Walking in the Footsteps of American Frontiersman Daniel Boone

The Tachinid Times

Issue 29

Exploring Chile

Curious case of *Girschneria*

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Progress in Iran

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February 2016

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February 2016, Issue 29

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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*. Illustrate submissions with high quality images sent 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.

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 2017 issue of *The Tachinid Times* to the editor by the end of January 2017.

FRONT COVER *Zelia* sp. (Dexiinae, Dexiini) on a tree trunk along Auxier Ridge Trail in Daniel Boone National Forest, Kentucky, USA. (See article herein by O'Hara and Stireman for a report on the Tachinidae of the Red River Gorge area of eastern Kentucky.)
Photo: Matthew Duncan (Wright State University, Dayton, Ohio), 9 June 2015

TABLE OF CONTENTS *Xanthoepalpus bicolor* (Williston) feeds from a flower in Lockett Meadow in the San Francisco Peaks, northern Arizona, USA.
Photo: J.E. O'Hara, 13 August 2013

BELOW Petrified wood and hoodoos dot the landscape of the Bisti Wilderness Area in the high desert region of northwestern New Mexico, USA.
Photo: J.E. O'Hara, 27 August 2015

Update on New Zealand Tachinidae

by Franz-Rudolf Schnitzler

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Two years on from my presentation "A Tussle with Tachinidae" at the 8th International Congress of Dipterology in Potsdam, Germany, I am pleased to be able to report on the progress I have made in establishing a key to the New Zealand tachinid genera. The key, along with factsheets containing representative images of the New Zealand tachinid genera, will go live on the Landcare Research – Manaaki Whenua website (http://tachinidae.landcareresearch.co.nz) in March/April this year.

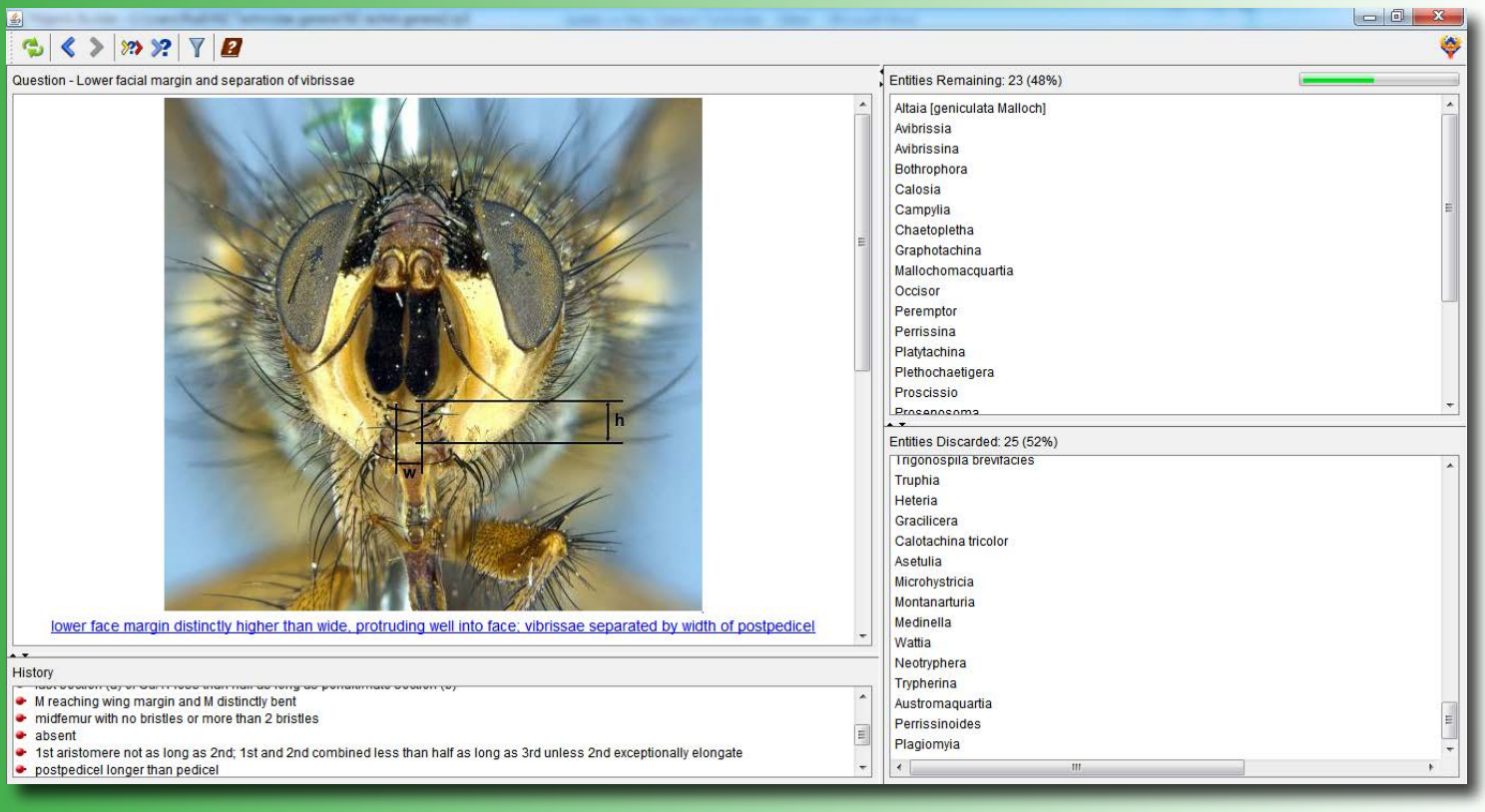
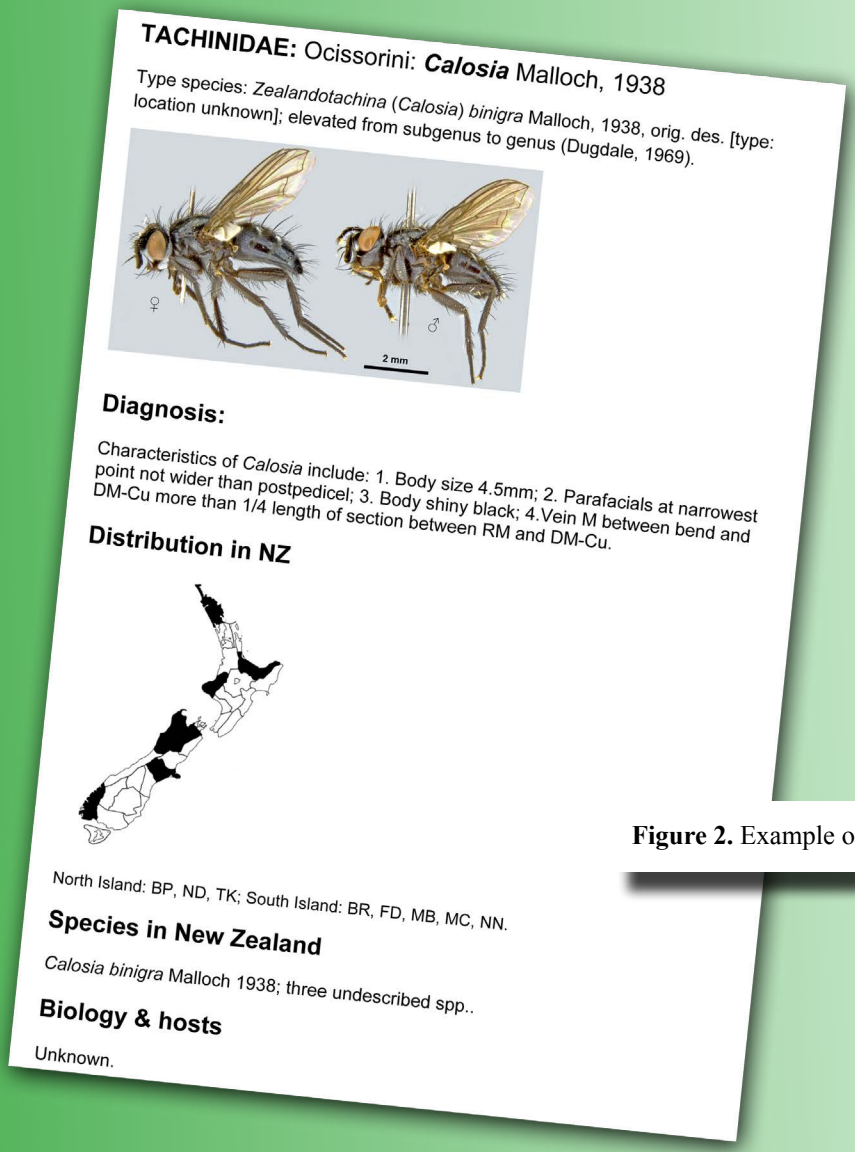


Figure 1. Screen capture of part of the dichotomous Phoenix key to the New Zealand tachinid genera.

New Zealand has 56 described tachinid genera, of which 93% are endemic (4 genera are present elsewhere); and these include approximately 142 described species, of which 98.5% are endemic (2 species are introduced). The key to the genera will be a dichotomous Phoenix key (Fig. 1) and is considered preliminary.

A separate factsheet has been produced for each genus, which contains information about the tribe, type species (and the depository of its name-bearing type), diagnosis, distribution in New Zealand, species within the genus, and biology and hosts (Fig. 2). A synoptic collection has been established at the New Zealand Arthropod Collection. Where available the name-bearing type of the type species for each genus has been examined by me.



TACHINIDAE: Ocissorini: ***Calosia*** Malloch, 1938

Type species: *Zealandotachina* (*Calosia*) *binigra* Malloch, 1938, orig. des. [type: location unknown]; elevated from subgenus to genus (Dugdale, 1969).

♀ ♂ 2 mm

Diagnosis:

Characteristics of *Calosia* include: 1. Body size 4.5mm; 2. Parafacials at narrowest point not wider than postpedicel; 3. Body shiny black; 4.Vein M between bend and DM-Cu more than 1/4 length of section between RM and DM-Cu.

Distribution in NZ

North Island: BP, ND, TK; South Island: BR, FD, MB, MC, NN.

Species in New Zealand

Calosia binigra Malloch 1938; three undescribed spp..

Biology & hosts

Unknown.

Figure 2. Example of a New Zealand tachinid genus factsheet.

The key and factsheets are still heavily based on Malloch's (1938) key and Dugdale's (1969) work. However, this is the first work to provide photographic images of characters that are relevant to our current understanding of New Zealand's Tachinidae and a representative specimen for each genus. This will hopefully form the basis for further work on the New Zealand Tachinidae.

Foremost, I would like to thank the New Zealand Department of Conservation for making this work possible through a *Terrestrial and Freshwater Biodiversity Information System (TFBIS)* grant. I also wish to thank Landcare Research – Manaaki Whenua, Auckland, and the New Zealand Arthropod Collection, which housed me during this project and made their imaging system available to me. Many thanks also go to John Dugdale and Robert Hoare, both of whom listened carefully and patiently to my lamentations about tachinids.

It has been a steep learning curve for me to come to grips with this fascinating group. I quite enjoyed the work, despite it sometimes being painful (no, I am not a masochist!) trying to understand the genera and their species. It was a tremendous encouragement for me to meet so many tachinid enthusiasts in Potsdam nearly two years ago now. This work is not yet finished, however, and so I look forward to contributing to a revision of the New Zealand tachinid genera in the future. Following a change in my job position as of June last year, I should have plenty of time to start to attempt such a revision at the genus level. In the meantime, I have already collected a number of fresh specimens and hope to find more time to carry out active collections throughout New Zealand. Where possible, I have been setting

aside legs in ethanol and will continue to do this for future molecular work, as recommended by O'Hara (2011). It may not come as a surprise that I am continually finding new species and genera that nobody else has collected previously. For example, the new genus shown in Fig. 3 contains four to five species, two of which I only collected this month in a Malaise trap. I will provide an update of what I am doing and the progress I am making on http://www.bugz.co.nz/new-zealand-tachinidae/.

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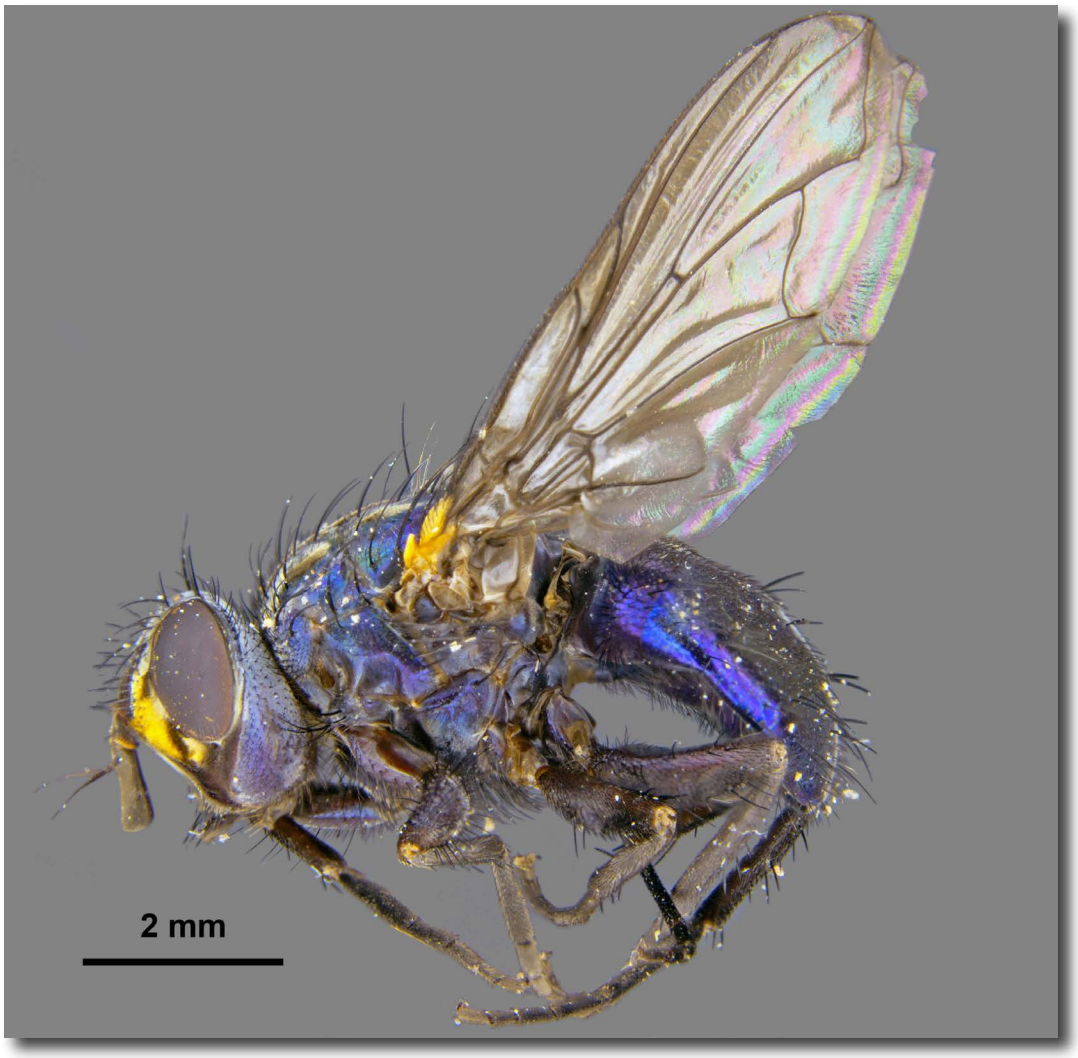

Figure 3. A new New Zealand tachinid species representing a new genus.

Teratological specimens and the curious case of *Girschneria* Townsend

by James E. O'Hara

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In the last issue of *The Tachinid Times*, Jaakko Pohjoismäki illustrated and discussed a specimen of *Gonia divisa* Meigen that has an extra arista protruding from the apex of the left first flagellomere (Pohjoismäki 2015). Deformities or "monstrosities" are occasionally found in Tachinidae but are rarely reported in the literature. To generate interest in such peculiarities, Jaakko issued a "friendly invitation", challenging "all *Tachinid Times* readers to report their tachinid monsters in forthcoming issues of this newsletter". I am familiar with one specimen that garnered some interest in the entomological literature in the mid 1880s that I would like to review here. It was described as a new genus and species some 30 years after it was first reported and 25 years after that some similarly deformed specimens in the Canadian National Collection of Insects (CNC) led an author to a simple explanation for the deformity. I located these CNC specimens and have included some images of one of them here. As a parting comment I cite a little-known article of the ICZN *Code* that comes into play concerning the availability of the genus and species names proposed for the original specimen. This is a review of the curious case of *Girschneria* Townsend.

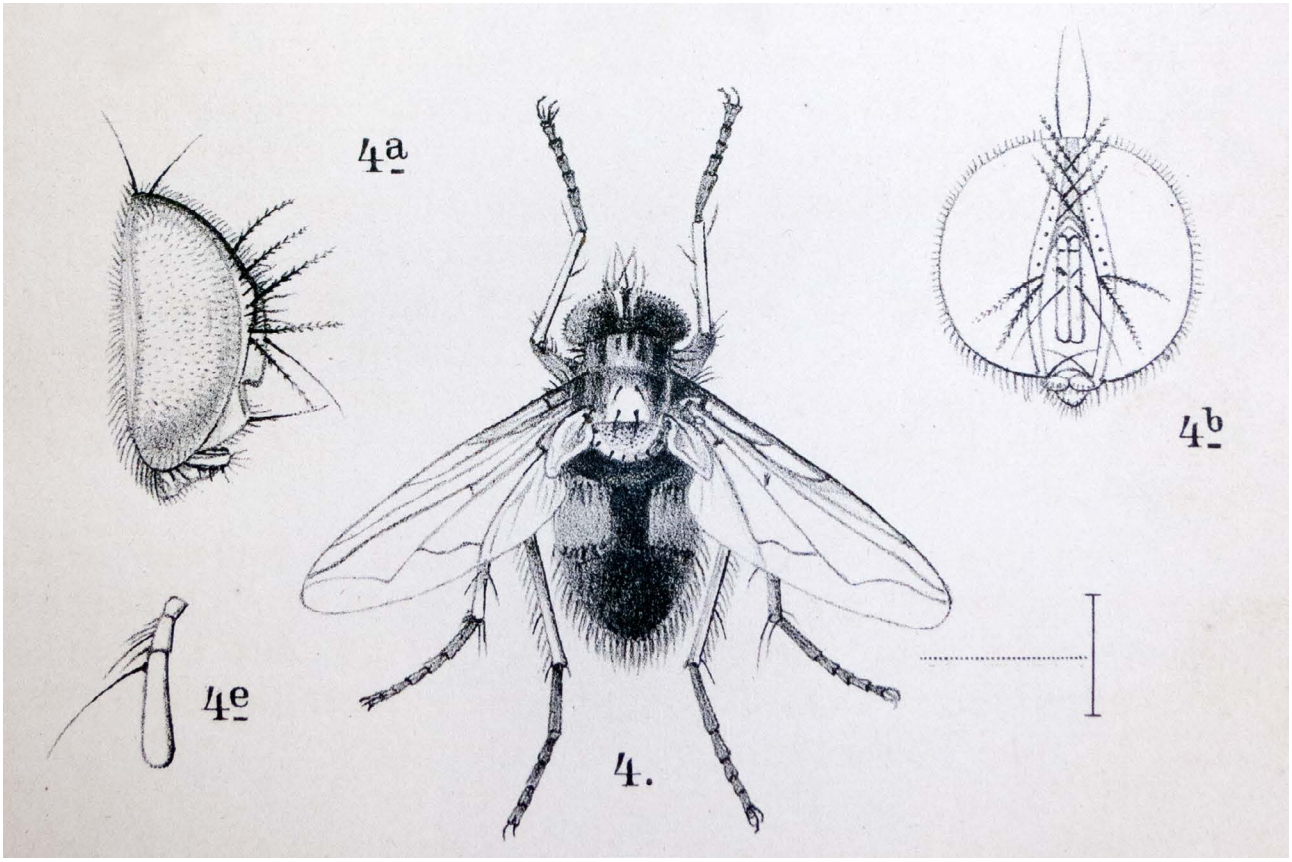

Figure 1. Portion of a plate from Girschner (1855) showing a tachinid fly with peculiar plumose hairs on the head.

Our story begins with a short communication by Girschner (1885) about two species of Diptera from the Thuringia region of Germany. One is described and given a new name and the other is described but not named beyond a tentative assignment to "*Exorista* (*Carcelia* R.D.)". This second specimen is unusual in possessing some remarkable and symmetrically-placed plumose hairs originating from both sides of the ptilinal fissure on the front of the head (Fig. 1, photographed from an original printed copy of the journal). Girschner is unsure whether these plumose hairs are of extraneous origin but thinks they are probably not. He mentions that Mik, a dipterist in Vienna to whom he had sent the specimen for examination, disagrees and believes the hairs probably originated from some other animal, perhaps a caterpillar. Girschner argues against this citing the symmetry of the hairs and concludes that the finding of a second specimen similar to this one will settle the matter.

Mik felt compelled to respond to Girschner's published remarks with an elaboration of his own opinion on the strange fly they had both examined (Mik 1885). He notes that the plumose hairs, in addition to being pale instead of black, are not of a kind he has ever seen in a dipteran before, and he has seen a lot of flies. After a careful consideration of the available evidence he is still of a mind that the plumose hairs are not the product of the fly and most likely came from the caterpillar in which it lived during its early life.

The last paper in this exchange was a further discussion by Girschner (1886) about some points raised by Mik (1885). Girschner maintains his original view but acknowledges that proof of his opinion will only come with the discovery of second specimen matching the first.

These observations by Girschner and Mik should have ended the matter until the true nature of the peculiar hairs on the front of their fly could be uncovered, but unfortunately Townsend (1919) intervened first. Townsend, never one to shy away from an opportunity to name a new genus and species from the works of others (see for example O'Hara *et al*. 2013), named the specimen of Girschner as "*Girschneria mirabilis*, new genus and species". The genus was named in honour of the original author and the species in recognition of the fly's appearance (*mirabilis* being Latin for "wonderful"). Townsend surmised that the plumose hairs on the head are likely found only in the male of the species and noted at the end of his brief description that "They [the plumose hairs] were believed by Mik to be of extraneous origin, but are unquestionably structures of the fly". Townsend treated *Girschneria* as valid in his key to the genera of Carceliini (Townsend 1936: 208) and *Manual of Myiology* (Townsend 1941: 151). In the last, Townsend listed the holotype of *G. mirabilis* as lost but the figures in Girschner (1885, reproduced here as Fig. 1) provide a lasting record of the general features of the fly and the arrangement of the plumose hairs on the head.

Interestingly, to this point in our tale no author has drawn attention to the functional role of the ptilinal fissure that frames the face in schizophoran flies. Behind the face is the ptilinum, a membranous sac that is inflated to help the fly emerge from its puparium. This ptilinum is retracted back into the head as the fly's exoskeleton hardens but its presence can be inferred by the fine outline of the ptilinal fissure. The role of the ptilinum has been known since the studies of the famous French scientist Réaumur in the early 1700s (Strickland 1953). Yet, neither Girschner nor Townsend considered the possibility that caterpillar hairs caught in the ptilinal fissure might account for the plumose hairs on the head of *G. mirabilis*, and even Mik did not infer this despite suggesting that the plumose hairs might have come from the host caterpillar. We will never know why none of these authors advanced this argument. Instead, it was left to Canadian entomologist Brooks (1945) to prove beyond reasonable doubt that the plumose hairs of *G. mirabilis* were nothing more than the hairs of its host caught in the ptilinal fissure when the ptilinum was retracted. Brooks examined a series of tachinid specimens belonging to the genus *Leschenaultia* Robineau-Desvoidy reared from *Lophocampa caryae* Harris (as "*Halisidota caryae*") (Arctiidae). He noted that some of the specimens had hairs of the caterpillar stuck in the ptilinal fissure much like they were in *G. mirabilis*, with additional hairs on other parts of the body. Brooks (1945: 185) concluded:

> "These plumose bristles are identical with those making up the cocoon of the host, their position in the ptilinal suture and in various body membranes indicating that they had become stuck to these parts as the fly was emerging from the host cocoon, at which time the membranes are greatly expanded. While the bristles show a remarkable symmetry in their position, ranging from one or two on each side of the face to twenty or more, there can be no doubt as to their origin."

Figures 2–4. A paratype of *Leschenaultia halisidotae* Brooks showing plumose hairs from the host attached to the ptilinal fissure and other parts of the body.

Brooks illustrated his short paper with a drawing of the head of one of the *Leschenaultia* specimens in which the host's plumose hairs arise from the ptilinal fissure. He later revised the North American species of *Leschenaultia* (Brooks 1947) and included the specimens mentioned in his earlier paper in the type series of his new species *Leschenaultia halisidotae* Brooks. One CNC paratype of this species is illustrated here in Figs. 2–4.

As for the fate of the name *Girschneria mirabilis* Townsend, Herting (1984: 56) treated the genus name as a junior synonym of *Carcelia* Robineau-Desvoidy, 1830 and briefly explained the history of the name in Note 40 (p. 187). The species *G. mirabilis* was treated as an unidentified species in Herting's catalogue and was later listed as a as a doubtful species (i.e., a *nomen dubium*) by Herting and Dely-Draskovits (1993: 215).

There is one more aspect of this "curious case" that bears mention. In the glossary of the *International Code of Zoological Nomenclature* (ICZN 1999), "an abnormal specimen or a monstrosity" is termed a teratological specimen. According to Article 1 of the *Code*, under "[exclusions] from the provisions of the *Code* are names proposed …for teratological specimens as such." There is some ambiguity as to what is meant by "as such" and not everyone agrees with how to interpret this provision of the *Code*. The most common interpretation, and the one I follow here, is this: if an author knows he or she is proposing a new name for a teratological specimen then the name is unavailable (i.e., a *nomen nudum*) and if the author does not know then the name is available. Following this interpretation of *Code* Article 1.3.2, *Girschneria mirabilis* is an available name. Regardless of the availability of the name it is not valid because it is a junior synonym of *Carcelia*.

Acknowledgements

I thank Alan Fleming (AAFC, Ottawa) for the images of *Leschenaultia halisidotae* used in Figs. 2–4 and Jaakko Pohjoismäki for suggesting articles on tachinid monsters.

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Interim report on the project to study the tachinid fauna of Khuzestan, Iran

by Ebrahim Gilasian[1], Joachim Ziegler[2] and Mehrdad Parchami-Araghi[1]

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Over the past two years, we have assembled a sizable collection of flies from the Karkheh and Dez national parks situated in the southwestern province of Khuzestan, Iran. The Khuzestan Plain borders Iraq (Mesopotamia) on the west and Persian Gulf on the south (Fig. 1) and is one of the richest agricultural areas in Iran. The area is generally hot and humid during the summer and is irrigated by several large permanent rivers including the Karkheh and Dez rivers (Figs. 3–6). We have been running Malaise traps (Fig. 2) throughout the parks from early March through August since 2013. Up to now about 600 tachinid specimens have been collected and they are housed mainly in the Hayk Mirzayans Insect Museum, Tehran, Iran (HMIM), with a few reference specimens in the Museum of Natural History, Leibniz-Institute for Research on Evolution and Biodiversity, Berlin, Germany (ZMHB) and in the private collection of Joachim Ziegler, Bernau, Germany (CZB).

To date we have identified 31 tachinid genera in four subfamilies of Exoristinae (18 genera), Tachininae (7 genera), Phasiinae (4 genera) and Dexiinae (2 genera). The discovery of an undescribed species of the genus *Minthodes* Brauer & Bergenstamm (Fig. 7) in our study area, which is closely related to *M. brevipennis* (Brauer & Bergenstamm), led us to review the genus and provide a key to the *Minthodes* species in Iran (Gilasian *et al*. under revision). We have also found several other undescribed species in the subfamilies Exoristinae and Tachininae and plan to publish our results in a series of future papers.

This project is in line with our continuing research on the tachinid fauna of Iran (Gilasian *et al*. 2013a, 2013b, 2014a, 2014b) and is being funded by the Iranian Department of Environment and the Iranian Research Institute of Plant Protection.

Figure 1. Map of Iran with the boundary of the province of Khuzestan outlined in purple.

Figures 2–7. 2. Malaise trap in Karkheh National Park, province of Khuzestan, Iran (7 March 2015). **3–6**. Views of Karkheh National Park (photos by Farshad Eskandari). **7**. Adult male of an undescribed *Minthodes* species from Karkheh National Park.

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Figure 1. View from Auxier Ridge Trail, Daniel Boone National Forest, Kentucky.

Tachinidae of the Red River Gorge area of eastern Kentucky

by James E. O'Hara[1] and John O. Stireman III[2]

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Introduction

On June 7th, 1769, the legendary American frontiersman Daniel Boone stood atop Pilot Knob (Figs. 2, 5) in what is now east-central Kentucky and gazed down upon an unbroken, pristine wilderness. He and his companions had not ventured this far west before. They were among the first whites to enter this area through the Cumberland Gap in the Appalachian Mountains, a land then known only to the native Cherokee, Chickasaws and Shawnee, and a few adventurous hunters and trappers brave enough to risk their lives in the pursuit of animal pelts for the fur trade. Boone would return to Kentucky six years later, this time opening a path known as the Wilderness Road and leading the first party of permanent settlers through the Cumberland Gap to a small community christened Boone's Station, later to take the name Boonesborough.

On June 7th, 2015, John and I ascended an easy winding trail to the top of Pilot Knob where we were greeted to a vista probably not much different from the one seen by Daniel Boone 246 years to the day earlier. The forest below, a rich mixture of mostly temperate deciduous trees, was logged years ago but has since been allowed to grow back. We were here also on a hunting expedition, but our quarry was smaller than Boone's, for (as the readers of this newsletter well know) we were after tachinid flies. We had come here as participants in (and John as a co-organizer of) the Field Meeting of North American Dipterists Society (NADS) being held in the Red River Gorge area of eastern Kentucky on 7–11 June 2015.

Figure 2. Pilot Knob plaque near entrance to Pilot Knob State Nature Preserve.

The setting of the NADS meeting was chosen by Gregory Dahlem of Northern Kentucky University (a sarcophagid specialist). The Red River Gorge offers a variety of habitats within an ecoregion known as the Appalachian mixed mesophytic forest. The Appalachian Mountains themselves stretch from the Canadian border to Alabama and represent an ancient mountain range dating back several

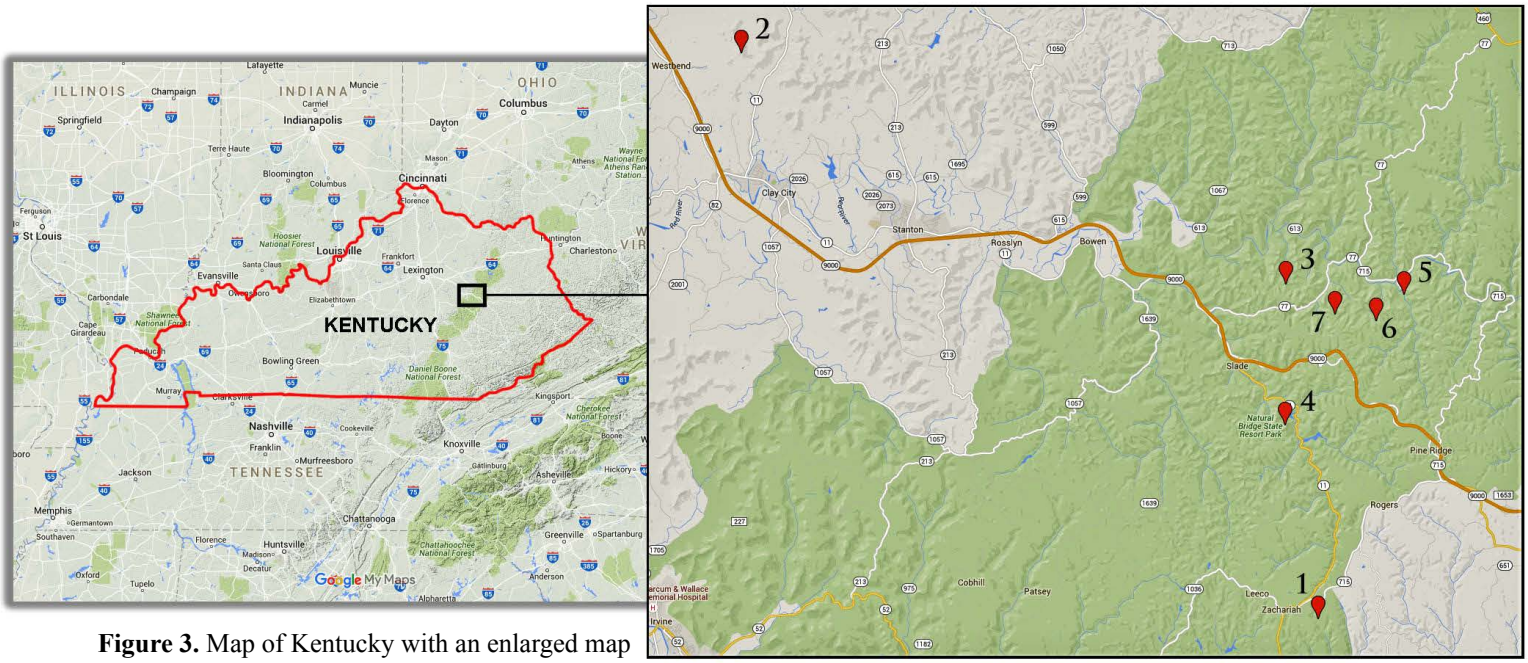

Figure 3. Map of Kentucky with an enlarged map showing the locations of the seven sites where tachinids were collected. Map data © 2016 Google.

hundred million years and now much eroded (and well forested) after its long history. In contrast, the mighty Rocky Mountains to the west are less than 100 million years old. The Red River Gorge is a foothills area to the west of the main Appalachians within the Daniel Boone National Forest. It is a popular destination for tourists because of the natural arches, for hikers because of the scenic beauty of the trail system, and for nature lovers because of the rich diversity of the fauna and flora. It is especially well known, as are the Appalachians in general, for its herpetofauna; in fact, there are more species of salamanders farther south in the southern Appalachians than anywhere else in the world, posing interesting questions about their evolution and historical biogeography.

The NADS field meetings are held every two years somewhere in North America. The purpose is to bring together dipterists in an informal setting to collect flies in local habitats and to share research findings during a session of oral presentations. Days are devoted to collecting and evenings are spent preparing the day's catch and listening to presentations. For John and me, the meeting in the Red River Gorge area provided not only an opportunity to collect tachinid flies for ongoing and future studies but also a chance to document, albeit incompletely, the local tachinid fauna. The tachinid fauna of eastern North America is relatively well known compared to the continent as a whole but is poorly known compared to the European fauna. There are taxonomic difficulties in many genera and species distributions are not accurately recorded. There exists no list of Kentucky tachinids, not even an old one as best we can tell, and the Canadian National Collection of Insects (CNC) in Ottawa has fewer tachinids from Kentucky than from most other eastern states. The National Museum of Natural History (USNM) in Washington surely has a better collection of Kentucky tachinids but the Tachinidae of neither collection has been database. The species list below represents a small contribution towards a better understanding of the tachinids of Kentucky.

Figure 4. Greg Dahlem's 6-meter Malaise trap at Cliffview Resort, locality 1.

Materials and Methods

Specimens were hand collected at one site on May 24th (prior to the NADS meeting) and at several sites during June 7–11. Additionally, on most days we were able to pick out tachinids from the dry catch of Greg Dahlem's 6-meter Malaise trap that was set up at the forest edge beside our main cabin (locality 1) (Fig. 4).

Tachinids were collected from the following seven localities (Fig. 3), ordered in sequence with the site producing the most specimens (and coincidentally the most species) given first. Species recorded from each site are identified in the list by superscript numbers that correspond to the numbers given here.

1. Wolfe County, Cliffview Resort off Route 715, 350m, 37°42.10′N 83°39.98′W, 7–11 June 2015 [most specimens caught in G.A. Dahlem's 6-meter Malaise trap] (Fig. 4).
2. Powell County, Pilot Knob State Nature Preserve, 430m, 37°54.65′N 83°56.18′W, 7–8,10 June 2015 [collectors J.E. O'Hara, J.O. Stireman, E. Wong] (Fig. 5).
3. Powell County, Daniel Boone National Forest, Auxier Ridge Trail, 395m, 37°49.53′N 83°40.88′W, 9–10 June 2015 [collectors J.O. Stireman, Z.L. Burington, J.E. O'Hara, E. Wong, A. Eckhardt] (Fig. 1).
4. Powell County, Natural Bridge State Park, along trails, 370m, 37°46.4′N 83°40.9′W, 8 June 2015 [collectors J.O. Stireman, J.E. O'Hara, A. Eckhardt].
5. Wolfe County, Daniel Boone National Forest, Sheltowee Trace Trail, Chimney Top Creek, 215m, 37°49.30′N 83°37.57′W, 9 June 2015 [collector J.O. Stireman].
6. Powell County, Daniel Boone National Forest, Pinch-em Tight Ridge, 395m, 37°48.72′N 83°38.35′W, 24 May 2015 [collector J.O. Stireman].
7. Powell County, Daniel Boone National Forest, Gray's Arch, 365m, 37°48.87′N 83°39.50′W, 10 June 2015 [collector A. Eckhardt].

Figure 5. John at Pilot Knob, locality 2.

The classification of Tachinidae follows O'Hara and Wood (2004) except for the placement of *Campylocheta* Rondani and *Spathidexia* Townsend in the Voriini rather than the Campylochetini and Thelairini, respectively, following Cerretti (2010).

Further information about the 2015 NADS Field Meeting was given in Fly Times in two pre-meeting announcements (Dahlem *et. al*. 2014, 2015) and in a final report (Dahlem 2015).

Results

A total of **308** specimens representing **84** species were collected. The number of specimens and species collected at each site are as follows:

1. Cliffview Resort: 131 specimens, 48 species. The Malaise trap accounted for 127 specimens and 46 species; two specimens were captured in a smaller Malaise trap run by Z. Smith and J.E. O'Hara and J.O. Stireman each caught one specimen at blacklight.
2. Pilot Knob State Nature Preserve: 83 specimens, 30 species.
3. Auxier Ridge Trail: 49 specimens, 20 species.
4. Natural Bridge State Park: 18 specimens, 10 species.
5. Sheltowee Trace Trail, Chimney Top Creek: 18 specimens, 9 species.
6. Pinch-em Tight Ridge: 8 specimens, 4 species.
7. Gray's Arch: 1 specimens, 1 species.

DEXIINAE

DEXIINI

Billaea satisfacta (West)[4]
Billaea sibleyi (West)[3]
Zelia n. sp.[3]

VORIINI

Campylocheta nasellensis (Reinhard) or *semiothisae* (Brooks)[1]
Chaetonopsis spinosa (Coquillett)[2]
Spathidexia (*Spathidexia*) *dunningii* (Coquillett)[1]

EXORISTINAE

BLONDELIINI

Anisia ?*gilvipes* (Coquillett)[1,2]
Anisia optata (Reinhard)[1,5]
?*Belida* sp.[1]
Blondelia eufitchiae (Townsend) or *hyphantriae* (Tothill)[1,2,3,4]
Blondelia n. sp.?[1]
Chaetostigmoptera manca (Greene)[1]
Compsilura concinnata (Meigen)[1,2,3]
Euhalidaya genalis (Coquillett)[3]
Lixophaga nr. *opaca* Reinhard[1]
Lixophaga variabilis (Coquillett)[1,2,4]
Medina barbata (Coq.) or *quinteri* (Tnsd.)[1,2]
Myiopharus dorsalis (Coquillett)[1,5]
Myiopharus macellus (Reinhard)[1]
Oswaldia sp.1
Paracraspedothrix angulicornis (Curran)[1]
Thelairodoria setinervis (Coquillett)[2,3]
Vibrissina ?*leibyi* (Townsend)[1]
Zaira sp.[1]

ERYCIINI
Aplomya theclarum (Scudder)[1,2,3,5]
Carcelia tenuiforceps (Reinhard)[1]
Carcelia diacrisiae Sellers[1,3,5]
Carcelia sp. 1[1,2,4]
Carcelia sp. 2[1]
Carcelia sp. 3[2]
Carcelia sp. 4[1]
Carcelia sp. 5[1]
Lespesia anisotae (Webber)[3]
Lespesia ?*frenchii* (Williston)[2]
Lespesia schizurae (Tnsd.) or *stonei* Sabrosky[1,2,3,4, 6,7]
Nilea valens (Aldrich & Webber)[5]
Siphosturmia melampyga (Reinhard)[3]
ETHILLINI
Neoethilla antennalis (Coquillett)[5]
EXORISTINI
Phorocera (*Pseudotachinomyia*) *auriceps* Wood[4]
Phorocera or *Tachinomyia* sp.[1]
Tachinomyia variata Curran[6]
GONIINI
Belvosia unifasciata (Rob.-Des.)[3]
Chaetogaedia ?*townsendi* Sabrosky & Arnaud[1,2,3]
Frontiniella spectabilis (Aldrich)[2]
Gaediopsis ocellaris (Coquillett)[5]
Hypertrophomma opacum Townsend[2]
Hyphantrophaga blanda (Osten-Sacken)[5]
Hyphantrophaga hyphantriae (Townsend)[1]
Leschenaultia reinhardi Toma & Guimaraes[2,4,5,6]
Leschenaultia sp. 1 or close[2,4]
Patelloa meracanthae (Greene)[1,2,3]
Patelloa sp.[1,2,3]
Pseudochaeta (*Pseudochaeta*) *robusta* (Reinhard)[1]
MASIPHYINI
Masiphya ?*confusa* Aldrich[2]
WINTHEMIINI
Winthemia datanae (Townsend) complex[2]
Winthemia sp. 1[2]
Winthemia sp. 2[2]
Winthemia sp. 3[1]
Winthemia sp. 4[3]

PHASIINAE

CYLINDROMYIINI
Cylindromyia binotata (Bigot)[2]
Cylindromyia propusilla Sabrosky & Arnaud[2]
PHASIINI
Phasia robertsonii (Townsend)[1]
STRONGYGASTRINI
Strongygaster triangulifera (Loew)[1]
TRICHOPODINI
Xanthomelanodes arcuatus (Say)[1]

TACHININAE

ERNESTIINI
Panzeria ampelus (Walker)[2]

Figure 6. A male of *Zelia* sp. on a tree trunk on the Auxier Ridge Trail.

EUTHELAIRINI
Neomintho celeris (Townsend)[2,3]
GRAPHOGASTRINI
Phytomyptera longicornis (Coquillett)[1]
Phytomyptera melissopodis (Coquillett)[1]
Phytomyptera palpigera (Coquillett)[1]
Phytomyptera sp.[2]
LESKIINI
Clausicella turmalis (Reinhard)[1]
Genea (*Genea*) *aurea* James[1]
Genea (*Siphoclytia*) *pavonacea* (Reinhard)[1]
MINTHOINI
Paradidyma singularis (Townsend)[6]
MYIOPHASIINI
Cholomyia inaequipes Bigot[1,3]
POLIDEINI
Chrysotachina longipennis O'Hara[1]
Mauromyia pulla Coquillett[1]
SIPHONINI
Actia diffidens Curran[1]
Ceromya americana (Townsend) group[1]
TACHININI
Archytas (*Nemochaeta*) *aterrimus* (Rob.-Des.)[3,4]
Archytas sp. 1[2,3]
Archytas sp. 2[4]
Archytas sp. 3[1]
Archytas sp. (n. sp.?)[2]

Discussion

The species documented here represent named species and species that are undescribed or difficult to match to named species. The fauna is characteristic of eastern North America and no dramatic range extensions from other parts of North America were discovered.

Only one species, *Zelia* n. sp. (Fig. 6), is recorded as unequivocally undescribed. It is morphologically similar to, but distinct from, *Z. vertebrata* (Say) among the eastern species of the genus. The results of a COI analysis of several *Zelia* species corroborate the morphological evidence that this species is undescribed (Fig. 7, as *Zelia* sp. 1).

A remarkable result of this survey was the effectiveness of Greg Dahlem's 6-meter Malaise trap. We had seen Greg's trap in action during other NADS field meetings and had seen a similar trap used to good effect in South Africa by Ashley Kirk-Spriggs (National Museum, Bloemfontein) (see fig. 2 in Cerretti *et al*. 2013). Yet, it was not until now that we could quantitatively compare the trap against hand collecting. What we found was that the trap collected 46 of the 84 species recorded (55%), of which 31 species (37%) were not caught by other means. The trap caught species of all sizes but many of the smallest were not caught by hand collecting. One of us (JEOH) was so impressed by this result that he ordered a 6-meter trap from BioQuip® and hopes to use it in Colorado this summer. The trap is not in more common usage primarily because it takes effort, patience, and some skill to set up and is bulky to travel with especially if poles are used for support.

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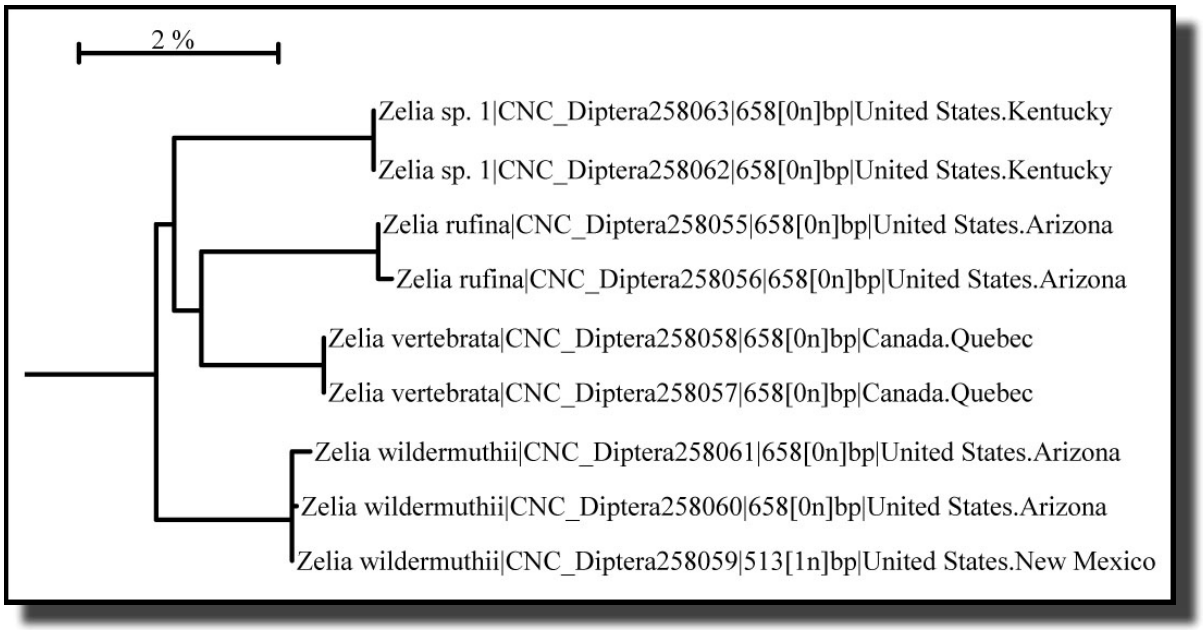

Figure 7. Neighbor joining tree based on COI data for *Zelia* species, including the new species (sp. 1) from Kentucky. The scale bar indicates percent sequence divergence.

Landscape dynamics of tachinid parasitoids

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Habitat fragmentation and the intensification of agricultural landscapes are among the main drivers affecting parasitoid diversity. Although many empirical and theoretical studies have elucidated the effects of these processes on populations and communities of parasitoids, the majority of the research has been focused on specialized groups of hymenopterans. For this reason, for my PhD thesis I studied the highly-diverse group of tachinid parasitoids as an alternative model system to test the effects of landscape fragmentation and agricultural intensification on the third trophic level (Fig. 1). Last year I completed my PhD program at the university of Padova in Italy under the supervision of Dr. Lorenzo Marini, Prof. Andrea Battisti and Dr. Pierfilippo Cerretti.

During my PhD project I sampled with pan-traps a variety of habitats from Mediterranean grasslands to Alpine forest. This allowed me to work with a great diversity of tachinids. Specifically, I collected and identified more than 18,900 individuals belonging to 240 species. Interestingly, four species were recorded for the first time in Italy: *Chetogena micronychia* (Masson), *Linnaemya zachvatkini* Zimin, *Oswaldia eggeri* (Brauer and Bergenstamm) and *Pseudomintho diversipes* (Strobl).

The thesis is divided into six main chapters, where the first chapter includes a general introduction. In the second chapter, the effects of habitat fragmentation on the diversity of tachinids are evaluated (Inclán et al. 2014). This chapter evaluates the relative importance of habitat loss, decrease of connectivity and their potential interaction on tachinid diversity. This chapter shows that the reduction of habitat area and the loss of connectivity significantly interacted, suggesting that management practices aimed at mitigating the negative effect of habitat fragmentation need to consider the connectivity in the surrounding landscape.

In the following chapters, diverse components of the intensification of agricultural landscapes are evaluated. In Chapter III, the diversity of tachinids are examined in relation to farm management (organic vs. conventional) at different spatial scales (Inclán *et al*. 2015a). This study shows that organic management improved the diversity of tachinids at both the local and landscape scales but only in arable crops while the effect in grasslands was neutral. Thus, any attempt to enhance parasitoid diver-

Figure 1. Author collecting tachinids in a meadow in Italy.

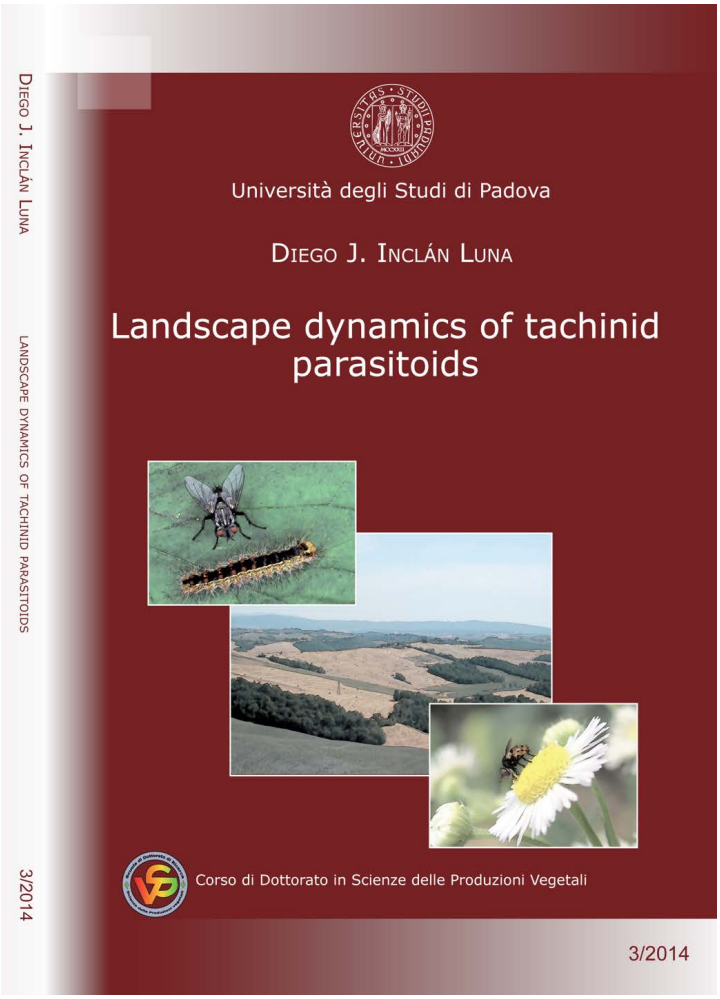

Figure 2. Cover of PhD thesis.

sity needs to consider the local farming system in relation to the agricultural management in the surrounding landscape.

In Chapters IV and V the spatial dynamics and movement of parasitoids between crop and non-crop habitats are evaluated (Inclán *et al*. 2015b, Inclán *et al*. 2016). These chapters show that the spillover of tachinid parasitoids are favored by the low contrast in habitat structure between the crop and non-crop habitats. The highest spillover of parasitoids to arable land was found from herbaceous semi-natural habitats, while woody structure reduced the exchange of individuals between arable crop and non-crop habitats. Finally, in the last two chapters the effects of different field margins to enhance farmland biodiversity are examined (Dainese *et al*. 2015, Inclán *et al*. 2016). The results from these chapters demonstrate that the positive effect of field margins to enhance the diversity of tachinids was related to the type and complexity of these semi-natural habitats.

This research provides new insights into the consequences of landscape changes on the diversity of a key functional group that has been long overlooked in ecological and conservation studies. The results will provide guidelines to implement conservation measures to halt or reduce biodiversity loss of this important group of parasitoids.

Full text link to thesis (Fig. 2):
http://paduaresearch.cab.unipd.it/7731/1/Inclán_PhD_thesis_final.pdf

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Figure 1. Looking east towards the Argentinian border in the El Volcán River Valley, east of Santiago.

Tachinid collecting in temperate South America. Expeditions of the Phylogeny of World Tachinidae Project. Part III: Chile

by John O. Stireman III[1], James E. O'Hara[2], Pierfilippo Cerretti[3] and Diego J. Inclán[4]

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Introduction

As readers of this newsletter are likely familiar, we and our collaborators have been working for the past several years on a family-wide phylogeny of the Tachinidae of the world (see Stireman *et al*. 2013, Winkler *et al*. 2014). We have already published a morphological analysis of tachinid phylogenetics (Cerretti *et al*. 2014), as well as an initial molecular phylogenetic framework for the family (Winkler *et al*. 2015). An in-depth molecular phylogenetic analysis of the Phasiinae led by Jeremy Blaschke (originally at University of Tennessee and now at Union University, TN) and Kevin Moulton (U. of Tenn.) is currently being prepared for publication, and we are making a final push to obtain the remaining sequences for our family-wide molecu-

Figure 2. The six circles numbered A to F correspond to the areas discussed in the text where tachinids were collected in Chile during our December 2015 expedition.

lar phylogenetic analysis. This analysis will include nearly all recognized tribes of Tachinidae and a significant, if still small, fraction of genera (ca. 250–300).

As part of this NSF funded project we have undertaken several expeditions to collect tachinids including South Africa (Cerretti *et al*. 2013), Australia (O'Hara *et al*. 2014), Ecuador and Costa Rica. In addition to material collected on these trips and from our home regions, many helpful collaborators sent us specimens from around the world. This past December, we completed our final grant-funded expedition to collect tachinids for the phylogeny project and this time we travelled to the South American country of Chile.

Why Chile?

Initially we were planning major collecting trips to each major biogeographic realm (that we did not live in), and thus we planned to travel to the Oriental Region—somewhere in Southeast Asia, possibly Thailand or Borneo. However, we received a fair amount of alcohol-preserved material from Martin Hauser and Steve Gaimari (both with California Department of Food and Agriculture, Sacramento) from their various jaunts in Thailand, Vietnam, China, and Borneo (Malaysia), which lessened our need to travel there. This, along with logistical issues and our shrinking grant funds forced us to look a little closer to home.

Chile seemed like a good choice for several reasons:

1) We had no material from temperate South America and there are many endemic taxa there.
2) The tachinid fauna of the region has received a relatively large amount of attention. This is particularly due to Raúl Cortés (1915–2001) who worked on the tachinids of Chile from the mid 1940s to the 1990s, and his student Christian González who has published on Tachinidae as recently as 2004. We should also note the importance of Aldrich's (1934) seminal treatment of the tachinids of Patagonia and South Chile.
3) Logistics. Despite a checkered past (e.g., Pinochet), Chile is one of the most stable, safe, economically thriving, and well-managed countries in South America. The country also has an excellent highway system with generally well-maintained roads.
4) It was unlikely to rain a lot given that we were entering the dry summer season (see below).
5) It seemed like an interesting place to collect that none of us had been to.

Chile is a long narrow country on the western margin of South America, with the Pacific Ocean to the west and the long chain of the Andes Mountains forming a natural border with Bolivia and Argentina to the east. Despite being nearly 4,300 km long and spanning over 38 degrees of latitude, the average width is less than 180 km. Due to this great length, Chile encompasses a variety of biomes and habitats. The northern half or so is marked by aridity and is home to the Atacama Desert, the driest non-polar desert in the world. There is however a gradient of increasing precipitation to the south, from the Mediterranean-like scrub in the middle region (e.g., Santiago Metro. Region) to the increasingly moist and temperate forest (e.g., *Nothofagus* and *Araucaria*) regions of the south.

Our collecting took place in Central Chile from slightly north of Santiago down to the border between the Los Ríos and Los Lagos regions (Fig. 2). The central valley (Valle Central) and most of the flatter low-lying areas are dominated by agriculture (e.g., vineyards, orchards) and forestry (pine and *Eucalyptus* plantations). The roadsides are colorfully adorned with flowering plants but many of them are introduced species from other continents. Such habitats are unlikely to host a high diversity of tachinid species, so most of our collecting was focused along the western slope of the Andes or in other mountainous areas (e.g., P.N. Nahuelbuta).

Early in our trip, and before leaving the Santiago area, we visited Dr. Christian González at the Universidad Metropolitana de Ciencias de la Educación (UMCE) (Fig. 3). We discussed places to collect in Chile and took a quick look at the tachinids in the collection. John returned at the end of the trip to examine the collection more closely. Below, some of the major sites we visited are briefly described and a list is given of some of the taxa collected. These lists of taxa include specimens that the first author (John) collected, as well as some specimens collected by Diego and retained by John. All of them were collected by hand netting. It should also be noted that these identifications, particularly those of species, are preliminary. They represent initial identifications based primarily on the available literature and brief notes made from specimens housed in UMCE and the Museo Nacional de Historia Natural (MNHN), and some will likely need to be corrected after more thorough examination. Finally, we have not yet had the opportunity to closely examine similar species in the same genera across sites to determine precisely how many species were collected. A more comprehensive, updated list of all specimens collected by our group will be provided on the Tachinidae Resources web page (http://www.nadsdiptera.org/Tach/WorldTachs/TachPhylo/Phylohome.html).

Figure 3. Meeting with Christian González at UMCE. Left to right: John Stireman, Christian González, Pierfilippo Cerretti, Jim O'Hara and Diego Inclán.

A. Santiago Area (Figs. 4–8)

Several sites were visited in the vicinity of Santiago (Región Metropolitana de Santiago) both at the beginning of our expedition and at the end. This central region of Chile has a classic "Mediterranean" climate with precipitation predominantly falling between May and September, and a long dry summer starting in October and extending to April. After visiting several lower elevation sites it became clear that our December timing was a bit late to catch the spring flush of vegetation and we focused our collecting at higher elevations in the Andes Mountains east of Santiago (Fig.1). Across this whole region, from low to high elevations, an outbreak of noctuid caterpillars was occurring (probably Heliothinae). These caterpillars were everywhere and seemed to feed on everything. This may explain the large numbers of female *Archytas* cf. *scutellatus* observed (many more were seen than collected).

7 December, gas station west of Santiago

After picking up our rental car and driving west from Santiago, Diego and John decided to stop at a gas station to get some food and water for their anticipated first day of collecting. When they returned to the car, it would not start. They collected flies in a field behind the gas station while waiting for the rental car company to bring them a new vehicle, and luckily found a couple of *Leucostoma* visiting Asteracaeae.

Phasiinae
  Leucostomatini: *Leucostoma* sp. [2 males]

7 December, "Cuesta lo Prado", ridge west of Santiago

We collected several tachinids from a dry ridge top with scrubby Mediterranean-type vegetation west of Santiago off the Cuesta lo Prado road. Most were collected while visiting flowering trees (possibly *Quillaja saponaria* Molina).

Dexiinae
  Dexiini: Unknown genus sp. [1 male, 1 female]
  Voriini: *Ateloglutus* nr. *nitens* Aldrich [1 female]
Exoristinae
  Goniini: *Chaetocraniopsis argenticeps* Aldrich or *C. similis* (Townsend) [2 males, 1 female]
Tachininae
  Leskiini: *Clausicella* sp. [4 males]
  Tachinini: *Archytas* cf. *scutellatus* (Macquart) [1 male, 4 females]

8, 19 December, road to Lagunillas ski area, Valle de Maipo (Figs. 4–8)

This collecting took place near the road up to the Lagunillas ski area, mostly at higher elevations (over 2000 m). The vegetation generally consisted of low grasses, shrubs, and herbs, but on our first visit to the area most of the tachinids were collected on low shrubs or on the ground (Figs. 4, 5). We returned to the area on Dec. 19, having realized that the area was relatively good collecting compared to some other sites we visited at which we found few or no tachinids. On this second visit we found a few small patches of an unknown species of flowering herb, which were particularly attractive to tachinids (Figs. 7, 8). This was the only site where we were able to collect *Ruiziella* (Fig. 40, 41), one of several tachinid genera in Chile with an extremely pronounced lower facial margin.

8 December (Figs. 4, 5)

Dexiinae

Voriini: ?*Prosopochaeta* sp. [1 male]

Exoristinae

Eryciini/Goniini: *Lespesia* R.-D. (Eryciini) or possibly nr. *Blepharipa* Rondani (Goniini) sp. [1 male]

Goniini: *Chaetocraniopsis* sp. [1 male]

Phasiinae

Cylindromyini: *Cylindromyia apicalis* (Bigot) [1 male]

Tachininae

Tachinini: *Archytas* cf. *scutellatus* (Macquart) [2 females]

Leskiini: *Clausicella* sp. [1 female]

Megaprosopini: *Trichoceronia* ?*thermitana* Cortés [1 male]

?Myiophasiini: "*Myiophasia*" [*sensu* Aldrich (1934)] ?nr. *antennalis* (Aldrich) [1 female]

Polideini: *Comops* cf. *ruficornis* Aldrich [1 male]

Tachinini: *Ruiziella* sp. [1 male]

Figure 4. Dry scrubland covers the mountains on the road to the Lagunillas ski area, Valle de Maipo (east of Santiago) (Dec. 8).

(Along a stream at lower elevation (Estero el Saucé, 1460 m)) (Fig. 6)

Exoristinae

Winthemiini: *Winthemia* sp. [1 male]

Figure 5. A slightly more lush area was discovered just over the hill from the place shown in Fig. 4. The yellow spot in the center was relatively good for tachinids on Dec. 8 but not on Dec. 19.

Figure 6. Jim is hoping for a tachinid here at Estero el Saucé, near San Jose del Maipo (east of Santiago). This was a poor collecting site.

19 December (Figs. 7, 8)

Dexiinae

Voriini: *Voria* n. sp. (not *ruralis* (Fallén)) [1 male, 2 females]

Voriini: *Myiochaeta* cf. *marnefi* Cortés [1 male]

Exoristinae

Eryciini/Goniini: *Lespesia* R.-D. (Eryciini) or possibly nr. *Blepharipa* Rondani (Goniini) sp. [2 females]

Goniini: *Chaetocnephalia americana* (Schiner) [3 females]

Goniini: *Chaetocraniopsis* sp. A [1 female]

Goniini: *Chaetocraniopsis* sp. B (short palpi) [2 males, 4 females]

Goniini: *Chaetocraniopsis* sp. B (long palpi) [5 males, 3 females]

Goniini: *Chaetocraniopsis* sp. C [3 males]

Phasiinae

Cylindromyini: *Cylindromyia* nr. *apicalis* (Bigot) sp. 1 [7 males]

Cylindromyini: *Cylindromyia* nr. *apicalis* (Bigot) sp. 2 [2 males]

Gymnosomatini: *Ectophasiopsis* cf. *arcuata* (Bigot) [1 male]

Tachininae

Leskiini: *Epicoronimyia* sp. [2 males]

Leucostomatini: prob. nr. *Labigastera* Macquart (a Palaearctic genus) [2 males, 3 females]

?Myiophasiini: ?"*Myiophasia*" [*sensu* Aldrich (1934)] sp. [1 female]

Polideini: *Comops ruficornis* Aldrich [1 male]

Tachinini: *Archytas* cf. *scutellatus* (Macquart) [5 females]

Tachinini: *Ruiziella* ?*luctuosa* Cortés [2 males]

Figure 7. We returned on Dec. 19 to the place on the road to the Lagunillas ski area first visited on Dec. 8. A variety of tachinids were attracted to a few patches of a ground-hugging flowering plant being watched here by John and Pierfilippo.

Figure 8. Close-up of one of the plants in Fig. 7 that tachinids found highly attractive.

20 December, mountains east of Santiago, Tres Valles and Valle Nevado (Figs. 9–11)

Another road to the popular ski areas comprising the "Tres Valles" provided us access to higher elevation sites in the vicinity of Santiago. We collected at two main sites in this area, the lower (1820 m) Mirador de Los Tres Valles (Figs. 9, 10), which consists of a ridge of several low peaks providing a popular overlook of the valley and a higher elevation site (ca. 2400 m) along the Valle Nevado road (Fig. 11). The Tres Valles site was a relatively dry ridge with small trees and low shrubs and even some columnar cacti (*Echinopsis chiloensis*). Tachinids were collected from large shrubs on the hilltops as well as on the ground along the ridge. The higher elevation site was treeless and the vegetation consisted of low-growing grasses and shrubs. This area was very windy and seemed bereft of tachinids. However, Pierfilippo found that sweeping some low-growing blooming species of *Euphorbia* yielded an array of small-bodied tachinids.

Mirador de Los Tres Valles (Figs. 9, 10)

Dexiinae
- Dexiini: *Psecacera* ?*robusta* Aldrich [2 males]
- Voriini: *Ateloglutus ruficornis* Aldrich [5 males]
- Voriini: *Voria* n. sp. (not *ruralis* (Fallén)) [1 female]

Exoristinae
- Blondeliini: Unknown genus sp. [1 male]
- Blondeliini: *Incamyia picta* Cortés [1 male]
- Blondeliini: *Poliops* (cf. *Admontia* B. & B.) cf. *striatus* Aldrich [3 males]
- Blondeliini: *Myiopharus* sp. [1 male]
- Goniini: *Macropatelloa* (cf. *Patelloa* Tnsd.) *tanumeana* Townsend [1 male]
- Goniini: *Chaetocraniopsis* ?*argenticeps* Aldrich [2 males, 1 female]
- Goniini: *Chaetocnephalia* ?*americana* (Schiner) [1 female]

Phasiinae
- Cylindromyini: *Cylindromyia* nr. *apicalis* (Bigot) [1 male]
- Cylindromyini: *Cylindromyia* ?*pirioni* (Townsend) [1 female]

Tachininae
- Graphogastrini: *Clastoneura* (cf. *Graphogaster* Rondani) sp. [2 males]
- Graphogastrini: *Camposodes* (cf. *Phytomyptera* Rondani) nr. *evanescens* Cortés [6 males]
- Leskiini: *Clausicella* sp. [1 male, 1 female, possibly different species]
- Tachinini: *Archytas* cf. *scutellatus* (Macquart) [4 females]

Figure 9. View eastward into the high Andes from a popular stop along the road, Mirador de Los Tres Valles.

Figure 10. Pierfilippo on path to hilltop at Mirador de Los Tres Valles.

Calle Valle Nevado (Fig. 11)

Dexiinae
- Voriini: ?*Myiochaeta* sp. [1 male]
- Voriini: *Aldrichiopa coracella* (Aldrich) [2 females]

Exoristinae
- Blondeliini: *Embiomyia* cf. *australis* Aldrich [3 males]
- Blondeliini: *Poliops* (cf. *Admontia* B. & B.) sp. [2 males]

Phasiinae
- Leucostomatini: *Leucostoma* nr. *aterrimum* (Villers) [1 male]

Tachininae
- Graphogastrini: *Campsodes* (cf. *Phytomyptera* Rondani) sp. [1 male]

Figure 11. Low shrubs and grasses along Valle Nevado road, where we collected from *Euphorbia* flowers.

21 December, Reserva Nacional Río Clarillo (Fig. 12)

The only protected area that we visited in the Región Metropolitana de Santiago was Reserva Nacional Río Clarillo (Fig. 12). This reserve comprises over 1300 ha and ranges in elevation from 850 and 3500 m. However, we only collected in the lower more accessible part of the reserve, consisting mostly of sclerophyllous forest and scrub. This is a popular park due to its proximity to Santiago and has a well developed trail system with an arboretum displaying a wide diversity of Chilean flora. Most of our collecting took place along a short interpretive nature trail near the entrance to the park (Sendero Quebrada Jorquera). For a more complete assessment of the tachinid fauna of this reserve see González (1992).

Dexiinae
- Dexiini: *Dasyuromyia* (or *Psecacera*?) sp. [2 females]
- Voriini: *Voria* n. sp. (not *ruralis* (Fallén)) [1 female]

Exoristinae
- Blondeliini: *Myiopharus* cf. *pirioni* Aldrich [7 males]
- Blondeliini: *Poliops* (cf. *Admontia* B. & B.) sp. [1 female]
- Blondeliini: (Unplaced to genus) ?*negrensis* Aldrich [5 males, 3 females]

Phasiinae
- Leucostomatini: *Leucostoma* sp. [1 male]

Tachininae
- Siphonini: *Siphona* (*Pseudosiphona*) sp. [1 male]

Figure 12. The Reserva Nacional Río Clarillo southeast of Santiago.

B. Valle Las Trancas and Reserva Nacional Nuble (Figs. 13, 14)

Hoping to catch more spring-like conditions in the mountains to the south of Santiago, we headed for Valle Las Trancas (Figs. 13, 14), an attractive mountain valley popular with skiers (Termas de Chillán) and for other outdoor sports. This represented a major change from the drier, scrubbier areas to the north, with tall forests of southern beech (*Nothofagus* spp.) and much cooler weather. At the highest elevations around the ski resort, spring was just beginning, and although flies were in abundance, we found no tachinids. Extensive searching at slightly lower elevations in the "Shangri-La" valley (Fig. 13) resulted in only a few species of tachinids collected. This area is known for good collecting and was recommended to us, and our relatively poor collecting was probably due to a late, wet spring with relatively cool temperatures in this area. We had somewhat better luck in woodlands and open grassy areas at lower elevations along the road to the Reserva Nacional Nuble. Still, tachinids were not abundant and each specimen took some collecting effort.

10 December, Valle Shangri-La, 1750 m (Fig. 13)

Exoristinae
- Goniini: *Chaetocraniopsis* sp. [1 female]

Tachininae
- Polideini: *Lypha* nr. *orbitalis* Cortés [7 males]
- ?Myiophasiini: "*Myiophasia*" [*sensu* Aldrich (1934)] ?nr. *antennalis* (Aldrich) [1 male]
- Tachinini: *Deopalpus* ?*pulchriceps* (Aldrich) [1 male]

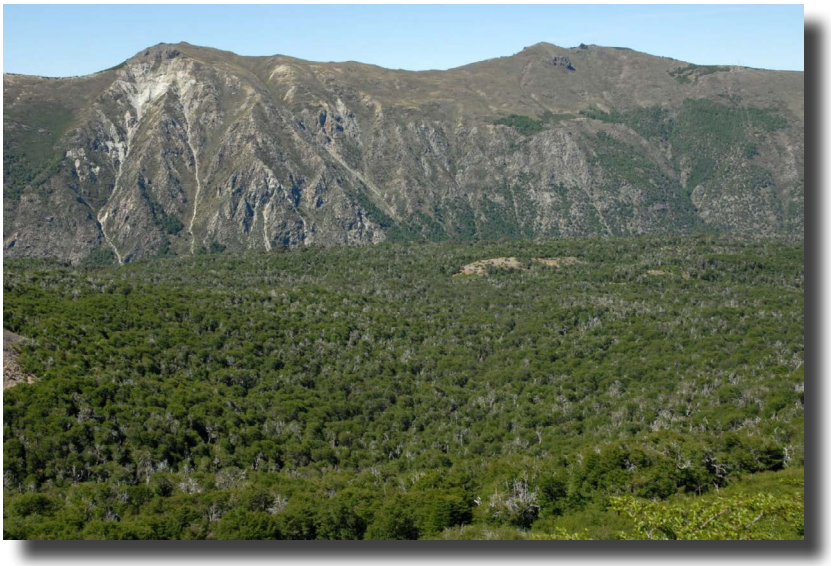


Figure 13. *Nothofagus* forest in the Shangri-La Valley east of Chillán.

10 December, Reserva Nacional Nuble, 650 m

Dexiinae
- Voriini: *Prosopochaeta* ?*anomala* Aldrich [1 male]
- Voriini: ?*Nothovoria* sp. [1 female]
- Voriini: Unknown sp. (damaged) [1 male]

Exoristinae
- Goniini: *Macropatelloa* (cf. *Patelloa* Tnsd.) *tanumeana* Townsend [1 male, 1 female]
- Goniini: *Macropatelloa* (cf. *Patelloa* Tnsd.) nr. *tanumeana* Townsend [1 male]

Tachininae
- Polideini: *Lypha* nr. *orbitalis* Cortés [1 male]
- Siphonini: *Siphona* (*Siphona*) sp. [1 male]
- Tachinini: *Deopalpus* sp. [3 females]

Figure 14. A windy ridge above Valle Las Trancas, looking towards Nevados de Chillán.

C. Río Maule (Figs. 15, 16)

In the Maule Región, a major road (Ruta 115) travels up the canyon of the Río Maule and eventually crosses the spine of the Andes over a 2500 m pass into Argentina. We sought to do some high elevation collecting along this road, stopping at about 2200 m. At this elevation (and latitude) patches of snow still remained in sheltered areas and the weather was cool and windy (Fig. 15). After an hour or so of hunting, only a single tachinid was collected (between four people), and we decided to try our luck at lower elevations along the Río Maule (Fig. 16). Some of us had moderate luck collecting here, particularly among the blossoms of some flowering *Baccharis* shrubs, but John had very limited success (below).

18 December, Río Maule, 1370 m (Fig. 16)

Dexiinae
  Dexiini: *Psecacera chilensis* Bigot [1 male]
Exoristinae
  Goniini: *Macropatelloa* (cf. *Patelloa* Tnsd.) *tanumeana* Townsend [1 male]
Tachininae
  Siphonini: *Siphona* (*Siphona*) sp. [1female]

Figure 15. Scenic but cool highlands close to Laguna del Maule. No tachinids here.

Figure 16. Lower elevation collecting site along the Río Maule.

D. Parque Nacional Nahuelbuta (Figs. 17–23)

One of the few places we visited that was not part of the Andes Mountain range was Parque Nacional Nahuelbuta, which is located in one of Chile's coastal mountain ranges. This park protects about 7000 ha of the highest part of Cordillera de Naheulbuta, and its main function and claim to fame is the protection of an old growth forest of monkey puzzle trees (*Araucaria araucana*). It is one of the few areas that such trees persist in numbers outside of the main Andean range. Extensive pine plantations surround the park making it somewhat of an island of native Chilean vegetation. At the highest points, rocky outcrops allow excellent views of the surrounding *Araucaria* forest. It is on and around these outcrops where we focused much of our collecting (Figs. 17–20). We visited Nahuelbuta on two occasions. During our first visit we focused most of our collecting around a high point, Cerro Anay (Fig. 19). We later returned to the park after encountering cold, wet weather elsewhere. However, the cold weather we were fleeing caught up to us on Cerro Anay, forcing us to retreat to a more sheltered, lower elevation site that consisted of an open field and wetland and forest edges (Figs. 21–23). Prominent sunlit tree trunks in this area harbored many robust-bodied *Psecacera* individuals. Overall, Nahuelbuta was probably our best major collecting area in terms of numbers and diversity of Tachinidae. Some additional specimens from pan traps have yet to be examined.

11–12 December, Cerro Anay and overlook (1300 m) (Figs. 17–20)

Dexiinae
- ?Dexiini: *Morphodexia*-like genus [6 males] (ground resters)
- Dexiini: *Psecacera* nr. *chilensis* Bigot [1 male]
- Dexiini: Unknown genus, keys to *Prosopochaeta* Macquart [1 female]
- ?Dufouriini: *Oligooestrus* ?*oestroideus* Townsend [1 male]
- Voriini: ?*Neochaetoplagia* sp. [20 males, 1 female]
- Voriini: ?*Nothovoria* sp. [1 male, 1 female]
- Voriini: *Opsophagus* ?*nigripalpis* Aldrich [2 males, 1 female]
- Voriini: *Opsophagus* sp. [1 male]

Exoristinae
- Blondeliini: (Unplaced to genus) *negrensis* Aldrich [2 males]
- ?Exoristiini: (Unplaced to genus) *bullocki* Aldrich [1 male]
- Goniini: *Chaetocnephalia* sp. (not *americana* (Schiner)) [1 male]
- Goniini: *Chaetocraniopsis* nr. *similis* (Townsend) [1 male, 3 females]
- Goniini: *Macropatelloa* (cf. *Patelloa* Tnsd.) *tanumeana* Townsend [1 male]
- Goniini: *Macropatelloa* (cf. *Patelloa* Tnsd.) nr. *tanumeana* Townsend [1 female]

Figure 17. John, Pierfilippo and Diego hunt for tachinids on Piedra del Águila in Parque Nacional Nahuelbuta.

Tachininae

Dexiini: *Morphodexia* sp. [1 male, 2 females]
Graphogastrini: *Clastoneura* (cf. *Graphogaster* Rondani) ?*brevicornis* Aldrich [2 males]
Polideini: *Lypha* nr. *corax* Aldrich [1 male]
Polideini: *Lypha* nr. *triangulifera* [2 males]
Polideini: *Lypha* sp. [1 female]
Polideini: ?*Telodytes* sp. (not *analis* Aldrich) [2 males]
Polideini: *Dolichostoma* cf. *puntarenensis* (Townsend) [1 female]
Tachinini: *Deopalpus* sp. 1 [1 male]
Tachinini: *Deopalpus* sp. 2 [7 males, 1 female]

Figure 18. View of the picturesque *Aracauria* forest from atop Piedra del Águila.

Figure 19. Diego climbs a tree in pursuit of an elusive tachinid that is not landing anywhere else.

Figure 20. Yellow pan traps were surprisingly effective at attracting tachinids along the trail to Cerro Anay.

17 December, lower site (1210 m) (Figs. 21–23)

Dexiinae
- ?Dexiini: *Morphodexia*-like sp. [1 male, 1 female]
- Dexiini: *Psecacera robusta* Aldrich [4 males, 2 females]
- Dexiini: *Psecacera* nr. *robusta* Aldrich [1 male]
- Dexiini: *Psecacera* sp. [1 male, 1 female]
- Voriini: ?*Neochaetoplagia* sp [6 males]
- Voriini: ?*Prosopochaeta* sp. [3 males]

Exoristinae
- Blondeliini: Unknown sp. (damaged) [1 male]
- Goniini: *Chaetocraniopsis* cf. *chilensis* Townsend [3 males, 1 female]

Tachininae
- Megaprosopini: *Trichoprosopus durvillei* Macquart [1 male]
- Polideini: *Dolichostoma* sp. [1 female]
- Tachinini: *Archytas* cf. *scutellatus* (Macquart) [1 female]
- Tachinini: *Peleteria* ?*filipalpis* (Rondani) [5 males]

17 December, Cerro Anay (1300 m)

Exoristinae
- Blondeliini: *Embiomyia* cf. *australis* Aldrich [1 male]
- Goniini: *Chaetocraniopsis* cf. *chilensis* Townsend [3 males]

Figure 21. Lush but cold lower site in Parque Nacional Nahuelbuta.

Figure 22. *Dasyuromyia nervosa* (Walker), a species not collected by John, perches in the hollowed-out base of a dead shrub at the lower site.

Figure 23. Diego, John and Pierfilippo wish for warmer weather during a break for lunch at the lower site.

E. Parque Nacional Conguillío and surroundings (Figs. 24–27)

Parque Nacional Conguillío was one of the most visually striking areas we visited. Much of the park consists of dense forests of *Araucaria* and *Nothofagus* and beautiful, clear alpine lakes, but it is the snow-covered volcán Llaima towering above the surroundings at 3125 m that demands one's attention (Fig. 24). This is one of Chile's most active volcanoes, having erupted explosively as recently as 2008. The consequences of Llaima's activity is evident as large swaths of the ~60,800 ha park are covered by lava flows and ash fields creating an otherworldly landscape. Although most of the park where we collected is not that high in elevation (ca.1100–1300 m), we encountered frost on the ground on our first morning. We collected at several different sites in Conguillío and in the surrounding area over a couple of days (Figs. 25–27), despite getting not just one but two flat tires (on two different vehicles on the same day)! The sites where specimens were collected include the shores of Laguna Conguillío (mostly from low-growing flowering shrubs), a sun gap along a deep forest road, an unremarkable roadside (Ruta 955) to the east of the park, and a low, *Araucaria* covered pass near Laguna Icalma (also east of the park) (Fig. 27). This last site deserves special mention. Here, Pierfilippo discovered an open area with very low-growing vegetation in which tachinids were unusually abundant. He alone collected at least 100 tachinids here in less than an hour (and could have collected many more) that were primarily found on an unidentified prostrate mat-forming flowering plant. Although diversity was relatively low, the density of tachinids was extraordinary.

15 December Conguillío – Forest road, 1100 m

Dexiinae
  Dexiini: *Notodytes* ?*variabilis* Aldrich [1 female]
  Dexiini: *Psecacera* sp. [1 female]
Tachininae
  Siphonini: *Siphona* (*Siphona*) sp. [1 male]

Figure 24. Snow covered volcán Llaima in Parque Nacional Conguillío.

15 December Conguillío – Laguna Conguillío, 1120 m (Fig. 26)

Dexiinae
- Dexiini: *Dasyuromyia* cf. *sarcophagidea* (Bigot) [1 male]
- Voriini: *Alexogloblinia shannoni* (Aldrich) [1 female]
- Voriini: *Ateloglutus* sp. [1 female]
- Voriini: ?*Neochaetoplagia* sp. [4 males]
- Voriini: *Opsophagus nigripalpis* Aldrich [3 males]

Exoristinae
- Goniini: *Chaetocraniopsis* sp. [7 males, 13 females]

Tachininae
- Leskiini: *Clausicella* sp. [1 male]
- Leskiini: *Epicoronimyia* sp. 1 [4 females]
- Leskiini: *Epicoronimyia* sp. 2 [2 females]
- Polideini: *Comops* cf. *ruficornis* Aldrich [1 male]
- Polideini: *Lypha* prob. *corax* Aldrich [1 male]
- Tachinini: *Deopalpus australis* (Townsend) [1 female]

Figure 25. Laguna Captrén near entrance to Parque Nacional Conguillío.

Figure 26. There was relatively good collecting here close to Laguna Conguillío.

15 December. Pass west of Laguna Iclama, 1340 m (Fig. 27)

Dexiinae
- Voriini: *Ateloglutus ruficornis* Aldrich [4 males, 1 female]
- Voriini: *Prosopochaeta* cf. *nitidiventris* Macquart [1 male]

Exoristinae
- Blondeliini: (Unplaced to genus) *negrensis* Aldrich [1 male, 1 female]

Tachininae
- Leskiini: *Spathipalpus philippii* Rondani [1 male, 5 females]
- Megaprosopini: *Trichoprosopus* sp. 1 [24 males, 8 females] (could be >1 sp.)
- Megaprosopini: *Trichoprosopus* sp. 2 [2 males, 1 female]

Figure 27. John and Diego search for ground-resting tachinids at the pass west of Laguna Iclama.

16 December. Ruta 955 (south of Punta Negra), 1108m

Dexiinae
- Dexiini: *Dasyuromyia* cf. *sarcophagidea* (Bigot) [1 male]
- Voriini: ?*Opsophagus* sp. [1 male]
- Voriini: *Prosopochaeta anomala* Aldrich [3 males]

Exoristinae
- Blondeliini: *Embiomyia* possibly *australis* Aldrich [1 male]
- Blondeliini: *Embiomyia* cf. *australis* Aldrich [1 male]
- Eryciini/Goniini: nr. *Siphosturmia* Coq. (Eryciini) or possibly nr. *Atactosturmia* Tnsd. sp. (Goniini) [1 male]

Tachininae
- Megaprosopini: *Trichoprosopus* sp. 1 [1 male]
- Megaprosopini: *Trichoprosopus* sp. ?1 [4 males, 1 female]
- Megaprosopini: *Trichoprosopus* sp. 2 [1 female]
- ?Myiophasiini: ?"*Myiophasia*" [*sensu* Aldrich (1934)] sp. [1 male]
- Polideini: *Dolichostoma puntarenensis* (Townsend) [4 males]
- Siphonini: *Siphona* (*Siphona*) sp. 1 [1 male, 3 females]
- Siphonini: *Siphona* (*Siphona*) sp. 2 [3 males, 2 females]
- Siphonini: *Siphona* (*Siphona*) sp. 3 [1 female]

16 December, Town of Curacautin (while getting flat-tire fixed!)

Tachininae
- Tachinini: *Peleteria filipalpis* (Rondani) [1 female]

F. Parque Nacional Puyehue (Figs. 28, 29)

As we ventured farther south, the weather grew cooler and wetter. We only lost one full day of collecting due to rain but on several days cool and/or overcast weather hampered our collecting efforts. This weather is the reason why we did not press our collecting further south. Parque Nacional Puyehue was the most southerly park we visited. This park, consisting of more than 100,000 ha, is one of the most popular national parks in Chile, with placid lakes and ponds, rushing streams and waterfalls, lush temperate rain forest, hot springs, and snow-covered volcanos. Part of the park is also covered with relatively desolate lava fields stemming from a recent (1960) major eruption of volcán Puyehue. The day we visited was relatively cool with only intermittent sun. These less than ideal conditions limited our success in an otherwise very promising area (especially at site in Fig. 28), but we were able to collect some interesting taxa. Among these was the striking *Pelycops darwini* (Figs. 34, 35), a robust dexiine the holotype of which was collected by Charles Darwin in Tierra del Fuego during his worldwide voyage aboard the *Beagle*. For some reason, these flies found the top of Jim's silver-colored rental car an ideal place to perch (Fig. 29).

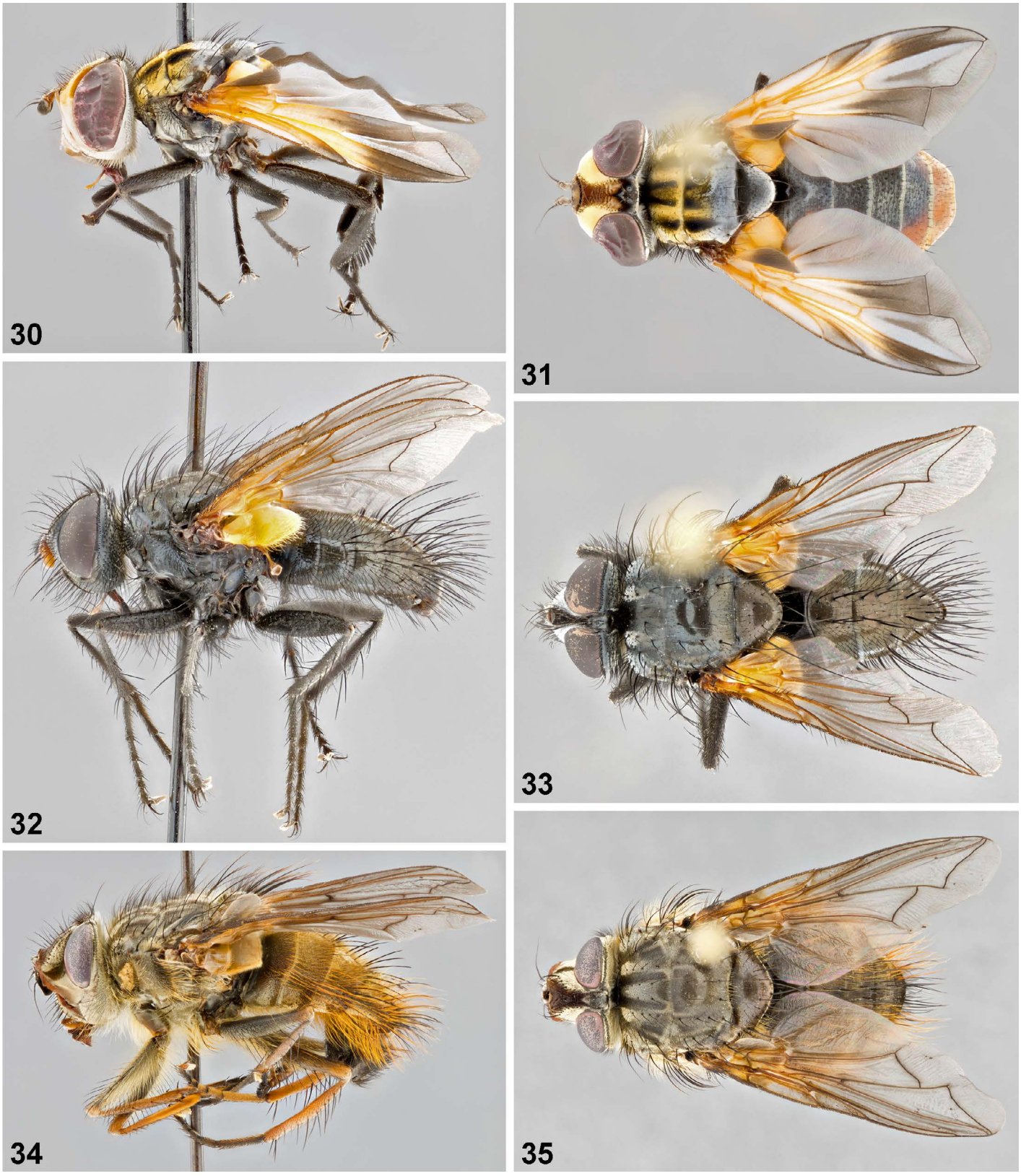
Dexiinae
- Dexiini: *Dasyuromyia* nr. *aperta* Aldrich [1 female]
- Dexiini: *Morphodexia nigra* Aldrich [1 male]
- Dexiini: *Pelycops darwini* Aldrich [2 males, 1 female]
- Palpostomatini: *Xanthobasis* sp. [1 male]
- Voriini: *Opsophagus* sp. [1 male]
- Voriini: *Phaeodema* ?*mystacina* Aldrich [2 males]

Exoristinae
- Blondeliini: *Admontia* nr. *pictiventris* Aldrich sp. 1 [2 males]
- Blondeliini: *Admontia* nr. *pictiventris* Aldrich sp. 2 [1 male]
- Blondeliini: *Admontia* nr. *pictiventris* Aldrich sp. 3 [1 male]
- Blondeliini: (Unplaced to genus) *negrensis* Aldrich [1 female]

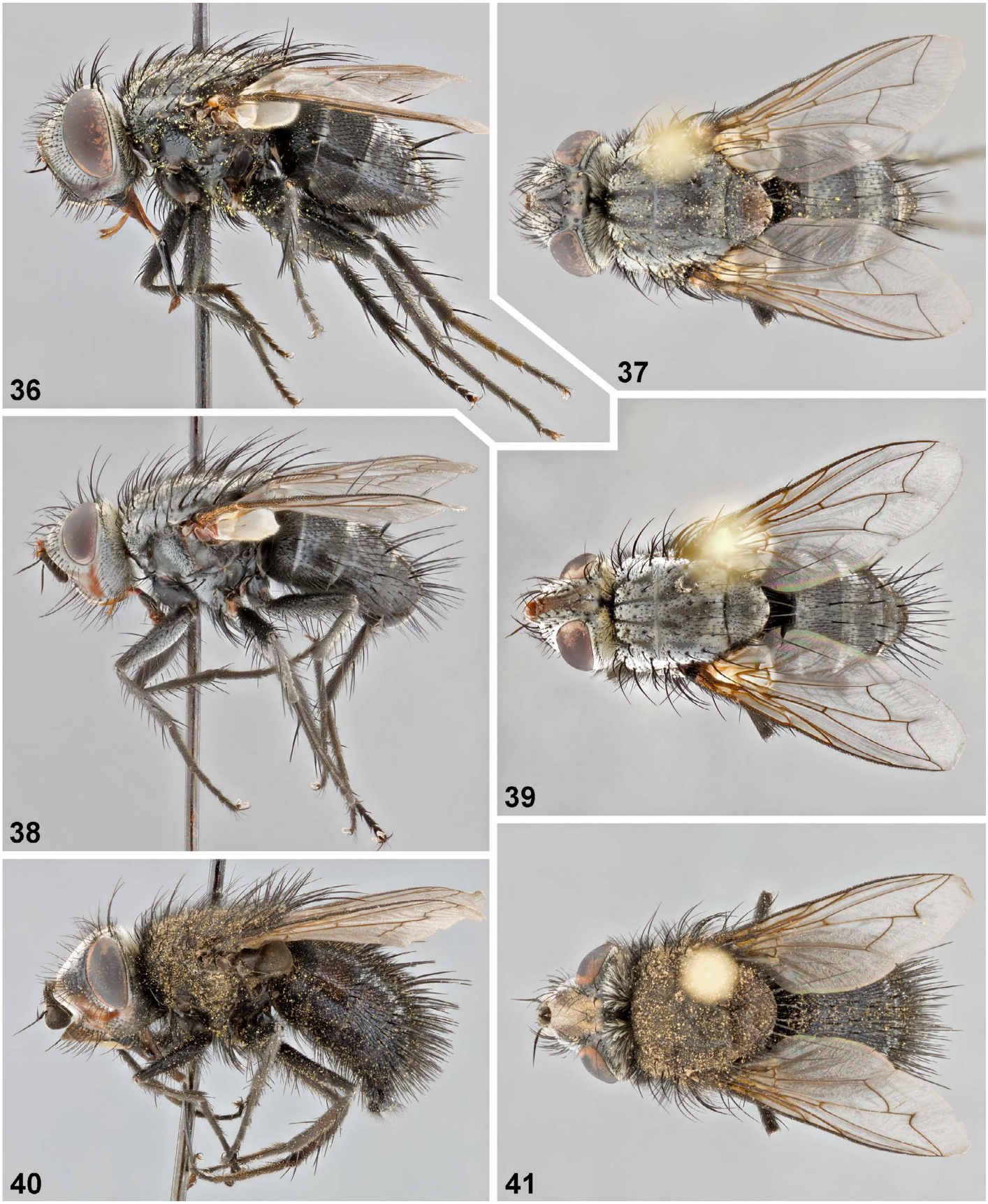
Tachininae
- Graphogastrini: *Phytomyptera atra* (Aldrich) [1 female]
- Tachinini: *Peleteria filipalpis* (Rondani) [11 females]

Figure 28. This sheltered grassy meadow in Parque Nacional Puyehue was a great spot for tachinids and especially *Peleteria*.

Figure 29. Diego, Pierfilippo and John eagerly await the arrival of the next *Pelycops darwini* Aldrich on the roof of Jim's car, which was the only place these flies were seen.



Figures 30–35. Representative tachinids from Chile. **30–31**. *Ectophasiopsis arcuata* (Bigot) (Phasiinae, Gymnosomatini) (CNC487602). **32–33**. *Chiloclista bicolor* Townsend (Dexiinae, Voriini) (CNC487550). **34–35**. *Pelycops* nr. *darwini* Aldrich (Dexiinae, Dexiini) (CNC487520). All specimens were collected by Jim on this trip and are housed in the Canadian National Collection of Insects in Ottawa.



Figures 36–41. Representative tachinids from Chile. **36–37**. *Chaetocraniopsis argenticeps* Aldrich (Exoristinae, Goniini) (CNC487624). **38–39**. *Trichoprosopus* sp. (Tachininae, Megaprosopini) (CNC487471). **40–41**. *Ruiziella* sp. (Tachininae, Tachinini) (CNC487659). All specimens were collected by Jim on this trip and are housed in the Canadian National Collection of Insects in Ottawa.

General discussion of the fauna

Numbers. Overall, the tachinids hand-collected by John (including some from Diego) amount to some 425 specimens. Assuming that each member of our expedition collected at least this many specimens (a conservative estimate, as Pierfilippo probably collected twice as many), we probably collected on the order of 2000 tachinids. It is too early to tell how many species this represents, as specimens need to be carefully compared between sites and collectors, but a conservative estimate for the species represented in the lists above is 90 species. All told, it is likely that well over 100 species were collected (examples are shown in Figs. 30–41). This is a decent number, but given the effort put forth and the number of sites visited, this is not exceptionally high. In general, it appeared that many species were widely distributed, being found at several different sites across a variety of elevations and habitats. For example, *Archytas* nr. *scutellatus*, *Chaetocraniopsis* spp. (Figs. 36, 37), and unplaced blondeliine *negrensis* Aldrich were found at many different sites. This moderate number of species may in part reflect a relatively low diversity of southern temperate Neotropical tachinids relative to the enormous richness in the northern, more tropical Andes (e.g., see Stireman *et al*. 2009). This is supported by cursory examination of museum collections, which suggest that we collected a good fraction of the available genera. On the other hand, we collected over only a very short time period, and we were told that the Chilean spring of 2015 was unusually wet and the weather we experienced, unusually cool. If the Chilean tachinid fauna tends to be highly seasonal (e.g., as suggested by González 1992), then we may have only captured a small part of it.

Composition. Overall, the composition of the tachinids we collected was quite different from what we have experienced in other parts of South America and elsewhere. Again, this may reflect in part the limited duration of our collecting and perhaps unusual weather, but species lists (e.g., see Cortés and Hichins 1969) and museum specimens suggest that our observations were fairly reflective of the fauna.

One unique feature was the frequent occurrence of *Dasyuromyia*-group tachinids among the dexiines. We caught a number of different species and genera of this group (*Dasyuromyia*, *Notodytes*, *Pelycops*, *Psecacera*), which appears to fill the ecological roles that more typical Dexiini fill elsewhere. Voriines were also unusually diverse and abundant. Previous collecting by John in Costa Rica and Ecuador (across elevations) has typically resulted in relatively few Voriini, so the large numbers of species and individuals, including a number of genera apparently endemic to the region (e.g, *Ateloglutus*, *Myiochaeta*, *Neochaeotoplagia*) was noteworthy. Goniini were well-represented, albeit by a few common and widespread genera such as *Chaetocraniopsis*, *Chaetocnephalia*, and *Macropatelloa*. Among the Tachininae, it was the Polideini and Megaprosopini that stood out in terms of relative abundance, with long series of *Lypha*, *Dolichostoma*, and especially *Trichoprosopus* (Figs. 38, 39) being collected (see above).

On the other hand, some groups seemed to be dramatically under-represented. Although *Archytas*, *Deopalpus* and *Peleteria* were abundant (if not especially rich), other tachinines such as those in former "Dejeaniini" and "Juriniini" (both included in the present-day Tachinini) were noticeably absent. This is surprising given the vast numbers of species in these groups known from the Ecuadorian and Peruvian Andes. The exoristine tribes Eryciini, Exoristini, and Winthemiini were also under-represented, and generic richness of Blondelliini, another hugely diverse group in the tropical Andes, was low. Finally, the more "typical" Dexiini (i.e., those with a haired arista) were represented by only a handful of specimens, with no representatives of common genera such as *Billaea*, *Ptilodexia*, or *Zelia*. One common theme of the fauna across genera and tribes was the possession of bright orange antennae. This was observed in species of Voriini (e.g., Ateloglutus), Polideini (e.g., *Comops*, *Lypha*), Tachinini (*Deopalpus*), and Myiophasiini

("*Myiophasia*" of Aldrich (1934) [a name currently in synonymy with *Gnadochaeta* Macquart], but note that we are unsure of this identification even at the tribal level). This trait, of course, is found in many taxa outside of this region, but it seemed particularly common among Chilean tachinids. It may be that this antennal coloration is related to another general theme running through the fauna, that of sarcophagid mimicry. Many species, including a number with orange antennae, appeared to be mimicking Sarcophagidae to varying degrees (e.g., *Macropatelloa* species, *Cylindromyia*, *Dolichostoma*/*Comops*, *Deopalpus*) and some were quite impressive in their similarity. The function of this mimicry (which has been noted in other taxa in other regions; e.g., see O'Hara *et al*. 2014) remains somewhat of a mystery.

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Tachinid Photo

Submitted by Qiang Wang

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This brightly coloured tachinid was photographed by Chao Wu on a tree trunk in the Xizang [or Tibet] Autonomous Region of China along a route from Bomi to Motuo (at 29°39′14.89″N 95°29′16.29″E) at 2000 m on 15 June 2014. According to Hiroshi Shima (pers. comm.), it appears to be a new species of *Austrophasiopsis* Townsend, a genus tentatively assigned to the Minthoini by Crosskey in his conspectus of Oriental Tachinidae (1973).

Tachinid Bibliography

Included here are references on the Tachinidae that have been found during the past year and have not appeared in past issues of this newsletter. This list has been generated from an EndNote 'library' and is based on online searches of literature databases, perusal of journals, and reprints or citations sent to me by colleagues. The complete bibliography, incorporating all the references published in past issues of *The Tachinid Times* and covering the period from 1980 to the present is available online at: http://www.nadsdiptera.org/Tach/WorldTachs/Bib/Tachbiblio.html. I would be grateful if omissions or errors could be brought to my attention.

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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Waiter! There's a tachinid in my soup!