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Two new genera and two new species of Conopidae (Diptera) from China

With 32 figures and 1 key

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Abstract

Gellergrimmellus fritzi gen. et spec. nov. and *Hauserimyia martini* gen. et spec. nov. are described from Sichuan Province, China. A key to the Palaearctic and Oriental genera of Conopinae with a short proboscis is presented which includes both of the new genera described herewith.

Nomenclatural acts

Gellergrimmellus fritzi spec. nov. – urn:lsid:zoobank.org:act:2A744921-9129-4B6C-A0E5-163E0AE6AC7D
Hauserimyia martini spec. nov. – urn:lsid:zoobank.org:act:73C2ED04-9AB4-4DF6-82D1-A1F8EC0BAF75

Key words

Conopidae, Conopinae, *Gellergrimmellus*, *Hauserimyia*, taxonomy, gen. et spec. nov., Sichuan, China, key

Zusammenfassung

Gellergrimmellus fritzi gen. et spec. nov. und *Hauserimyia martini* gen. et spec. nov. werden aus der Provinz Sichuan, China, beschrieben. Ein Bestimmungsschlüssel für die paläarktischen und orientalischen Conopidengattungen mit einem kurzen Proboscis wird präsentiert – darin sind die beiden neuen Gattungen enthalten.

Schlüsselwörter

Conopidae, Conopinae, *Gellergrimmellus*, *Hauserimyia*, Taxonomie, gen. et spec. nov., Sichuan, China, Bestimmungsschlüssel

Introduction

New conopid genera have previously been introduced in two ways: (1) a new genus has been erected for a well-known species or species-group because of new interpretations of morphological characters; (2) an undescribed but very distinctive species is found which cannot be placed in any known genus. Because the Conopidae are comparatively well known the second route has become very uncommon following the major revisions of the family by Kröber (1939a, b, c, d, 1940a, b). Within the last 60 years only a few new conopid species have been described in a new genus, mainly arising from the very distinctive faunas of Australia (Schneider 2010), Brazil (Pearson 1974, Papavera 1970) and Madagascar (Camras 1962). Recently, however, I received a small collection of Conopidae from China which contained only a few specimens, but it was at once obvious that two of the species in the collection are both undescribed and belong to an undescribed genus. This is the most exciting material I have ever received in my time as a conopid researcher! The new material is described herewith.

Methods

The terminology used for the description is adopted from Cumming & Wood (2009). The terminology used to describe the postabdomen is additionally illustrated in Figs 9–10 and 25–27. The term "hair" is replaced by "setula" because I cannot distinguish between genuine hairs and setulae. The term "seta" is used if the structure is stronger than the surrounding setulae or can be identified as one of the known setae of the acalyptrate chaetotaxy. Numbers of setae refer to one side of the body only. For primary type material the original labels are cited as follows: the labels are listed and numbered in the order found, commencing with the uppermost. Linebreaks on labels are indicated by a slash-mark („/").

Results

Gellergrimmellus gen. nov.

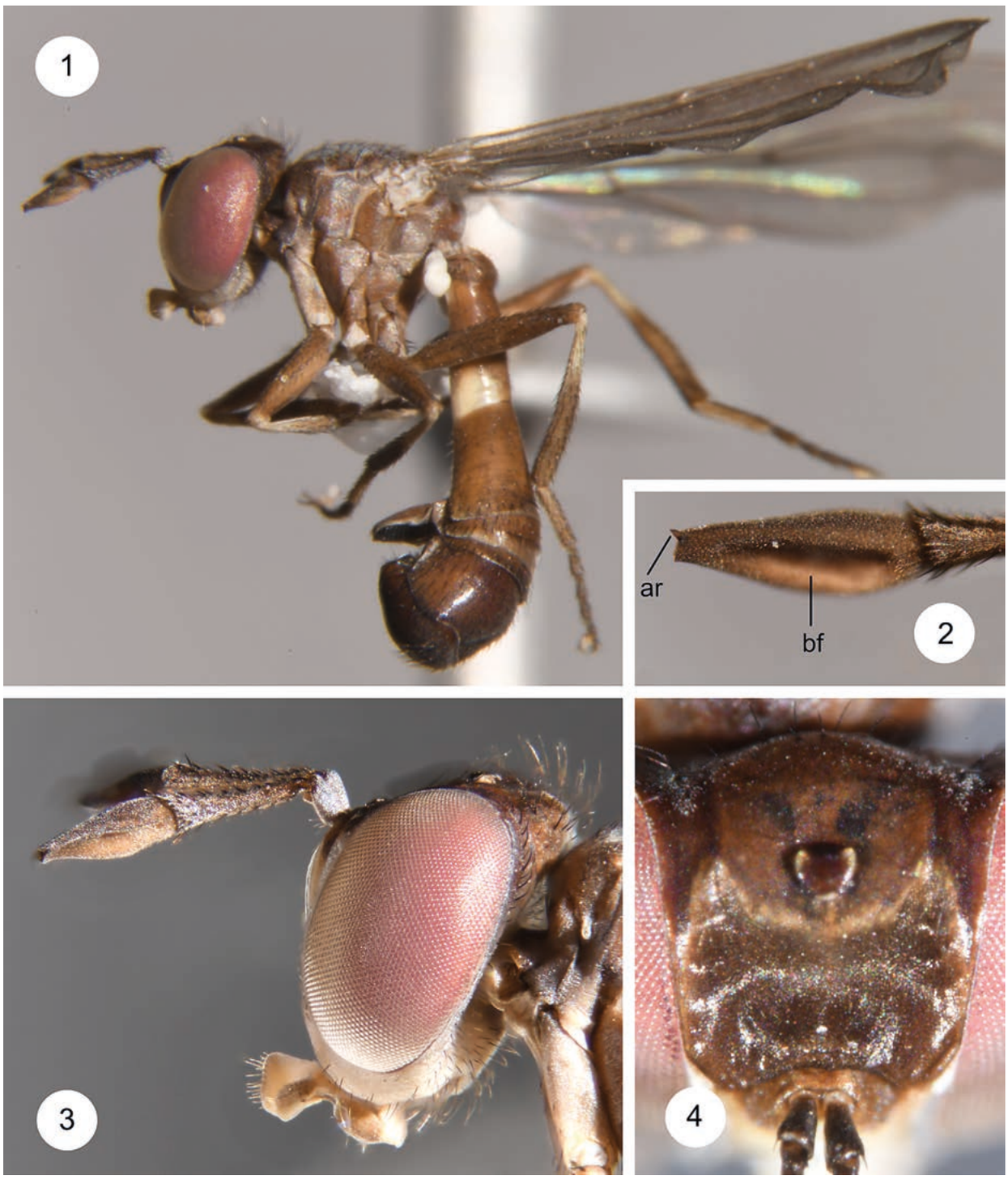
(Figs 1–13)

Type-species: *Gellergrimmellus fritzi* spec. nov., designated herewith.

Diagnosis: *Gellergrimmellus* is easily identified by the combination of the following characters: three distinct ocelli (Fig. 4), frons and vertex smooth, lacking any obvious grooves (Fig. 4), proboscis shorter than head length (Fig. 3), arista reduced to only one visible aristomere (Fig. 2), wing completely covered with microtrichia, and tibiae dorsally with preapical setulae. At first glance *Gellergrimmellus* resembles some of the Australian Conopinae which may be very small, often have ocelli and can have a reduced and inconspicuous arista (although always of at least with two distinct aristomeres). Only *Tanyconops* Schneider, 2010 has a very short proboscis and lacks distinct grooves on the frons, but this has a very characteristic female postabdomen with an obviously prolonged and flattened tergite 7 (Schneider 2010: 241, Figs 321 & 242, Fig. 325). *Tanyconops* also lacks ocelli and has an obviously different wing venation (Schneider 2010: 241: 320).

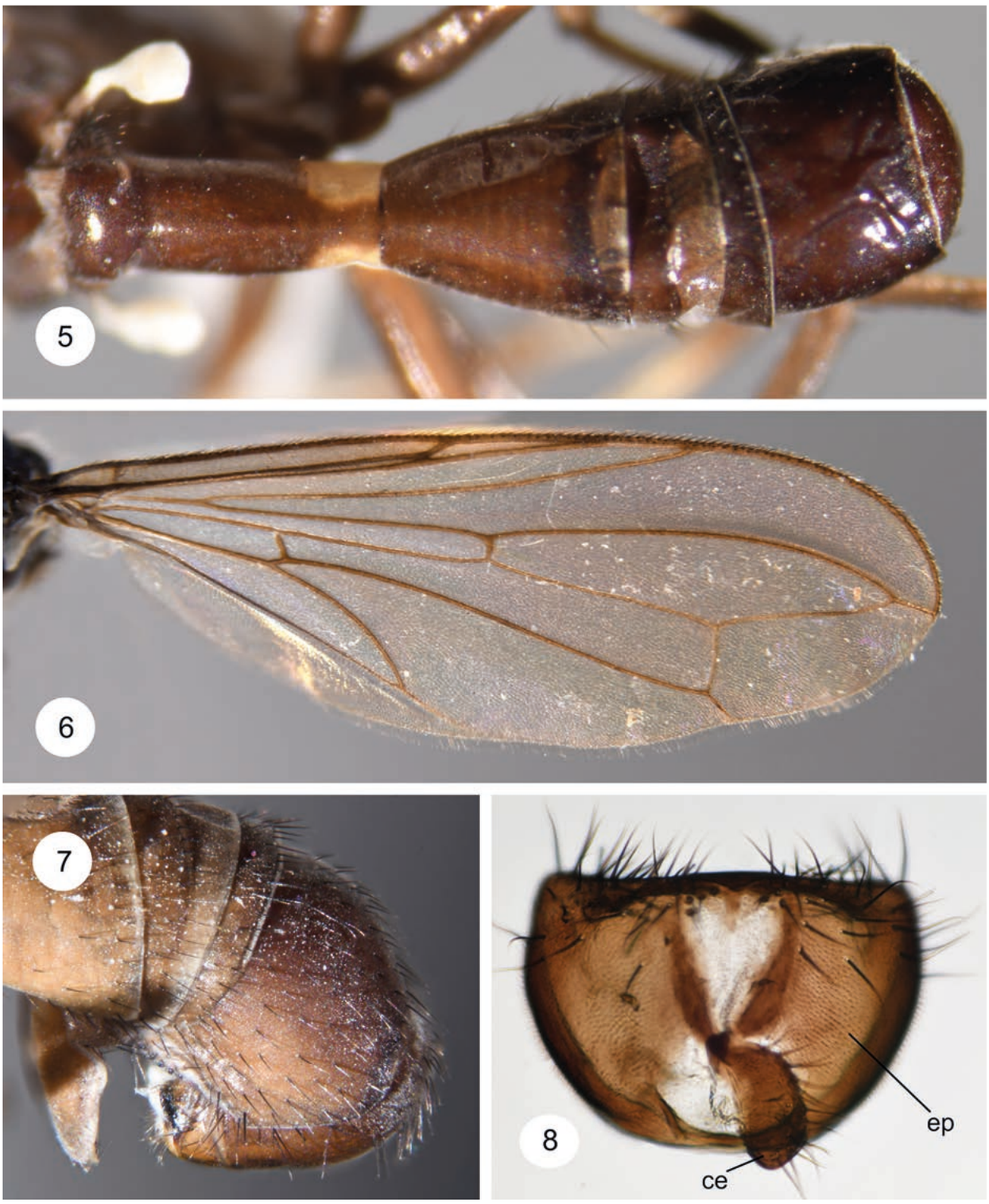
Etymology: The genus *Gellergrimmellus* is derived from the name „Geller-Grimm". The Latinized name is in the diminuative, as signified by the ending „-ellus", which refers to the small body size of the fly. This patronym is dedicated to Fritz Geller-Grimm (Frankfurt) to whom I am very grateful for his long-standing support of my dipterological work. The name *Gellergrimmellus* is to be treated as masculine.

Description: **Head**: Arista with only one minute aristomere situated at tip of basal flagellomere (Fig. 2). Scape about two times longer than maximum width, apically and ventrally with black setae. Pedicel about four times longer than maximum width, completely covered with black setae, lacking a blunt ridge at base, and slightly expanded towards the apex. Basal flagellomere long, about three times longer than high, and almost as long as pedicel. Basal flagellomere pointed, ventrally lacking membranous area, dorsally lacking setae. Lunule between base of antennae and ptilinal suture distinct, distinctly shorter than width of scape. Eye reddish brown, lacking ommatrichia. Facets all of about the same size. Posterior margin of eye convex, lacking an indentation. Ratio of gena height / eye height (measurements are taken from head in lateral view) ≈ 0.1. Ocellar tubercle distinct, with three ocelli (Fig. 4). No ocellar triangle. No frontofacial spot. Vertex only about 2/3 width of frons, separated from latter by a ridge, distinctly rounded anteriorly, bulging posteriorly, and covered with scattered black setulae (Fig. 4). Gena with a few long black setulae, parafacial with line of regularly arranged minute white and black setulae. Distinct facial grooves reaching mouth edge. Distinct facial carina reaching from base of antennae to a barely developed frontoclypeal tubercle. Ptilinal suture stretching a short way on either side beneath the antennal bases. The area surrounding the ptilinal suture is blackish. Mouth opening slightly tapering dorsally. Postcranium obviously invaginated. Postgena not widened and therefore not separated from occiput. Bottom portion of postcranium distinctly separated. No palp. Proboscis geniculated once only, at base. Labium shorter than head-length, hardly projecting out of mouth opening, distinctly thickened basally, anterior section not fused into a tube. Labrum not recognised. Labellum short, completely divided, broad, white and covered with long yellow setulae. Labellum with 8 indistinct pseudotracheae on each side. Head lacking setae.



Figs 1–4: *Gellergrimmellus fritzi* spec. nov. – **1** habitus, lateral view (♀ holotype). – **2** arista, lateral view (♀ paratype). – **3** head, lateral view (♀ holotype). – **4** vertex and frons, dorsal view (♀ holotype). ar - aristomere; bf - basal flagellomere.

Thorax: Presternum distinct, about as wide as the compound basisterna. Presternum distinctly separated from basisternum. Basisternum broad, narrowed to a tip, lacking setulae. Proepisternum with 1 black seta ventrally, dorsally lacking setulae. Mediotergite convex, lacking setulae, and projecting distinctly over scutellum. Subscutellum not developed. Metakatepisternum, anepisternum and anepimeron lacking setulae. Subcostal-radial crossvein sc-r present (Fig. 6). Radial-medial crossvein r-m complete. Radius R_1 and R_2 terminate close together in costa, well beyond the end of the subcosta. Radius R_{4+5} with a shallow and even curve in the distal section which is directed to a point beyond the wing tip. Radial cell r_{4+5} pedunculate, with vein R_{4+5} + M distinctly expressed and longer than radial-medial crossvein r-m. Cubital cell cup elongated (distinctly longer than vein A_1+CuA_2) and pointed distally (cubitus CuA_2 and anal vein A_1 meet at an acute angle). Cubital vein CuA_1 and crossvein bm-cu



Figs 5–8: *Gellergrimmellus fritzi* spec. nov. – **5** ♀ abdomen, dorsal view (♀ holotype). – **6** wing, ventral view (♂ paratype). – **7** ♀ postabdomen, lateral view (♀ holotype). – **8** ♂ epandrium, dorsal view (♂ paratype). ce - cercus; ep - epandrium.

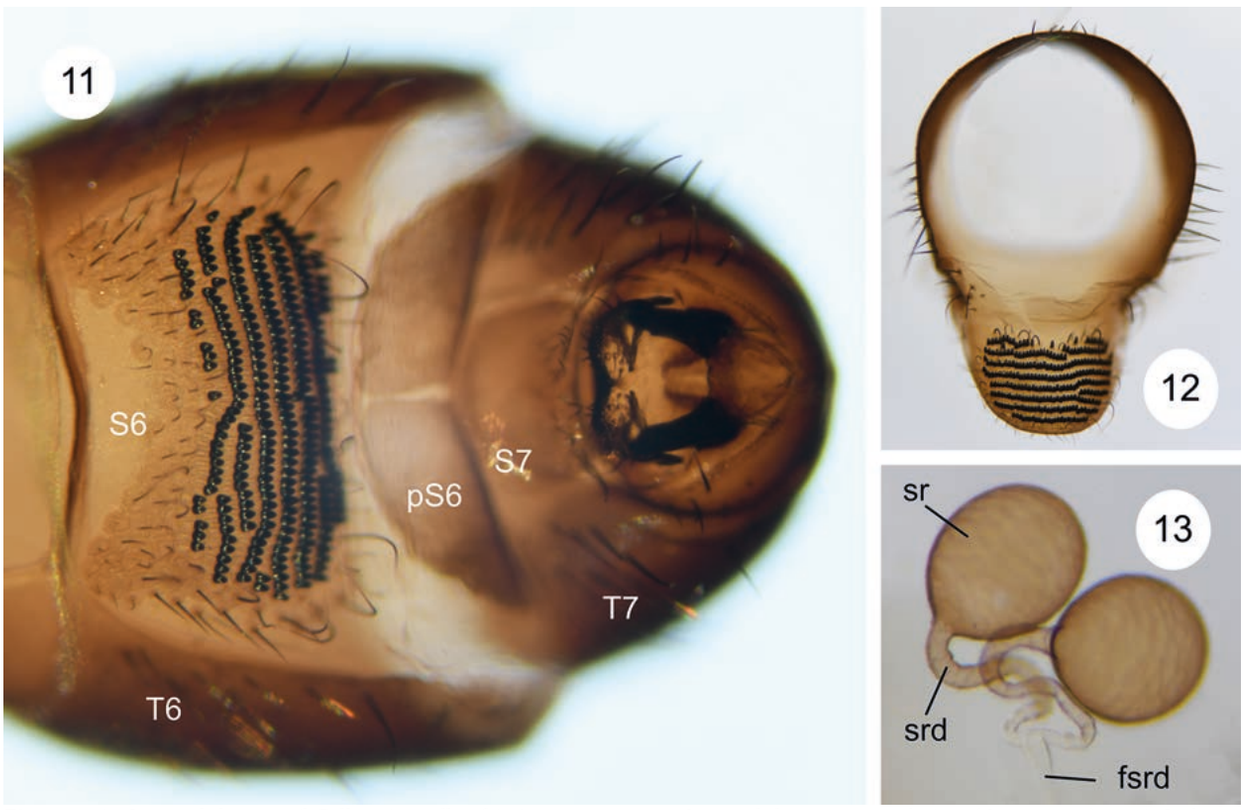
distinctly separated. Alula minute, about 3 times broader than long, with white setulae on posterior margin. Vena spuria indistinctly evident only in cubital cell cup. Base and stem of haltere each with areas of sensillae. Knob of haltere with isolated white setulae. Posterior surfaces of fore and middle tibiae lacking obvious dusted fields distally. Areas with dense brown setulae ventrally at tip of fore tibia, and ventrally and posteriorly at tip of hind tibia. Middle femur posteriorly with regularly arranged, comb-like long setulae. Hind femur dorsally lacking outstanding long setulae. Tibiae dorsally with small preapical setulae. No setulae ventrally on tibiae. Femora ventrally lacking rows of short black setulae. Hind femur not obviously thickened in basal half. No lines of black, regularly arranged setulae ventrally on tarsi.

Figs 9–10: ♂ genitalia of *Gellergrimmellus fritzi* spec. nov. – **9** ♂ hypandrium and phallus, lateral view (♂ paratype); – **10** ♂ hypandrium and phallus, dorsal view (♂ paratype). bp - basiphallus; dbhy - dorsolateral bar of hypandrium; dp - distiphallus; ea - ejaculatory apodeme; edp - evagination of distiphallus; hya - hypandrial arm; hybr - hypandrial bridge; hyr - hypandrial bars; po - postgonite; poe - postgonite evagination; rs - ring sclerite.

Abdomen: Tergites 1–3 fused but distinctly separated from each other (Fig. 5). Lateral margins of tergites almost straight.

♂ abdomen with 5 tergites. Tergite 1 with obvious black setulae laterally on the bulbous projections. Tergite 2 distinctly elongated and parallel-sided, about 5 times as long as broad when viewed dorsally, and lacking obvious lateral tufts of setulae. Tergite 3 distinctly widened posteriorly, about 3.8 times as wide posteriorly than anteriorly. Sternites 1-5 present, sternites 1 and 2 not fused and distinctly separated. Tergite 5 and sternite 5 distinctly separated. Sternite 5 apically with a small field of thick setulae and several long black setulae.

♂ postabdomen with protandrium obviously broader than epandrium and therefore projecting over it. Sternite 8 distinctly delimited from protandrium. Ventrally



Figs 11–13: ♀ postabdomen of *Gellergrimmellus fritzi* spec. nov. – **11** ♀ postabdomen, ventral view (♀ paratype). – **12** ♀ theca, posterior view (♀ paratype). – **13** spermathecae (♀ paratype). fsrd - fused spermathecae ducts; pS6 - posterior part of sternite 6; S6 - sternite 6; S7 - sternite 7; sr - spermatheca; srd - spermatheca duct; T6 - tergite 6; T7 - tergite 7.

the lateral edges of the protandrium are fused by a narrow sclerotised strip, which is not widened medially. Cercus distinct, completely sclerotised and covered with setulae (Fig. 8). No hypoproct evident. Posterior and anterior surstyli absent. No obvious strong black setae nor long black setulae which would indicate the base of a surstylus. Subepandrial plate not sclerotised nor covered with microtrichia and therefore not evident. Hypandrium slightly sclerotised or hyaline with the exception of two unique dorsolateral bars (Fig. 9: dbhy). These bars are curved upwards apically, bear a broad tooth basally and are connected by a small, slightly sclerotised hypandrial bridge (Fig. 9: hybr). No hypandrial lobe evident. Hypandrial bars fused distally to a hypandrial arm (Fig. 10: hya, hyr). Hypandrial membrane reduced, lacking microtrichia. Phallus sheath not fused dorsally; lacking any evagination or setulae. Postgonite small. Postgonite evagination not sclerotised, not projecting above distiphallus and lacking obvious microtrichia (Fig. 9: poe). No plate on inner side of postgonite evagination. Ring sclerite developed (Fig. 10: rs). No epiphallus recognised. Phallus apodeme longer than hypandrium arm. Ejaculatory apodeme elongate, lacking distinct attachment to sperm sac (Fig. 10: ea).

♀ abdomen with sternites 1–2 fused. Sternites 3–4 not protruding ventrally, posterior parts of sternites inconspicuous. Tergites 3 and 4 lacking any protuberances. Tergite 5 and sternite 5 fused laterally to form a syntergosternite with obvious theca below (Fig. 12). Posterior part of sternite 6 conspicuous sclerotised, slightly bent dorsally, and distinctly divided medially (Fig. 11: pS6). Tergite 7 distinctly bent ventrally, without a longitudinal gap, and with a hardly protruding blunt tooth in middle of posterior margin. Sternite 8 not fused with syntergite 8+9 and therefore not connecting on its sides. Tooth on syntergite 8+9 distinct, its base elongated anteriorly. Sternite 9 slightly bulging posteriorly, lacking strong long black setae but with several long setulae. Paired cerci distinct. Sack-like ventral protrusion of vagina with distinct annular sclerotisation. Sack-like ventral protrusion is hardly larger than annular sclerotisation and no evagination or additional sclerotisations are recognised. 2 pairs of round spermathecae, spermathecal ducts fused some distance before reaching spermathecae. Spermathecal ducts sclerotised a long distance before reaching spermathecae, this sclerotised part winding (Fig. 13).

Distribution: The genus *Gellergrimmellus* is only known from the *locus typicus* of *Gellergrimmellus fritzi*. This location is placed in the Min Mountains (Minshan). The biogeographical classification of this location is not clear. Sensu Heiser & Schmitt (2013) the locus typicus belongs to the transition zone of the Oriental and Palaearctic regions, whilst sensu Chen et al. (2008) or Kreft & Jetz (2010) the *locus typicus* lies in the Oriental region.

Biology: Nothing is known about the biology of this genus.

Phylogenetic placement of *Gellergrimmellus*: *Gellergrimmellus* belongs in the subfamily Conopinae due to the following characters: Stylate arista placed apically on basal flagellomere (Fig. 2); no ocellar triangle; lunule distinct (Fig. 4); facial grooves reaching to mouth opening, divided by a central carina which widens ventrally; mouth opening tapering dorsally; postgena not widened and therefore not separate from the narrow occiput; chaetotaxy reduced, no obvious setae on the head; radial cell r_{4+5} petiolate and R_{4+5} + M distinct (Fig. 6); subcosta-radial crossvein sc-r well developed (Fig. 6); ♂ protandrium obviously broader than epandrium and therefore projecting over it. As discussed in detail under *Hauserimyia* a more detailed phylogenetic classification is not possible at the time of writing. Within the Conopinae *Gellergrimmellus* is an isolated genus with no related or similar genera known.

Gellergrimmellus fritzi spec. nov.

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(Figs 1–13)

Holotype ♀: (1) „China; Sichuan; Old Creek / field station; 17.viii.2016; / 32.484°N, 104.72°E; 1370 m; / Hand collecting; CJ Borkent; / FFP16CH089"; (2) „Holotypus / *Gellergrimmellus fritzi* / spec. nov. ♂ / det. Stuke 2018". Holotype is deposited in the collection of the California Academy of Sciences, USA, San Francisco, (CAS). The holotype was initially kept in alcohol and dried afterwards. It is glued on a card-point and otherwise in good condition (Fig. 1).

1 ♂, 1 ♀ paratypes: 1 ♂ same data as holotype; 1 ♀ same date as holotype but collected by M. Hauser and „FFP16CH088". Paratypes are deposited in the collection of the author (Germany, Leer, PJHS).

Description of holotype (♀): Length 4.9 mm. Wing-length 4.3 mm. Head-height 1.2 mm. Antenna black to dark brown, with first flagellomere orange-brown ventrally and pedicel indistinctly orange-brown apically (Fig. 3). Frons broader than long, slightly concave, not projecting above eyes, smooth, with only some long black hardly-visible setulae laterally (Fig. 4). Frons and lunule black. Frons subshining. Face and gena light yellow to white. Parafacial, gena and antennal groove obviously silver dusted. Facial ridges only slightly dusted. Postcranium black in dorsal 2/3, clearly separated white in ventral 1/3. Adjacent to posterior margin of eye there is only an indistinct strip of grey dusting, the remaining postcranium slightly dusted to shining. Postcranium with black setulae. No setulae on a small area adjacent to eye margin but with scattered setulae on bottom portion of postcranium. Proboscis brown basally and whitish apically (Fig. 3). Frontoclypeal membrane small, hardly widened basally, light yellow and easy to distinguish from the darker clypeus. Thorax black to brown, without distinct colour contrast. Thorax microtomentose all over, with an indistinct grey dusted band extending from middle coxa to notopleuron (Fig. 1). Scutellum with 1 long apical seta and 2–3 lateral setae. Scutum with short black setulae. 1 notopleural seta, no postalar seta recognised. Postalar callus with 3 long black setae and no long setulae. 2–3 black setae posterodorsally on katepisternum, no seta ventrally. Wing hyaline to slightly brownish, lacking any distinct markings. All veins dark brown. Wing completely covered with microtrichia. Upper and lower calypters yellowish white, upper calypter with long white setulae on margin. Haltere white with a light brown base. Legs light brown, with basal half of tibiae and basal fore and middle tarsi white. Legs not dusted, and all with short, adpressed black setulae. Hind and middle coxae with 2–3 strong lateral setae. Pulvilli brownish white. Claws brown with distinct black tips. Empodium whitish yellow, about as long as pulvilli. Abdomen light brown. Tergite 2 with characteristic yellow lateral spots apically (Fig. 5). Abdomen covered with black setulae which are longer and more obvious from hind margin of tergite 3 to tip of abdomen. Abdomen subshining to shining. Maximum width of abdomen is at segments 4–6. Length : maximum width of tergite 2 = 2.1; length : maximum width of tergite 3 = 1.1. Theca slightly shorter than height of abdomen at segment 5 in side view (Figs 7, 12). Anterior surface of theca lacking setulae. Posterior surface of theca with close-set, short, blunt pallisade groups of spicules, arranged in 9 close-set horizontal lines (Fig. 12). Sternite 5 anteriorly lacking an elongation. Sternite 6 almost completely covered with short, blunt spicules which are arranged in 6–7 horizontal lines (Fig. 11).

Female abdomen of holotype not macerated and therefore several characters could not be examined. Based on examination of a paratype, however, sternite 7 is slightly longer than broad, anteriorly rounded and with several scattered setae only at the posterior.

Description of ♂: abdomen subshining to shining. Sternite 4 longer than broad, minute and not clearly delimited from membrane, with 3 black setae. Epandrium not fused behind cerci but with a slightly sclerotised connection at both sides of the epandrium (Fig. 8). Posterior margin of epandrium with long black setulae but no projecting tooth (Fig. 8). Epandrium distinctly dented-in laterally. Distiphallus shorter than epandrium but distinct, with dense black setae distally. Distiphallus basally with almost equal large flattened lateral evaginations (Fig. 9: edp). Each of these evaginations has a plate-like sclerotisation.

Variability: There is a yellow brown marking beneath the vertex in the ♀ paratype. Thorax of the paratypes less dusted and therefore the dusting stripe from middle coxa to notopleuron is more distinct. Legs and abdomen dark brown in paratypes. ♂ paratype has black facial ridges.

Diagnosis: As described for the monotypic genus.

Etymology: The species epithet „fritzi“ is derived from the given name of Fritz Geller-Grimm.

Distribution: As described for the whole genus.

Hauserimyia gen. nov.

(Figs 14–27)

Type-species: *Hauserimyia martini* spec. nov., designated herewith.

Diagnosis: *Hauserimyia* is easily identified as belonging in the Conopinae because of the characteristic shape of the antenna, which has an apical stylus. Given the combination of an elongated pedicel (Fig. 15), an elongated basal flagellomere (Fig. 24), a lack of ocelli, a very short (i.e. distinctly shorter than head length) and apically widened proboscis and more than 10 lamellae on the labrum (Fig. 15), there are only three other similiar genera which occur in the Oriental and Palaearctic regions. These are *Leopoldius* Rondani, 1843, *Abrachyglossum* Kröber, 1919 and *Neobrachyglossum* Kröber, 1915. *Hauserimyia* is easily distinguished both from these and from all other conopid genera by the unique shape of the arista, which has three large aristomeres as shown in Fig. 24, and the unique pairs of warty submedial protuberances on tergites 3 and 4 of the female (Figs 17–19).

Etymology: The genus *Hauserimyia* is derived from the name „Hauser“ in combination with the Greek noun „myia“, meaning “fly”. This patronym is dedicated to Martin Hauser (Sacramento) to whom I am very grateful for his long-standing support of my dipterological work. The name *Hauserimyia* is to be treated as feminine.

Description: **Head**: Arista stylus-like, with 3 aristomeres situated at tip of basal flagellomere (Figs 15, 24). Basal aristomere and medial aristomere short and about the same size, apical aristomere elongated, tapering gently to a blunt tip. Scape about 1.5 times longer than maximum width, dorsally with black setae. Pedicel about six times longer than maximum width, completely covered with long black setae, with a small and inconspicuous blunt ridge at base, and slightly expanded towards apex. Basal flagellomere long, about three times longer than high and almost as long as pedicel. Basal flagellomere pointed, ventrally lacking a membranous area, and lacking setae dorsally. Lunule between base of antennae and ptilinal suture distinct, slightly shorter than width of scape. Eye brown, lacking ommatrichia. Facets all of about the same size. Posterior margin of eye convex, lacking an indentation. Gena height / eye height (measurements are taken from head in lateral view) = 0.2. Ocellar tubercle not evident. No ocelli and no ocellar triangle evident. Black frontofacial spots distinct. Vertex as broad as frons, not separated from latter by a ridge, distinctly rounded anteriorly, and covered with black setulae on posterior only. Gena with a few black setulae, facial ridge lacking setulae. Distinct facial grooves reaching mouth edge. Distinct facial carina reaching from base of antennae to a distinctly widened and outstanding frontoclypeal tubercle. Ptilinal suture stretching a short way on either side beneath the antennal bases. The area surrounding the ptilinal suture is yellow with the exception of the lunule. Mouth opening tapering dorsally. Postcranium not obviously invaginated. Postgena not widened and therefore not separated from the occiput. Bottom portion of postcranium distinctly separated. Palp present, but very small and hard to detect in dried specimens. Proboscis geniculated once only, at base. Labium shorter than head-length, hardly projecting out of mouth opening, distinctly thickened basally, the anterior section not fused into a tube. Labrum only evident in about the basal half of the haustellum. Labellum short, completely divided, broad (at least two times broader than the adjacent haustellum) and covered with long yellow setulae. Labellum with about 15 distinct pseudotracheae on each side. Head lacking setae.

Thorax: Presternum distinct, slightly wider than the compound basisterna. Presternum distinctly separated from basisterna. Basisternum broad, narrowed to a tip, lacking setulae. Proepisternum with a hardly visible small black seta which is adpressed and directed posteriorly, and which could not be found in every specimen. Mediotergite convex, lacking setulae, and hardly projecting over scutellum. Subscutellum inconspicuous. Metakatepisternum, anepisternum and anepimeron lacking setulae. Subcostal-radial crossvein sc-r present (Fig. 21). Radial-medial crossvein r-m complete. Radius R_1 and R_2 terminate close together in costa, well beyond end of subcosta. Radius R_{4+5} with a shallow and even curve in the distal section that is directed towards the wing tip. Radial cell r_{4+5} pedunculate, with vein R_{4+5} + M distinctly expressed and about as long as radial-medial crossvein r-m. Cubital cell cup elongated (distinctly longer than vein A_1+CuA_2) and pointed distally (cubitus CuA_2 and anal vein A_1 meet at an acute angle). Cubital vein CuA_1 and crossvein bm-cu distinctly separated. Alula broad (about 2.5 times broader than long), with brown setulae on posterior margin. Venae spuriae pronounced in radial cell r_{4+5} and also indistinctly in cubital cells cup and cua_1. Base and stem of haltere each with areas of sensillae. Knob of haltere with isolated black setulae. Posterior surfaces of fore and middle tibiae lacking obvious dusted fields distally. Areas with dense brown setulae ventrally at tip of fore tibia and ventrally and posteriorly at tip of hind tibia. Middle femur posteriorly lacking regularly arranged long setulae. Hind femur dorsally lacking outstanding long setulae. No preapical setulae dorsally on tibiae. No setulae ventrally on tibiae. All femora ventrally with two rows of short, regularly arranged black setae. Hind femur not obviously thickened in basal half. Line of black, regularly arranged setae posteroventrally on fore metatarsus, anteroventrally and posteroventrally on middle metatarsus, and anteroventrally on hind metatarsus.

Figs 14–16: *Hauserimyia martini* spec. nov. (♂ holotype). – **14** habitus, lateral view. – **15** head, lateral view. – **16** vertex and frons, dorsal view.

Abdomen: Tergites 1–3 fused but distinctly separated from each other (Figs 17, 18). Lateral margins of tergites almost straight.

♂ preabdomen with 5 tergites. Tergite 1 with obvious black setulae laterally on the bulbous projections. Tergite 2 hardly elongated but parallel-sided, about 1.5 times as long as broad when viewed dorsally, and lacking obvious lateral tufts of setulae. Tergite 3 slightly widened posteriorly, about 1.5 times as wide posteriorly than anteriorly, and not obviously broader than long. Sternites 1–5 present, sternites 1 and 2 not fused and distinctly separated. Tergite 5 and sternite 5 distinctly separated. Sternite 5 apically with a small field of thick setulae. Protandrium obviously broader than epandrium and therefore projecting over it. Sternite 8 distinctly delimited from protandrium. Ventrally the lateral edges of the protandrium are fused by a narrow sclerotised strip, which is not widened medially. Paired cerci distinct, completely sclerotised and covered with setulae (Fig. 25). Posterior and anterior surstyli absent. No obvious strong black setulae nor long black setulae which would indicate the base of a surstylus. Subepandrial plate not sclerotised and therefore not evident, covered with microtrichia. Dorsal hypandrial bridge developed. No hypandrial lobe evident. Hypandrial bars fused distally and hypandrium ending in a hypandrial arm. Hypandrial membrane reduced, lacking microtrichia. Phallus sheath fused dorsally; apically with lateral evagination (Fig. 25: lehy) close to the fused postgonite evagination, which has several short setulae. Postgonite distinct. Postgonite evagination hardly sclerotised, not projecting above distiphallus, and bearing distinct microtrichia (Fig. 26: poe). No plate on inner side of postgonite evagination but dense elongated and lightly sclerotised setulae. Ring sclerite developed. No epiphallus recognised. Phallus apodeme longer than hypandrium arm. Ejaculatory apodeme elongate, with a distinct narrow attachment to sperm sac.

♀ abdomen with sternites 1–2 fused. Sternites 3–4 not protruding ventrally, posterior parts of sternites inconspicuous. Tergites 3 and 4 each with a conspicuous pair of submedial protuberances, the surfaces of which bear some wart-like structures (Figs 17–19). Tergite 5 and sternite 5 fused laterally to form a syntergosternite with an obvious theca below (Figs 20, 22). Posterior part of sternite 6 inconspicuous, slightly bent dorsally (Fig. 23). Tergite 7 distinctly bent ventrally, without a longitudinal gap and lacking a protruding tooth in middle of posterior margin. Sternite 8 not fused with syntergite 8+9 and therefore not connecting on its sides. Tooth on syntergite 8+9 distinct, its base elongated anteriorly. Sternite 9 bulging posteriorly, covered with strong long black setulae, and with long setulae on posterior margin. Paired cerci distinct. Sack-like ventral protrusion of vagina with distinct annular sclerotisation. Sack-like ventral protrusion is hardly larger than annular sclerotisation and no evagination or additional sclerotisations are recognised. 2 pairs of round spermathecae, spermathecal ducts fused shortly after leaving spermathecae. Spermathecal ducts only sclerotised directly at spermathecae.

Distribution: The genus *Hauserimyia* is known only from the locus typicus of *Hauserimyia martini* in the Min Mountains (Minshan). The biogeographical classification of the locus typicus is discussed under *Gellergrimmellus*, above.

Biology: Nothing is known about the biology of this genus.

Phylogenetic placement of *Hauserimyia*: Without doubt *Hauserimyia* belongs in the Conopinae due to the following characters: stylate arista placed apically on basal flagellomere (Fig. 15); ocelli and ocellar tubercle absent; vertex reaching from one eye to the other (Fig. 16); no ocellar triangle; lunule distinct (Fig. 15); facial grooves reaching to mouth opening, divided by a central carina which widens ventrally; mouth opening tapering dorsally; postgena not widened and therefore not separate from the narrow occiput; chaetotaxy reduced, no obvious setae on the head; no preapical setulae dorsally on the tibiae; radial cell r_{4+5} petiolate and R_{4+5} + M distinct (Fig. 21); subcosta-radial crossvein sc-r well developed (Fig. 21); ♂ protandrium obviously broader than epandrium and therefore projecting over it (Fig. 14); ♂ hypandrium sheath fused dorsally and therefore surrounding the phallus completely.

The further subdivision of the Conopinae is not currently resolved. Gibson & Skevington (2013) attempted to separate the Conopinae into eleven tribes based on a phylogenetic approach but this took into account only relatively few species, and did not sufficiently discuss the morphological characters used in the cladistic analysis (Borkent 2018). It is therefore more of a preliminary basis for discussion than an elaborated hypothesis concerning the evolution of the Conopinae. Stuke (2017) does not recognise any tribes in the world catalogue of Conopinae and it has been demonstrated that the system proposed by Gibson & Skevington (2013) cannot be applied consistently in several cases (Stuke 2014, 2018). It is therefore not currently possible to place *Hauserimyia* phylogenetically with any sister taxon within the Conopinae in the absence of a complete cladistic analysis of the subfamily. Nevertheless the similarity between *Leopoldius*, *Neobrachyglossum* and *Hauserimyia* is striking and it may well be the case that these form a monophyletic group.

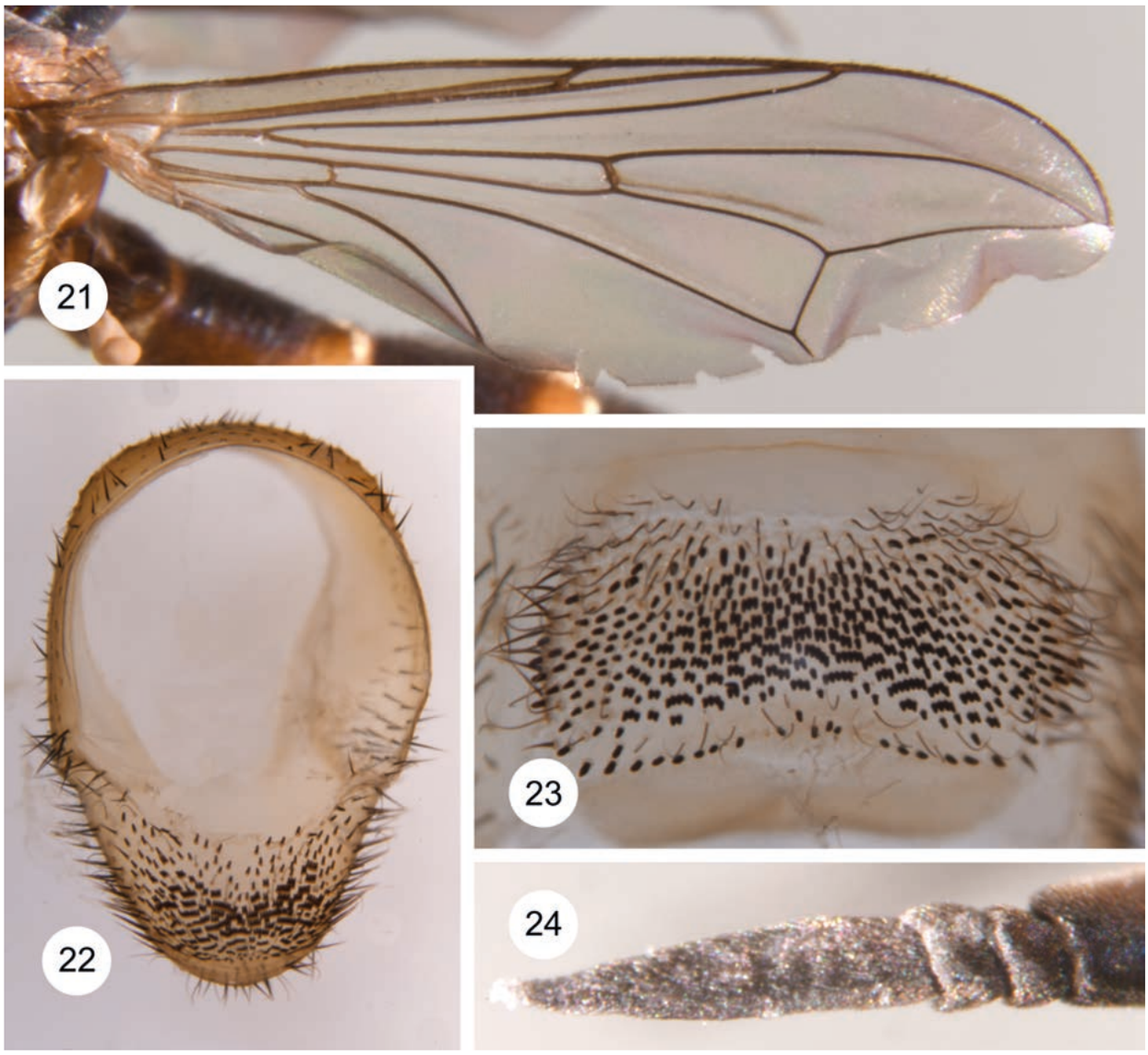
Hauserimyia martini spec. nov.

urn:lsid:zoobank.org:act:73C2ED04-9AB4-4DF6-82D1-A1F8EC0BAF75

(Figs 14–24)

Holotype ♂: (1) „China; Sichuan; Old Creek / field station; 17.viii.2016; / 32.484°N, 104.72°E; 1370 m; / Light trap; M. Hauser; / FFP16CH091"; (2) „Holotypus / Hauserimyia martini / spec. nov. ♂ / det. Stuke 2018". Holotype is deposited in the collection of the California Academy of Sciences, USA, San Francisco, (CAS). The holotype

Figs 17–20: *Hauserimyia martini* spec. nov. (♀ paratype). – **17** abdomen, lateral view. – **18** abdomen, dorsal view. – **19** submedial protuberance with wart-like structures on tergite 4, lateral view. – **20** postabdomen, lateral view.

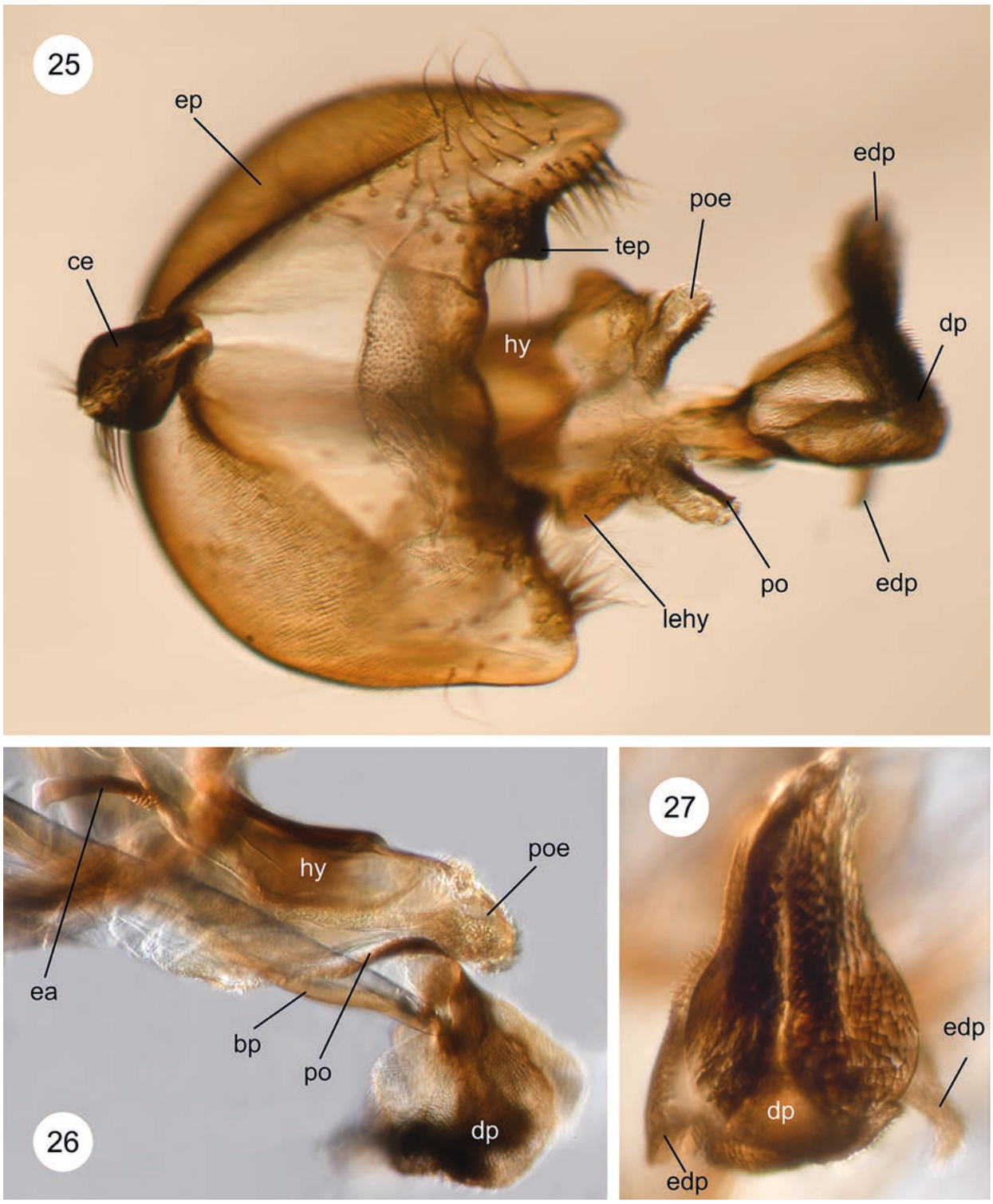


Figs 21–24: *Hauserimyia martini* spec. nov. – **21** wing, ventral view (♂ paratype). – **22** ♀ theca, posterior view (♀ paratype). – **23** sternite 6, ventral view (♀ paratype). – **24** arista, lateral view (♂ paratype).

was initially kept in alcohol and dried afterwards. It is complete and in a very good condition (Fig. 14).

9 ♂♂, 3 ♀♀ paratypes: 4 ♂♂ same data as holotype but collected with Malaise trap 17.–20.viii.2016, leg. M. Hauser, C. J. Borkent, T. Zhang, FFP16CH080; 1 ♂ same data as holotype but hand collected, FFP16CH088; 2 ♂♂ same data as holotype but hand collected at 18.viii.2016, FFP16CH094; 1 ♀ China, Sichuan, Old Creek field station along stream beside field station, 19.viii.2016, hand collected, leg. M. Hauser, FFP16CH100; 2 ♂♂ 2 ♀♀ China, Sichuan, Old Creek field station, 32.494°N 104.723°E, 1430 m, Malaise trap 17.–20.viii.2016, leg. M. Hauser, C. J. Borkent, T. Zhang, FFP16CH086. Paratypes are deposited in the collections of California Academy of Sciences (CAS) and the private collection of the author (Germany, Leer, PJHS).

Description of holotype (♂): Length 9.2 mm. Wing-length 6.7 mm. Head-height 2.3 mm. Antenna orange-brown with pedicel and first flagellomere dorsally and arista black (Fig. 15). Frons (Fig. 16) broader than long, slightly concave, not projecting above eyes, smooth and lacking setulae. Frons brown with a black central stripe and a narrow black stripe laterally at eye margin which reaches anteriorly to a small black frontofacial spot. Lunule black. Frons with golden dusting in posterior half and along eye margin (in anterior view). Distinct rugose light yellow area between frons and ptilinal suture. Face yellow. Facial keel ventrally light brown. Gena yellow. Parafacial and antennal grooves obviously golden dusted, facial ridges and gena only slightly dusted. Postcranium yellow to yellow-brown, with a light brown area ventrally on bottom portion of postcranium. Adjacent to posterior margin of the eye there is an obvious stripe of golden dusting, remaining postcranium slightly dusted to shining. Postcranium with black setulae. No setulae on a small area adjacent to eye margin and bottom portion of postcranium. Proboscis light brown to yellow. Frontoclypeal membrane small, hardly widened



Figs 25–27: Male postabdomen of *Hauserimyia martini* spec. nov. (♂ paratype). – **25** postabdomen, dorsal view. – **26** genitalia, lateral view. – **27** distiphallus, posterior view. bp - basiphallus; ce - cercus; dbhy - dorsolateral bar of hypandrium; dp – distiphallus; ea - ejaculatory apodem; edp - evagination of distiphallus; ep - epandrium; hy - hypandrium; lehy - lateral evagination of hypandrium; po - postgonite; poe - postgonite evagination; tep - strongly sclerotised tooth at posterior margin of the epandrium.

basally, light yellow to light brown and easy to distinguish from the darker clypeus. Palp apically with two black setae. Thorax orange-brown with an almost completely black scutum (but with the margins of scutum orange-brown) and with dark brown spots on katepisternum and anepisternum. Distinct golden dusting on scutum, proepimeron and anatergite. Dusting stripe extending from middle coxa to notopleuron (Fig. 14). Scutum with short black setulae. Scutellum covered with short black setulae and with 2 scutellar setae. 1 notopleural seta and no postalar seta.

Figs 28–30: *Neobrachyglossum punctatum* Kröber (1915) (♀, Turkey, Afyon). – **28** frons, dorsal view. – **29** antenna, lateral view. – **30** ♀ postabdomen, lateral view.

Postalar callus with 2–3 long black setae and no long curved setulae. 1 black seta and 3 black setulae posterodorsally on katepisternum, no setae ventrally. Wing hyaline to slightly brownish, lacking any distinct marking (Fig. 21). Veins dark brown to yellowish brown. Subcosta contrasting light yellow. Basal medial-cubital crossvein bm-cu white. Wing mainly covered with microtrichia, but with no microtrichia at base of radial cell r_{2+3} and basal radial cell br, basal medial cell bm and alula almost completely lacking microtrichia. Discal medial cell dm also basally lacking microtrichia. Upper and lower calypters yellowish white, upper calypter with long white setulae on margin. Haltere yellow to light brown with a slightly darker brown base. Legs yellowish brown. Hind femur slightly darker brown posterodorsally and hind tibia darker brown in apical half. Legs at most with inconspicuous golden to silver dusting. Legs all with short, adpressed black setulae. Hind coxa with 2 strong lateral setae. Pulvilli brownish white. Claws yellowish brown with distinct black tips. Empodium whitish yellow, about as long as pulvilli. Abdomen mainly black (Fig. 14). Tergites 2–5 with an orange-brown posterior margin. Tergites 1–2 laterally orange-brown. Protandrium and epandrium almost completely orange-brown. Abdomen with scattered short black setulae, except tergite 2 lacking setae. ♂ abdomen slightly to distinctly golden dusted in anterior view, with denser golden dusting at hind margins of tergites 2–5 and almost complete dense golden dusting on protandrium. Sternite 4 longer than broad, about 0.2 width of sternite 5, lacking any setulae.

Figs 31–32: Antennae of Conopinae in lateral view. – **31** *Abrachyglossum capitatum* (Loew, 1847) (♀, Germany, Feuerbach). – **32** *Leopoldius signatus* (Wiedemann, 1824) (♀, Switzerland, Bossy).

Description of ♂ postabdomen based on one dissected paratype: Epandrium as shown in Fig. 25. Epandrium not fused behind cerci but with a slightly sclerotised connection at both sides of epandrium. Posterior margin of epandrium laterally with long black setulae and a distinctly projecting and strongly sclerotised submedial tooth (Fig. 25: tep). Epandrium distinctly dented-in laterally. No hypoproct evident. Distiphallus shorter than epandrium but distinct, covered with dense microtrichia basally and with two fields of dense black setae distally (Fig. 27). Distiphallus basally with two lateral evaginations of different sizes (Fig. 27: edp), one finger-like, the other one larger and flat. Both are densely covered in microtrichia.

Description of ♀: Abdomen subshining to shining, only tergites 2–5 with an inconspicuously dusted hind margin (Figs 17–18). Maximum width of abdomen is at segment 4. Length : maximum width of tergite 2 = 1.3; length : maximum width of tergite 3 = 1.2. Shape of theca as shown in Figs 20, 22. Anterior surface of theca with long black setulae. Apical half of posterior surface of theca with scattered short blunt spicules, those in the central area in short horizontal pallisade groups but not markedly arranged in long horizontal lines (Fig. 22). Sternite 5 anteriorly lacking an elongation. Sternite 6 almost completely covered with short blunt spicules which are also in short horizontal pallisade groups towards the centre but not arranged in horizontal lines (Fig. 23). Sternite 7 slightly longer than broad, anteriorly rounded and with a line of black setae at posterior margin only.

Variability: Wing length 5.9–7.4 mm. Facial keel can be completely yellow or completely light brown. Postcranium can be completely yellow. Mediotergite can be almost completely black. One female paratype has an almost completely orange-brown scutum with only two black spots. Variable setation: there can be only 1 scutellar seta or scutellar setae may not be separable from setulae on scutellum. There can be 2 notopleural setae, and postalar setae can occur. Subcosta can be less conspicuously lighter than adjacent veins. Basal medial-cubital crossvein bm-cu can be brownish. The female abdomen can be almost completely orange-brown.

Diagnosis: As described for the monotypic genus.

Etymology: The species epithet „martini“ is derived from the given name of Martin Hauser.

Distribution: As described for the whole genus.

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Genera of Oriental and Palaearctic Conopinae having a short proboscis which is enlarged apically and which bears more than five lamellae

1 Arista greatly reduced, with only 1 tiny aristomere visible (Fig. 2); 3 ocelli present on distinct ocellar tubercle (Fig. 4); gena narrow: gena height / eye height (in lateral view) ≈ 0.1 (Fig. 3); tibiae dorsally with preapical setulae; no palp; wing completely covered with microtrichia; radial cell r_{4+5} lacking vena spuria; ♂: hypandrium only lightly sclerotised and with two dorsolateral bars which are upcurved dorsally and are connected by a small, lightly sclerotised hypandrial bridge (Fig. 9: dbhy); phallus sheath not fused dorsally (Fig. 10); ♀: posterior surface of the theca with pallisade spicules arranged in 9 close-set horizontal lines (Fig. 12); ♀: posterior part of sternite 6 obviously sclerotised and divided medially (Fig. 11: pS6); overall length < 6 mm. ..... *Gellergrimmellus* gen. nov.

– Arista longer, with 3 aristomeres (e.g. Figs 31–32); usually no ocelli, occasionally 1 anterior ocellus present; usually no ocellar tubercle present; gena broader: gena height / eye height > 0.2; tibiae dorsally lacking preapical setulae; palp present but may be short and difficult to find; usually at least parts of the wing lacking microtrichia; radial cell r_{4+5} with vena spuria; ♂: hypandrium distinctly sclerotised, without dorsolateral bars, with a large, distinctly sclerotised hypandrial bridge; phallus sheath fused dorsally; ♀: posterior surface of the theca with pallisade spicules not usually arranged in long close-set lines (Fig. 22); ♀: posterior part of sternite not obviously sclerotised and therefore not divided medially (Fig. 23); overall length > 7 mm. 2

2 First flagellomere with setae dorsally (Fig. 31); ocellar tubercle usually well developed, occasionally with an indistinct anterior ocellus present; hind metatarsus anteroventrally lacking a line of black, regularly arranged, close-set setae; proboscis longer and sclerotised, almost as long as head length. ..... *Abrachyglossum* Kröber

– First flagellomere lacking setae dorsally (Fig. 32); lacking ocellar tubercle (a scar-like structure may be visible); hind metatarsus anteroventrally with a distinct line of black, regularly arranged, close-set setae (except in *Leopoldius calceatus*); proboscis shorter and unsclerotised, obviously shorter than head length. 3

3 Arista as Fig. 32: apical aristomere moderately elongated, tapering from base to a finely attenuated tip; lacking black frontofacial spot. ..... *Leopoldius* Rondani

– Arista different; apical aristomere either obviously much elongated (Fig. 29) or broader, tapering gently to a blunt tip (Fig. 24) ; black frontofacial spot present (Figs 19, 28). 4

4 Apical aristomere much elongated and attenuated from base (Fig. 29); frons with dark crossband (Fig. 28); gena with short black setulae; thorax mainly black; scutum black; femora ventrally lacking rows of short, regularly arranged black setae; ♀ tergites lacking warty submedian protuberances; ♀ theca as in Fig. 30. .... *Neobrachyglossum* Kröber

– Apical aristomere not so elongated and broader, tapering gently from about midway along (Fig. 24); frons with a longitudinal stripe (Fig. 16); gena with long black setulae; thorax orange brown (Fig. 14); black of central scutum not reaching to margins; all femora ventrally with two rows of short, regularly arranged black setae. ♀ tergites 3 and 4 each with a pair of warty submedial protuberances (Figs 17–19); ♀ theca as Fig. 20. .... *Hauserimyia* gen. nov.

References

Borkent, A. 2018: The state of Phylogenetic Analysis: Narrow Visions and Simple Answers - Examples from the Diptera (Flies). – Zootaxa **4374**: 107–143. – https://www.zin.ru/Animalia/Coleoptera/pdf/borkent_2018_state_phylogenetic_analysis.pdf.

Camras, S. 1962: The Conopidae of Madagascar (Diptera). – Mémoires de l' Institut Scientifique de Madagascar, serie E **13**: 179–187.

Chen, L.; Song, Y. & Xu, S. 2008: The boundary of palaearctic and oriental realms in western China. – Progress in Natural Science **18**: 833–841. – http://www.nsfc.gov.cn/csc/20345/24371/pdf/2008/The%20boundary%20of%20palaearctic%20and%20oriental%20realms%20in%20western%20China.pdf.

Cumming, J. M. & Wood, D. M. 2009: Adult Morphology and Terminology: 9–50. – In: Brown, B. V.; Borkent, A.; Cumming, J. M.; Wood, D. M.; Woodley, N. E. & Zumbado, M. A. (eds.): Manual of Central American Diptera. Volume 1 – NRC Research Press, Ottawa.

Gibson, J. F. & Skevington, J. H. 2013: Phylogeny and taxonomic revision of all genera of Conopidae (Diptera) based on morphological data. – Zoological Journal of the Linnean Society **167**: 43–81. – https://academic.oup.com/zoolinnean/article-pdf/167/1/43/24385990/zoj873.pdf.

Gibson, J. F.; Skevington, J. H. & Kelso, S. 2013: A phylogenetic analysis of relationships among genera of Conopidae (Diptera) based on molecular and morphological data. – Cladistics **29**: 193–226. – https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1096-0031.2012.00422.x.

Heiser, M. & Schmitt, M. 2013: Tracking the boundary between the Palaearctic and the Oriental region: new insights from dragonflies and damselflies (Odonata). – Journal of Biogeography **40**: 2047–2058. – https://onlinelibrary.wiley.com/doi/epdf/10.1111/jbi.12133.

Kreft, H. & Jetz, W. 2010: A framework for delineating biogeographical regions based on species distributions. – Journal of Biogeography **37**: 2029–2053. – https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1365-2699.2010.02375.x.

Kröber, O. 1939a: Beiträge zur Kenntnis der Conopiden. I. – Annals and Magazine of Natural History **11** (4): 362–395.

Kröber, O. 1939b: Beiträge zur Kenntnis der Conopiden. II. – Annals and Magazine of Natural History **11** (4): 454–468.

Kröber, O. 1939c: Beiträge zur Kenntnis der Conopiden. III. – Annals and Magazine of Natural History **11** (4): 525–543.

Kröber, O. 1939d: Beiträge zur Kenntnis der Conopiden. IV. – Annals and Magazine of Natural History **11** (4): 594–607.

Kröber, O. 1940a: Beiträge zur Kenntnis der Conopiden. VI. – Annals and Magazine of Natural History **11** (5): 203–245.

Kröber, O. 1940b: Beiträge zur Kenntnis der Conopiden. V. – Annals and Magazine of Natural History **11** (5): 64–82.

Papâvero, N. 1970: Novo gênero de Dalmanniinae do Brasil (Diptera: Conopidae). – Papéis Avulsos de Zoologia **23**: 121–125.

Pearson, D. L. 1974: A new genus and species of Neotropical Dalmanniinae, with a key to the genera of the subfamily (Diptera: Conopidae). – Annals of the Entomological Society of America **67**: 148–149.

Schneider, M. A. 2010: A taxonomic revision of Australian Conopidae (Insecta: Diptera). – Zootaxa **2581**: 1–246. – https://www.biotaxa.org/Zootaxa/article/view/zootaxa.2581.1.1/38173.

Stuke, J.-H. 2014: A new genus of Conopidae from Europe (Diptera). – Zootaxa **3795**: 472–482. – https://www.biotaxa.org/Zootaxa/article/view/zootaxa.3795.4.6/8339.

Stuke, J.-H. 2017: World Catalogue of Insects. Volume 15. Conopidae (Diptera). – E. J. Brill, Leiden: xxxviii + 354 pp.

Stuke, J.-H. 2018: Revisionary notes on *Siniconops* Chen, 1939 (Diptera: Conopidae), together with a key to known species. – Oriental Insects 2018: 1–27.