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A Preliminary Study of the Diversity and Temporal Patterns of Abundance of Tachinidae in Southwestern Ohio

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Last year's issue of **The Tachinid Times** was dedicated to Professor Chien-ming Chao of China, who passed away in March 2007. Sadly, the year 2008 was similarly marked by the passing of a famous tachinidologist, Dr. José Henrique Guimarães, formerly of the Museu de Zoologia da Universidade de São Paulo (MZSP), São Paulo, Brazil. Dr. Guimarães died on 14 October 2008, just days after his 71th birthday. He was a world authority on the Neotropical Tachinidae and also published on the Calliphoridae, Oestridae, Muscidae, and a few other families of Diptera. This issue of **The Tachinid Times** is respectfully dedicated to his memory. A brief biography of Dr. Guimarães was published by R. Toma and S.S. Nihei several years ago in their paper on the type material of Tachinidae in MZSP (2006, *Revista Brasileira de Entomologia* **50**: 240–256). Dr. Nelson Papavero, a colleague and personal friend of Dr. Guimarães, will publish a posthumous biography of Dr. Guimarães in an upcoming issue of *Revista Brasileira de Entomologia*.

The Tachinid Times is primarily an online newsletter but continues to be offered in hardcopy to provide a permanent record of all issues in a few libraries around the world, and to comply with the wishes of those persons who prefer to receive a print copy for their own files. Both versions are based on the same PDF original and have the same pagination and appearance. The online version of this issue is available as a PDF file (ca. 3 MB in size) on the North American Dipterists Society (NADS) website at: http://www.nadsdiptera.org/Tach/TTimes/TThome.htm.

If you wish to contribute to **The Tachinid Times** next year, then please send me your article, note or announcement before the end of January 2010. This newsletter accepts submissions on all aspects of tachinid biology and systematics, but please keep in mind that this is not a peer-reviewed journal and is mainly intended for shorter news items that are of special interest to persons involved in tachinid research. Student submissions are particularly welcome, especially abstracts from theses and accounts of studies in progress or about to begin. I encourage authors to illustrate their articles with colour images, since these add to the visual appeal of the newsletter and are easily incorporated into the final PDF document. Please send images as separate files apart from the text.

A preliminary study of the diversity and temporal patterns of abundance of Tachinidae in Southwestern Ohio (by D.J. Inclan and J.O. Stireman III)

Although tachinids are one of the most diverse families of Diptera (Irwin *et al.* 2003) and represent the largest group of non-hymenopteran parasitoids (Belshaw 1994), the ecology of most species in the family is poorly known. Most of the studies that have focused on tachinids are related to taxonomic descriptions. Currently, our knowledge is very limited in terms of the diversity and distribution of populations across time and space, especially in the Nearctic and Neotropical Regions (Stireman 2008). There have been a number of recent studies focused on diversity and temporal distributions of tachinids in the Palaearctic Region such as Ford and Shaw (1991, 2000), Avci and Kara (2002) and Richter (2005), but there are relatively few similar studies for specific areas of the Nearctic Region (though see O'Hara 1999, 2002; Tooker *et al.* 2006; Stireman 2008). The present study provides some initial data on the diversity and temporal distribution of Tachinidae in Southwestern Ohio, USA.

Tachinid specimens were collected in a single Malaise trap located in Greene County, Southwestern Ohio in the Huffman Metropark (39°48'27.91"N 84°05'35.58"W, ~250m in elevation). The trap was placed in a narrow grass and forb dominated field in a powerline right-of-way that is periodically mowed (ca. once every two to three

years) (Fig. 1). The plant community in the immediate vicinity of the trap was dominated primarily by Asteraceae (e.g., *Solidago*, *Symphyotrichum*) and Poaceae (e.g., *Sorghastrum*). The narrow field was bordered by second growth deciduous forest consisting largely of maples (*Acer* spp.), ashes (*Fraxinus* spp.), hickory (*Carya*) and honeysuckle (*Lonicera*). The trap was set up perpendicular to the forest edge in the middle of the field on 25 June 2008 and it was periodically checked once or twice per week until 17 November 2008. Potassium cyanide was used as the killing agent in the dry head of the trap. All the material collected in the trap was taken to a laboratory at Wright State University, where specimens were sorted, pinned, and identified using Wood (1987) and comparison with specimens in the Wright State University insect collection.

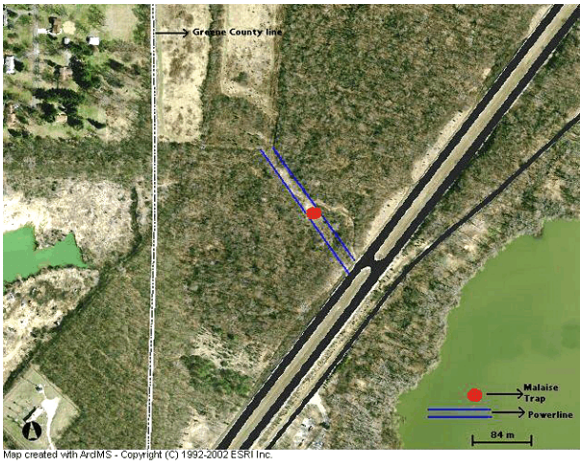

Figure 1. Aerial photograph of Huffman Metropark. The location of the Malaise trap is indicated by a red oval, inside the power line right of way (blue lines). Huffman Metropark, Greene County, Ohio, USA.

Over the summer and fall season of 2008, in 146 days of collecting material, 368 tachinid specimens were collected. A total of 54 genera were identified (~17% of all the genera described for the Neartic Region (O'Hara 2008)). The subfamily Exoristinae comprised 54% of all the specimens collected, followed by Tachininae, Dexiinae, and Phasiinae with 22, 20, and 4% respectively. Likewise, only four tribes represented 68% of the total specimens collected (Blondeliini 29%, Campylochetini 14%, Leskiini 14%, and Eryciini 11%) (Table 1; Figs. 3–5). Identification of species is still in progress.

The distribution of tachinid abundance over the sampling period appears to be bimodal (Fig. 2). The early summer mode, however, is relatively small and most of the specimens were collected between late summer and fall (Fig. 2). An ongoing inventory of caterpillars in the same geographic area indicates that the temporal distribution of larval stages of Lepidoptera is also bimodal, with an early spring peak (April – May) and late summer-early fall peak (mid August to September) (Stireman, unpub. data). The temporal distribution of tachind abundance and diversity reported here appears to follow this pattern, although further sampling in the spring months is needed to evaluate this correlation.

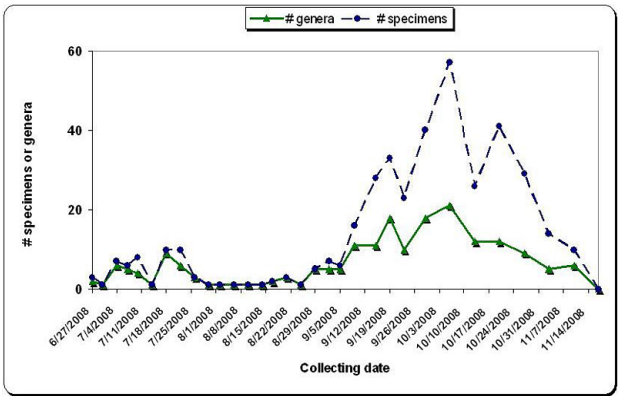

Figure 2. Numbers of genera and individuals over the summer fall season of 2008, Huffman Metropark, Ohio, USA.

Twenty-four percent of the identified genera are represented by only a single specimen. This percentage is likely to increase if evaluated at the species level. This makes it difficult to accurately assess the seasonality of particular genera and species. However, some patterns are suggested by these data. First, genera that were found in multiple, disparate seasons are likely to complete several generations per year (e.g., *Aplomya, Thelaira*, *Campylocheta*, *Actia, Exorista*), or they consist of species that are active in different seasons (e.g., *Lespesia*, *Lixophaga, Myiopharus, Winthemia*). Conversely, those genera represented by appreciable numbers of individuals that were only captured in a single sampling period or across two neighboring sampling periods, are likely to be univoltine (e.g., *Genea* (Fig. 4), *Kirbya*, *Medina*). Of course, these patterns could also reflect changes in habitat use (e.g., attraction to floral resources), and must be interpreted with caution. Some specimens in the genera *Admontia*, *Blondelia*, *Campylocheta*, *Lixophaga*, *Medina*, and *Strongygaster* exhibited unexpected patterns in their temporal distribution, with relatively large numbers being collected late in the season when temperatures were falling below 0ºC. It would seem that this late in the season, time for development and availability of hosts is likely to be limited.

In order to better understand these patterns of activity and their relationship to voltinism, seasonal fluctuations of available hosts, and temperature, a broader sampling period (summer, fall, and spring), and additional replicate traps will be needed. In addition, trapping in other nearby habitats (e.g., forest interior and canopy, see Cerretti *et al.*

2004; Stireman 2008), would provide valuable information on the habitat specificity of the tachinid community and the effect of habitat structure on their seasonal patterns of abundance and diversity.

Acknowledgments

We would like to thank the Five-Rivers Metroparks of Dayton for permission to sample Tachinidae at Huffman Metropark, J. Heath for assistance with the Malaise trap, and H. Devlin for reviewing this contribution.

Figure 3. A specimen of *Belvosia* (probably *B. unifasciata* (Rob.-Des.)) collected in the Malaise trap on September 15, 2008. This species was relatively common throughout the summer months. Huffman Metropark, Ohio, USA. (photo by D.J. Inclan)

Table 1. List of identified genera and their seasonality over summer and fall of 2008, Huffman Metropark, Ohio, USA.

Subfam/Tribe/Genus	Seasonality**
EXORISTINAE	
BLONDELIINI	
Admontia (36)*	LS, F
Blondelia (5)	ES, LS
Celatoria (10)	ES, LS, F
Chaetostigmoptera (2)	F
Cryptomeigenia (1)	LS
Eucelatoria (2)	MS, LS
Lixophaga (15)	ES, LS, F
Medina (14)	F
Myiopharus (12)	ES, LS, F
Oxynops (8)	LS, F
ERYCIINI	
Aplomya (16)	ES, LS, F
Buquetia (1)	ES
Carcelia (4)	MS, LS, F
Drino (1)	ES
Lespesia (8)	MS, LS, F
Nilea (4)	LS
Prooppia (1)	LS
Siphosturmia (6)	MS, LS, F
EXORISTINI	
Chetogena (1)	LS
Exorista (4)	ES, MS, F
Tachinomyia (3)	F
GONIINI	
Belvosia (13)	ES, MS, LS
Leschenaultia (2)	F
Platymya (3)	LS
MASIPHYINI	
Masiphya (4)	ES, MS
WINTHEMIINI	
Hemisturmia (1)	LS
Winthemia (21)	ES, LS, F
DEXIINAE	
CAMPYLOCHETINI	
Campylocheta (51)	ES, LS, F
DEXIINI	
Zelia (1)	LS
THELAIRINI	
Spathidexia (5)	MS, LS, F
Thelaira (4)	MS, LS, F
VORIINI	
Eulasiona (3)	LS, F
Kirbya (7)	ES
PHASIINAE	
CATHAROSIINI	
Catharosia (2)	F
CYLINDROMYIINI	
Cylindromyia (4)	MS, LS
Gymnoclytia (1)	ES
PHASIINI	
Phasia (2)	F
TRICHOPODINI	
Xanthomelanodes (6)	F
TACHININAE	
ACEMYINI	
Ceracia (10)	LS, F
ERNESTIINI	
Gymnocheta (1)	F
Linnaemya (2)	F
EUTHELAIRINI	
Neomintho (1)	MS
LESKIINI	
Clausicella (2)	F
Genea (46)	LS, F
Ginglymia (1)	F
Leskia (3)	LS, F
MINTHOINI	
Paradidyma (11)	MS, LS, F
MYIOPHASIINI	
Cholomyia (1)	F

Gnadochaeta (3)	ES, LS
POLIDEINI	
Lypha (1)	LS
SIPHONINI	
Actia (3)	ES, F
STRONGYGASTRINI	
Strongygaster (8)	LS, F
TACHININI	
Archytas (1)	LS
Deopalpus (1)	LS

* Numbers between parentheses indicate the number of specimens collected for each genus.
** Seasonality is indicated by ES, Early Summer (Jun/21-Jul/22); MS, Middle Summer (Jul/23-Aug/21); LS, Late Summer (Aug/22-Sep/21); and F, Fall (Sep/22-Nov/10).

Figures 4–5. Figure 4. A specimen of *Genea* collected in the Malaise trap on 6 October 2008. This was one of the most abundant tachinids collected in the late Summer and Fall. **Figure 5.** A specimen of *Ceracia dentata* (Coquillett) collected in the Malaise trap on 9 September 2008. This species appears to be abundant across North America except at high latitudes. Both specimens from Huffman Metropark, Ohio, USA. (Photos by D.J. Inclan.)

References

Avci, M. and Kara, K. 2002. Tachinidae parasitoids of *Traumatocampa ispartaensis* from Turkey. Phytoparasitica **30**: 361–364.

Belshaw, R. 1994. Life history characteristics of Tachinidae (Diptera) and their effect on polyphagy. Pp. 145–162. *In*: Hawkins, B. and Sheehan, W., eds., Parasitoid community ecology. Oxford University Press.

Cerretti, P., Whitmore, D., Mason, F. and Vigna Taglianti, A. 2004. Survey on the spatio-temporal distribution of tachinid flies – using Malaise traps (Diptera, Tachinidae). Pp. 229–256. *In*: Cerretti, P., Hardersen, S., Mason, F., Nardi, G., Tisato, M. and Zapparoli, M., eds., Invertebrati di una foresta della Pianura Padana, Bosco della Fontana. Secondo contributo. Conservazione Habitat Invertebrati, 3. Cierre Grafica Editore, Verona. 303 pp.

Ford, T.H. and Shaw, M.R. 1991. Host records of some West Palearctic Tachinidae (Diptera). Entomologist's Record and Journal of Variation **103**: 23–38.

Ford, T.H., Shaw M.R. and Robertson, D.M. 2000. Further host records of some West Palearctic Tachinidae (Diptera). Entomologist's Record and Journal of Variation **112**: 25–36.

Irwin, M.E., Schlinger, E.I. and Thompson, F.C. 2003. Diptera, true flies. Pp. 692–702. *In*: Goodman, S.M. and Benstead, J.P., eds., The Natural History of Madagascar. University of Chicago Press, Chicago and London. 1728 pp.

O'Hara, J.E. 1999. Tachinidae (Diptera) parasitoids of bertha armyworm (Lepidoptera: Noctuidae). Canadian Entomologist **131**: 11–28.

O'Hara, J.E. 2002. Spring collecting in the Sonoran desert. Tachinid Times **15**: 3–4.

O'Hara, J.E. 2008. World genera of the Tachinidae (Diptera) and their regional occurrence. Version 4.0. PDF document, 71 pp. Available from: http://www.nadsdiptera.org/Tach/Genera/Gentach ver4.pdf (accessed 9 January 2009).

Richter, V.A. 2005. New data on the biology and distribution of Palaearctic tachinids (Diptera, Tachinidae). [In Russian.] Entomologicheskoe Obozrenie **84**: 911–915. [English translation in Entomological Review **85**: 1227–1230, 2005.]

Stireman, J.O., III. 2008. α and β diversity of a tachinid parasitoid community over space and time. Annals of the Entomological Society of America **101**: 362–370.

Tooker, J.F., Hauser, M. and Hanks, L.M. 2006. Floral host plants of Syrphidae and Tachinidae (Diptera) of Central Illinois. Annals of the Entomological Society of America **99**: 96–112.

Wood, D.M. 1987. Chapter 110. Tachinidae. Pp. 1193–1269. *In*: McAlpine, J.F., Peterson, B.V., Shewell, G.E., Teskey, H.J., Vockeroth, J.R. and Wood, D.M., eds., Manual of Nearctic Diptera. Vol. 2. Agriculture Canada Monograph **28**. iv + 675–1332 pp.

Notes on the Tachinidae of Kyrgyzstan (by T. Zeegers)

Introduction

In 2008, I had the opportunity to visit the central Asian state of Kyrgyzstan. My main interest for visiting Kyrgyzstan was the presence of coniferous forest in the east of the country. This forest can be seen as the southernmost extension of the Siberian taiga, which I had visited in 2006. I had some opportunity to collect flies, though restricted in intensity and only by traditional netting. Collecting took place between June 17th and July 10th, 2008.

Landscape

Kyrgyzstan is a former Soviet Republic located in Central Asia, neighbored by Kazakhstan in the north, Uzbekistan in the west, Tadzikistan in the south and China in the east. Though often referred to as one of the steppe