

IN MEMORIAM: ROGER WARD CROSSKEY

THE TACHINID TIMES

ISSUE 31

News from China, Brazil,
Italy and the United States...
AND MORE



FEBRUARY 2018

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DISTRIBUTION

This newsletter is distributed near the end of February each year. It is published simultaneously in hardcopy and online, both based on the same PDF generated from an InDesign file. Hardcopies are distributed to several libraries and to a few readers who request them.

INSTRUCTIONS TO AUTHORS

This newsletter accepts submissions on all aspects of tachinid biology and systematics. It is intentionally maintained as a non-peer-reviewed publication so as not to relinquish its status as a venue for those who wish to share information about tachinids in an informal medium. All submissions are subjected to careful editing and some are (informally) reviewed if the content is thought to need another opinion. Some submissions are rejected because they are poorly prepared, not well illustrated, or excruciatingly boring.

Authors should try to write their submissions in a style that will be of interest to the general reader, in addition to being technically accurate. This is a newsletter, not *Science* or *Nature*. Try to illustrate submissions with high quality images sent to the editor as separate files at the same time as the text. Text files sent with embedded images will not be considered for publication. All content should be original; if copyrighted material (online or in print) is used then permission from the copyright holder is needed. Submitted pictures of tachinids in the field will be considered for the cover, table of contents, or a special section in the newsletter.

Student submissions are particularly welcome. Writing about a thesis study or a side project involving tachinids is a good way to inform others about a study that is underway before it has generated formal publications.

Please send submissions for the 2019 issue of *The Tachinid Times* to the editor by the end of January 2019.

FRONT COVER Four dipterists hilltopping for flies on the summit of Union Peak in the Rocky Mountains of Montana during the Field Meeting of the North American Dipterists Society. From left to right: John Stireman, Greg Dahlem, Juan Manuel Perilla López and Jim O'Hara. See the first article in this issue for an account of the tachinids collected during this meeting.

Photo: J.E. O'Hara, 27 June 2017

TABLE OF CONTENTS *Adejeania vexatrix* (Osten Sacken) (Tachininae, Tachinini) feeding from a flower in Lockett Meadow in the San Francisco Peaks, northern Arizona, USA.

Photo: J.E. O'Hara, 5 July 2017

BELOW View looking east from near Mesa Arch into the canyons of the Colorado River in Canyonlands National Park, southeastern Utah, USA.

Photo: J.E. O'Hara, 28 September 2017



Figure 1. Juan Manuel (left) and John (right) search for tachinids at Hoodoo Pass on the Montana-Idaho border in the Bitterroot Range of the Rocky Mountains.



Tachinid collecting in the Rocky Mountains of Western Montana, U.S.A.

by John O. Stireman III¹, James E. O'Hara² and Juan M. Perilla López¹

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In June of 2017, the Field Meeting of the North American Dipterists Society (NADS) was held at the Lubrecht Experimental Forest in western Montana, U.S.A. NADS field meetings, held every two years, provide an opportunity for the Diptera research community to meet with their colleagues, collect flies in interesting locales, and learn about current research projects of participants during evening talks. Each meeting is held at a different field site in North America that provides access to a variety of habitats for collecting. An overview of the 2017 meeting in Montana, written by the organizer Andrew Fasbender, can be found in [Fly Times issue 59](#) (Fasbender 2017). Here, we report on the tachinid fauna of the area collected by John Stireman, Jim O'Hara and Juan Manuel Perilla López (accompanied by fellow collector and oestroidiphile Greg Dahlem; see the four of us on the cover of this issue of *The Tachinid Times*).

Collecting Sites

Our collecting was conducted in the Rocky Mountains of western Montana, in the vicinity of the city of Missoula (Fig. 2). This region, known as the “Northern Rockies”, is characterized by moderate to high forest-covered mountain ranges (2000–3000m) interspersed with semi-arid grassy valleys. The mountain vegetation is dominated by ponderosa pine (*Pinus ponderosa*), fir (*Abies* spp.), Douglas fir (*Pseudotsuga menziesii*) and other conifers, although the understory and openings host a wide diversity of shrubs, forbs, and grasses (see Lackschewitz 1991 for a guide to the flora). The majority of our collecting was focused around three major sites: Union Peak (Figs. 3, 4), Gold Creek (Fig. 5), and around the Castles Forestry Center of the Lubrecht Experimental Forest (Figs. 6, 11) where the meeting was held.

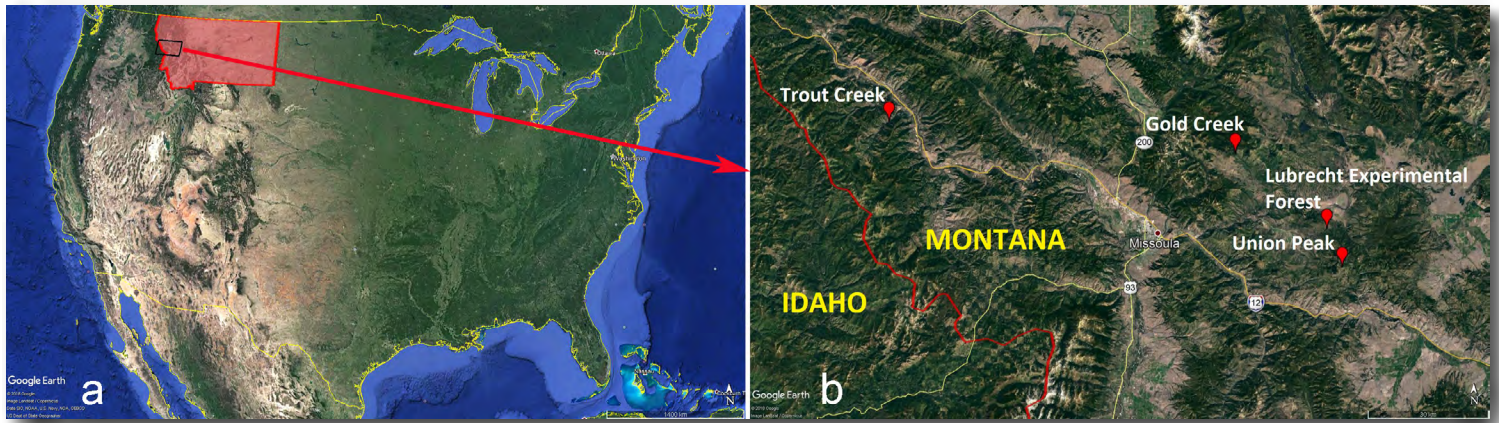


Figure 2. Locations where tachinids were collected during the 2017 NADS meeting in Montana. **a.** Map of the United States with Montana in red. **b.** Enlargement of small rectangle in Montana with the four main collecting locations indicated. Map data © 2018 Google.

Union Peak, Garnet Range

Figures 3, 4.

Soon after our arrival we learned from Andrew Fasbender about Union Peak, a potential hilltopping site a short distance away from the meeting center, and we immediately ventured there in the afternoon of June 26th. Conveniently, this low peak could be accessed by a dirt road nearly to its summit, although the quality of the road became increasingly questionable as we approached the top as evidenced by the punctured tire we had to change near the summit. Atop the summit was a fire-lookout cabin with the area around clear of tall vegetation (Fig. 3), offering a commanding view of the surrounding mountain ranges (Fig. 4). It was fairly active with the buzzing of flies and we collected a number of tachinids, mostly Tachinini (*Tachina*, *Peleteria*), Ernestiini (*Panzeria*) and Dexiini (*Ateloglossa*, *Ursophyto*), as well as some goniines (*Patelloa*, *Gonia*, *Gaediopsis*, *Spallanzania*). We returned to this site the following two days of June 27th (afternoon) and June 28th (morning), with somewhat diminishing returns on the final morning, possibly due to increased windiness and decreased temperatures.

Tachina was the most diverse genus, with about seven species collected at this one hilltop, followed by *Peleteria* with six species. Several *Tachina* (subgenus *Rhachogaster*) species were of a large, shiny black form with orange wing bases, which appear to form a convergent coloration syndrome at high elevations with species of *Peleteria* (e.g., *cornigera* complex, Fig. 15) and *Melanophrys*. Two or three species of *Tachina* (subgenus *Nowickia*) near *latigena* could not be confidently matched to known species and one or more may be undescribed.

Although generally it did not seem that the area possessed an especially rich tachinid fauna, there was an impressive diversity of *Panzeria* species for a single site (5–6 species). We are not certain exactly how many species were present, however, due to difficulties separating and identifying members of the *P. fasciventris-hirta-genalis* complex (Fig. 14). It is unclear if we have one variable species or two and which species they correspond to. Furthermore, it is unclear if the names *P. hirta* and *P. genalis* refer to the same or different species (Tothill 1921). We plan to DNA barcode some specimens to help us sort out the species.

The tribe Dexiini was represented by several specimens of the large, dark-bodied *Ursophyto nigriceps*, which appears to be closely allied with *Ateloglossa*. Of the latter we collected but a single, unidentifiable species. Goniini were represented by several genera including *Gonia*, *Gaediopsis*, *Onychogonia*, *Patelloa* and *Spallanzania*, but with only one species of each genus and few total specimens. Some additional highlights included: *Acemya tibialis* (a first for John), *Bombyliomyia soror* (an unusual ernestiine belonging to a largely tropical group), and *Hemyda aurata* (the only phasiine collected during the trip).



Figures 3–11. 3. Fire-lookout cabin at summit of Union Peak (elevation 2070m). 4. View from summit of Union Peak. 5. Collecting site along Gold Creek road with unidentified dipterists. 6. Main lodge at the Castles Forestry Center in Lubrecht Experimental Forest, with vegetation dominated by ponderosa pine. 7. John changes second flat tire on “Stiretruck” under Juan Manuel’s watchful supervision. 8. *Smidtia fumiferanae* female feeds on sugar solution at Gold Creek road site. 9. John and Juan Manuel on Heart Lake Trail in Bitterroot Mountains. 10. Jim beside Trout Creek along Heart Lake Trail. 11. Jim’s 6-metre trap in a small grove of quaking aspen in Lubrecht Experimental Forest near main lodge.

Gold Creek

Figure 5.

On June 28th, Jim and Greg joined a group that visited the Nature Conservancy's Clearwater Blackfoot project area and surrounding Lolo National Forest in the "Rattlesnake Mountains". Although most of this area was heavily impacted by timber harvesting and fire, Jim and colleagues found a productive roadside area on a slope in the midst of an old-growth section of conifers, near the Gold Creek trailhead. John, Juan Manuel and Greg revisited this site in midday on June 30 (where we experienced our second flat tire! [Fig. 7]). Our collecting here was primarily conducted by walking the roadside and netting tachinids off the leaves of sunlit herbs and shrubs. John and Juan Manuel attracted additional tachinids by "sugaring" leaves with a water/honey/cola concoction.

The most abundant species we collected here was *Smidtia fumiferanae* (Fig. 8), with large numbers of both males and females resting on leaves and sponging up our sugary spray. In just a couple of hours, John and Juan Manuel collected 74 specimens. At some point we gave up collecting more of them, as they were so abundant. This broadly distributed species is the only *Smidtia* species known from North America. We were also able to collect a number of specimens of *Lypha fumipennis* (probably), the ever-present *Voria ruralis* (a species complex), and *Proopopia strigifrons* (Fig. 13). This last species is a new record for the "lower 48 states" of the United States; it was previously known as a Holarctic species with a northern distribution including Alaska and Canada. Several taxa overlapped with those found on Union Peak including *Tachina spineiventer*, *T. ampliforceps*, *Aphria ocypterata* and *Smidtia fumiferanae*, although one species of *Panzeria*, *P. flavicornis*, was found only here. As might be expected, many more females were collected here than at the hilltop site.

Lubrecht Experimental Forest

Figures 6, 11.

The area around the Castles Forestry Center where the meeting was held was relatively level, with open stands of ponderosa pine and small patches of quaking aspen (*Populus tremuloides*) accompanied by a low grassy herbaceous understory with low emergent shrubs and some flowering perennials. A large open mowed field formed the center of the complex of cabins and buildings. Visual searching in this area resulted in the collection of very few tachinid specimens; John and Juan Manuel only ended up collecting a single specimen each (*Eunemorilla alearis* and *Myxexoristops ?fronto*, respectively). However, Jim's 6-metre Malaise trap (Fig. 11), erected between aspens close to the mowed field and within sight of the main lodge, revealed that the area was frequented by a good diversity of mostly medium- to small-bodied tachinid species.

The Malaise trap caught 46 specimens belonging to 23 species over two and one-half days (these comprise all of the CNC specimens from site 3 in the species list below). In addition to several species that were found at other sites, it captured *Admontia degeeriodes*, *Euthelyconychia* sp., *Ceromasia auricaudata*, *Eulasiona comstocki*, *Lydina* sp., *Periscepsia helymus*, *Phebellia erecta*, several species of *Phytomyptera*, and a number of *Siphona* species. There are many undescribed species of *Siphona* s.l. in North America and we appear to have caught two: one has the typical long and geniculate proboscis of subgenus *Siphona* and the other (Fig. 12) is an undescribed and unplaced species examined but not described by O'Hara (1989: 131, as "*Siphona* s.l. New World unplaced sp. 1"). This last species is unusual among *Siphona* s.l. species in having wing vein R_1 setulose distally.

Grizzly Creek/Heart Lake Trail/Hoodoo Pass, Bitterroot Mountains

Figures 1, 9, 10.

On June 29th we ventured with a larger group of dipterists up Trout Creek Road into the beautiful Bitterroot Mountains. We stopped at several sites along this route as the road wound up the canyon to Hoodoo Pass, marking the border between Montana and Idaho. The Heart Lake Trail was particularly beautiful with large old-growth forest, including stands of tall mountain hemlock (*Tsuga mertensiana*), cold mountain streams, and diverse mountain wildflowers. Unfortunately, the weather was cool and overcast, and the fly collecting was extremely poor. Despite this, we collected a few interesting species including *Eumegaparia flaveola* (a first for John), *Pelatachina limata*, and yet another species of *Panzeria*, *P. sulcocarina*. Two additional tachinid specimens were collected by tipulidologist Daichi Kato at nearby Brewster's Creek and generously donated, including *Actia diffidens* and *Lydina* sp. This latter specimen appears to differ from the *Lydina* sp. specimen collected in the Malaise trap at the Lubrecht Experimental Forest, however distinguishing between these taxa is not straightforward and a species complex may be involved (O'Hara 2002).

Overview of Results

In total, we collected 335 individuals of ca. 62 tachinid species over four days of collecting (see list below). This is not a highly impressive number relative to other sites in North America (e.g., 84 spp./308 specimens from the 2015 NADS meeting in Kentucky, O'Hara and Stireman 2016; and 62 spp./139 specimens from the 2007 NADS meeting in New Mexico by one collector, Stireman 2007). Although this modest collection can be explained in part by poor weather and vehicle difficulties, it also likely reflects a relatively low diversity of tachinid species present at moderate to high elevations in the Northern Rocky Mountains. This is expected due to lower vegetational diversity (e.g., trees), which limits diversity of potential hosts (largely Lepidoptera and Coleoptera in this case). Still, the many singletons and doubletons represented in our overall species list hint at a much greater diversity than we actually sampled, and it would likely take several years of sampling to achieve a clear picture of the diversity and composition of the tachinid fauna in this area. In addition, we collected many species that we had not collected previously and several species (*Ateloglossa*, *Siphona*, *Phytomyptera*, *Tachina*) are likely to be undescribed. We should note that many of our identifications remain tentative and require further comparison with reliably identified material and/or type series, and for some of the genera we examined it is clear that additional taxonomic revisionary work and DNA barcoding is needed to assess species limits.

List of Collecting Localities

Tachinids were collected at the following eight sites during the Field Meeting of the North American Dipterists Society held in western Montana in late June 2017. The sites are arranged into four general areas as described below and shown in Fig. 2. Specimens were hand collected except for those captured in Jim's 6-metre Malaise trap set up near the main lodge of the Castles Forestry Center in the Lubrecht Experimental Forest (Fig. 11, site 3).

Union Peak, Garnet Range (Figs. 3, 4)

1. Granite County, Garnet Range, Union Peak summit, 2070m, 46°48.46'N 113°23.94'W, 26–28 June 2017 [collectors J.M. Perilla López, J.E. O'Hara, J.O. Stireman].

Gold Creek, Rattlesnake Mountains (Fig. 5)

2. Missoula County, Lolo National Forest, Gold Creek Road, 1700m, 47°03.44'N 113°44.94'W, 28 June 2017 [collector J.E. O'Hara] and 30 June 2017 [collectors J.M. Perilla López, J.O. Stireman].

Lubrecht Experimental Forest (Figs. 6, 11)

3. Missoula County, Lubrecht Experimental Forest, 1250m, 46°53.61'N 113°27.08'W, 27–29 June 2017, 6-metre Malaise trap [collector J.E. O'Hara] and 1 July 2017, hand collecting [collectors J.M. Perilla López, J.O. Stireman].

Grizzly Creek/Heart Lake Trail/Hoodoo Pass, Bitterroot Mountains (Figs. 1, 9, 10)

4. Granite County, Lolo National Forest, Grizzly Creek Campground, 1240m, 46°34.46'N 113°39.46'W, 27 June 2017 [collectors J.M. Perilla López, J.O. Stireman].
5. Missoula County, Lolo National Forest, Brewster's Creek, 1190m, 46°36.69'N 113°38.42'W, 28 June 2017 [collector Daichi Kato].
6. Mineral County, Lolo National Forest, Bitterroot Mountains, Trout Creek Road, 909m, 47°06.75'N 114°52.51'W, 29 June 2017 [collectors J.M. Perilla López, J.O. Stireman].
7. Mineral County, Lolo National Forest, Bitterroot Mountains, Trout Creek Road, Heart Lake Trail, 1460m, 46°58.61'N 114°58.85'W, 29 June 2017 [collector J.E. O'Hara].
8. Mineral County, Bitterroot Mountains, Hoodoo Pass, 1810m, 46°58.50'N 115°01.55'W, 29 June 2017 [collector J.E. O'Hara].



Figures 12–15. Lateral views of four specimens caught in western Montana during the NADS meeting. **12.** *Siphona* undescribed New World sp. 1, unplaced to subgenus (♀, CNC821007, length 3.6mm). **13.** *Proopopia strigifrons* (Zetterstedt) (♂, CNC821057, length 8.0mm). **14.** *Panzeria* ?*fasciventris* (Curran) (♂, CNC820953, length 10.2mm). **15.** *Peleteria* (*Panzeriopsis*) *cornigera* Curran variation 2 (yellow pedicel) (♂, CNC820977, length 12.0mm).

List of taxa and specimens

Listed here are the 335 specimens of ca. 62 tachinid species that were collected in western Montana during the NADS meeting of 2017. Unidentified species are indicated as “sp.” or “spp.” and questionable identifications are preceded with a question mark. A portion of the specimens will be DNA barcoded to provide reference barcodes for future identifications and to help resolve the identities of the specimens that could not be identified with certainty. Specimens collected by John and Juan Manuel (231) are kept in John’s collection (JOS below) at Wright State University. Code numbers are given below for John’s specimens from which legs have been removed and frozen for possible future molecular analysis. Specimens collected by Jim (104) are housed in the Canadian National Collection of Insects (CNC) and have been entered into that institution’s specimen database. The database numbers are given below.

DEXIINAE

DEXIINI

Ateloglossa sp. JOS: Site 1, 3♂♂ incl. JOS617.28, JOS617.30. CNC: Site 3, 1♀, CNC821107.

Eumegaparia flaveola (Coquillett). JOS: Site 6, 1♂, JOS617.39.

Ursophyto nigriceps (Bigot). JOS: Site 1, 10♂♂ incl. JMPL2017.054, JOS617.03, JOS617.38. CNC: Site 1, 6♂♂, CNC820945, CNC820946, CNC820947, CNC820950, CNC820973, CNC820974.

VORIINI

Eulasiona comstocki Townsend. CNC: Site 3, 1♀, CNC821006.

Periscepsia (*Ramonda*) *helymus* (Walker). CNC: Site 3, 1♀, CNC821120.

Periscepsia (*Ramonda*) *rohweri* (Townsend). JOS: Site 1, 3♂♂ incl. JOS617.21.

Voria ruralis (Fallén) complex. JOS: Site 2, 3♀♀ incl. JOS617.51. CNC: Site 2, 1♀, CNC821077.

EXORISTINAE

BLONDELIINI

Admontia degeerioides (Coquillett). CNC: Site 3, 2♂♂, CNC821011, CNC821014.

Euthelyconychia sp. CNC: Site 3, 1♀, CNC821111.

Unidentified blondeliine: CNC: Site 2, 1♀, CNC821081.

ERYCIINI

Aplomya theclarum (Scudder) complex. JOS: Site 1, 2♂♂ incl. JOS617.34. CNC: Site 1, 2♂♂, CNC820954, CNC820984.

Drino (*Drino*) *?incompta* (van der Wulp). JOS: Site 2, 1♂, JOS617.55.

Eunemorilla ?alearis (Reinhard). JOS: Site 3, 1♂.

Nilea ?sternalis (Coquillett). JOS: Site 1, 4♂♂, 1♀ incl. JOS617.43, JOS617.37.

Phebellia erecta (Sellers). JOS: Site 6, 1♀. CNC: Site 3, 1♀, CNC821104.

Prooppia strigifrons (Zetterstedt) (Fig. 13). JOS: Site 2, 3♀♀ incl. JOS617.56. CNC: Site 1, 1♂, CNC821057. **New record** for the United States south of Canada (previously known as a Holarctic species with a northern distribution, including Alaska and Canada).

EXORISTINI

Exorista dydas (Walker) or *trudis* (Reinhard). CNC: Site 1, 1♀, CNC821058. CNC: Site 3, 1♀, CNC821013.

Exorista trudis (Reinhard). JOS: Site 1, 3♂♂ incl. JOS617.42, JOS617.36.

GONIINI

Ceromasia auricaudata Townsend. CNC: Site 3, 1♂, CNC821114.

Gaediopsis setosa Coquillett. JOS: Site 1, 2♂♂ incl. JOS617.20.

Gonia porca Williston. JOS: Site 1, 2♀♀, JMPL2017.052, JOS617.29.

Myxexoristops ?fronto (Coquillett). JOS: Site 3, 1♀, JMPL2017.047.

Onychogonia flaviceps (Zetterstedt). JOS: Site 1, 1♂, JOS617.35.

Patelloa pluriseriata (Aldrich & Webber). JOS: Site 1, 2♂♂ incl. JOS617.08.

Spallanzania ?hebes (Fallén). JOS: Site 1, 1♂, JOS617.11.

WINTHEMIINI

Smidtia fumiferanae (Tothill). JOS: Site 1, 6♀♀ incl. JOS617.09, JMPL2017.048; Site 2, 18♂♂, 56♀♀ incl. JOS617.44, JOS617.45, JOS617.46, JOS617.48, JOS617.52. CNC: Site 2, 3♂♂, 4♀♀, CNC821074, CNC821075, CNC821082, CNC821076, CNC821079, CNC821083, CNC821085; Site 3, 2♂♂, 2♀♀, CNC821001, CNC821105, CNC821108, CNC821118.

PHASIINAE

CYLINDROMYIINI

Hemyda aurata Robineau-Desvoidy. JOS: Site 1, 1♂, JOS617.24.

TACHININAE

ACEYMYINI

Acemya tibialis Coquillett.

JOS: Site 1, 1♂, JOS617.25. CNC: Site 3, 1♀, CNC821012.

ERNESTIINI

Bombyliomyia soror (Williston). JOS: Site 1, 1♂, JOS617.40.

Melanophrys flavipennis Williston. JOS: Site 1, 3♂♂ incl. JOS617.02, JOS617.12. CNC: Site 1, 1♂, CNC820981.

Panzeria alberta (Curran). CNC: Site 1, 1♂, CNC821055.

Panzeria fasciventris (Curran). JOS: Site 1, 3♂♂.

Panzeria ?fasciventris (Curran) (Fig. 14). JOS: Site 1, 5♂♂ incl. JOS617.18. CNC: Site 1, 3♂♂, CNC820951, CNC820953, CNC820983.

Panzeria ?flavicornis Brauer. JOS: Site 2, 1♂, JOS617.53.

Panzeria genalis (Coquillett) or *hirta* (Townsend). JOS: Site 1, 9♂♂ incl. JOS617.13, JOS617.14. CNC: Site 1, 4♂♂, CNC820955, CNC820975, CNC820982, CNC820985.

Panzeria nigrocornea (Tothill). JOS: Site 1, 9♂♂ incl. JOS717.07, JOS717.17, JOS717.19. CNC: Site 1, 3♂♂, CNC820972, CNC820979, CNC820980.

Panzeria ?setifrons (Brooks). JOS: Site 1, 1♂.

Panzeria sulcocarina (Tothill). CNC: Site 7, 1♂, CNC821173.

GRAPHOGASTRINI

Phytomyptera amplicornis (James). CNC: Site 3, 10♂♂, CNC821010, CNC821015, CNC821017, CNC821018, CNC821019, CNC821020, CNC821021, CNC821022, CNC821023, CNC821024.

Phytomyptera sp. 1. CNC: Site 3, 1♂, CNC821025.

Phytomyptera sp. 2. CNC: Site 3, 2♀♀, CNC821008, CNC821115.

Phytomyptera sp. 3. CNC: Site 3, 1♀, CNC821016.

Phytomyptera sp. 4. CNC: Site 3, 1♀, CNC821009.

Phytomyptera sp. JOS: Site 1, 1♀.

LESKIINI

Aphria ocypterata Townsend. JOS: Site 1, 2♀♀ incl. JOS617.41. CNC: Site 2, 2♀♀, CNC821078, CNC821080; Site 3, 3♀♀, CNC821106, CNC821112, CNC821113.

PELATACHININI

Pelatachina limata Coquillett. CNC: Site 7, 1♂, CNC821174.

POLIDEINI

Lydina sp(p). JOS: Site 5, 1♂. CNC: Site 3, 1♀, CNC821110.

Lypha ?*fumipennis* Brooks. JOS: Site 2, 8♀♀ incl. JOS617.47, JOS617.50.

Lypha sp. CNC: Site 2, 1♀, CNC821084; Site 3, 3♀♀, CNC821109, CNC821119, CNC821282.

SIPHONINI

Actia diffidens Curran. JOS: Site 5, 1♀.

Siphona undescribed New World sp. 1, unplaced to subgenus (Fig. 12) (see O'Hara 1989: 131). CNC: Site 1, 1♂, CNC820956; Site 3, 1♀, CNC821007.

Siphona (*Siphona*) *intrudens* (Curran). CNC: Site 3, 2♀♀, CNC821003, CNC821283.

Siphona (*Siphona*) ?*multifaria* O'Hara. CNC: Site 3, 1♂, CNC821121.

Siphona (*Siphona*) sp. 1. CNC: Site 3, 6♂♂, CNC821002, CNC821004, CNC821005, CNC821116, CNC821117, CNC821122.

TACHININI

Peleteria (*Oxydosphyria*) *iterans* (Walker). JOS: Site 1, 4♂♂, 2♀♀, JOS617.23, JOS617.15, JOS617.16, JOS617.26, JOS617.27, JMPL2017.049. CNC: Site 1, 3♂♂, CNC820943, CNC820969, CNC820970.

Peleteria (*Panzeriopsis*) ?*cornigera* Curran, variation 1 (dark pedicel). JOS: Site 1: 6♂♂, incl. JOS617.06, JOS617.33. CNC: Site 1, 2♂♂, CNC820939, CNC820942.

Peleteria (*Panzeriopsis*) ?*cornigera* Curran, variation 2 (orange pedicel) (Fig. 15). JOS: Site 1: 8♂♂. CNC: Site 1, 5♂♂, CNC820941, CNC820977, CNC820978, CNC821054, CNC821056.

Peleteria (*Panzeriopsis*) *cornuta* Curran. JOS: Site 1, 1♂.

Peleteria (*Peleteria*) *neglecta* (Townsend). JOS: Site 1, 2♂♂ incl. JOS617.10. CNC: Site 1, 1♂, CNC820948.

Peleteria (*Sphyrmyia*) nr. *malleola* (Bigot). JOS: Site 1, 1♂, JMPL2017.053.

Peleteria sp. CNC: Site 8, 1♀, CNC821281.

Tachina (*Nowickia*) *ampliforceps* (Rowe). JOS: Site 1, 1♂, JOS617.04; Site 2, 1♀; Site 6, 1♂. CNC: Site 2, 1♂, CNC821073.

Tachina (*Nowickia*) prob. *latigena* (Tothill). CNC: Site 1, 1♂, CNC820944.

Tachina (*Nowickia*) spp. JOS: Site 1, 6♂♂ incl. JOS617.22, JMPL2017.051; Site 2, 1♀, JOS617.49; Site 4, 1♂. CNC: Site 1, 3♂♂, CNC820949, CNC820952, CNC820971.

Tachina (*Rhachogaster*) ?*latianulum* (Tothill). JOS: Site 1, 4♂♂ incl. JOS617.31.

Tachina (*Rhachogaster*) *robinsoni* (Townsend) complex. JOS: Site 1, 9♂♂, 2♀♀, incl. JMPL2017.050, JOS617.32, JOS617.05. CNC: Site 1, 2♂♂, CNC820940, CNC820976.

Tachina (*Rhachogaster*) *spineiventer* (Tothill). JOS: Site 1, 4♂♂; Site 2, 5♂♂ incl. JOS617.54. CNC: Site 1, 1♂, CNC821072. CNC: Site 2, 1♂, CNC821053.

Acknowledgments

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What does morphology say about Phasiinae systematics?

Deepening the knowledge on Phasiinae systematics and morphology

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Figure 1. Author collecting tachinids at Estação Biológica de Boracéia in São Paulo state. (Photo taken on October 2016 by Pedro Dias.)

liopterygini, Gymnosomatini (Fig. 2), Hermyini, Imitomyiini, Leucostomatini, Parerigonini, Phasiini, Strongygastriini, Tarassini (Fig. 3), Xystini and Zitini (Blaschke *et al.* 2018). This last publication reinstated the tribe Xystini, erected the new tribe Zitini, and changed the composition of some of the other tribes. Two of the tribes, Tarassini and Euscopliopterygini, are rare and could not be sampled for this last phylogeny hypothesis. It is possible that both of them can be included in other phasiine tribes, and this is one of the questions I will address in my Ph.D. project.

Despite the smallest number of species within Tachinidae, the subfamily Phasiinae is a morphologically diverse group, with the highest diversity of forms in the male terminalia among the four tachinid subfamilies (Dupuis 1963, Tschorsnig 1985). Some structures of phasiine male terminalia do not have appropriate terminology, even though some detailed studies have been made (Rubtsov 1951, Verbeke 1962, Tschorsnig 1985, Cantrell 1988).

The subfamily Phasiinae is the smallest of the four subfamilies of Tachinidae considering the number of species, but it also presents an astonishing morphological variation (Blaschke *et al.* 2018). The subfamily was historically grouped mainly by its habit of parasitizing Heteroptera. Now it is accepted that there are a few exceptions in Phasiinae, as well as a few other Tachinidae that parasitize Heteroptera (Blaschke *et al.* 2018). Many phasiine hosts are pests of different agricultural crops, and Phasiinae play an important role in biological control.

For some time, the only putative synapomorphy for Phasiinae was the presence of an elongated medial plate of the hypandrium in males, in which the pregonites are attached posteriorly (Tschorsnig 1985). Recently, another possible putative synapomorphy was proposed – the lack of differentiation between the basiphallus and distiphallus (Shima 2015).

The first phylogenetic reconstruction focused on Tachinidae based on morphological characters considered Phasiinae monophyletic, but the subfamily was grouped with homoplasies and with a taxonomic sampling that included mostly Nearctic and Palaearctic species (Cerretti *et al.* 2014). A focused and extensive Phasiinae phylogeny using molecular data was just published and it corroborates the subfamily monophyly, with very interesting results, and represents a great contribution to the subfamily knowledge (Blaschke *et al.* 2018).

At the present time, there are 13 tribes of Phasiinae: Catharosiini, Cyndromyiini, Euscopo-



Figure 2. A female of *Eutrichopoda* sp., photographed in the city of São Paulo, Brazil.

supervision of Dr. Silvio Shigueo Nihei. My project aims to produce a cladistic analysis of the Phasiinae based on morphological data. I have been studying Tachinidae, mainly Phasiinae, since my graduation and I am focused on the Neotropical fauna, in which I have a great interest (Figs. 1, 4).

In my Ph.D. project I intend to include all tribes in the analysis, and at the moment the only tribe that I still do not have any specimens of is the new tribe, Zitini. I am trying to sample the greatest number of Phasiinae genera possible, but I am still missing some monotypic genera. Of the approximately 100 genera of Phasiinae, I have sampled more than half. I will expand my examination of the Phasiinae by studying the collections of the Smithsonian National Museum of Natural History (Washington, D.C., United States) and the Canada National Collection of Insects (Ottawa, Canada) in the first semester of 2018. Visiting these collections will allow me to include more terminal taxa in the analysis. Most of my characters are from male and female terminalia and one of the expected outcomes of my Ph.D. research will be a comprehensive study of Phasiinae terminalia, focusing in females. Some taxonomic revisions are also being prepared.

My preliminary analyses, based on low sampling (few genera for each tribe), results in a topology for the Phasiinae that is similar in many aspects to the recent one of Blaschke *et al.* (2018), with some small differences. But probably some changes will occur once more taxa are added to the analysis. Most of the proposed changes in the tribal composition are also being recovered. I expect to recognize synapomorphies for most or all of the tribes and for the subfamily itself, as well as discuss and try to interpret some important Phasiinae characteristics. I also intend to present some preliminary results at the 9th International Congress of Dipterology (Windhoek, Namibia).

Considering the historical bias towards male terminalia studies in insect taxonomy (Ah-King *et al.* 2014, Simmons 2014), the female terminalia characterization in Tachinidae is even scarcer, with Herting's (1957) publication on *Calyptratae* flies and some relevant studies with Phasiinae (Dupuis 1963, Cantrell 1988). Nevertheless, females of Phasiinae have a wide range of adaptations and modifications in their morphology to inject eggs into, or attach them on to, their hosts. These different forms could have evolved due to their phasiine habit of parasitizing adults and nymphs of Heteroptera which are heavily sclerotized (in contrast to most Tachinidae which parasitize larvae with soft bodies) (Verbeke 1962, Blaschke *et al.* 2018). The diversity of female terminalia was also used by Dupuis (1963) to classify phasiine tribes but lacked a comprehensive study of its terminalia (male and female), as well as homology hypotheses.

Phasiinae systematics has undergone great improvement in its knowledge and understanding, but there is always more that can be added. My Ph.D. project is being done at the "Insects Systematics and Biogeography Laboratory" at the University of São Paulo (Brazil) under the



Figure 3. Lateral view of a male of the rare *Tarassus shannoni* Aldrich. Scale bar = 1mm.

I would appreciate some extra Phasiinae material on loan, if available. Most of my missing genera are from the Afrotropical, Oriental and Australasian regions, but more material from rare Palaearctic genera would be great contributions (mainly in the Leucostomatini and Catharosiini). Since I am including many terminalia characters, I need specimens from both sexes and they need to be dissected.



Figure 4. Author in the Brazilian Atlantic Forest, Estação Biológica de Boracéia, São Paulo state. (Photo by Fernando Martins.)

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Figure 1. Zhonglu Tibetan Fortress Village, Danba County, Sichuan, China. This is rated as one of the most picturesque villages in China.



Collecting tachinid flies (Diptera, Tachinidae) in the Hengduan Mountains of SW China

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The Hengduan Mountains in southwestern China are recognized as one of the world's 36 biodiversity hotspots according to Conservation International (Boufford 2014). These mountains are contiguous with the southeastern edge of the Qinghai-Tibet Plateau, which began forming about 65 million years ago as the Indian tectonic plate drifted northward and collided with the Eurasian plate. The main uplift of the Hengduan Mountains appears to have occurred fairly quickly and recently, mostly between the late Miocene (8–10 mya) and late Pliocene (ca. 3 mya) (Xing & Ree 2017).

The uplift of the Hengduan Mountains region created a spectacular series of seven parallel high mountain ranges separated by six deep valleys with fast-flowing rivers. These ranges and valleys are roughly aligned in a north-to-south orientation with overall elevation decreasing in the same direction. In some places in the north the mountain peaks are over 6000m high and the valleys 3000m deep. As a result of both geography and climate the northern portion of the Hengduan Mountains is generally cold and dry and the southern portion warm and wet. Warm humid air from the Indian Ocean enters China through these river valleys. The combination of high mountains, deep valleys, climatic variation, and rapid evolution (due to “uplift-driven diversification”, Xing & Ree 2017) has resulted in the Hengduan Mountains becoming one of the most biologically diverse temperate forest ecosystems in the world. It is



famous for its exceptional flora, including Orchidaceae (orchids), Ericaceae (incl. *Rhododendron*) and Gentianaceae. Many of the ornamental plants that are grown today in the gardens of Europe and North America originated in the Hengduan Mountains. It is also home to some of the rarest vertebrates, such as the giant panda, red panda, white-lipped deer, white eared pheasant, and the recently described Skywalker hoolock gibbon. There are 28 ethnic minorities that are native to the Hengduan Mountains region.

There are many famous natural scenic places in the Hengduan Mountains. For example, Mount Gongga (the highest mountain in Sich-

The Hengduan Mountains ‘hotspot’ is exceptionally rich in Tachinidae, as reflected in the high number of species and endemics recorded from Sichuan and Yunnan compared to all of China (Table 1) (see also O’Hara *et al.* 2009).

	No. of species	% of total	No. of endemics	% land area
Sichuan	419	33.52	138	5
Yunnan	432	34.64	149	4
Sichuan + Yunnan	685	54.91	229	9
China	1253	100	434	100

July 12 We flew from Shenyang to Kunming, Yunnan.

Yunnan

July 13 Kunming to Xiangyun-Binchuan-Heqing, Huangping.

July 13–15 Heqing County, Huangping.

July 16 Heqing, Huangping to Yulong-Shangri-La Valley-Napahai-Balagezong Valley to Deqen, Benzilan (World Nature Heritage).

July 17 Benzilan-Deqen Valley to Baima & Meili Snow Mountains (Figs. 3–6, 10)-Feilai Temple.

July 18 Deqen (Fig. 12), Feilai Temple to Weixi, Tacheng.

July 19 Weixi, Tacheng to Lijiang (World Heritage).

July 20 Lijiang, Yulong Snow Mountains (Botanical Garden) (Fig. 23) to Wenhai, Daju.

July 21 Lijiang, Daju to Jiangbian Village-Baishuitai-Haba Snow Mountains (Figs. 19, 20)-Daju.

July 22 Lijiang, Daju to Stone Town-Mingyin.

July 23 Lijiang, Mingyin-Fengke to Ninglang, Labo-Yongning-Lugu Lake (Fig. 24).

July 24 Ninglang, Lugu Lake-Yongsheng-Huaping to Sichuan, Panzhihua City.

Sichuan

July 25 Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala (Fig. 22).

Yunnan

July 26 Panzhihua to Yunnan, Yuanmou, Jiangbian village-Kunming.

July 27 Kunming Botanical Garden.

July 28–29 H-C Liang went to Sichuan, Mianyang, Pingwu, Wanglang Nature Reserve by train and bus.

July 28 C-T Zhang and X-Y Li went back to Shenyang by plane for the Zoological Meeting of NE China.

Sichuan

July 30–Aug. 4 Pingwu, Wanglang (Panda) Nature Reserve, Reserve Station up-Baozigou-down-Baixionggou-Qikeshu, H-C Liang collected fly specimens.

Aug. 5–6 H-C Liang, Wanglang to Chengdu-Yaan. C-T Zhang & X-Y Li came to Chengdu-Yaan.

Aug. 7 Yaan, Qingyi River-Bifeng Valley-Mt. Zhougong to Erlang Mountains (Fig. 13)-Luding, Moxi.

Aug. 8 Luding, Moxi to Hailuoguo, Gongga Shan (7556m, World Heritage) (Figs. 17, 18), Ganheba.

Aug. 9 Moxi to Nanmenguan village-Luding-Kangding (Fig. 21).

Aug. 10 Kangding, Laoyulin to Zheduo Mountains (Fig. 28)-Xinduqiao-Tagong-Daofu, Bamei.

Aug. 11 Bamei town to Danba (Figs. 7, 8), Maoni Valley-Danba, Jiaju-Zhonglu Rongchag Tibetan Village.

Aug. 12 Danba, Zhonglu (Fig. 1, 11) and Jiaju Rongchag Tibetan Village-Meiren Valley to Markang (Barkam), Songgang.

Aug. 13 Songgang-Markang-Miyalu to Guergou-Li Xian.

Aug. 14 Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2-Wolong.

Aug. 15 Wenchuan, Wolong (China Panda Protection Center)-Gengda (China Panda Garden)-Hetaoping to Rilong, Xiaojin. A harvest of tachinid specimens collecting.

Aug. 16 Xiaojin, Rilong to Shuangqiao Valley, Siguniang Shan Nature Reserve (Figs. 25, 26), World Heritage.

Aug. 17 Rilong, Xiaojin to Baoxing, Jiajin Mountains-Mahuang (leech) Valley-Fengtongzhai.

Aug. 18 Baoxing, Fengtongzhai (Panda Nature Reserve; pandas are sent from here as gifts to friendly countries) (Figs. 9, 15, 16)-Dengchigou (the first panda sent to Europe was found here by the French priest and naturalist, Armand David (1826–1900))-Muping to Lushan.

Aug. 19 Lushan, Longmen-Taiping-Shuangshi to Yaan City (Fig. 27).

Aug. 20 Yaan, Mt. Mengding to Mingshan, Mount Top Effort, many specimens of *Blepharipa zebina* caught here from the Emperor's Tea Garden.

Aug. 21–22 Yaan to Chengdu by bus and back to Shenyang by plane.



Figures 3–4. Baima Snow Mountains, Yunnan.

Checklist of Tachinidae collected in the Hengduan Mountains in 2017*

Total: 4 subfamilies, 21 tribes, 68 genera, 130 species.

* A few additional specimens from earlier collecting trips are included.

DEXIINAE

3 tribes, 14 genera, 36 species

DEXIINI

6 genera, 22 species; see Zhang *et al.* (2015) for a review of *Billaea* Robineau-Desvoidy, Zhang *et al.* (2010) for a review of *Dexia* Meigen, and Zhang & Shima (2006) and Zhang & Fu (2012) for treatments of *Dinera* Robineau-Desvoidy.

1. *Billaea atkinsoni* (Baranov, 1934)

Specimens examined. Sichuan: 1♂, Barkam (= Markang), Songgang to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, H-C Liang.

2. *Billaea brevicauda* Zhang & Shima, 2015

Specimens examined. Sichuan: 1♂, Kangding, Moxi, Nanmenguan village to suburbs, 1920–2161m, 9.viii.2017, C-T Zhang, X-Y Li. Yunnan: 1♂, Lijiang, Daju, Jiangbian village to Baishuitai, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang, X-Y Li. 2♂♂, Lijiang, Lugu Lake-Yongsheng to Panzhuhua, Sichuan, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

3. *Billaea chinensis* Zhang & Shima, 2015

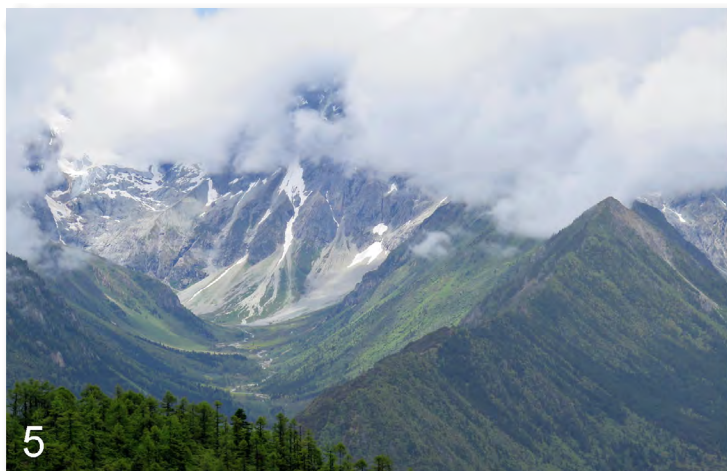
Specimens examined. Sichuan: 1♂, Markang (= Barkam), Songgang to LiXian, 2484m, N31.91°, E102.06°, 13.viii.2017, H.-C. Liang.

4. *Billaea setigera* Zhang & Shima, 2015

Specimens examined. Yunnan: 32♂, Deqen, Baima Snow Mountains to Meili Snow Mountains, 3300–4000m, 17.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

5. *Dexia alticola* Zhang & Shima, 2010

Specimens examined. Sichuan: 5♂, 8♀, Luding, Hailuo Valley, Ganheba, 3032m, N29.57°, E101.99°, 8.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 24♂, 40♀, Kangding, Laoyushu village to Zheduo Mountains, 3132–3231m, N29.94°, E101.96°, 10.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 2♂, 1♀, Barkam, Songgang Town to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, C-T Zhang, X-Y Li. 3♂, 1♀, Aba Prefecture, Xiaojin, Jiajin village, 3084m, N30.91°, E102.65°, 17.viii.2017, H-C Liang. Yunnan: 4♂, 2♀, Shangri-La, Napahai, 3819m, N28.03°, E99.85°, 16.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♀, Lijiang, Mingyin- Fengke-Lugu Lake, 2751–3359m, N27.57°, E100.37°, 23.vii.2017, H-C Liang.



Figures 5–6. Baima Snow Mountains, Yunnan.

6. *Dexia caldwelli* Curran, 1927

Specimens examined. Sichuan: 1♂, Danba, Meiren Valley, Waterfall, 2727m, N31.08°, E101.83°, 12.viii.2017, H-C Liang.

7. *Dexia chaoi* Zhang & Shima, 2010

Specimens examined. Sichuan: 4♂, Aba Prefecture, Xiaojin, Jiajin Shan, 3084m, N30.91°, E102.65°, 17.viii.2017, C-T Zhang, X-Y Li. Yunnan: 1♂, Lijiang, Mingyin- Fengke-Lugu Lake, 2751–3359m, N27.57°, E100.37°, 23.vii.2017, H-C Liang. 4♀, Lijiang, Lugu Lake-Yongsheng to Panzhihua, Sichuan, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang, X-Y Li.

8. *Dexia monticola* (Malloch, 1935)

Specimens examined. Sichuan: 2♂, Baoxing, Dengchigou to Lushan, 1539m, N30.54°, E102.94°, 18.viii.2017, C-T Zhang, X-Y Li.

9. *Dexia tenuiforceps* Zhang & Shima, 2010

Specimens examined. Sichuan: 1♀, Lushan-Longmen-Taiping-Shuangshi, 800–1328m, N30.29°, E102.96°, 19.viii.2017, H-C Liang. Yunnan: 1♂, 2♀, Lijiang, Lugu Lake-Yongsheng to Panzhihua, Sichuan, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

10. *Dexia ventralis* Aldrich, 1925

Specimens examined. Sichuan: 2♂, Baoxing, Dengchigou to Lushan, 1539m, N30.54°, E102.94°, 18.viii.2017, H-C Liang. 1♀, Lushan-Longmen-Taiping-Shuangshi, 800–1328m, N30.29°, E102.96°, 19.viii.2017, H-C Liang. Yunnan: 1♀, Lijiang, Lugu Lake-Yongsheng to Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, H-C Liang.

11. *Dinera alticola* Zhang & Shima, 2006

Specimens examined. Sichuan: 2♀, Danba, Maoniu Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, H-C Liang.

12. *Dinera angustifrons* Zhang & Shima, 2006

Specimens examined. Sichuan: 1♀, Kangding, Laoyushu village to Zheduo Mountains, 3132–3231m, N29.94°, E101.96°, 10.viii.2017, H-C Liang. 1♀, Danba, Maoniu Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, H-C Liang. 1♀, Danba, Meiren Valley, Waterfall, 2727m, N31.08°, E101.83°, 12.viii.2017, H-C Liang. 10♂, 9♀, Markang, Songgang to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 19♂, 13♀, Aba Prefecture, Xiaojin, Shuangqiao Valley, Siguniang Shan, 2850–3700m, 16.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♂, 1♀, Aba Prefecture, Xiaojin, Jiajin Shan, 3084m, N30.91°, E102.65°, 17.viii.2017, X-Y Li, H-C Liang. Yunnan: 1♂, Shangri-La, Napahai, 3819m, N28.03°, E99.85°, 16.vii.2017, C-T Zhang. 1♀, Lijiang, Daju-Jiangbian village-Baishuitai, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang.

13. *Dinera fuscata* Zhang & Shima, 2006

Specimens examined. Sichuan: 1♂, 1♀, Mianyang, Pingwu, Wanglang, E. Baixionggou, 2730–2941m, N33.00°, E104.03°, 3.viii.2017, H-C Liang. 2♂, Danba, Maoniu Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, H-C Liang. 2♂, Danba, Meiren Valley, waterfall, 2727m, N31.08°, E101.83°, 12.viii.2017, H-C Liang. 5♂, 1♀,



Figures 7–8. Bamei to Danba, Sichuan.

Markang, Songgang to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 3♂, Li Xian, Guqiangpuxi to Wenchuan, Qianzhu Tunnel 2-Wolong, 1800–2256m, 14.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 2♂, Aba Prefecture, Xiaojin, Shuangqiao Valley, Siguniang Shan, 2850–3700m, 16.viii.2017, H-C Liang. 2♂, Aba Prefecture, Xiaojin, Jiajin Shan, 3084m, N30.91°, E102.65°, 17.viii.2017, C-T Zhang, X-Y Li. Yunnan: 3♂, Shangri-La, Napahai, 3819m, N28.03°, E99.85°, 16.vii.2017, C-T Zhang, X-Y Li.

14. *Dinera miranda* (Mesnil, 1963)

Specimens examined. Sichuan: 1♀, Danba, Maoniu Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, H-C Liang.

15. *Dinera setifacies* Zhang & Shima, 2006

Specimens examined. Sichuan: 2♂♂, Danba, Meiren Valley, Waterfall, 2727m, N31.08°, E101.83°, 12.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♂, Aba Prefecture, Xiaojin, Shuangqiao Valley, Siguniang Shan, 2850–3700m, 16.viii.2017, H-C Liang. Yunnan: 1♂, Shangri-La, Napahai, 3819m, N28.03°, E99.85°, 16.vii.2017, H-C Liang. 1♂, Lijiang, Daju, Jiangbian village to Baishuitai, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, H-C Liang. 2♂, 3♀, Lijiang, Lugu Lake-Yongsheng to Panzhuhua, Sichuan, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

16. *Dinera takanoi* (Mesnil, 1957)

Specimens examined. Sichuan: 2♂, Danba, Meiren Valley, waterfall, 2727m, N31.08°, E101.83°, 12.viii.2017, H-C Liang. 1♂, Markang, Songgang to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, H-C Liang.

17. *Estheria magna* (Baranov, 1935)

Specimens examined. Sichuan: 1♂, Kangding, Moxi, Nanmenguan village to suburbs, 1920–2161m, 9.viii.2017, H-C Liang. 6♂, 13♀, Danba, Maoniu Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♀, Aba Prefecture, Xiaojin, Shuangqiao Valley, Siguniang Shan, 2850–3700m, 16.viii.2017, H-C Liang.

18. *Estheria* sp. 1

Specimens examined. Sichuan: 1♂, 1♀, Kangding, Laoyushu village to Zheduo Mountains, 3132–3231m, N29.94°, E101.96°, 10.viii.2017, C-T Zhang, X-Y Li. Yunnan: 2♂, Lijiang, Mingyin- Fengke-Lugu Lake, 2751–3359m, N27.57°, E100.37°, 23.vii.2017, C-T Zhang, H-C Liang.

19. *Estheria* sp. 2

Specimens examined. Sichuan: 2♂, Kangding, Laoyushu village to Zheduo Mountains, 3132–3231m, N29.94°, E101.96°, 10.viii.2017, C-T Zhang, X-Y Li. 2♂, Danba, Maoniu Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, C-T Zhang, X-Y Li. 1♀, Aba Prefecture, Xiaojin, Jiajin Shan, 3084m, N30.91°, E102.65°, 17.viii.2017, C-T Zhang.

20. *Estheria* sp. 3

Specimens examined. Sichuan: 1♀, Kangding, Laoyushu village to Zheduo Mountains, 3132–3231m, N29.94°, E101.96°, 10.viii.2017, C-T Zhang.



Figures 9–10. 9. Fengtongzhai Nature Reserve, Baoxing County, Sichuan. 10. Border between Yunnan and Tibet, with Chuntian Zhang on left, Dongsheng Li (driver) in middle, and Houcan Liang on right.

21. *Prosenia siberita* (Fabricius, 1775)

Specimens examined. Sichuan: 1♀, Kangding, Moxi, Nanmenguan village to suburbs, 1920–2161m, 9.viii.2017, C-T Zhang. Yunnan: 2♀, Lijiang, Lugu Lake-Yongsheng to Panzhihua, Sichuan, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

22. *Trixa pellucens* (Mesnil, 1967)

Specimens examined. Sichuan: 3♂, Aba Prefecture, Xiaojin, Jiajin Shan, 3084m, N30.91°, E102.65°, 17.viii.2017, C-T Zhang, X-Y Li.

RUTILIINI

1 genus, 1 species

23. *Rutilia* sp.

Specimens examined. Sichuan: 1♀, Baoxing, Dengchigou to Lushan, 1539m, N30.54°, E102.94°, 18.viii.2017, H-C Liang.

VORIINI

7 genera, 13 species

24. *Dexiomimops brevipes* Shima, 1987

Specimens examined. Sichuan: 1♂, Li Xian, Guqiangpuxi to Wenchuan, Qianzhu tunnel 2-Wolong, 1800–2256m, 14.viii.2017, H-C Liang.

25. *Dexiomimops curtipes* Shima, 1987

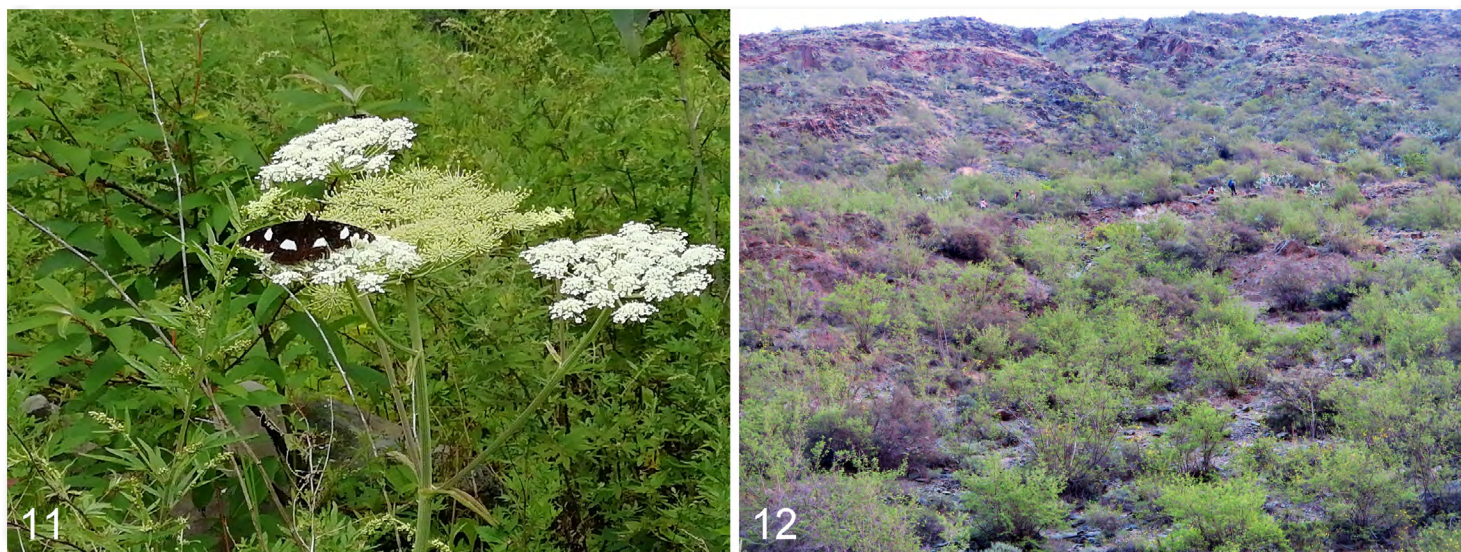
Specimens examined. Sichuan: 1♀, Baoxing, Dengchigou to Lushan, 1539m, N30.54°, E102.94°, 18.viii.2017, H-C Liang.

26. *Dexiomimops rufipes* Baranov, 1935

Specimens examined. Sichuan: 1♂, Markang, Songgang to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, H-C Liang. 5♂, 1♀, Li Xian, Guqiangpuxi to Wenchuan, Qianzhu tunnel 2-Wolong, 1800–2256m, 14.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 2♂, Aba Prefecture, Xiaojin, Jiajin Shan, 3084m, N30.91°, E102.65°, 17.viii.2017, C-T Zhang, X-Y Li, H-C Liang. Yunnan: 3♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♀, Lijiang, Daju-Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang, X-Y Li. 1♀, Lijiang, Lugu Lake-Yongsheng to Panzhihua, Sichuan, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, H-C Liang.

27. *Leptothelaira longipennis* Zhang, Wang & Liu, 2006

Specimens examined. Sichuan: 1♀, Danba, Maoni Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, H-C Liang. 2♂, Danba, Meiren Valley, waterfall, 2727m, N31.08°, E101.83°, 12.viii.2017, C-T Zhang, X-Y Li. 1♂, Li Xian,



Figures 11–12. 11. Danba, Sichuan. 12. Deqen, Balagezong dry and hot valley, Yunnan.

Guqiangpuxi to Wenchuan, Qianzhu tunnel 2-Wolong, 1800–2256m, 14.viii.2017, C-T Zhang. 1♀, Wolong-Gengda-Hetaoping to Rilong, Xiaojin, 1826m, N31.07°, E103.22°, 15.viii.2017, H-C Liang. Yunnan: 1♂, Deqen Valley to Baima & Meili Snow Mountains, 3300–4000m, 17.vii.2017, H-C Liang. 7♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 16♂, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 6♂, Lijiang, Daju to Baishuitai-Haba Snow Mountains, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 12♂, Lijiang, Daju-Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 3♂, Lijiang, Mingyin-Fengke-Ningliang, Lugu Lake, 2751–3359m, N27.57°, E100.37°, 23.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

28. *Peteina hyperdiscalis* Aldrich, 1926

Specimens examined. Sichuan: 1♀, Aba Prefecture, Xiaojin, Shuangqiao Valley, Siguniang Shan, 2850–3700m, 16.viii.2017, H-C Liang.

29. *Phyllomya annularis* (Villeneuve, 1937)

Specimens examined. Sichuan: 5♂, 23♀, Kangding, Laoyushu village to Zheduo Mountains, 3132–3231m, N29.94°, E101.96°, 10.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♀, Danba, Maoniu Valley-Danba, 2888m, N30.61°, E101.69°, 11.viii.2017, H-C Liang. 2♀, Gengda (Chinese Panda Garden)-Hetaoping 1826m, N31.07°, E103.22°, 15.viii.2017, H-C Liang. 1♂, Xiaojin, Shuangqiao Valley, Siguniang Shan, 2850–3700m, 16.viii.2017, C-T Zhang. Yunnan: 2♀, Deqen Valley to Baima & Meili Snow Mountains, 3300–4000m, 17.vii.2017, H-C Liang. 1♀, Lijiang, Daju-Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang.

30. *Phyllomya gymnops* (Villeneuve, 1937)

Specimens examined. Sichuan: 1♀, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m, 9.viii.2017, H-C Liang. 1♂, Bamei town to Danba, Maoniu Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, H-C Liang. Yunnan: 15♂, Deqen Valley to Baima & Meili Snow Mountains, 3300–4000m, 17.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 2♀, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♀, Lijiang, Yulong Snow Mountains to Wenhai, Daju, 2685–3107m, N26.98°, E100.17°, 20.vii.2017, H-C Liang. 2♀, Lijiang, Daju-Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang, H-C Liang. 2♀, Lijiang, Mingyin-Fengke-Ningliang, Lugu Lake, 2751–3359m, N27.57°, E100.37°, 23.vii.2017, C-T Zhang, H-C Liang.

31. *Stomina tachinoides* (Fallén, 1817)

Specimens examined. Sichuan: 1♂, Danba, Meiren Valley to Markang, Songgang, 2727m, N31.08°, E101.83°, 12.viii.2017, H-C Liang.



Figures 13–14. 13. Erlang Mountains and Dadu River, Sichuan. 14. Some of the tachinid tachinids collected in the Hengduan Mountains.

32. *Thelaira macropus* (Wiedemann, 1830)

Specimens examined. Sichuan: 3♂, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village, 1339–2070m, N26.79°, E101.06°, 25.vii.2017, C-T Zhang, X-Y Li, H-C Liang. Yunnan: 1♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang, X-Y Li. 2♂, 1♀, Ninglang, Lugu Lake-Yongsheng-Huaping to Sichuan, Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

33. *Thelaira nigripes* (Fabricius, 1794)

Specimens examined. Sichuan: 21♂, 27♀, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala, 1339–2070m, N26.79°, E101.06°, 25.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♀, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m, 9.viii.2017, C-T Zhang. 1♀, Bamei to Danba, Maoni Valley, 2800m, 11.viii.2017, H-C Liang. 2♀, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017, C-T Zhang, H-C Liang. 1♀, Baoxing, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, C-T Zhang. Yunnan: 3♀, Heqing, Huangping, 1955m, N26.13°, E100.29°, 14–15.vii.2017, C-T Zhang, X-Y Li. 2♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, H-C Liang. 9♂, 4♀, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♂, 2♀, Lijiang, Yulong Snow Mountains (Botanical Garden) to Wenhai, Daju, 2685–3107m, N26.98°, E100.17°, 20.vii.2017, C-T Zhang, X-Y Li. 5♂, 5♀, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains-Daju, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 9♂, 7♀, Lijiang, Daju to Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang, X-Y Li, H-C Liang. C-T Zhang, X-Y Li, H-C Liang. 2♂, 1♀, Lijiang, Mingyin-Fengke to Ninglang, Labo-Yongning-Lugu Lake, 2751–3359m, N27.57°, E100.37°, 23.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 8♂, 1♀, Ninglang, Lugu Lake-Yongsheng-Huaping to Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

34. *Thelaira occellaris* Chao & Shi, 1985

Specimens examined. Sichuan: 5♂, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala, 1339–2070m, N26.79°, E101.06°, 25.vii.2017, C-T Zhang, X-Y Li. Yunnan: 2♂, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♂, Lijiang, Daju to Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, H-C Liang. 6♂, Ninglang, Lugu Lake-Yongsheng-Huaping to Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

35. *Thelaira solivaga* (Harris, 1780)

Specimens examined. Sichuan: 7♀, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala, 1339–2070m, N26.79°, E101.06°, 25.vii.2017, C-T Zhang, X-Y Li. 2♀, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m, 9.viii.2017, C-T Zhang, X-Y Li. 2♀, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017, H-C Liang. 2♀, Rilong, Xiaojin to Baoxing, Jiajin Mountains-



Figures 15–16. 15. Fengtongzhai Nature Reserve, Baoxing County, Sichuan. 16. Giant panda exhibit in museum at Fengtongzhai Nature Reserve.

Mahuang (leech) Valley-Fengtongzhai, 3084m, N30.91°, E102.65°, 17.viii.2017, C-T Zhang, H-C Liang. 3♀, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, X-Y Li, H-C Liang. Yunnan: 2♀, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, H-C Liang. 2♀, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains-Daju, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang, X-Y Li. 4♀, Ninglang, Lugu Lake-Yongsheng-Huaping to Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

36. *Voria ruralis* (Fallén, 1810)

Specimens examined. Sichuan: 1♀, Luding, Hailuo Valley, Gongga Shan, 3032m, N29.57°, E101.99°, 8.viii.2017, H-C Liang. 2♂, 2♀, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m, 9.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 3♂, Bamei to Danba, Maoniu Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♂, Gengda (China Panda Garden)-Hetaoping, 1826m, N31.07°, E103.22°, 15.viii.2017, C-T Zhang, X-Y Li. 1♀, Xiaojin to Baoxing, Jiajin Mountains-Fengtongzhai 3084m, N30.91°, E102.65°, 17.viii.2017, H-C Liang. Yunnan: 1♀, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, H-C Liang. 1♂, 2♀, Lijiang, Yulong Snow Mountains (Botanical Garden) to Wenhai, Daju, 2685–3107m, N26.98°, E100.17°, 20.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♂, Lijiang, Daju to Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang, X-Y Li. 1♀, Lijiang, Mingyin-Fengke to Ninglang, Labo-Yongning-Lugu Lake, 2751–3359m, N27.57°, E100.37°, 23.vii.2017, H-C Liang. 2♀♀, Ninglang, Lugu Lake-Yongsheng-Huaping to Sichuan, Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

EXORISTINAE

5 tribes, 29 genera, 42 species

BLONDELIINI

4 genera, 4 species

37. *Admontia podomyia* Brauer & Bergenstamm, 1889

Specimens examined. Sichuan: 1♀, Wanglang, W Reserve Station, 2722–2750m, N32.98°, E104.08°, 31.vii.2017, H-C Liang.

38. *Blondelia nigripes* (Fallén, 1810)

Specimens examined. Sichuan: 3♂, Aba Prefecture, Xiaojin, Shuangqiao Valley, Siguniang Shan, 2850–3700m, 16.viii.2017, H-C Liang.

39. *Gastrolepta* sp., newly recorded genus for China

Specimens examined. Yunnan: 3♂, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains-Daju, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, H-C Liang.



Figures 17–18. 17. Vicinity of Mount Gongga, Sichuan. 18. Gongga Glacier, Sichuan.

40. *Vibrissina turrita* (Meigen, 1824)

Specimens examined. Yunnan: 1♂, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, H-C Liang.

ERYCINI

12 genera, 20 species

41. *Aplomya confinis* (Fallén, 1820)

Specimens examined. Yunnan: 1♀, Lijiang, Yulong Snow Mountains (Botanical Garden) to Wenhai, Daju, 2685–3107m, N26.98°, E100.17°, 20.vii.2017, C-T Zhang. 1♀, Ninglang, Lugu Lake-Yongsheng-Huaping to Sichuan, Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang.

42. *Carcelia* sp. 1

Specimens examined. Sichuan: 1♀, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala, 1339–2070m, N26.79°, E101.06°, 25.vii.2017, C-T Zhang. 1♀, Yaan, Qingyi River-Mt. Zhougong, 998m, N29.97°, E103.3°, 7.viii.2017, C-T Zhang. 1♀, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m, 9.viii.2017, C-T Zhang. 2♀, Baoxing, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, C-T Zhang. Yunnan: 3♀, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang, X-Y Li. 1♀, Heqing, Huangping, 1955m, N26.13°, E100.29°, 14–15.vii.2017, C-T Zhang, 2♀, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains-Daju, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang, X-Y Li. 1♀, Lijiang, Daju to Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang.

43. *Carcelia* sp. 2

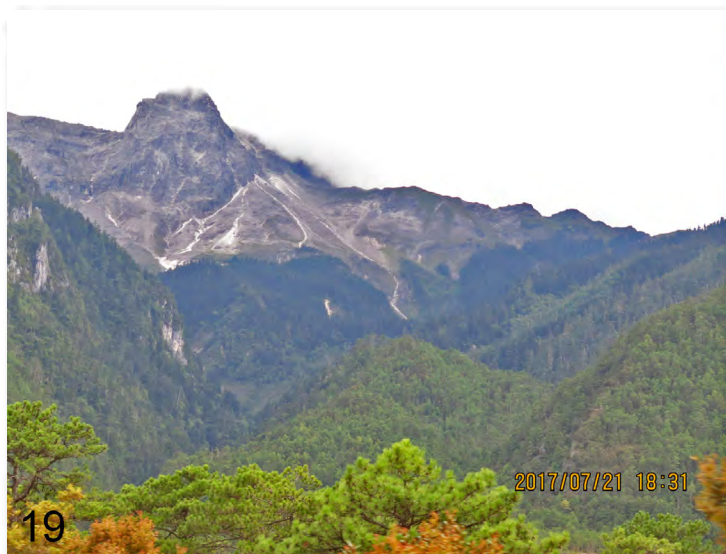
Specimens examined. Sichuan: 2♂, Yaan, Qingyi River-Mt. Zhougong, 998m, N29.97°, E103.3°, 7.viii.2017, C-T Zhang. 1♂, Markang, Songgang to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, C-T Zhang. Yunnan: 6♂, 37♀, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang, X-Y Li. 5♀, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, C-T Zhang, X-Y Li. 1♀, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains-Daju, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang.

44. *Carcelia* sp. 3

Specimens examined. Sichuan: 1♂, Wolong-Gengda-Hetaoping to Rilong, Xiaojin, 1826m, N31.07°, E103.22°, 15.viii.2017, C-T Zhang. Yunnan: 1♂, Heqing, Huangping, 1955m, N26.13°, E100.29°, 14–15.vii.2017, C-T Zhang. 1♂, Ninglang, Lugu Lake-Yongsheng-Huaping to Sichuan, Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang.

45. *Drino atropivora* (Robineau-Desvoidy, 1830)

Specimens examined. Yunnan: 1♂, Kunming, Mt. Xishan, 1950–2350m, 27.vii.2010, C-T Zhang.



Figures 19–20. Haba Snow Mountains, Yunnan.

46. *Drino* sp. 1

Specimens examined. Yunnan: 1♀, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang. 1♂, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, X-Y Li. 1♀, Lijiang, Daju to Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang. 3♂, Ninglang, Lugu Lake-Yongsheng-Huaping to Sichuan, Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, H-C Liang.

47. *Drino* sp. 2

Specimens examined. 1♂, Gengda (China Panda Garden)-Hetaoping, 1826m, N31.07°, E103.22°, 15.viii.2017, C-T Zhang. 1♂, Xiaojin to Baoxing, Jiajin Mountains-Fengtongzhai 3084m, N30.91°, E102.65°, 17.viii.2017, H-C Liang. Yunnan: 1♀, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang, X-Y Li. 1♀, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, X-Y Li. 1♀, Lijiang, Daju to Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang.

48. *Drino* sp. 3

Specimens examined. Yunnan: 1♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, X-Y Li. 1♂, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, H-C Liang.

49. *Drino* sp. 4

Specimens examined. Sichuan: 1♀, Markang, Songgang to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, H-C Liang. 1♀, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017, H-C Liang. Yunnan: 1♀, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains-Daju, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, H-C Liang.

50. *Epicampocera succincta* (Meigen, 1824)

Specimens examined. Sichuan: 1♀, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017, C-T Zhang.

51. *Gymnophryxe modesta* Herting, 1973

Specimens examined. Yunnan: 1♀, Deqen Valley to Baima & Meili Snow Mountains, 3300–4000m, 17.vii.2017, C-T Zhang.

52. *Nilea* sp.

Specimens examined. Sichuan: 1♂, 1♀, Luding, Hailuo Valley, Gongga Shan, 3032m, N29.57°, E101.99°, 8.viii.2017, C-T Zhang.

53. *Phebellia* sp.

Specimens examined. Sichuan: 1♂, Luding, Hailuo Valley, Gongga Shan, 3032m, N29.57°, E101.99°, 8.viii.2017, X-Y Li.



Figures 21–22. 21. Kangding, Sichuan. 22. Panzhihua to Yanbian, Gesala, Sichuan.

54. *Phryxe nemea* (Meigen, 1824)

Specimens examined. Sichuan: 1♀, Kangding, Laoyushu village to Zheduo Mountains, 3132–3231m, N29.94°, E101.96°, 10.viii.2017, C-T Zhang. 1♀, Bamei to Danba, Maoni Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, C-T Zhang. 1♂, Xiaojin to Baoxing, Jiajin Mountains-Fengtongzhai 3084m, N30.91°, E102.65°, 17.viii.2017, H-C Liang.

55. *Phryxe vulgaris* (Fallén, 1810)

Specimens examined. Sichuan: 1♂, Kangding, Laoyushu village to Zheduo Mountains, 3132–3231m, N29.94°, E101.96°, 10.viii.2017, C-T Zhang. 1♀, Xiaojin to Baoxing, Jiajin Mountains-Fengtongzhai 3084m, N30.91°, E102.65°, 17.viii.2017, H-C Liang. Yunnan: 2♀, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang. 1♀, Lijiang, Daju to Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang.

56. *Senometopia* sp. 1

Specimens examined. Sichuan: 2♂, 1♀, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala, 1339–2070m, N26.79°, E101.06°, 25.vii.2017, C-T Zhang, X-Y Li. 1♂, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m, 9.viii.2017, C-T Zhang. 2♂, Markang, Songgang to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, C-T Zhang, X-Y Li. Yunnan: 1♀, Heqing, Huangping, 1955m, N26.13°, E100.29°, 14–15.vii.2017, C-T Zhang, X-Y Li. 5♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang, X-Y Li. 1♀, Lijiang, Daju to Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang. 2♂, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, H-C Liang.

57. *Senometopia* sp. 2

Specimens examined. Sichuan: 1♂, Yaan, Qingyi River-Mt. Zhougong, 998m, N29.97°, E103.3°, 7.viii.2017, C-T Zhang. 1♂, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala, 1339–2070m, N26.79°, E101.06°, 25.vii.2017, C-T Zhang. 2♂, Baoxing, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, C-T Zhang, X-Y Li. Yunnan: 1♂, Heqing, Huangping, 1955m, N26.13°, E100.29°, 14–15.vii.2017, C-T Zhang, X-Y Li. 1♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang.

58. *Sisyropa* sp.

Specimens examined. Yunnan: 1♂, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains-Daju, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang.

59. *Sturmiopsis* sp.

Specimens examined. Yunnan: 1♀, Heqing, Huangping, 1955m, N26.13°, E100.29°, 14–15.vii.2017, C-T Zhang.



Figures 23–24. 23. Yulong Snow Mountain, Lijiang High Mountain Botanical Garden, Yunnan. 24. Lugu Lake, Yunnan.

60. *Weingaertneriella* sp.

Specimens examined. Sichuan: 1♀, Yaan, Qingyi River-Mt. Zhougong, 998m, N29.97°, E103.3°, 7.viii.2017, C-T Zhang. Yunnan: 1♀, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, C-T Zhang.

ETHILLINI

1 genus, 1 species

61. *Phorocerosoma vicarium* (Walker, 1856)

Specimens examined. Sichuan: 1♂, Lushan-Longmen-Taiping-Shuangshi, 800–1328m, N30.29°, E102.96°, 19.viii.2017, C-T Zhang. Yunnan: 1♂, 1♀, Heqing, Huangping, 1955m, N26.13°, E100.29°, 14–15.vii.2017, C-T Zhang.

GONIINI

8 genera, 14 species

62. *Blepharella lateralis* Macquart, 1851

Specimens examined. Yunnan: 1♀, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, H-C Liang.

63. *Blepharipa latigena* (Mesnil, 1970)

Specimens examined. Sichuan: 1♂, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village- Gesala, 1339–2070m, N26.79°, E101.06°, 25.vii.2017, C-T Zhang. 1♀, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017, X-Y Li. Yunnan: 5♂, Deqen, Yunling Mountains, 2600–2900m, 27–31.v.2012, Q. Wang.

64. *Blepharipa sugens* (Wiedemann, 1830)

Specimens examined. Sichuan: 1♂, Yaan, Qingyi River-Mt. Zhougong, 998m, N29.97°, E103.3°, 7.viii.2017, X-Y Li. 1♂, Baoxing, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, C-T Zhang. 1♂, Lushan-Longmen-Taiping-Shuangshi, 800–1328m, N30.29°, E102.96°, 19.viii.2017, X-Y Li. 3♂, Yaan, Mt. Mengding to Mingshan, 1300–1420m, N30.09°, E103.05°, 20.viii.2017, C-T Zhang, X-Y Li. 4♂, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains-Daju, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang, X-Y Li.

65. *Blepharipa zebina* (Walker, 1849)

Specimens examined. Sichuan: 1♀, Leshan, Emei Mountains, 1200–2500m, 20.viii.2013, C-T Zhang, X-Y Li. 1♂, 2♀, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village- Gesala, 1339–2070m, N26.79°, E101.06°, 25.vii.2017, C-T Zhang, X-Y Li. 3♂, 1♀, Yaan, Qingyi River-Mt. Zhougong, 998m, N29.97°, E103.3°, 7.viii.2017, C-T Zhang, X-Y Li. 5♀, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m,



Figures 25–26. Siguniang Shan Nature Reserve, Sichuan.

9.viii.2017, C-T Zhang, X-Y Li. 2♀, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017, C-T Zhang, X-Y Li. 6♂, Baoxing, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, C-T Zhang, X-Y Li. 2♂, Lushan, Longmen-Taiping-Shuangshi to Yaan City, 18.viii.2017, C-T Zhang, X-Y Li. 52♂, 1♀, Yaan, Mt. Mengding to Mingshan, 800–1420m, N30.09°, E103.05°, 20.viii.2017, C-T Zhang, X-Y Li, H-C Liang. Yunnan: Yunnan: 1♂, Deqen, Yunling Mountains, 2900m, 1–2. vi.2012, Q. Wang. 2♂, 1♀, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, C-T Zhang, X-Y Li. 1♂, Lijiang, Yulong Snow Mountains (Botanical Garden) to Wenhai, Daju, 2685–3107m, N26.98°, E100.17°, 20.vii.2017, C-T Zhang, X-Y Li. 12♂, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains-Daju, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang, X-Y Li. 1♂, Lijiang, Daju to Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang.

66. *Eumea linearicornis* (Zetterstedt, 1844)

Specimens examined. Sichuan: 1♂, Markang, Songgang to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, H-C Liang. 1♂, 1♀, Gengda (China Panda Garden)-Hetaoping, 1826m, N31.07°, E103.22°, 15.viii.2017, C-T Zhang. 1♀, Bamei to Danba, Maoni Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, C-T Zhang. 5♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang, X-Y Li. 1♂, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, X-Y Li.

67. *Gonia* sp.

Specimens examined. Sichuan: 1♂, Gengda (China Panda Garden)-Hetaoping, 1826m, N31.07°, E103.22°, 15.viii.2017, C-T Zhang.

68. *Pales abdita* Cerretti, 2005

Specimens examined. Sichuan: 1♂, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala, 1339–2070m, N26.79°, E101.06°, 25.vii.2017, C-T Zhang.

69. *Pales carbonata* Mesnil, 1970

Specimens examined. Sichuan: 1♀, Yaan, Qingyi River-Mt. Zhougong, 998m, N29.97°, E103.3°, 7.viii.2017, H-C Liang. 2♀, Gengda (China Panda Garden)-Hetaoping, 1826m, N31.07°, E103.22°, 15.viii.2017, C-T Zhang. 1♂, Xiaojin to Baoxing, Jiajin Mountains-Fengtongzhai 3084m, N30.91°, E102.65°, 17.viii.2017, H-C Liang. 1♀, Baoxing, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, C-T Zhang. Yunnan: 1♂, Heqing, Huangping, 1955m, N26.13°, E100.29°, 14–15.vii.2017, C-T Zhang. 1♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang. 1♀, Ninglang, Lugu Lake-Yongsheng-Huaping to Sichuan, Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, H-C Liang.

70. *Pales murina* Mesnil, 1970

Specimens examined. Sichuan: 5♂, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala, 1339–2070m, N26.79°, E101.06°, 25.vii.2017, C-T Zhang, X-Y Li.



Figures 27–28. 27. Lushan to Longmen to Taiping to Yaan, Sichuan. 28. Zheduo Mountains, Kangding, Sichuan; Xinyi Li is collecting on the upper left and Houcan Liang on the right.

71. *Pales pavid* (Meigen, 1824)

Specimens examined. Sichuan, Pingwu, Wanglang: 1♀, Qikeshu, 2653m, N33.94°, E104.14°, 4.viii.2017, H-C Liang. 1♀, E Reserve Station, 2666–2752m, 2.viii.2017, H-C Liang. 1♂, E Baozigou, 2697–2655m, N32.91°, E104.16°, 1.viii.2017, H-C Liang. 1♀, Danba, Meiren Valley, waterfall, 2727m, N31.08°, E101.83°, 12.viii.2017, C-T Zhang. 3♀, Xiaojin to Baoxing, Jiain Mountains-Fengtongzhai 3084m, N30.91°, E102.65°, 17.viii.2017, C-T Zhang, X-Y Li. 1♀, Baoxing, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, H-C Liang. Yunnan: 2♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang, X-Y Li. 1♂, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains-Daju, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, H-C Liang.

72. *Pales* sp.

Specimens examined. Sichuan: 3♂, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala, 1339–2070m, N26.79°, E101.06°, 25.vii.2017, C-T Zhang, X-Y Li.

73. *Pexopsis* sp.

Specimens examined. Yunnan: 1♂, Ninglang, Lugu Lake-Yongsheng-Huaping to Sichuan, Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, H-C Liang.

74. *Pseudogonia rufifrons* (Wiedemann, 1830)

Specimens examined. Yunnan: 1♂, Lijiang, Shigu town, 1800m, 20.viii.2010, C-T Zhang.

75. *Zenillia libatrix* (Panzer, 1798)

Specimens examined. Sichuan: 1♀, Yaan, Qingyi River-Mt. Zhougong, 998m, N29.97°, E103.3°, 7.viii.2017, C-T Zhang. 2♂, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala. Tibet: 1♂, Ricaze, Yadong, 2900–3000m, 19–21.vii.2014, Q. Wang.

WINTHEMIINI

2 genera, 3 species

76. *Smidtia* sp.

Specimens examined. Sichuan: 2♀, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017, H-C Liang. 1♀, Baoxing, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, X-Y Li.

77. *Winthemia venusta* (Meigen, 1824)

Specimens examined. Sichuan: 1♂, Danba, Meiren Valley, waterfall, 2727m, N31.08°, E101.83°, 12.viii.2017, C-T Zhang, X-Y Li. 5♂, Markang, Songgang to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, C-T Zhang, X-Y Li. 1♀, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017, H-C Liang.

20♂, Wolong-Gengda-Hetaoping to Rilong, Xiaojin, 1826m, N31.07°, E103.22°, 15.viii.2017, C-T Zhang, X-Y Li. 1♀, Aba Prefecture, Xiaojin, Shuangqiao Valley, Siguniang Shan, 2850–3700m, 16.viii.2017, H-C Liang. 1♂, Xiaojin to Baoxing, Jiajin Mountains-Fengtongzhai 3084m, N30.91°, E102.65°, 17.viii.2017, C-T Zhang. 2♀, Rilong, Xiaojin to Baoxing, Jiajin Mountains-Mahuang (leech) Valley-Fengtongzhai, 3084m, N30.91°, E102.65°, 17.viii.2017, C-T Zhang, H-C Liang. 2♂, 1♀, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, X-Y Li, H-C Liang.

78. *Winthemia* sp.

Specimens examined. Sichuan: 2♀, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m, 9.viii.2017, C-T Zhang, X-Y Li.

PHASIINAE

6 tribes, 10 genera, 16 species

CYLINDROMYIINI

4 genera, 6 species

79. *Besseria* sp.

Specimens examined. Sichuan: 1♂, Pingwu, Wanglang, E Baozigou, 2697–2655m, N32.91°, E104.16°, 1.viii.2017, H-C Liang.

80. *Cylindromyia luciflua* (Villeneuve, 1944)

Specimens examined. Sichuan: 1♂, 1♀, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m, 9.viii.2017, H-C Liang. 1♂, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, H-C Liang.

81. *Cylindromyia (Malayocyptera) umbripennis* (van der Wulp, 1881)

Specimens examined. Sichuan: 1♂, Yaan, Qingyi River-Bifeng Valley-Mt. Zhougong to Erlang Mountains- Luding, Moxi, 7.viii.2017, H-C Liang. 1♀, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, H-C Liang. 1♀, Lushan-Longmen-Taiping-Shuangshi, 800–1328m, N30.29°, E102.96°, 19.viii.2017, H-C Liang.

82. *Cylindromyia* sp.

Specimens examined. Sichuan: 1♀, Markang, Songgang to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, H-C Liang.

83. *Hemyda deqinensis* Wang, Zhang & Wang, 2015

Specimens examined. Yunnan: 1♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang.

84. *Lophosia excisa* Tothill, 1918

Specimens examined. Yunnan: 2♂, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, C-T Zhang, H-C Liang.

GYMNOSOMATINI

1 genus, 3 species

85. *Gymnosoma rotundatum* (Linnaeus, 1758)

Specimens examined. Yunnan: 1♂, 1♀, Shangri-La, Napahai, 3819m, N28.03°, E99.85°, 16.vii.2017, C-T Zhang.

86. *Gymnosoma sylvaticum* Zimin, 1966

Specimens examined. Sichuan: 4♂, 2♀, Yaan, Qingyi River-Bifeng Valley-Mt. Zhougong to Erlang Mountains- Luding, Moxi, 7.viii.2017, H-C Liang. 1♀, Xiaojin to Baoxing, Jiajin Mountains-Fengtongzhai 3084m, N30.91°, E102.65°, 17.viii.2017, H-C Liang.

87. *Gymnosoma* sp.

Specimens examined. Sichuan: 2♂, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala, 1339–2070m, N26.79°, E101.06°, 25.vii.2017, C-T Zhang, X-Y Li. 1♂, 1♀, Gengda (China Panda Garden)-Hetaoping, 1826m, N31.07°, E103.22°, 15.viii.2017, C-T Zhang, X-Y Li. 1♂, 1♀, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, X-Y Li.

HERMYINI

1 genus, 1 species.

88. *Hermya beelzebul* (Wiedemann, 1830)

Specimens examined. Sichuan: 1♀, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m, 9.viii.2017, H-C Liang. 1♀, Danba, Maoniu Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, H-C Liang. H-C Liang. 3♂, Danba, Meiren Valley, Waterfall, 2727m, N31.08°, E101.83°, 12.viii.2017, C-T Zhang, X-Y Li. 1♀, Li Xian, Guqiangpuxi to Wenchuan, Qianzhu tunnel 2-Wolong, 1800–2256m, 14.viii.2017, C-T Zhang. 1♂, 3♀, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, X-Y Li. 1♀, Lushan-Longmen-Taiping-Shuangshi, 800–1328m, N30.29°, E102.96°, 19.viii.2017, C-T Zhang. Yunnan: 1♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, H-C Liang. 3♂, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 3♂, Weixi, Tacheng to Lijiang, 1924–2700m, N27.34°, E99.66°, 19.vii.2017, C-T Zhang, X-Y Li.

LEUCOSTOMATINI

1 genus, 2 species

89. *Calyptromyia barbata* Villeneuve, 1915

Specimens examined. Yunnan: 1♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, H-C Liang.

90. *Calyptromyia* sp.

Specimens examined. Sichuan: 2♂, Danba, Meiren Valley, Waterfall, 2727m, N31.08°, E101.83°, 12.viii.2017, H-C Liang. 1♂, Li Xian, Guqiangpuxi to Wenchuan, Qianzhu tunnel 2-Wolong, 1800–2256m, 14.viii.2017, C-T Zhang. 6♂, 1♀, Xiaojin to Baoxing, Jiajin Mountains-Fengtongzhai 3084m, N30.91°, E102.65°, 17.viii.2017, H-C Liang.

PHASIINI

2 genera, 3 species

91. *Ectophasia crassipennis* (Fabricius, 1794)

Specimens examined. Sichuan: 1♂, Kangding, Laoyushu village to Zheduo Mountains, 3132–3231m, N29.94°, E101.96°, 10.viii.2017, H-C Liang. Yunnan: 1♀, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains-Daju, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, H-C Liang.

92. *Ectophasia rotundiventris* (Loew, 1858)

Specimens examined. Sichuan: 1♀, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m, 9.viii.2017, H-C Liang. 1♀, Danba, Meiren Valley, Waterfall, 2727m, N31.08°, E101.83°, 12.viii.2017, H-C Liang. 2♂, 1♀, Markang, Songgang to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, C-T Zhang, X-Y Li, H-C Liang.

93. *Phasia* sp.

Specimens examined. Sichuan: 1♂, Kangding, Laoyushu village to Zheduo Mountains, 3132–3231m, N29.94°, E101.96°, 10.viii.2017, H-C Liang.

STRONGYGASTRINI

1 genus, 1 species

94. *Melastrongygaster chaoi* Shima, 2015

Specimens examined. Sichuan: 1♂, Markang, Songgang to Li Xian, 2484m, N31.91°, E102.06°, 13.viii.2017, C-T Zhang. 7♂, Xiaojin to Baoxing, Jiajin Mountains-Fengtongzhai 3084m, N30.91°, E102.65°, 17.viii.2017, H-C Liang.

TACHININAE (Fig. 14)

7 tribes, 15 genera, 36 species

ERNESTIINI

5 genera, 13 species

95. *Chrysosomopsis euholoptica* (Chao & Zhou, 1989)

Specimens examined. Sichuan: 1♂, Pingwu, Wanglang, Changbaigou, 2588–2800m, N32.93°, E104.15°, 30.vii.2017, H-C Liang.

96. *Chrysosomopsis stricta* (Aldrich, 1926)

Specimens examined. Sichuan: 3♂, Pingwu, Wanglang, E Baozigou, 2697–2655m, N32.91°, E104.16°, 1.viii.2017, H-C Liang.

97. *Gymnocheta* sp.

Specimens examined. Sichuan: 1♂, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, H-C Liang.

98. *Hyalurgus sima* (Zimin, 1960)

Specimens examined. Sichuan, Pingwu, Wanglang: 2♀, W Reserve Station, 2722–2750m, N32.98°, E104.08°, 31.vii.2017; 2♀, E Baozigou, 2697–2655m, N32.91°, E104.16°, 1.viii.2017; 1♀, Qikeshu, 2653m, N33.94°, E104.14°, 4.viii.2017, all by H-C Liang.

99. *Linnaemya* (*Linnaemya*) *ruficornis* Chao, 1962

Specimens examined. Sichuan: 1♀, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017; Yunnan: 1♀, Deqen Valley to Baima & Meili Snow Mountains, 3300–4000m, 17.vii.2017, all by H-C Liang.

100. *Linnaemya* (*Ophina*) *microchaetopsis* Shima, 1986

Specimens examined. Sichuan: 1♂, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m, 9.viii.2017, H-C Liang.

101. *Linnaemya* (*Ophina*) *picta* (Meigen, 1824)

Specimens examined. Sichuan, Pingwu, Wanglang: 2♀, Changbaigou, 2588–2800m, N32.93°, E104.15°, 30.vii.2017; 1♀, W Reserve Station, 2722–2750m, N32.98°, E104.08°, 31.vii.2017; 1♀, Qikeshu, 2653m, N33.94°, E104.14°, 4.viii.2017, all by H-C Liang.

102. *Linnaemya* (*Ophina*) *rossica* Zimin, 1954

Specimens examined. Sichuan: 1♂, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m, 9.viii.2017; 1♂, Bamei to Danba, Maoni Valley, 2888m, N30.61°, E101.69°, 11.viii.2017; 1♀, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017 all by H-C Liang.

103. *Panzeria anthophila* (Robineau-Desvoidy, 1830)

Specimens examined. Sichuan: 1♀, Bamei to Danba, Maoni Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, H-C Liang. 1♂, Songgang- Markang-Miyalu to Guergou-Li Xian, 13.viii.2017, H-C Liang. 1♂, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017, X-Y Li. 1♀, Xiaojin, Rilong to Baoxing, Jiajin Mountains-Mahuang (leech) Valley-Fengtongzhai, 3084m, N30.91°, E102.65°, 17.viii.2017, H-C Liang. Yunnan: 2♂, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

104. *Panzeria connivens* (Zetterstedt, 1844)

Specimens examined. Sichuan: 1♀, Aba Prefecture, Xiaojin, Shuangqiao Valley, Siguniang Shan, 2850–3700m, 16.viii.2017; 1♀, Xiaojin, Rilong to Baoxing, Jiajin Mountains-Mahuang (leech) Valley-Fengtongzhai, 3084m, N30.91°, E102.65°, 17.viii.2017; 1♀, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, all by H-C Liang.

105. *Panzeria nemorum* (Meigen, 1824)

Specimens examined. Sichuan: 1♂, Pingwu, Wanglang, Changbaigou, 2588–2800m, N32.93°, E104.15°, 30.vii.2017, H-C Liang.

106. *Panzeria tuberculata* (Chao & Shi, 1981)

Specimens examined. Sichuan, Pingwu, Wanglang: 2♂, E Reserve Station, 2666–2752m, 2.viii.2017; 2♂, Baixiongou, 2730–2941m, N33.00°, E104.03°, 3.viii.2017; 1♀, Pingwu, Wanglang, Qikeshu, 2653m, N33.94°, E104.14°, 4.viii.2017, all by H-C Liang. Yunnan: 3♂, 1♀, Deqen Valley to Baima & Meili Snow Mountains, 3300–4000m, 17.vii.2017, H-C Liang.

107. *Panzeria* (*Fausta*) sp.

Specimens examined. Sichuan: 1♀, Yaan, Qingyi River-Mt. Zhougong, 550–800m, N29.97°, E103.03°, 7.viii.2017, H-C Liang.

LESKIINI

1 genus, 1 species

108. *Atylostoma towadensis* (Matsumura, 1915)

Specimens examined. Sichuan: 1♂, 2♀, Baoxing, Fengtongzhai-Dengchigou-Muping to Lushan 1539m, N30.54°, E102.94°, 18.viii.2017, C-T Zhang, X-Y Li, H-C Liang. Yunnan: 1♂, Lijiang, Daju to Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang. 1♂, Ninglang, Lugu Lake-Yongsheng-Huaping to Sichuan, Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang.

MACQUARTIINI

1 genus, 1 species

109. *Macquartia grisea* (Fallén, 1810), newly recorded species for China

Specimens examined. Sichuan: 1♂, Bamei to Danba, Maoniu Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, C-T Zhang.

MEGAPROSOPINI

1 genus, 1 species; see Zhang & Liu (2006) for a review of *Dexiosoma* Rondani.

110. *Dexiosoma nigricorne* Zhang & Liu, 2006

Specimens examined. Sichuan: 1♂, Pingwu, Baixiongou, 2730–2941m, N33.00°, E104.03°, 3.viii.2017, H-C Liang. 10♂, 11♀, Bamei to Danba, Maoniu Valley, 2888m, N30.61°, E101.69°, 11.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♂, Songgang- Markang-Miyaluo to Guergou-Li Xian, 13.viii.2017, H-C Liang. 2♀, Rilong, Xiaojin to Baoxing, Jiajin Mountains-Mahuang (leech) Valley-Fengtongzhai, 3084m, N30.91°, E102.65°, 17.viii.2017, C-T Zhang, H-C Liang. 1♀, Lushan, Longmen-Taiping-Shuangshi to Yaan City, 19.viii.2017, C-T Zhang. Yunnan: 1♀, Lijiang, Yulong Snow Mountains (Botanical Garden) to Wenhai, Daju, 2685–3107m, N26.98°, E100.17°, 20.vii.2017, C-T Zhang, X-Y Li. 1♀, Lijiang, Daju to Stone Town-Mingyin, 2351–2659m, N27.27°, E100.23°, 22.vii.2017, C-T Zhang. 8♂, 1♀, Lijiang, Mingyin-Fengke to Ninglang, Labo-Yongning-Lugu Lake, 2751–3359m, N27.57°, E100.37°, 23.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

MINTHOINI

1 genus, 1 species

111. *Dolichopodomintho dolichopiformis* Townsend, 1927

Specimens examined. Yunnan: 4♂, Heqing, Huangping, 1955m, N26.13°, E100.29°, 14–15.vii.2017, C-T Zhang, H-C Liang.

NEMORAEINI

1 genus, 4 species

112. *Nemoraea bifurca* (Chao & Shi, 1982)

Specimens examined. Sichuan: 1♀, Pingwu, Wanglang, E Reserve Station, 2666–2752m, 2.viii.2017, H-C Liang.

113. *Nemoraea fasciata* (Chao & Shi, 1985)

Specimens examined. Sichuan: 1♂, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala, 25.vii.2017, C-T Zhang. 8♂, 1♀, Xiaojin, Rilong to Baoxing, Jiajin Mountains-Mahuang (leech) Valley-Fengtongzhai, 3084m, N30.91°, E102.65°, 17.viii.2017, C-T Zhang, H-C Liang. 1♀, Songgang- Markang-Miyaluo to Guergou-Li Xian, 13.viii.2017, H-C Liang. Yunnan: 1♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang.

114. *Nemoraea javana* (Brauer & Bergenstamm, 1895)

Specimens examined. Sichuan: 1♂, Xiaojin, Rilong to Baoxing, Jiajin Mountains-Mahuang (leech) Valley-Fengtongzhai, 3084m, N30.91°, E102.65°, 17.viii.2017, H-C Liang.

115. *Nemoraea pellucida* (Meigen, 1824)

Specimens examined. Sichuan: 1♀, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala, 25.vii.2017, C-T Zhang. 1♂, Pingwu, Wanglang, Changbaigou, 2588–2800m, N32.93°, E104.15°, 30.vii.2017, H-C Liang. 1♂, 1♀, Moxi to Nanmenguan village-Luding-Kangding, 1920–2161m, 9.viii.2017, H-C Liang. 2♂, Songgang- Markang-Miyaluo to Guergou-Li Xian, 13.viii.2017, C-T Zhang. 1♀, Danba, Meiren Valley, waterfall, 2727m, N31.08°, E101.83°, 12.viii.2017, H-C Liang. 2♂, 1♀, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017, C-T Zhang, X-Y Li.

TACHININI

5 genera, 15 species

116. *Chrysomikia viridicapitis* Chao & Zhou, 1987

Specimens examined. Sichuan, Pingwu, Wanglang: 1♀, Qikeshu, 2653m, N33.94°, E104.14°, 4.viii.2017; 1♀, Changbaigou, 2588–2800m, N32.93°, E104.15°, 30.vii.2017, all by H-C Liang.

117. *Mikia apicalis* (Matsumura, 1916)

Specimens examined. Yunnan: 2♂, Deqen, Feilai Temple to Weixi, Tacheng, 2031–2225m, N27.54°, E99.04°, 18.vii.2017, C-T Zhang, X-Y Li.

118. *Mikia japonica* (Baranov, 1935)

Specimens examined. Sichuan: 1♂, Danba, Meiren Valley to Markang (Barkam), Songgang, 2727m, N31.08°, E110.83°, 12.viii.2017, C-T Zhang.

119. *Peleteria honghuang* Chao, 1979

Specimens examined. Sichuan: 15♂, 5♀, Ninglang, Lugu Lake-Yongsheng-Huaping to Sichuan, Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang, X-Y Li.

120. *Peleteria iavana* (Wiedemann, 1819)

Specimens examined. Sichuan, Pingwu, Wanglang: 4♀, Qikeshu, 2653m, N33.94°, E104.14°, 4.viii.2017, H-C Liang; 5♀, E Reserve Station, 2666–2752m, 2.viii.2017, H-C Liang. 1♂, 2♀, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017, H-C Liang. 68♂, 12♀, Wenchuan, Gengda (China Panda Garden)-Hetaoping, 1826m, N31.07°, E103.22°, 15.viii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♀, Rilong, Xiaojin to Baoxing, Jiajin Mountains-Mahuang (leech) Valley-Fengtongzhai, 3084m, N30.91°, E102.65°, 17.viii.2017, C-T Zhang. 1♀, Lushan, Longmen-Taiping-Shuangshi to Yaan City, 19.viii.2017, C-T Zhang. Yunnan: 1♀, Heqing County, Huangping, N26.13°, E100.29°, 14–15.vii.2017, C-T Zhang. 11♂, 5♀, Ninglang, Lugu Lake-Yongsheng-Huaping to Sichuan, Panzhihua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, C-T Zhang, X-Y Li.

121. *Peleteria trifurca* (Chao, 1963)

Specimens examined. Yunnan: 1♀, Deqen Valley to Baima & Meili Snow Mountains, 3300–4000m, 17.vii.2017, H-C Liang.

122. *Tachina* (*Tachina*) *amurensis* (Zimin, 1929)

Specimens examined. Sichuan: 1♂, Panzhihua, Cycas Nature Reserve to Yanbian, Yumen-Longshu village-Gesala, 25.vii.2017, C-T Zhang. 1♂, Gengda (China Panda Garden)-Hetaoping, 1826m, N31.07°, E103.22°, 15.viii.2017, H-C Liang. Yunnan: 1♂, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains-Daju, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, H-C Liang.

123. *Tachina (Tachina) bombylia* (Villeneuve, 1936), a beautiful fly.

Specimens examined. Sichuan, Pingwu, Wanglang: 2♂, Changbaigou, 2588–2800m, N32.93°, E104.15°, 30.vii.2017; 1♀, Baixiongou, 2730–2941m, N33.00°, E104.03°, 3.viii.2017, all by H-C Liang.

124. *Tachina (Tachina) cheni* (Chao, 1987)

Specimens examined. Sichuan: 1♂, Danba, Meiren Valley to Markang (Barkam), Songgang, 2727m, N31.08°, E110.83°, 12.viii.2017, H-C Liang. 1♂, Songgang- Markang-Miyaluo to Guergou-Li Xian, 13.viii.2017, C-T Zhang. 1♂, Wenchuan, Gengda (China Panda Garden)-Hetaoping, 1826m, N31.07°, E103.22°, 15.viii.2017, C-T Zhang. Yunnan: 2♀, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang, X-Y Li, H-C Liang.

125. *Tachina (Tachina) iota* Chao & Arnaud, 1993

Specimens examined. Sichuan: 1♂, Pingwu, Wanglang, Qikeshu, 2653m, N33.94°, E104.14°, 4.viii.2017, H-C Liang. Yunnan: 2♂, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang, H-C Liang.

126. *Tachina (Tachina) nupta* (Rondani, 1859)

Specimens examined. Sichuan: 1♀, Li Xian-Guqiangpuxi Valley to Wenchuan, Qianzhu Tunnel 2, 1800–2256m, 14.viii.2017, H-C Liang.

127. *Tachina (Tachina) sobria* Walker, 1853

Specimens examined. Sichuan: 1♂, Yaan, Mt. Mengding to Mingshan, 20.viii.2017, C-T Zhang.

128. *Tachina (Tachina) spina* (Chao, 1987)

Specimens examined. Sichuan: 1♂, Songgang- Markang-Miyaluo to Guergou-Li Xian, 13.viii.2017, C-T Zhang. 2♂, 1♀, Rilong, Xiaojin to Baoxing, Jiajin Mountains-Mahuang (leech) Valley-Fengtongzhai, 3084m, N30.91°, E102.65°, 17.viii.2017, C-T Zhang, X-Y Li, H-C Liang.

129. *Tachina (Tachina) subcinerea* Walker, 1853

Specimens examined. Sichuan: 1♂, Wanglang, W Reserve Station, 2722–2750m, N32.98°, E104.08°, 31.vii.2017, H-C Liang. 2♂, Danba, Meiren Valley, waterfall, 2727m, N31.08°, E101.83°, 12.viii.2017, C-T Zhang, X-Y Li. 1♂, Songgang- Markang-Miyaluo to Guergou-Li Xian, 13.viii.2017, C-T Zhang. Yunnan: 1♂, Ninglang, Lugu Lake-Yongsheng-Huaping to Sichuan, Panzhuhua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, H-C Liang.

130. *Tachina (Tachina) ursinoidea* (Tothill, 1918)

Specimens examined. Sichuan: 1♂, Wenchuan, Gengda (China Panda Garden)-Hetaoping, 1826m, N31.07°, E103.22°, 15.viii.2017, C-T Zhang. Yunnan: 1♂, Lijiang, Yulong Snow Mountains (Botanical Garden) to Wenhai, Daju, 2685–3107m, N26.98°, E100.17°, 20.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♂, 2♀, Lijiang, Daju to Jiangbian village-Baishuitai-Haba Snow Mountains, 2625–2794m, N27.35°, E100.16°, 21.vii.2017, C-T Zhang, X-Y Li, H-C Liang. 1♀, Ninglang, Lugu Lake-Yongsheng-Huaping to Sichuan, Panzhuhua, 2751–3359m, N27.57°, E100.37°, 24.vii.2017, H-C Liang.

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Student News

SILVIA GISONDI

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Figure 1. Silvia Gisondi in Allumiere, Rome. (Photo by A. Salituro.)

I am a first year Ph.D. student at the Sapienza University of Rome (Fig. 1). My project involves a collaboration with the University of Copenhagen. During the next three years I will be working with my supervisors Pierfilippo Cerretti (Rome) and Thomas Pape (Copenhagen) on the project "Phylogeny of Rhinophoridae and Polleniidae". My background is mainly in Conservation Biology and Chemical Ecology but then, thanks to my Master's supervisor, I became interested in Molecular Biology and Phylogeny and so could not help being involved in this project!

You may wonder why I am presenting my project in *The Tachinid Times* even though my topic is not strictly on Tachinidae. The reason for this is simple: several of the molecular and morphological analyses published so far reconstruct both the Rhinophoridae and Polleniidae as sister to Tachinidae (Singhi &

Wells 2013, Winkler *et al.* 2015). In order to test competing hypotheses and examine others, I will be studying tachinids and all possible relatives.

Another reason for my choice of project is that rhinophorids are utterly interesting (Fig. 2)! They do not, for instance, show any adult autapomorphies; instead, the only clear autapomorphies concern the morphology and the locomotion behavior of their first instar larva. It would be really exciting to find out more about the interfamilial relationships of this peculiar group and test its monophyly.

As far as the Polleniidae are concerned (Fig. 3), there has been much confusion over their phylogenetic affinities. These flies were long considered as a subfamily (Polleniinae) of the Calliphoridae *sensu lato*. Rognes (1997) conducted a cladistic analysis of Calliphoridae *sensu lato* and concluded that the group is not monophyletic. Portions of the Calliphoridae have since been elevated to family status (e.g., Rhiniidae, Mesembrinellidae) and the recognition of the polleniids as a family has not yet been published. Interestingly, all recent phylogenetic analyses employing molecular data seem to converge in reconstructing polleniids as sister to Tachinidae but only the genus *Pollenia* is included.

What about the parasitic habits of these flies? If tachinids are famous for their parasitoid lifestyle, so too is this true of rhinophorids and polleniids. While polleniids show, as far as we know, a host specificity towards earthworms, rhinophorids are even more particular because they are the only insects that select crustaceans (Crustacea, Isopoda, Oniscidea) as their hosts!

On these grounds, I would like to shed some light on different issues about the phylogeny of these two extremely fascinating groups. So, my plan is to focus on a total evidence phylogeny first for Rhinophoridae and next for Polleniidae and then to wrap up the third part of my Ph.D. with a more complete Calyptratae phylogeny.



Figure 2. *Bixinia winkleri* Cerretti *et al.*, Bunya Mtns. National Park, Australia. (Photo by P. Cerretti; also shown in Fig. 18E in Cerretti *et al.* 2014.)



Figure 3. *Pollenia* sp., Ottawa, Canada. (Photo by P. Cerretti.)

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Student News

ALICE LENZI

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I am a Masters student of Natural Science at the Sapienza University of Rome (Fig. 1).

During my studies I have discovered the fascinating world of flies, especially the family Tachinidae. I have now been working with my supervisor Pierfilippo Cerretti for a few months and we are now starting a new project which is going to be my thesis topic.

Some years ago Pierfilippo received a rare collection of tachinid specimens reared from Embioptera (webspinners) (Fig. 2). This material was collected a long time ago by the late Edward S. Ross of the California Academy of Sciences (CAS, San Francisco) (Crosskey 1976: 338 briefly mentioned this unstudied material within the context of its Oriental specimens). The material was loaned to Monty Wood of the Canadian National Collection of Insects (Ottawa) and later transferred to Pierfilippo in Rome.

Edward Ross travelled around the world collecting and rearing embiopterans (Ross 2009). He was mainly interested in males, as these are more easily identified to species than females. Over the years some tachinids emerged from his breedings and these were carefully preserved along with their puparia. He noticed that the specimens probably belong to different species. These reared tachinids were truly rare events! In fact, to date, only three described tachinids belonging to two genera are known to parasitize embiopterans. Two are species of *Rossimylops* Mesnil: *Rossimylops exquisitus* (Richter) (Palearctic, Iran and Afrotropical, Yemen) and *R. whiteheadi* (Mesnil) (Afrotropical, South Africa) (Cerretti *et al.* 2009; hosts of the other six species of *Rossimylops* were unknown but some of them are present in the Ross collection). The third species belongs to the genus *Perumyia* Arnaud (Fig. 3): *Perumyia embiaphaga* Arnaud (Neotropical, Perú) (Arnaud 1963).



Figure 1. Alice at work. Monte Gennaro, Lazio, Italy. (Photo by Laura Moro.)

At first glance we can confirm that several tachinid species are present in the Ross collection. These belong to two subfamilies and likely three tribes, thus suggesting an independent evolution of a host association with embiopterans in tachinids. Ross also took note of the different embiopteran hosts by writing their IDs on labels pinned under each fly, accompanying the locality label and accurate breeding notes. This is a small, unique collection which I think is worth studying in a phylogenetic context to understand how different tachinid lineages converged to exploit these hosts.

This study is not just a taxonomic work, but also an evolutionary one. First, we are going to revise taxonomically this material, then we would like to include these taxa in a morphological character matrix with representatives of all tachinid subfamilies, to give cladistic arguments for their proper tribal and generic placements. This done, we will be able to verify that this strategy evolved more than once in tachinids, and will try to answer the key question of whether the host shift happened from the same host group in the different tachinid taxa involved.

One problem that arose from our first analysis of the material was the detection of four putative undescribed genera of Embioptera among the hosts. We contacted Kelly Miller (University of New Mexico, Albuquerque) to ask him to collaborate on this study, as indeed this work could be useful to clarify some issues in embiopteran taxonomy as well.

Some extra material would help us to make this work even more interesting so we will appreciate any specimens or information pertaining to tachinids parasitizing embiopterans.

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Figure 2. Webspinners (*Haploembia* sp.) in their nest under a stone. Monti della Tolfa, Lazio, Italy. (Photo by Luigi Lenzini.)



Figure 3. Female of *Perumyia* sp., ex. an apparently undescribed embiopteran from Nicaragua (on loan from CAS).

IN MEMORIAM

ROGER WARD CROSSKEY (1930–2017)

by James E. O'Hara

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Roger Crosskey passed away in London on 4 September 2017 in his 87th year. On a personal level I barely knew Roger, in large part because he was winding down his work on Tachinidae just as I was getting started on them as a graduate student in the 1980s. Roger was by then returning to his real passion, the Simuliidae. He did in fact achieve international fame and adulation for his work on both tachinids and black flies (and other groups as well), which is an odd combination (shared by our mutual friend Monty Wood) given that they are at opposite ends of the Diptera with little in common either biologically or taxonomically.

I reviewed Roger's major contributions to tachinidology just a few years ago in an article entitled "History of tachinid classification" (O'Hara 2013). Here I quote a passage from that article that sums up the greatest of Roger's achievements, most of which were published in the brief span of 12 years between 1973 and 1984:

"Roger Ward Crosskey became the next dipterist with the Commonwealth Institute of Entomology after the death of van Emden. His would be a remarkable tenure, singlehandedly producing a revision of the Rutiliini (a tribe of Dexiinae confined to the Oriental and Australasian regions, Crosskey 1973a), conspecti on the Tachinidae of Australia (Crosskey 1973b) and the Oriental Region (Crosskey 1976), a catalogue of the Afrotropical Tachinidae (Crosskey 1980b), and keys to the tachinid genera of tropical and southern Africa (Crosskey 1984). Additionally, Crosskey later assisted with the preparation of a catalogue of the Tachinidae of the Australasian and Oceanian regions (Cantrell and Crosskey 1989). These resources offered a wealth of information on the names, classification, identification and hosts of Old World non-Palaearctic Tachinidae." (O'Hara 2013: 17–18).

What I would like to do here is reminisce a little about the influence Roger has had on me and my work. I met him briefly when he visited the University of Alberta in Edmonton on black fly business in the early 1980s and got to know him slightly better when I visited the Natural History Museum (then the British Museum of Natural History) in London in the fall of 1985 to study siphonine types. It is fair to say that what I learned most from Roger came from his publications. He created order from chaos for most of the Old World tachinids, treating the faunas region by region and sparing only the Palaearctic tachinids that were then the domain of Louis Mesnil and Benno Herting. By the mid-1980s Roger had completed his most significant works on the Old World Tachinidae. This was just in time, from my perspective, because these works brought together the names I would need to re-evaluate for my systematic revision of the world Siphonini. They were also my introduction to Roger's approach to the subdisciplines of nomenclature and cataloguing.

Zoological nomenclature is that dark corner of systematics that many researchers venture into only when they have to. Roger took a more straightforward approach, metaphorically shining a bright light into these dark corners and dealing with what he found there. He even began one paper—a detailed examination of the identities of "long-neglected" name-bearing types of Walker and Stephens—with the astute observation: "It is a fact of taxonomic life that to ignore names does not make them go away..." (Crosskey 1974: 269). Roger seemed to recognize that nomenclatural issues are much like legal ones and can be stripped down to their essentials and sorted out without a lot of fuss by knowing and applying the rules of the *International Code of Zoological Nomenclature*. I have found Roger to be a great role model for my own forays into the *Code*.

Roger has also influenced me in the science and art of cataloguing. Those of us who get into cataloguing mostly do so because our research is hampered by the scattered state of the literature and we want to see all the names, types, distributions and references brought together to make our lives easier. At least, this is how it started for me. Yet all catalogues are not created equal and Roger developed a style that I admired early on. There are certain intricacies to be found in a good catalogue, such as consistency in applying the *Code*, treatment of types, priority of names, dating of references, recording of geographic distributions, and explanatory notes. This is the "science" side of it. Then there

is the “art” side: how best to set apart genera, when to use uppercase, bold and italics, and where to insert indents and hanging indents. The goal with these aesthetic variables is to create a flow through the valid names and their synonyms that can be quickly comprehended by the reader. Taking all of these criteria into consideration, Roger was a great cataloguer!

I wrote Roger for the last time in August 2009, shortly after publication of a catalogue of the Tachinidae of China (O'Hara *et al.* 2009). My e-mail began as follows:

“I have not written you in many years, but I hear about you from time to time from Monty. I have just published a catalogue of the Tachinidae of China with Hiroshi Shima and Chuntian Zhang. A copy is attached. I would just like to tell you that your conspectus of the Tachinidae of the Oriental Region was a great help to us during the preparation of our catalogue. I have always admired your careful and authoritative works.”

I was delighted to receive back from Roger the letter (yes, not an e-mail) that is reproduced here as Fig. 1. You can tell from his remarks that he had an appreciation for the science and art aspects of cataloguing I referred to above. That he could conjure up in his mind many tachinid genera after “25-40+ years” was truly remarkable, though I was a little taken aback that he found black flies so much more demanding than tachinids. Tachinids are sufficiently demanding for most of us.

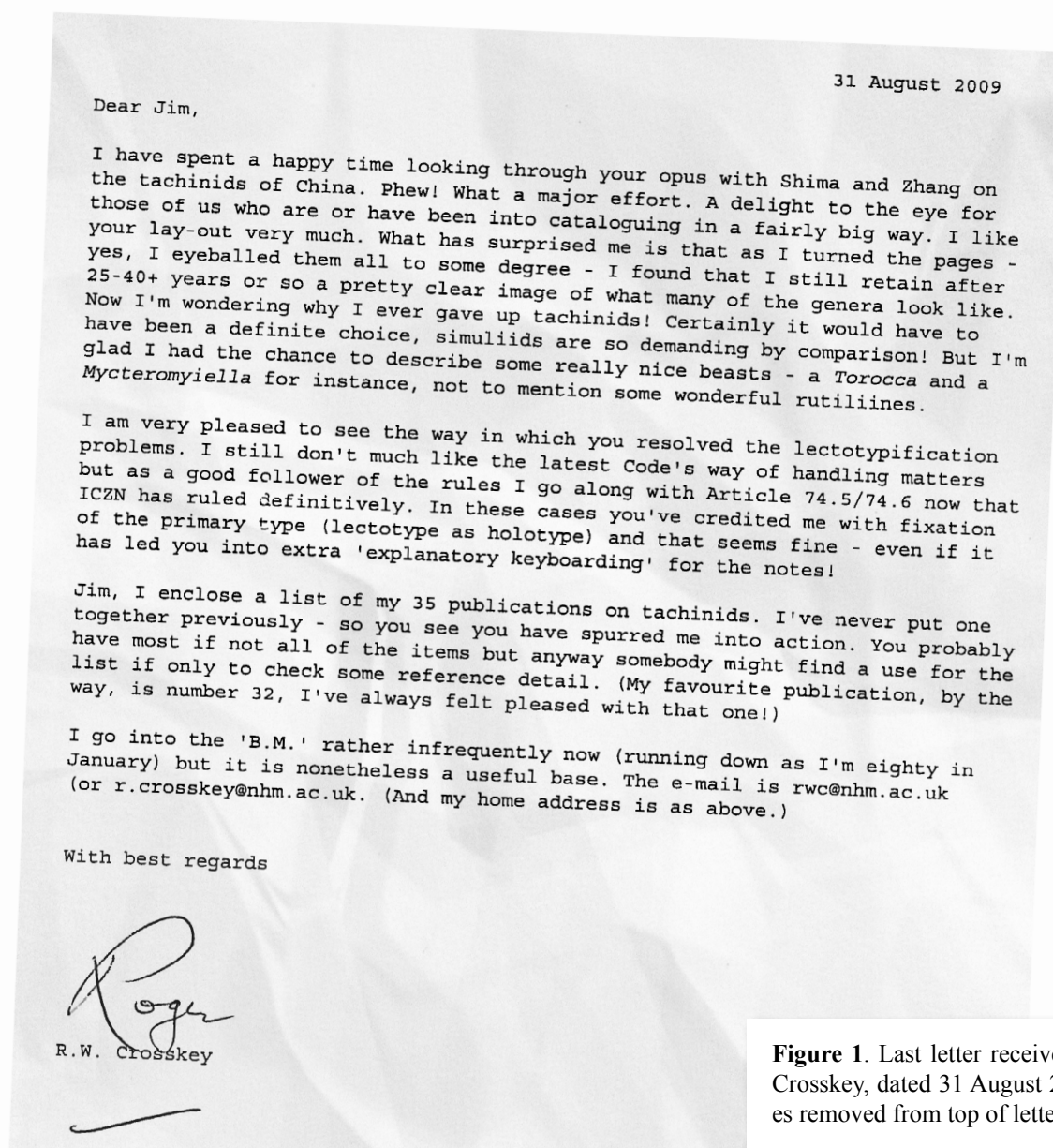


Figure 1. Last letter received from Roger Crosskey, dated 31 August 2009. Address-
es removed from top of letter.

Roger touched on the topic of lectotypifications in his letter. I was faced with a problem when reconciling the provisions of the current *Code* (ICZN 1999) with Roger's treatment of name-bearing types written in compliance with an earlier version of the *Code* (ICNZ 1964). Roger had used the term "holotype" in his works for a single type specimen if he had reasonable grounds to believe that no other syntypes had ever existed. This was fine under the 1964 *Code* but was contrary to Recommendation 73F of the 1999 *Code* concerning "Avoidance of assumption of holotype", which states:

"Where no holotype or syntype was fixed for a nominal species-group taxon established before 2000, and when it is possible that the nominal species-group taxon was based on more than one specimen, an author should proceed as though syntypes may exist and, where appropriate, should designate a lectotype rather than assume a holotype (see also Article 74.6)".

I was not too concerned about Recommendation 73F at the time of my first catalogue with Monty Wood (O'Hara & Wood 2004) but by the time the Tachinidae of China was underway I had sharpened my thinking on nomenclatural matters and had to deal with the presumed "holotypes" of Roger and others. It would be a pity to discard them all and start over with possible syntypes. The *Code* is not crystal clear on the available options in this situation but implicit in the section on lectotypifications is the possibility to accept presumed holotypes as lectotype fixations (see discussion in O'Hara *et al.* 2009: 10). So, this was the approach taken in the Tachinidae of China and I was both happy and relieved to receive Roger's endorsement of it in his last letter to me.

Accompanying Roger's letter was a list of his 35 publications on tachinids, arranged in chronological order and including dates of publication. This list is reproduced below in the same style as used by Roger. We can be thankful that Roger spent the better part of three decades studying Tachinidae amidst his long and illustrious career as an entomologist and dipterist.

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Please note that citations in the online Tachinid Bibliography are updated when errors are found or new information becomes available, whereas citations in this newsletter are never changed. Therefore, the most reliable source for citations is the online Tachinid Bibliography.

I am grateful to Shannon Henderson for performing the online searches that contributed most of the titles given below and for preparing the EndNote records for this issue of *The Tachinid Times*.

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