Homoplasy for each character (character number = combination of first column and first line) expressed as units of fit. Fit of a character measured as a concave function of its homoplasy (Goloboff 1993).

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5. Phylogenetic results

Searches yielded 1 tree of fit 21.45238 (Fig. 14). Australofannia spiniculnis was placed as the sister taxon to all other Fanniidae which formed two clades, one including the exemplar taxa of Piezura, Zealandofannia and Fannia, and the other including all species of Euryomma. The tree (Fig. 14) showed E. panamensis as the sister species to all remaining species of Euryomma, followed by E. palpingens and E. americanum. The species E. peregrinum + E. carioca + E. aburrae formed a sister group to E. longicorne and two groups: one formed by E. nigrifemur + E. rauffrons + E. rettenneyeri and another formed by E. muisca + E. chitarera + E. chillcottii + E. guane + E. uwa. Support measures for the monophyly of the genus and most internal groups were low, with the exception of node 36 (E. carioca + E. aburrae).

6. Discussion

The tree obtained with implied weights was fully resolved and the genus Euryomma was recovered as a monophyletic unit, although support measures were low for the genus and in general below the genus level, except for very few species groups. Many characters are highly homoplasious (Table 2) and the use of implied weights reduced the possibility of groupings based on strongly homoplasious characters such as leg chaetotaxy, because they were down weighted during the process, as explained by Goloboff et al. (2008).

Four character states supported the monophyly of Euryomma: 3 rows of setae on posterior surface of fore femur (28'); cercal plate weakly fused, this character state is shared with the included species of Fannia (57'); postgonites reduced to tiny stubs at side of phallus (61'); and hypandrium divided medially (68'). The characters traditionally used as diagnostic for the genera such as: dichoptic head in both sexes, no sexual dimorphism (0'); one strong presutural dc, the anterior one hardly distinct from the ground-setulae (16'); imaginary extensions of first (A1 + CuA2) and second (A3) anal veins meeting before wing margin (24') are shared with the genera Piezura, Zealandofannia and Australofannia.

Within the Fanniidae, the position of Australofannia as the sister-group to all remaining species of the family, as was also found in Domínguez & Roig-Juñent (2008), is due to the presence of a plesiomorphic feature: the ejaculatory apodeme (Pont 1977). The absence of this structure has been considered an autapomorphy of the family. Unlike Domínguez & Roig-Juñent (2008) the remaining outgroup taxa formed a monophyletic group with Piezura and Zealandofannia as sister groups of the species of the genus Fannia chosen as outgroups. We included Neotropical representatives of the canicularis species-group because Hennig (1965) considered the genus Fannia to be paraphyletic because this species-group formed a monophyletic group with Euryomma and Piezura. This latter monophyletic group proposed by Hennig (1965) was not recovered by Domínguez & Roig-Juñent (2008), although only one species of Euryomma and Piezura were included in the analysis. In this study, and as found by Domínguez & Roig-Juñent (2008), the species belonging to the canicularis species-group did not form a monophyletic unit, and did not group with Euryomma and Piezura.

Because of the low support values, little can be said with confidence about the internal phylogeny of the genus. Nonetheless, results converge on general patterns of relationships within the genus Euryomma. Euryomma panamensis, E. palpingens and E. americanum are the sister species to two large groups within Euryomma: one formed by three species (E. peregrinum, E. aburrae, E. carioca) and the other formed by the remaining nine species. Chillcott (1961) considered E. americanum as the western North American counterpart of E. peregrinum (he found the latter to be more predominant in eastern North America), but our analysis shows that E. americanum is more closely related to E. carioca and E. aburrae with which it shares character state (59') – the presence of a thin posterior prolongation of the cercal plate.

The remaining nine species of Euryomma, with E. longicorne at the base, are divided into two groups: one formed by E. nigrifemur, E. rettenneyeri and E. rauffrons, which share character state (11') – thin palpi; and a second group formed by the species E. chitarera, E. muisca, E. chillcottii, E. guane and E. uwa, which is supported by
character state (31) – pilose eyes and (51) – sterna 1 bare. Within the latter group, E. chillcottii, E. guane and E. uva share character state (25) – wings light brown tinted, with apical third between C vein and apical half darker, and character state (32) – anterodorsal row of setae of mid femur present only in apical half.

This is the first phylogenetic analysis of the genus Euryomma, and the low supports for all of the groups within the genus (Fig. 2), with the only exception of E. carioca + E. aburrae (we have suggested that these two species may be synonyms), indicate the need for additional data from molecular data and immature stages. There is no previous hypothesis regarding the definition of species groups in terms of morphological characters contrary to previous hypothesis regarding the definition of species from molecular data and immature stages. There is no may be synonyms), indicate the need for additional data from molecular data and immature stages. There is no previous hypothesis regarding the definition of species groups in terms of morphological characters contrary to the situation within the larger genus Fannia (DOMÍNGUEZ & ROIG-JUÑENT 2008). External morphological characters show a higher level of homoplasy than in Fannia, where the males of Euryomma are very similar in leg and thorax chaetotaxy. Male chaetotaxy in the genus Fannia allows the definition of many species-groups (DOMÍNGUEZ & ROIG-JUÑENT 2008), but the genus Euryomma does not show the striking sexual dimorphism of Fannia. And although characters from male and female genitalia were not as homogenous, they did not provide strong evidence for group support and in many cases the female genitalia is unknown.

The known distribution ranges of many species of Euryomma have been extended in this revision, but still very little is known of the distribution of each species. Many species, such as E. chitarera which was described from Colombia, has been also found in Argentina, leaving the gap between these two localities to explore for further information. Many species of Euryomma show this disjunct pattern of distribution, e.g. E. nigrofemur described by STEIN (1911) from Chile, has been recently collected in Colombia, Costa Rica and Nicaragua (Fig. 3), indicating that a picture of the fauna of Euryomma is still far from complete and does not allow us to make any biogeographical interpretation. We hope that further studies on this fascinating genus will reveal interesting evolutionary and biogeographical patterns.

7. Acknowledgments

Financial support for this study was partially provided by FON-CyT (Grant PICT 2012 N°0231, to Dr. Pablo Mulieri). We are very thankful to Adrian C. Pont (Oxford, United Kingdom) for suggestions and comments and for kindly sharing his knowledge on Fannid taxonomy. M.C.D. is especially thankful for help with the loans of type specimens to: Adrian C. Pont, Uwe Kallweit (Dresden, Germany), Björn Rulik (Dresden, Germany), James O’Hara (Ottawa, Canada), Raymond J. Gagné (Washington, USA) and Martin Lödl (Vienna, Austria). To Gabriel, my five-year-old son, for his contagious enthusiasm.

8. References


