



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

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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-

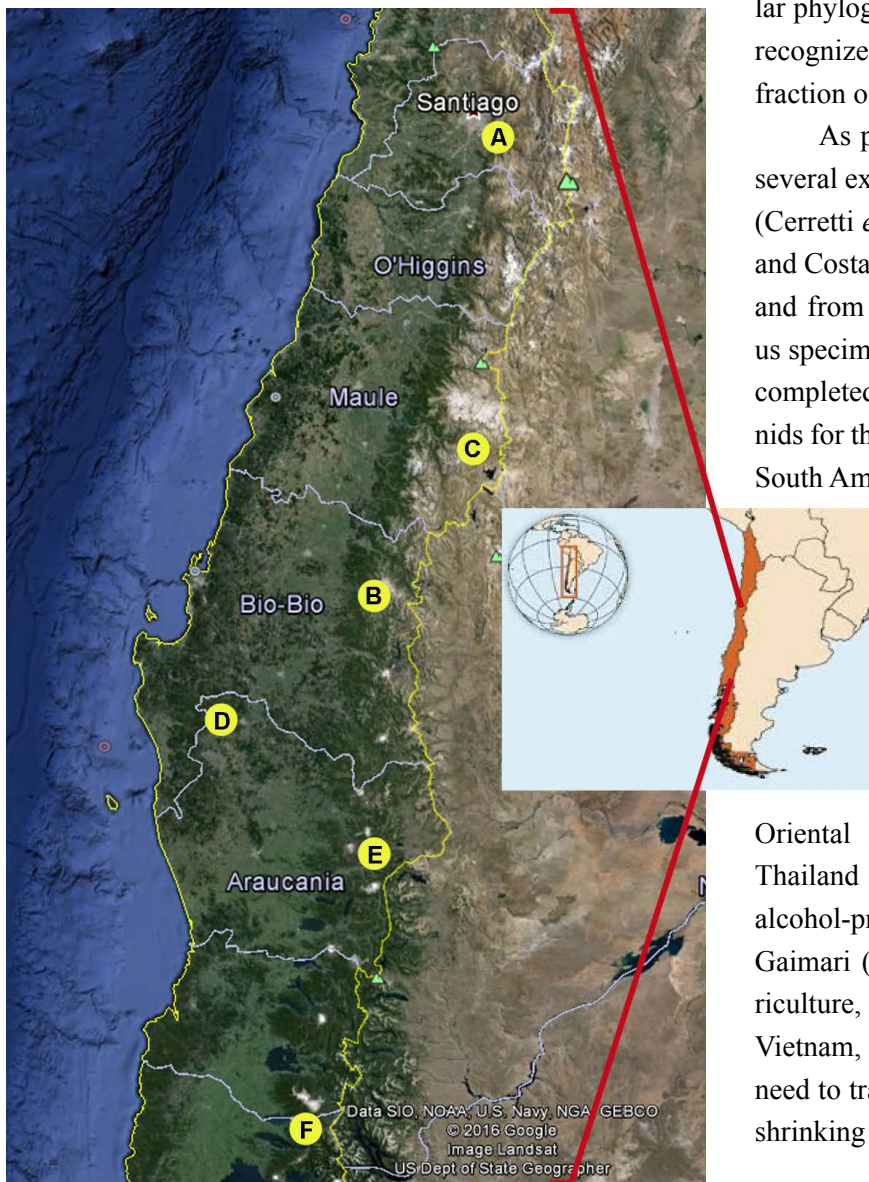


Figure 2. The six circles numbered A to F correspond to the areas discussed in the text where tachinids were collected in Chile during our December 2015 expedition.

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 Heliiothinae). 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 Asteraceae.

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 argenteiceps* 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]

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

Exoristinae

Winthemini: *Winthemia* 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).



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: *Incamiya 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.) *tanu-meana* Townsend [1 male]

Goniini: *Chaetocraniopsis* ?*argenteiceps* Aldrich [2 males, 1 female]

Goniini: *Chaetocnephala* ?*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.) *tanu-meana* 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 Nahuelbuta, 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 *Prosopochae-
ta* 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* Al-
drich [1 male]
- Goniini: *Chaetocnephala* sp. (not *americana*
(Schiner)) [1 male]
- Goniini: *Chaetocraniopsis* nr. *similis* (Townsend)
[1 male, 3 females]
- Goniini: *Macropatelloa* (cf. *Patelloa* Tnsd.) *tanu-
meana* 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: *Alexogoblinia 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 fe-
males]

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 dextine 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]



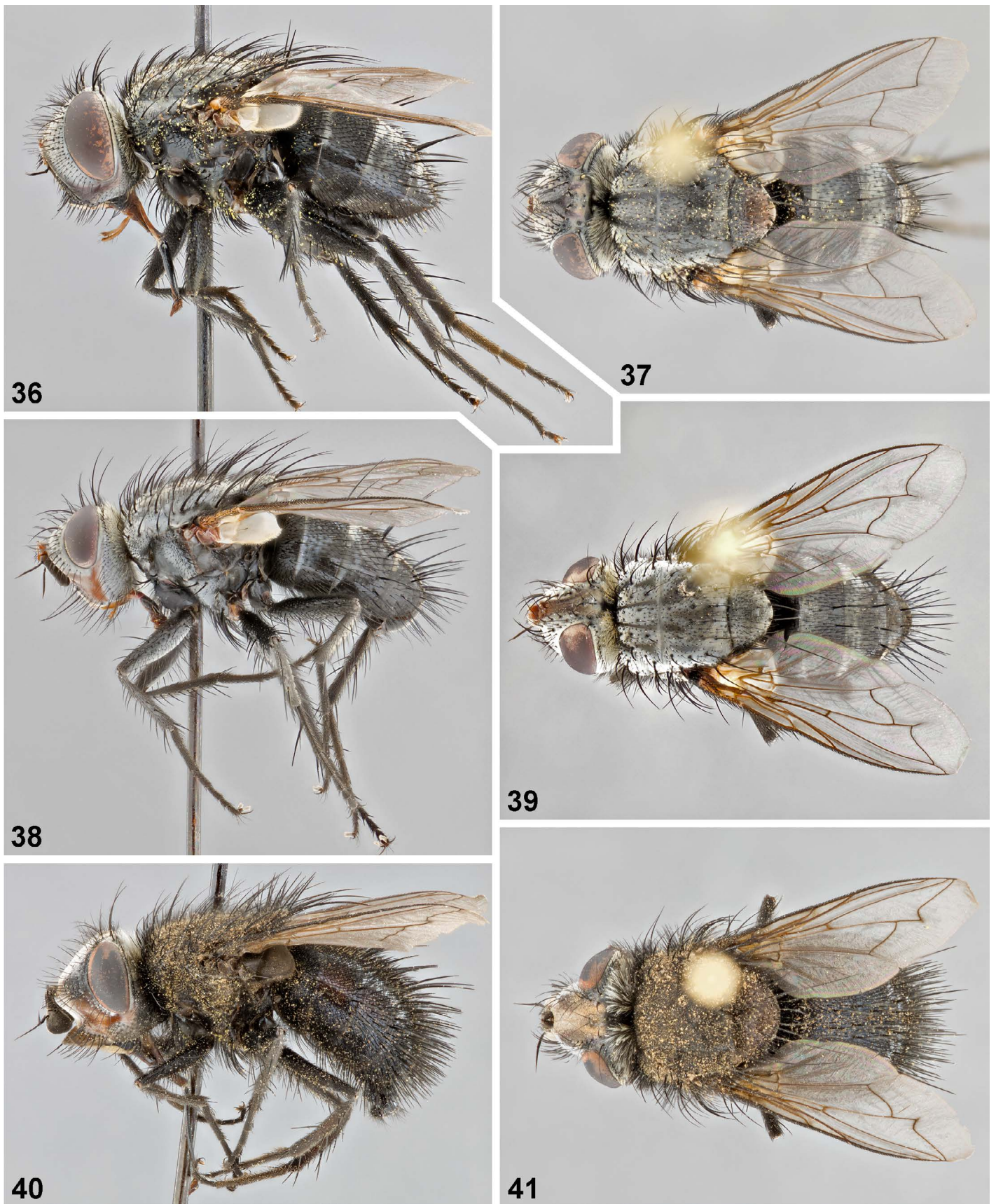
Figure 28. This sheltered grassy meadow in Parque Nacional Puyehue was a great spot for tachinids and especially *Peleteria*.



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.

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*, *Neochaetoplagia*) 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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