



Dishkeya, a recently described endemic Tischeriidae genus, now discovered in Colombia

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Abstract

This paper describes *Dishkeya ursipedella* Diškus, Mey & Stonis, **sp. nov.** from Cundinamarca, Choachi (Colombia). The new species was collected at night time at light, therefore, the host plant remains unknown. The examination of morphology of the male genitalia of *D. ursipedella* revealed a highly distinctive new taxon of trumpet moths belonging to the recently described endemic genus *Dishkeya* Stonis. The new species is illustrated with photographs of the male genitalia, adults, and habitats. In a pictorial scheme, the male genitalia characters of *D. ursipedella* are compared with those of all other currently known members of *Dishkeya*.

Key words: *Dishkeya ursipedella*, leaf miners, Neotropics, trumpet leafminer moths

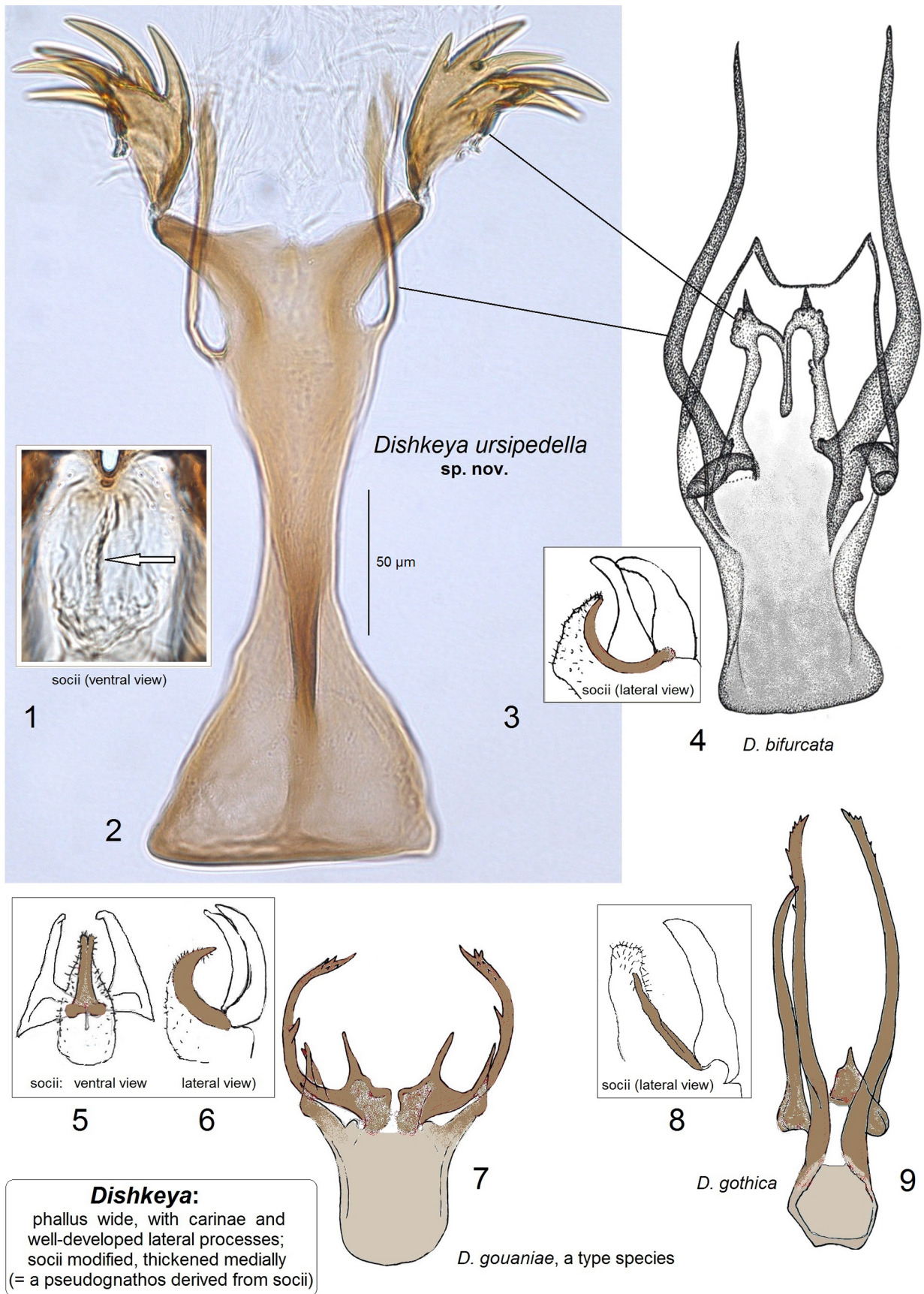
Introduction

Genus *Dishkeya* Stonis is a small genus of Tischeriidae recently described from the Americas (Stonis & Solis 2020). Previously, a couple of species, *Tischeria bifurcata* Braun, 1915 and *T. gouaniae* Stonis & Diškus, 2007 were excluded from the genus *Tischeria* Zeller because of some morphological characteristics not fitting to the diagnosis of *Tischeria*. Both these species were known as possessing greatly modified socii and, what is most important, were characterized by a well-developed carinae of the phallus instead of having a juxta, a major diagnostic character of *Tischeria* (Stonis & Solis 2020). It was also stated that retaining such species in *Tischeria* makes the genus *Tischeria* paraphyletic and the generic diagnostics of Tischeriidae rather complicated and inconvenient for users. Therefore, the authors excluded *T. bifurcata* and *T. gouaniae* from *Tischeria*, described a third, distinctive, species from Bolivia, and erected a new genus for all these three species.

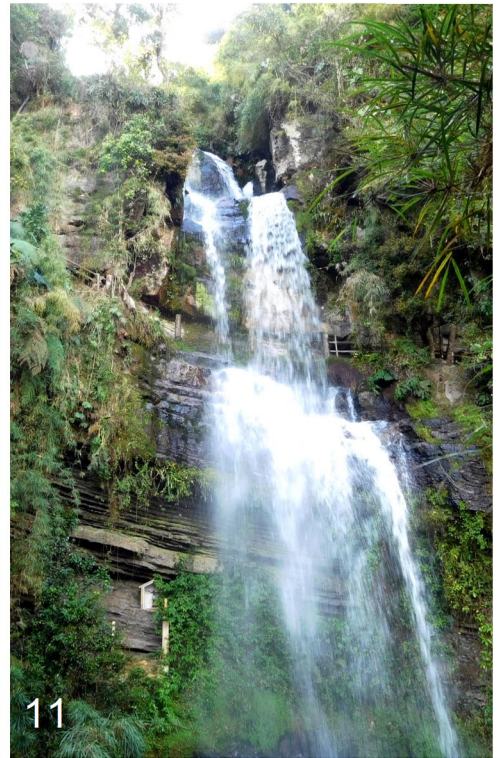
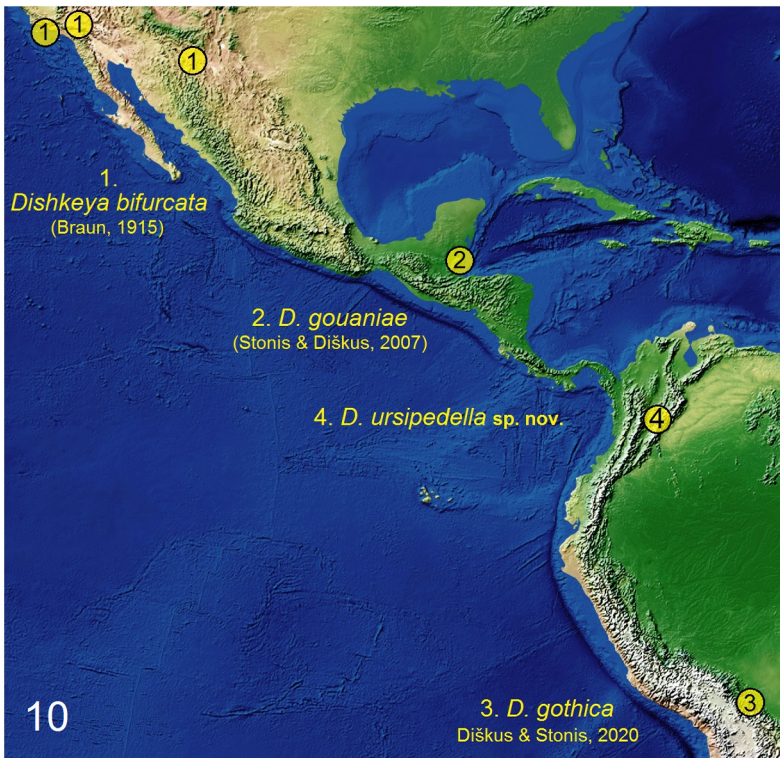
In the male genitalia, the genus *Dishkeya* is characterized by supposedly derived characters: thickened socii (or a unique pseudognathos which is derived from socii) and well-developed lateral processes as well as greatly developed carinae of the phallus (Figs 1–9). *Dishkeya* also differs from *Tischeria* in the absence of a juxta (see Stonis & Solis 2022).

Before our study, the genus was comprised of three species known from southern states of the USA, as well as Belize, and Bolivia (Fig. 10). Our current examination of the material collected by Wolfram Mey in Cundinamarca, Choachi, near the famous La Chorrera waterfall (Figs 11, 12) in Colombia has resulted in the discovery of one more *Dishkeya* species, *D. ursipedella* **sp. nov.** This new species is characterized by distinctive, rather outstanding, morphology of the male genitalia, and the data on the species morphology and distribution broaden our knowledge of *Dishkeya* in general.

In the current paper, we document and name the new species and compare its male genitalia characters with the morphology of all other known members of the recently erected genus *Dishkeya*.



FIGURES 1–9. Socii and phallus of *Dishkeya* Stonis. 1, 2, *D. ursipedella* Diškus, Mey & Stonis, **sp. nov.**; 3, 4, *D. bifurcata* (Braun); 5–7, *D. gouaniae* (Stonis & Diškus); 8, 9, *D. gothica* Diškus & Stonis



FIGURES 10–12. Distribution map and habitats. 10, currently known distribution of the *Dishkeya* species; 11, 12, habitats of *D. ursipedella* Diškus, Mey & Stonis, **sp. nov.**, in Choachi, Cundinamarca, near La Chorrera waterfall, at an altitude of about 2500 m

Material and methods

The description of the new species is based on the material deposited in the collection of the Museum für Naturkunde (MfN), Berlin, Germany, which was collected by Wolfram Mey in February 2017 in Colombia. Later, the material (holotypes) will be transferred to Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá (UNC).

Adults were caught at night time by using a battery (12 V) operated light tower from the F. Weber company, Stuttgart (Germany), equipped with two 15 W super actinic light tubes.

Preparation of genitalia mounts was done following Stonis *et al.* (2022). Abdomens were macerated in 10% KOH, and genital capsules, as well as phallus, were mounted in Euparal ventral side uppermost. Genitalia mounts on microscope slides were examined and photographed by using a Leica DM2500 microscope and a Leica DFC420 digital camera. Adults were studied and measured by using a Lomo10 stereoscopic microscope and photographed by using a Leica S6D stereoscopic microscope with an attached Leica DFC290 digital camera.

Description of a new species

Dishkeya ursipedella Diškus, Mey & Stonis, sp. nov.

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(Figs 1, 2, 11–30)

Type material. Holotype: ♂, COLOMBIA: Cundinamarca, Choachi (waterfall La Chorrera), 4°35'33"N, 73°57'36"W, elevation 2500 m, 1–2.ii.2017, leg. Wolfram Mey, genitalia slide no. AD1119 (MfN/UNC). Paratype: 1 ♂, same label data as holotype, genitalia slide no. AD1120 (MfN).

Diagnosis. Externally, this new species can be confused with some other dark-coloured species. In the male genitalia, the unique shape of the five-clawed carinae (Fig. 24), slender lateral processes of the phallus (Fig. 24), spinose uncus (Figs 15, 16, 23), and unique dorsal process of the valva with a basal arc (Figs 18, 19) distinguish *D. ursipedella* sp. nov. from all known congeneric species.

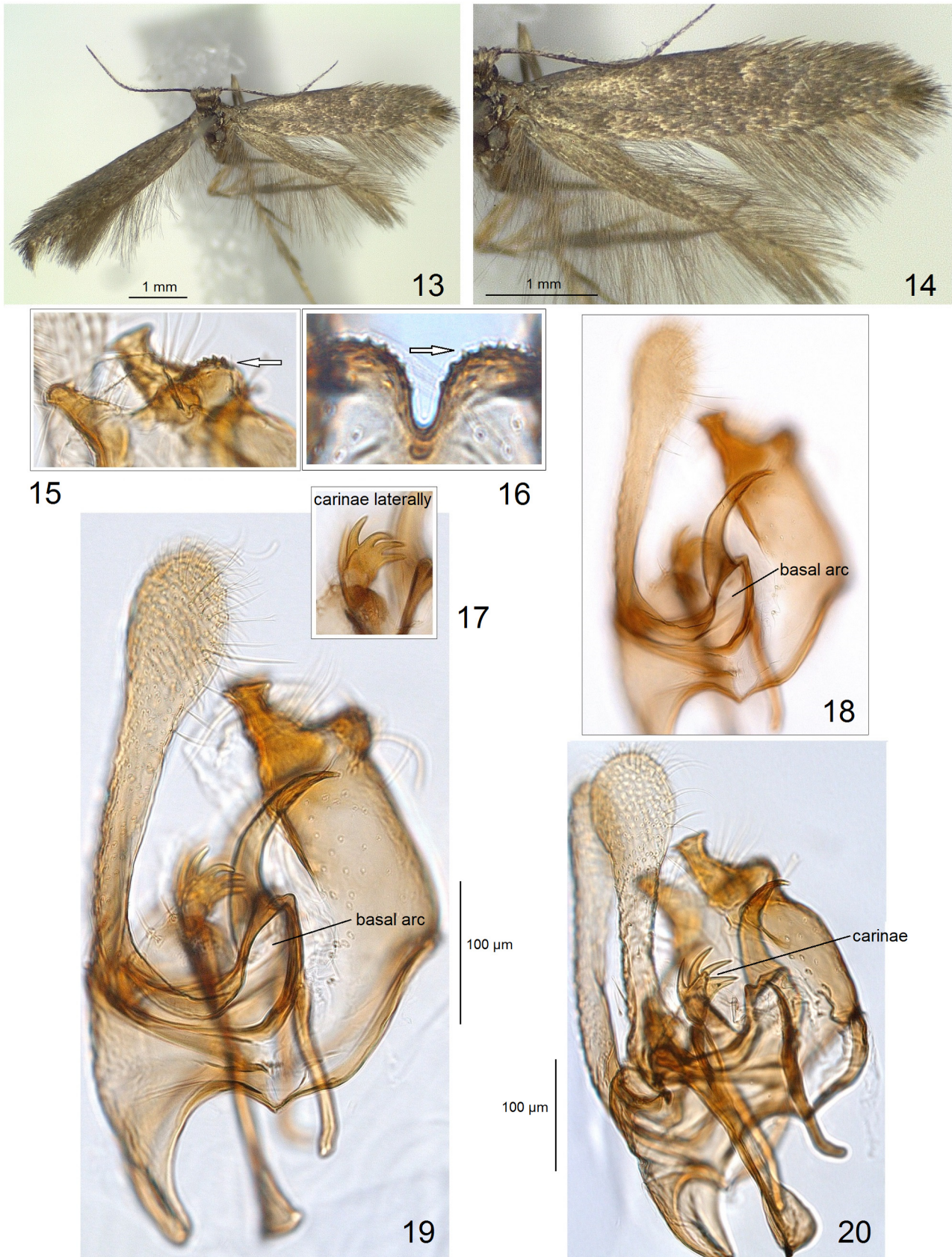
Male (Figs 13, 14). Forewing length 3.7–4.0 mm; wingspan 8.0–8.7 mm (n = 2). Head: frons and palpi pale grey; pecten small, slender, grey; frontal tuft and collar comprised of lamellar scales; frontal tuft brown-grey, distally pale grey, basally blackish grey; collar grey, distinctive; antenna longer than one half the length of forewing; flagellum brown-grey; sensillae 4–5 times longer than the width of the flagellum. Tegula and thorax covered with brown-grey scales. Forewing brown-grey, sparsely speckled with some dark brown scales; fringe grey, with an indistinctive fringe line; forewing underside dark brown, without spots or androconia, except for blackish grey special scales along costal margin at the forewing base. Hindwing dark brown-grey on upper side and underside, without androconia; fringe grey. Legs blackish grey on upper side, pale grey to grey cream on underside. Abdomen brown-grey on upper side, pale grey, glossy on underside; genital plates contrasting with the colour of the abdomen, cream; anal tufts lateral, almost merging, comprised of long brown scales.

Male genitalia (Figs 15–30) with capsule 480–490 µm long, 240–280 µm wide. Uncus (Figs 15, 16, 25) comprised of two relatively long and slender lateral lobes and short, rounded median lobes; the latter covered with thickened spines distally. Socii (Figs 23, 25) large, weakly paired or non-paired, with very little spines mostly on the medial fold (Fig. 25). Valva (Figs 18, 19, 21, 26–28) ca. 315 µm long (excluding the basal process); ventral lobe with a basal fold (Fig. 27); dorsal process (Figs 18, 19, 22, 26, 28) greatly developed but at a distance from the ventral lobe and with a basal arc (Figs 19, 26); there is also a short but wide lobe-like process in between the dorsal and ventral lobes (Figs 22, 28). Anellus absent. Vinculum relatively large, rounded or triangular distally (Figs 19, 21, 29, 30). Phallus (Fig. 24) 280–305 µm long, wide basally and apically, constricted medially, with slender lateral processes and well-developed five-clawed carinae.

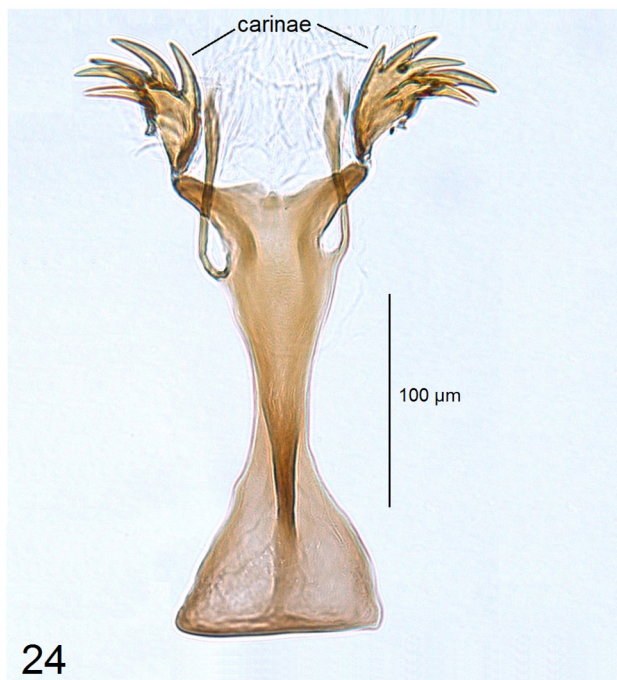
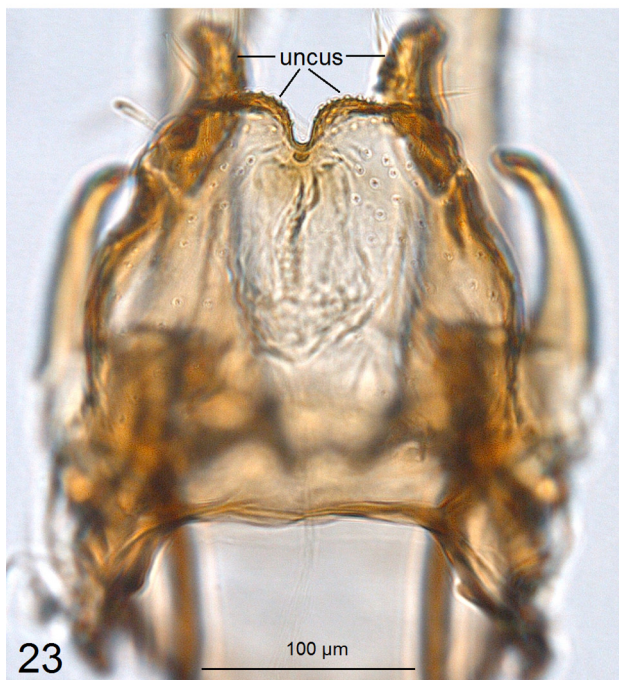
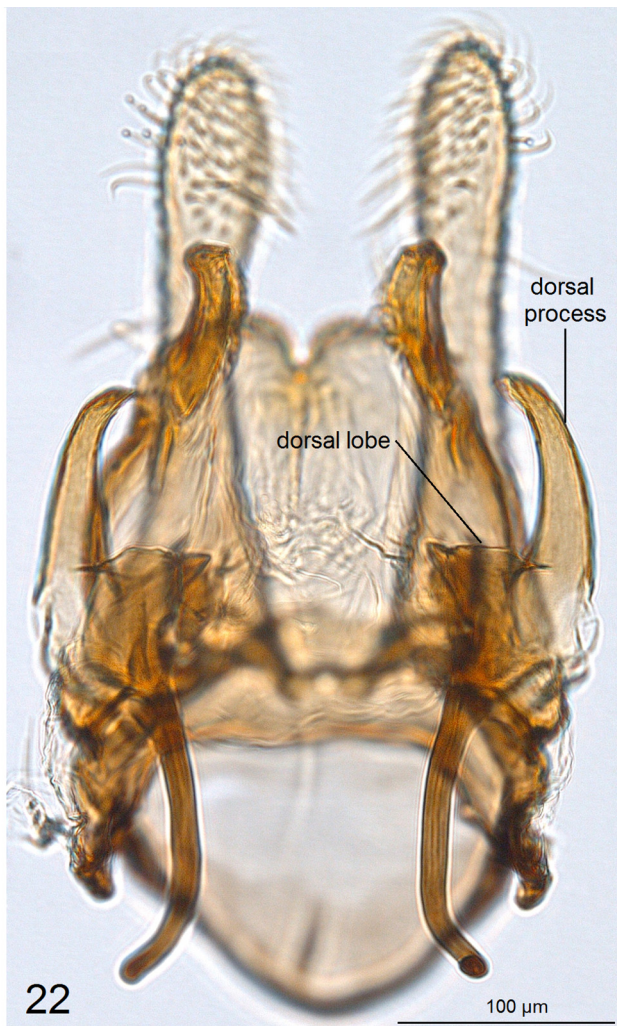
Female. Unknown.

Bionomics (Figs 11, 12). The host plant is unknown (see Discussion). Adults fly in February. Otherwise, the biology is unknown.

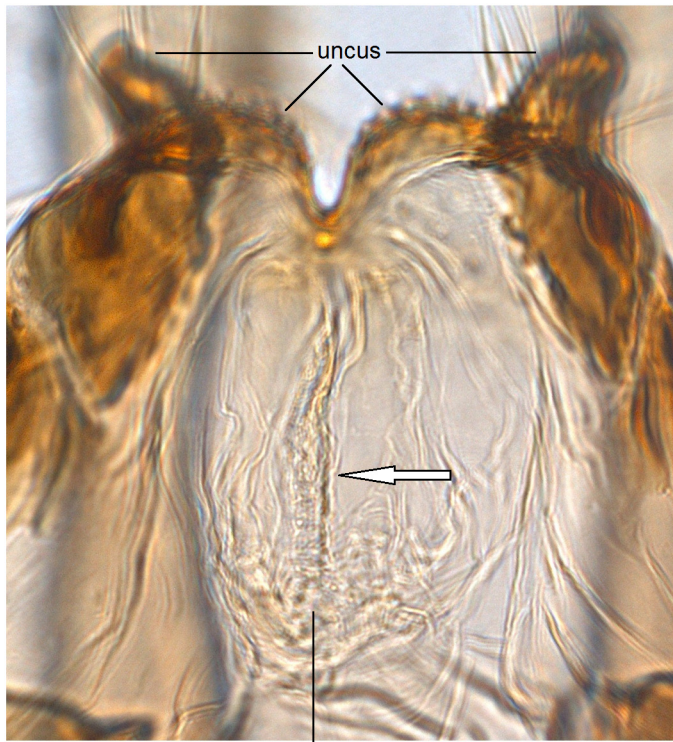
Distribution. This species is known from a single locality in Colombia (Choachi, Cundinamarca, near La Chorrera waterfall), at an altitude of about 2500 m.



FIGURES 13–20. *Dishkeya ursipedella* Diškus, Mey & Stonis, **sp. nov.** 13, 14, male adult, holotype; 15, male genitalia, holotype, genitalia slide no. AD1119, uncus, lateral view; 16, same, medial lobes of uncus, ventral view; 17–20, same, capsule with phallus inside, lateral view (MfN/UNC)



FIGURES 21–24. *Dishkeya ursipedella* Diškus, Mey & Stonis, **sp. nov.**, holotype, genitalia slide no. AD1119. 21–23, capsule with phallus removed; 24, phallus, ventral view (MfN/UNC)



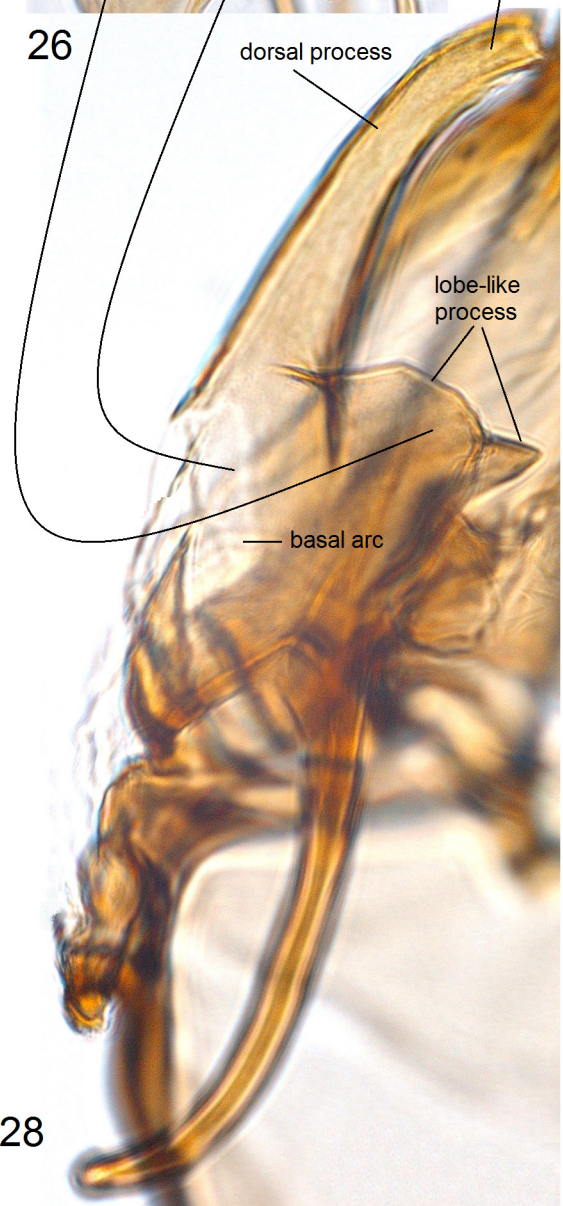
25

socii



26

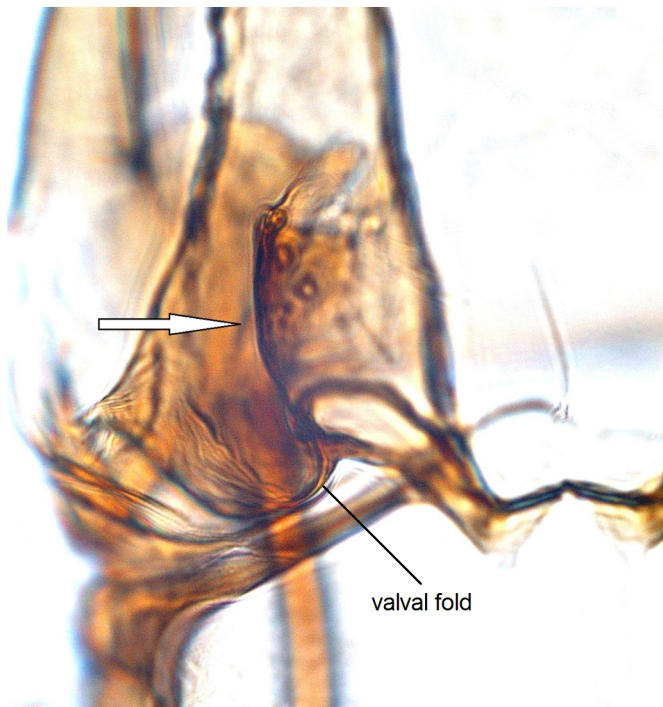
basal arc



dorsal process

lobe-like process

basal arc



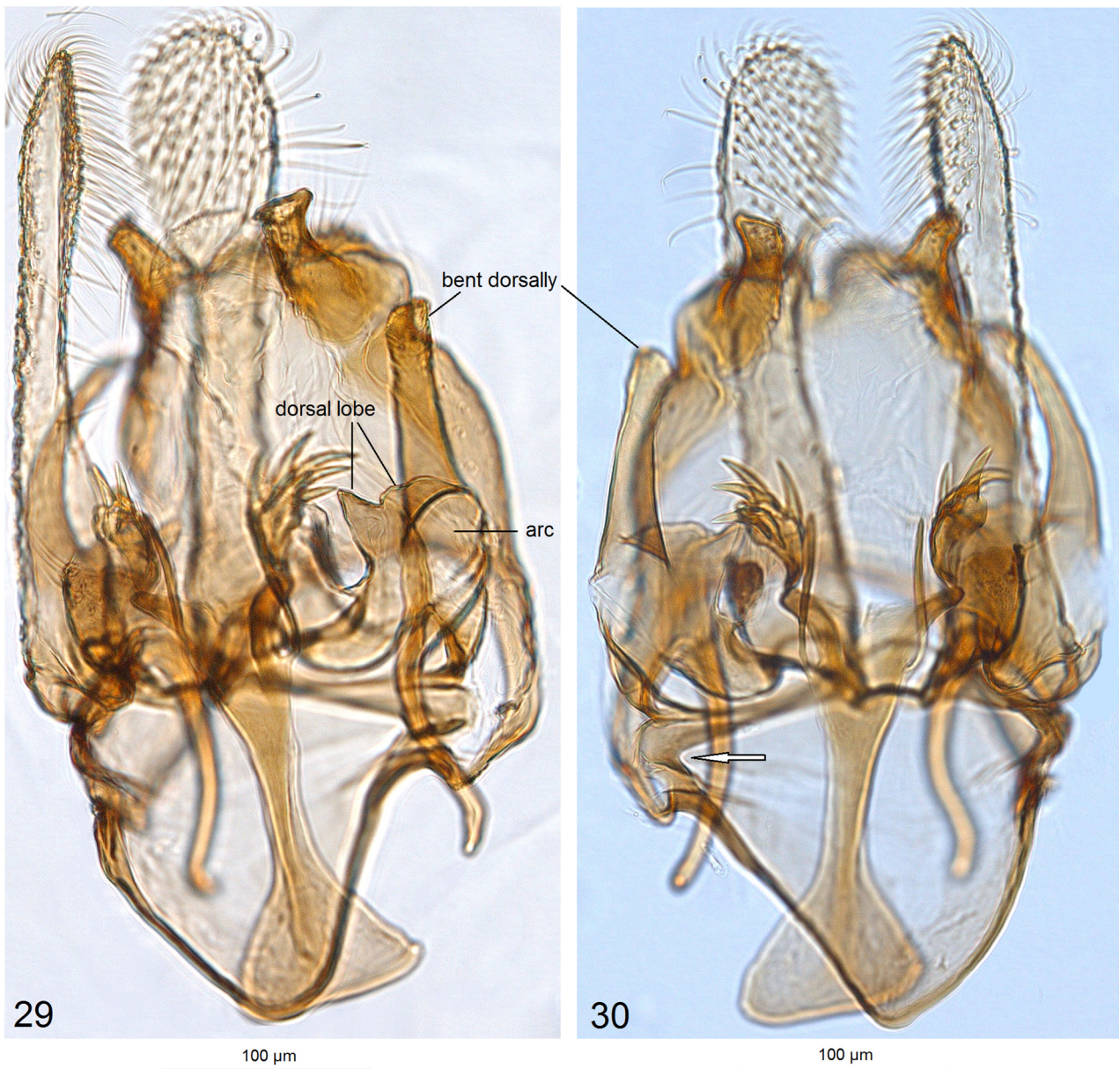
27

valval fold

28

FIGURES 25–28. *Dishkeya ursipedella* Diškus, Mey & Stonis, **sp. nov.**, details of male genitalia, slide no. AD1119, holotype. 25, ventral view; 26, lateral view; 27, 28, ventral view (MfN/UNC)

Etymology. The species name is derived from Latin *ursus* (a bear) and *pedis* (a foot) in reference to the distinctive claw-like carinae of the phallus in the male genitalia.



FIGURES 29, 30. *Dishkeya ursipedella* Diškus, Mey & Stonis, **sp. nov.**, male genitalia, capsule with phallus inside. 29, holotype, slide no. AD1119; 30, paratype, slide no. AD1120 (note the slightly different angle of the view) (MfN/UNC)

Key to the currently known *Dishkeya* species

- 1. Phallus (excluding lateral processes) short; carinae asymmetrical *D. gothica*
- Phallus long; carinae symmetrical 2
- 2. Phallus strongly constricted medially *D. ursipedella*
- Phallus wide medially 3
- 3. Lateral processes of phallus with spines *D. gouaniae*
- Lateral processes of phallus without spines *D. bifurcata*

Discussion

Dishkeya Stonis, a small genus comprising only four species so far, is a distinctive taxon of Tischeriidae. Our unpublished molecular studies have also shown *Dishkeya* as a separate clade (Stonis *et al.* in prep.).

The discovery of *D. ursipedella*, a highly distinctive and morphologically unusual new species, is important because it provides novel morphological and diversity data about the rare and endemic genus *Dishkeya*. The newly discovered species possesses a medially constricted phallus and an unusually strongly developed carinae. Mainly because of the clear demarcation between the phallus and carinae, these five-claw carinae might resemble a juxta of the predominately Old-World *Tischeria* Zeller and the recently described Old-World *Manitischeria* Diškus & Stonis (Stonis *et al.* 2021). However, here, we treat this paired morphological structure as not homologous to the juxta of *Tischeria* or *Manitischeria* but derived from carinae similar to that of *D. bifurcata* (Fig. 4).

It is noteworthy that dorsal lobes (processes) of the valva of *D. ursipedella* resemble those of *Astrotischeria* Puplesis & Diškus, 2003; however, only at first look. When studied from the lateral view (Figs 18, 26), the dorsal lobes of *D. ursipedella* were found different from those of *Astrotischeria*. Moreover, there is a short but wide lobe in between the dorsal lobe and the main body of the valva (Fig. 28). The anellus seems to be absent in *D. ursipedella* as it is lacking in all other *Dishkeya* species. However, it was found that there was an unusual valval fold in *D. ursipedella* extending into another, papillated, lobe (shown in Fig. 27 with an arrow).

Socii of *D. ursipedella* are modified but, unlike the socii of other *Dishkeya* species, less chitinized and do not form a pseudognathos. In addition, the short and rounded dorsal lobes of the uncus of *D. ursipedella* have unique thickened spines (Figs 15, 16, 25).

Unfortunately, the host of *D. ursipedella* is unknown, but all three other *Dishkeya* species are trophically associated exclusively with Rhamnaceae plants (Stonis & Solis 2020). Therefore, it can be assumed that *D. ursipedella* is also a Rhamnaceae-feeding species.

Despite the fact that currently the genus is known from few geographically separated areas (Fig. 10), it can be expected that the genus might have an almost continuous distribution at least along the West coast of the Americas (Stonis & Solis 2020). It would not be surprising if more species of *Dishkeya* were discovered in the future.

Acknowledgements

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