

## SYSTEMATICS, MORPHOLOGY AND PHYSIOLOGY

*Rhinoleucophenga joaquina* sp. nov. (Diptera: Drosophilidae) from the Neotropical RegionHERMES J SCHMITZ<sup>1</sup>, MARCO S GOTTSCHALK<sup>2</sup>, VERA L S VALENTE<sup>1,2</sup>

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*Rhinoleucophenga joaquina* sp. nov. (Diptera: Drosophilidae) da Região Neotropical

RESUMO - O gênero *Rhinoleucophenga* Hendel compreende 18 espécies nominais e possui distribuição Neotropical e Neártica. Uma nova espécie foi encontrada em coleta realizada em Florianópolis, SC, e é descrita como *Rhinoleucophenga joaquina* sp. nov. Os espécimes encontrados emergiram de flores de *Dyckia encholirioides* (Bromeliaceae) coletadas em região de restinga sobre dunas. Este é o primeiro registro da utilização de flores como sítio de oviposição para *Rhinoleucophenga*.

PALAVRAS-CHAVE: Taxonomia, nova espécie, Steganinae, Insecta, Brasil

ABSTRACT - The genus *Rhinoleucophenga* Hendel comprises 18 nominal species and has a Neotropical and Nearctic distribution. A new species was found in a collection in Florianópolis, SC, Brazil, and is described as *Rhinoleucophenga joaquina* sp. nov. The specimens found were reared from flowers of *Dyckia encholirioides* (Bromeliaceae), collected in a region of restinga on the dunes. The use of flowers as breeding site for *Rhinoleucophenga* has never been reported before.

KEY WORDS: Taxonomy, new species, Steganinae, Insecta, Brazil

*Rhinoleucophenga* Hendel is a genus with Neotropical and Nearctic distribution and currently comprises 18 nominal species. This genus is classified in the subfamily Steganinae, tribe Gitonini and subtribe Acletoxenina (Grimaldi 1990). It was erected by Hendel (1917) and new species were included by Duda (1927, 1929) and Malogolowkin (1946). Additionally, the genus *Pseudophortica* Sturtevant was synonymized under *Rhinoleucophenga* by Malloch & McAtee (1924), one species was transferred from *Drosophila* Fallén to *Rhinoleucophenga* by Vilela (1990) and the five American species originally described as *Gitona* Meigen are currently allocated in this genus by some authors (Brake & Bächli 2008).

The taxonomy and biology of species of this genus are poorly known. As result of our efforts to survey Drosophilidae species associated with living flowers, an undescribed species of *Rhinoleucophenga* was found in the dunes of Joaquina beach, in Florianópolis (SC), southern Brazil. This species is described in here.

### Material and Methods

The new species described in here was reared from flowers of a terrestrial bromeliad, *Dyckia encholirioides* (Bromeliaceae), collected at the Parque Municipal das Dunas da Lagoa da Conceição, in the municipality of Florianópolis, state of Santa Catarina, Brazil (27°38'S; 48°28'W), on the 28<sup>th</sup> of October, 2006. The park comprises a region of coastal sand dunes and restinga vegetation between Joaquina Beach and a coastal lagoon (Lagoa da Conceição), in the Santa Catarina Island, southern Brazil. The plant species was identified by one of us (HJS), and constitutes one important element of the flora of the shrubby restinga of the region (Falkenberg 1999).

One hundred living flowers at the stage of anthesis were collected, and separated from the axis of the inflorescence of *D. encholirioides*. The collection was carried out in the inner stable dunes, covered with herbaceous and brushy vegetation, in the western portion of the park. The flowers collected were

taken into plastic bags to the laboratory, transferred to vials with vermiculite and kept in a temperature-controlled room at 25°C. Twenty days later, six individuals of an undescribed species of *Rhinoleucophenga* emerged from the flowers, and another one emerged the day after. All seven specimens were males. No other insect emerged from the flowers.

The specimens were aged for 3-4 days after emergence and placed in ethanol: distilled water: acetic acid: glycerol (6:4:1:1). Measurements were taken with a reticle adjusted to an optical stereomicroscope. Male terminalia were disarticulated after treatment with 10% potassium hydroxide (KOH) and acid fuchsin (Wheeler & Kambysellis 1966, modified by Bächli *et al* 2004), and dissected in glycerol. Photos were taken with a digital camera coupled to an optical stereomicroscope, and drawings of male terminalia were made with a *camara lucida* attached to an optical microscope with a 10 x objective lens and a 10 x ocular lens.

The terminology follows Vilela (1990) and Bächli *et al* (2004). The measurements are given by averages followed by the ranges in parentheses.

The type-series was deposited in the Museu de Ciências Naturais (MCNZ), Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre, RS, Brazil. The specimens were pinned (double-mounted) and the disarticulated terminalia kept in microvials with glycerol, with the respective specimens. Before pinning, the specimens were dried with 100% ethanol, ethylene glycol and xylene, as described by Bächli *et al* (2004). Herbarium vouchers were deposited in the Herbário ICN, at the Universidade Federal do Rio Grande do Sul, Porto Alegre.

### *Rhinoleucophenga joaquina* sp. nov.

**Type series.** Male holotype labelled "*Rhinoleucophenga joaquina*; HOLOTYPE ♂; Brasil, Santa Catarina, Florianópolis, Joaquina; 27°38'S; 48°28'W; 28.x.2006 col.: H J Schmitz; ex: flores de *Dyckia encholirioides*". Six male paratypes labelled "*Rhinoleucophenga joaquina*; PARATYPE ♂; Brasil, Santa Catarina, Florianópolis, Joaquina; 27°38'S; 48°28'W; 28.x.2006 col.: H J Schmitz; ex: flores de *Dyckia encholirioides*". Postabdomen of holotype and two of the paratypes dissected, stored in microvials with glycerol, together with the respective specimen.

**Type locality.** Joaquina, Florianópolis, Santa Catarina, Brazil.

**Diagnosis.** Head and thorax mainly brownish. Arista microtrichose, with ca. 10-15 very short dorsal branches and no ventral branch. One strong pair of prescutellar acrostichal setae. Legs yellow, wings hyaline. Abdomen yellow, with black, medially interrupted marginal bands on tergites and a medial black stripe extending from the tip of the abdomen to tergite III or IV. Male terminalia as in Fig 1.

**Description. Male.** Head. Frons brownish, covered with ca. 9 (8-12) frontal setulae in each side and ca. 48 (35-54) scattered interfrontal setulae, frontal length 0.62 (0.60-0.64) mm; frontal index 1.12 (1.03-1.28), top-to-bottom width ratio 1.18 (1.10-

1.24). Ocellar triangle brown and prominent, around 35% (28-43%) of frontal length. Orbital setae black, distance of or3 to or1 70% (60-82%) of or3 to vtm, or1/or3 ratio 1.29 (0.63-1.87), or2/or1 ratio 0.30 (0.19-0.45), postocellar setae 14% (12-17%) and ocellar setae 52% (45-73%) of frontal length, vt index 0.67 (0.60-0.76). One pair of large vibrissae, vibrissal index 0.28 (0.19-0.42). Face brown. Carina prominent, nose-like, broadened downwards. Cheek index 4.69 (4.0-6.12). Eye index 1.32 (1.26-1.45). Occiput brownish, paler medially. Antennae brownish. Aristae minutely pubescent, with ca. 10-15 very short dorsal branches and no ventral branch (Fig 3). Proboscis yellow. Palpus brownish, with ca. 20 black setae along lower margin.

Thorax length 1.85 (1.62-2.00) mm. Scutum homogeneously brown or with three faint longitudinal stripes slightly darker (Fig 4); more than 10 irregular rows of acrostichal setulae. One strong pair of prescutellar acrostichal setae, about 59% (54-64%) of posterior dorsocentral setae. Transverse distance of dorsocentral setae 4.22 x (3.75-5.00 x) of longitudinal distance, dc index 0.45 (0.42-0.51). Scutellum brown, distance between apical scutellar setae about 82% (67-100%) of that between apical and basal one; basal scutellar setae divergent; scut index 1.05 (0.97-1.13). Just one pair of postpronotal setae. One pair of proepisternal setae, about 65% (50-78%) of postpronotal setae. Pleura brown, sterno index 0.96 (0.86-1.08), median katepisternal setae absent. Halteres whitish. Legs yellow.

Wings hyaline, veins yellow; length 3.03 (2.88-3.19) mm, length to width ratio 2.18 (2.09-2.28). Indices: C, 3.02 (2.84-3.31); ac, 1.30 (1.18-1.50); hb, 0.53 (0.40-0.60); 4C, 1.01 (0.97-1.15); 4v, 2.35 (2.16-2.59); 5x, 1.54 (1.39-1.62); M, 0.85 (0.81-0.96); prox. x, 0.92 (0.84-1.04).

Abdomen yellow, with black, medially interrupted marginal bands on tergites and a medial black stripe extending from the tip of abdomen to tergite III or IV (Fig 5).

Body length 4.59 (4.22-4.80) mm.

Terminalia (Fig 1). Surstyli fused to epandrium, in each side with 18-19 black rod-shaped prenisetae slightly round at tip. Decasternum absent. Hypandrium width greater than length. Aedeagus as a ring, dorsoventrally flattened, with two terminal processes linked to aedeagal apodeme in the anterior region. Paraphysis long, erect, dorsoventrally flattened, slightly shorter than aedeagus, bearing three setulae at tip, beyond three or four setulae placed subdistally (the latter missing in the holotype). Aedeagal apodeme long and rod-shaped.

Female. Unknown.

**Etymology.** The species name refers to its type locality, the dunes of Joaquina beach.

**Distribution.** Known only for the type locality.

**Biology.** Bred from flowers of *Dyckia encholirioides*.

### Discussion

*Rhinoleucophenga joaquina* sp. nov. will not fit or will run wrongly in the available keys to Drosophilidae genera.

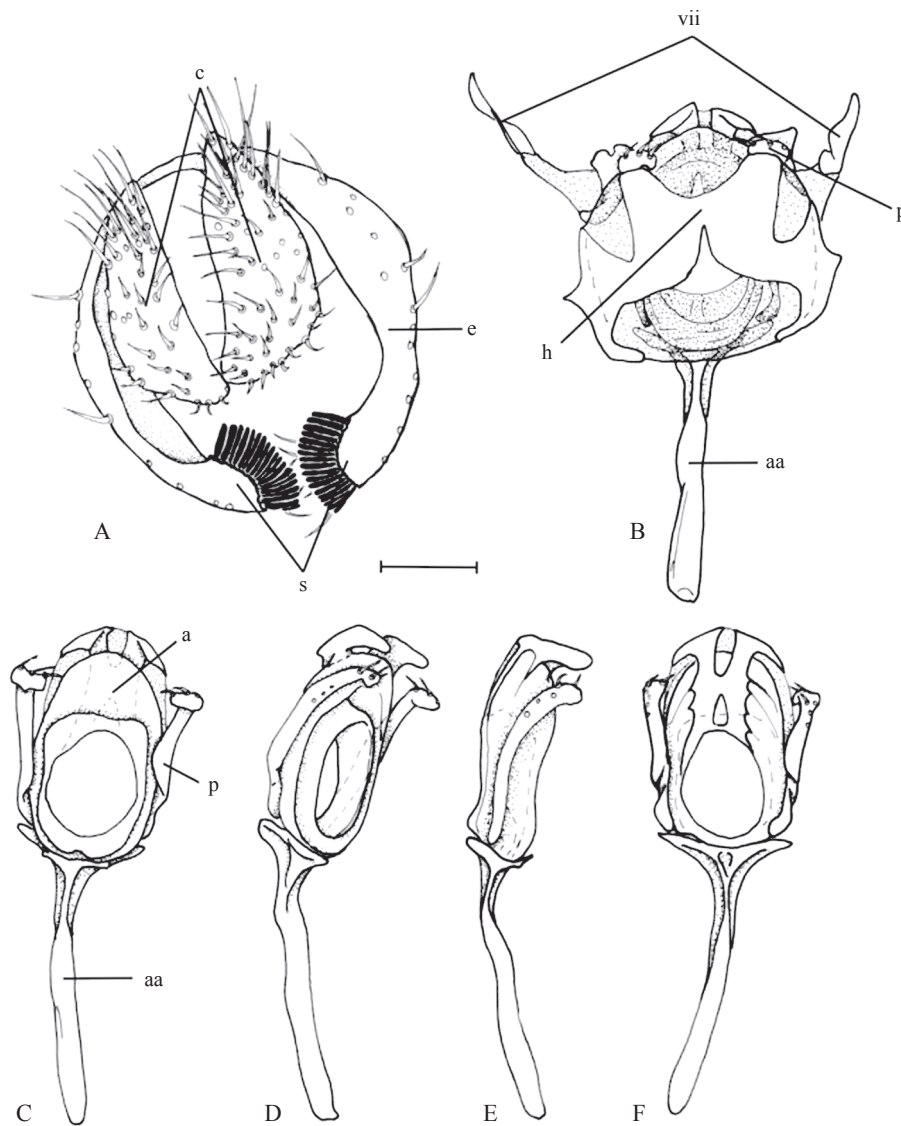
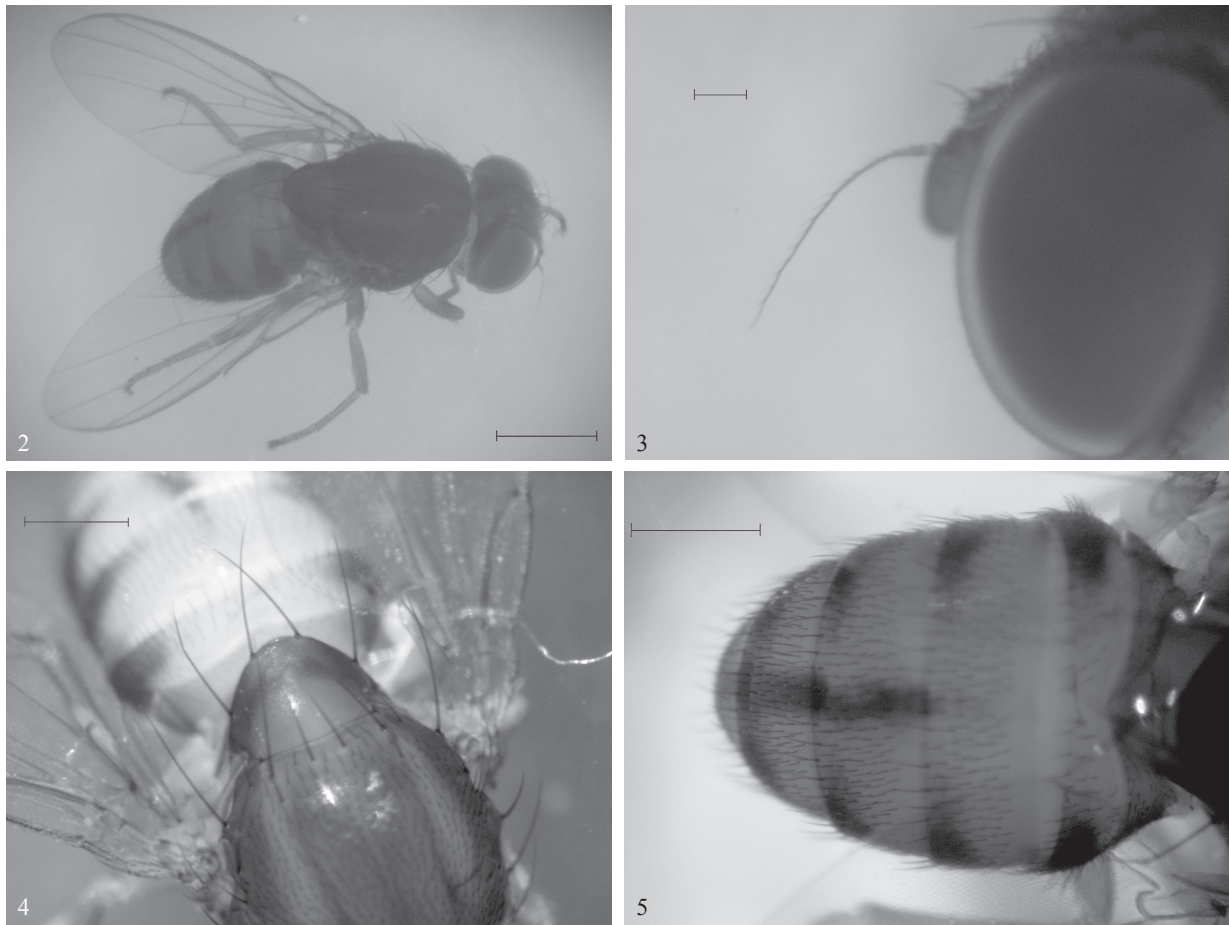


Fig 1 Male terminalia of *Rhinoleucophenga joaquina* sp. nov., male holotype. A. epandrium (e), cerci (c), and surstyli (s), oblique posterior view; B. hypandrium (h), sternite VII (vii), aedeagal apodeme (aa), paraphyses (p), and aedeagus, ventral view; C-F. aedeagus (a), aedeagal apodeme (aa), and paraphyses (p), several views from ventral through dorsal. All figures were drawn to the same scale. Scale bar = 0.1 mm.

It runs to *Gitona* in several of them (Sturtevant 1921, Patterson & Mainland 1944, Wheeler 1952, Bächli *et al* 2004) due to its unusual micropubescent aristae, contrasting to the plumose aristae of most of its congeners. If the micropubescent aristae are not taken into account and are treated as plumose, this species runs to *Rhinoleucophenga* in the keys of Sturtevant (1921), Malloch & McAtee (1924), Wheeler (1952, 1987) and Okada (1989). In the key of McAlpine (1968) for Drosophilidae genera with bare or micropubescent aristae, it runs to “Nearctic species assigned to *Gitona*” (but the mesonotum is not spotted). The traditional circumscription of *Rhinoleucophenga* comprises only species bearing plumose aristae. However, several authors pointed out that the Neotropical and Nearctic species that have bare or micropubescent aristae which were assigned to *Gitona*, were actually incorrectly placed

(McAlpine 1968, Wheeler & Takada 1971, Ashburner 1981, Bächli *et al* 2004, but see Grimaldi 1990 for a different opinion), and are classified as *Rhinoleucophenga* in the world catalogue of Brake & Bächli (2008). These species are *R. americana* (Patterson), *R. bivisualis* (Patterson), *R. brasiliensis* (Costa Lima), *R. fluminensis* (Costa Lima) and *R. sonoita* (Wheeler). Here, we also adopted a wider circumscription of *Rhinoleucophenga*, in agreement with Brake & Bächli (2008), including these species and the newly described *R. joaquina* sp. nov. in the genus *Rhinoleucophenga* instead of *Gitona*.

The morphological characters of *R. joaquina* sp. nov. fit well into the diagnosis of the genus provided by Malogolowkin (1946). In addition, it does not have the thorax spotted as *Gitona*. Furthermore, the analysis of male terminalia confirmed its identity as a *Rhinoleucophenga*



Figs 2-5 *Rhinoleucophenga joaquina* sp. nov., male paratype. 2) general aspect, oblique dorsal view; 3) head, detail of arista, left lateral view; 4) thorax, detail of scutellum, dorsal view; 5) abdomen, dorsal view. Scale bars: in Fig 2 = 1 mm; in Fig 3 = 0.1 mm; in Figs 4-5 = 0.5 mm.

species. It differs from all of its congeners by its colour pattern, the micropubescent arista and the male terminalia (in comparison with the descriptions in Duda 1927, 1929, Patterson 1943, Malogolowkin 1946, Costa Lima 1935, 1937, 1950, Wheeler 1949, 1952, Wheeler & Takada 1971, Vilela 1990). Although the male terminalia were not described for most of the species of the genus, *R. joaquina* sp. nov. clearly differs from all the other species by its colour pattern, especially the abdominal medial black stripe, and by the micropubescent arista, contrasting with the clearly plumose arista of almost all of its congeners. Furthermore, it is also very different from other species of the genus with micropubescent arista. It differs from all of them by the abdominal medial black stripe, and from *R. americana*, *R. bivisualis* and *R. sonoita* in not having the thorax spotted. The arista morphology is also quite different: at least *R. bivisualis* and *R. brasiliensis* clearly have ventral branches (Costa Lima 1937, Patterson 1943), which are lacking in *R. joaquina* sp. nov.

The lack of more detailed information on species of this genus, especially on male terminalia morphology, makes difficult to establish the relationships of *R. joaquina* within the genus.

The ecology of *Rhinoleucophenga* is also badly known. *Rhinoleucophenga americana* and *R. sonoita* were recorded to breed in cacti (Wheeler 1952). *Rhinoleucophenga obesa* (Loew), *R. brasiliensis* and *R. fluminensis* are known to prey on coccids during the larval stage (review in Ashburner 1981). Sturtevant (1921) mentioned having examined specimens of *R. obesa* collected "on persimmons". The presence of *Rhinoleucophenga* in flowers has never been reported. Although we have collected flowers of many other species of plants in order to obtain drosophilids in Joaquina dunes as well as in other sites, no other specimen of *R. joaquina* sp. nov. was found. Its biology remains obscure. If it is a host-specific flower-breeding species or if it can exploits other breeding sites remains unknown.

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