

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



Tachinidae of the Red River Gorge area of eastern Kentucky

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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.

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

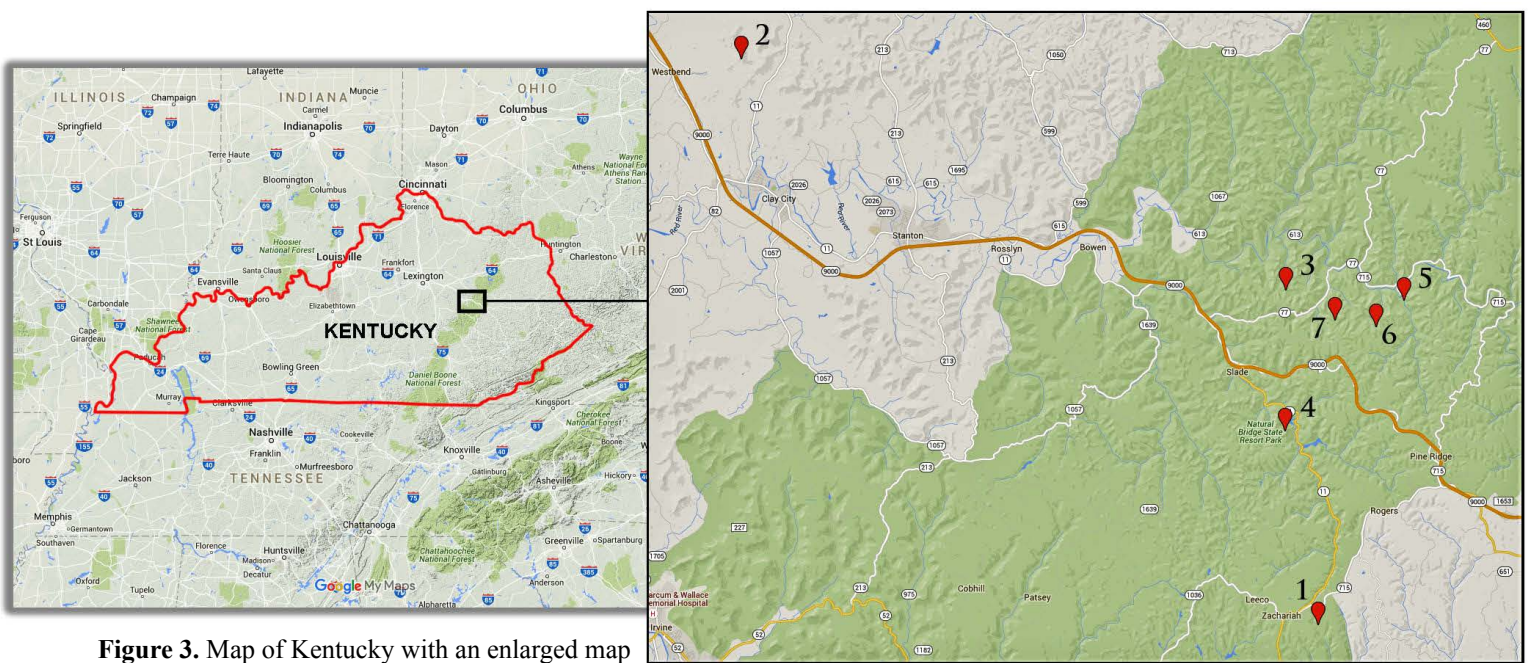


Figure 3. Map of Kentucky with an enlarged map showing the locations of the seven sites where tachinids were collected. Map data © 2016 Google.

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 databased. 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, Sheltoewe 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. Sheltoewe 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 *hyphanthrae* (Tothill)^{1,2,3,4}

Blondelia n. sp.^{?1}

Chaetostigmoptera manca (Greene)¹

Compsilura concinnata (Meigen)^{1,2,3}

Euhaliidaya genalis (Coquillett)³

Lixophaga nr. *opaca* Reinhard¹

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 ?leiby (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. 2¹
Carcelia sp. 3²
Carcelia sp. 4¹
Carcelia sp. 5¹
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* Wood⁴
Phorocera or *Tachinomyia* sp.¹
Tachinomyia variata Curran⁶

GONIINI

- Belvosia unifasciata* (Rob.-Des.)³
Chaetogaedia ?townsendi Sabrosky & Arnaud^{1,2,3}
Frontiniella spectabilis (Aldrich)²
Gaediopsis ocellaris (Coquillett)⁵
Hypertrophomma opacum Townsend²
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* Aldrich²

WINTHEMIINI

- Winthemia datanae* (Townsend) complex²
Winthemia sp. 1²
Winthemia sp. 2²
Winthemia sp. 3¹
Winthemia sp. 4³

PHASIINAE

CYLINDROMYIINI

- Cylindromyia binotata* (Bigot)²
Cylindromyia propusilla Sabrosky & Arnaud²

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.

EUTHELAIIRINI

- 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* James¹
Genea (*Siphoclytia*) *pavonacea* (Reinhard)¹

MINTHOINI

- Paradidyma singularis* (Townsend)⁶

MYIOPHASIINI

- Cholomyia inaequipipes* Bigot^{1,3}

POLIDEINI

- Chrysotachina longipennis* O'Hara¹
Mauromyia pulla Coquillett¹

SIPHONINI

- Actia diffidens* Curran¹
Ceromya americana (Townsend) group¹

TACHININI

- Archytas* (*Nemochaeta*) *aterrimus* (Rob.-Des.)^{3,4}
Archytas sp. 1^{2,3}
Archytas sp. 2⁴
Archytas sp. 3¹
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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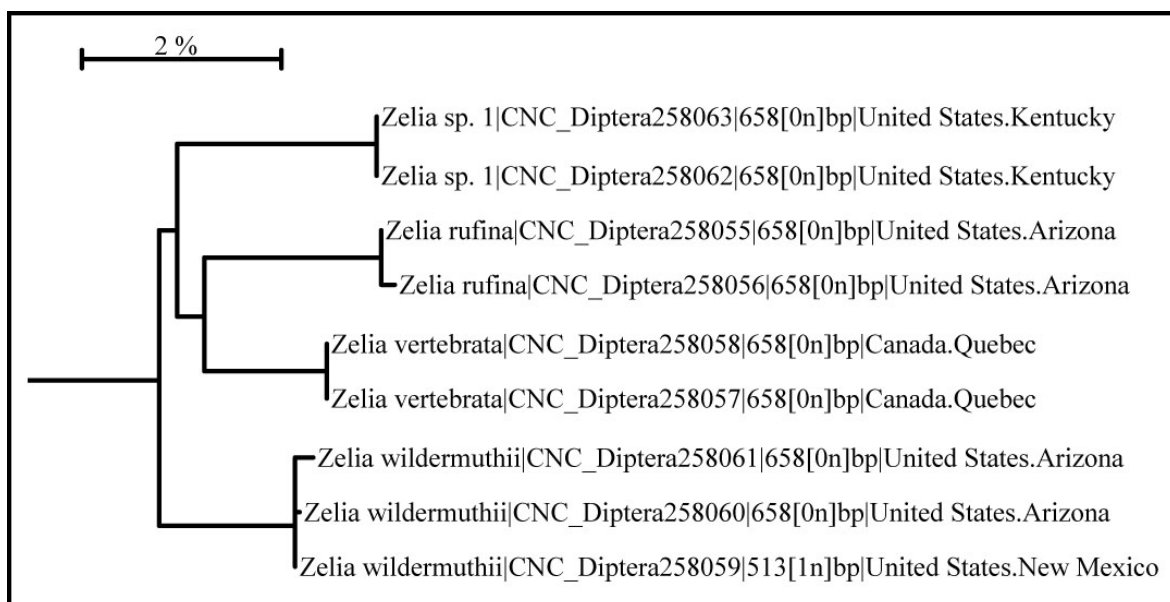


Figure 7. Neighbor joining tree based on COI data for *Zelia* species, including the new species (sp. 1) from Kentucky. The scale bar indicates percent sequence divergence.