This issue of The Tachinid Times marks an anniversary. It was twenty years ago, in March 1988, that Monty Wood and I started this newsletter to encourage better communication among tachinid workers and to serve as a “forum for the exchange of information and ideas about the Tachinidae”. There was no Internet or e-mail in 1988, so persons had to rely on publications, letters, and telephone calls (for those who could afford them), to keep abreast of what others were doing. We hoped that by publicizing what people were working on there would be more cooperation within the community and less surprise when a new paper was published. To that end, the early issues of this newsletter had few true articles but more news items about people’s interests, current research, and field trips. Monty stepped down as co-editor after the first issue and soon thereafter retired from Agriculture and Agri-Food Canada (AAFC), Ottawa. So it came to pass that by issue 3, in February 1990, I had been hired into Monty’s former position with AAFC, enabling me to continue my systematic studies on the Tachinidae and my editing of The Tachinid Times.

This newsletter has not changed substantially during the past twenty years, although it is now a mostly electronic publication and attracts more articles than the “Personal Notes” that used to be a popular part of the newsletter. At some point during the past ten years the Zoological Record began citing articles in The Tachinid Times, and this development may have given some authors an added incentive to publish in the newsletter. However, I continue to keep the newsletter non-peer reviewed to avoid competing with scientific journals and to keep the focus on short newsworthy articles of interest primarily to tachinid enthusiasts. Moving forward into the 21st year of publication I have no immediate plans to change the basic tenets of the newsletter, but I am open to any suggestions that readers might have to improve its appeal within its niche audience.

I would like to dedicate this 21st issue of The Tachinid Times to the late Professor Chien-ming Chao, the pioneer of Chinese tachinidology and former Director of the prestigious Institute of Zoology, Chinese Academy of Sciences, Beijing. Prof. Chao passed away in March 2007. A biography of Prof. Chao is published herein and I thank Chun-tian Zhang and Jing Hao for contributing this insightful article.

Reproduced below is my annual statement about publication of The Tachinid Times and my appeal for submissions for next year’s issue:

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. 4.3 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 2009. 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.
Chien-ming Chao, 1927–2007 (by C.-t. Zhang and J. Hao)

At the age of 81 years, one of the most outstanding experts on tachinids, a famous biologist, entomologist, and taxonomist of China, former Prof. Chien-ming Chao (= Jian-ming Zhao) (Fig. 1) of the Institute of Zoology, Chinese Academy of Sciences (IZCAS), died of cancer in Beijing on 24 March 2007.

Figure 1. Prof. Chien-ming Chao in Beijing, 2006. Photo courtesy of X.-k. Sun.

C.-m. Chao was born in Laoting County, Hebei Province, North China on 10 January 1927. From 1948 to 1949, Chao studied in the Department of Biology at the China-France University in Beijing. Due to the arrangement of faculties and departments of universities in China, Chao transferred to the Department of Biology at Nankai University in Tianjin in 1950 and continued studying biology. He finished his studies and graduated from Nankai University in August 1952. Chao then started work as a probational research fellow at the Institute of Entomology, Chinese Academy of Sciences, Beijing. In 1955, he was sent to study abroad in the Department of Biology and Pedology at Moscow University in the USSR (now Russia). He received his vice-Doctor degree from Moscow University in 1959. Chao went on to study ecology and Tachinidae in the Institute of Zoology of the Academy of Sciences of USSR in Leningrad (now St. Petersburg) and the Agricultural Academy of USSR in Moscow. One year later, in July 1960, Chao returned to the Institute of Entomology (merged with the Institute of Zoology, Beijing in 1962), Chinese Academy of Sciences, and began his professional study of tachinids. He began as an assistant research fellow, was appointed as head of the Diptera group in the 1960s, became associate research fellow as head of the Insect Classification Department in the 1970s, became research fellow (= professor) and associate Director of IZCAS in 1979, and served as the standing council member of the Entomological Society of China (ESC) from 1982. He was later appointed Director of IZCAS from 1983 to 1986, elected as vice council director of ESC from 1987 to 1991, and served as the member of the Editorial Committee of Fauna Sinica from 1976 to 2007. He served as a Council member of the International Congresses of Dipterology from 1984 to 1990. After 1980, he traveled separately to England, Germany and Japan for short term academic study of Tachinidae. Prof. Chao retired from IZCAS in October 1991.

Prof. Chao was mainly engaged in the systematics of Tachinidae and Sarcophagidae after 1960, making many contributions to the entomology of China. Altogether, he published 4 new genera and 277 new species of Tachinidae, and 21 new species of Sarcophagidae. From 1960, he (Chao and Shi 1980) studied Blepharipa Rondani of China and suggested that IPM could control pests of silkworm for sericulture production in Liaoning, N.E. China. With the help of the natural host Ostrinia furnacalis (Guenée), he bred Lydella grisescens R.-D. artificially, achieving great success. He also successfully used Phryxe vulgaris (Fallén) against the pest Pieris rapae L., opening up a new approach to biological control. He (Chao and Liang 1984) was the first to make important contributions on the biology and ecology of Tachinidae and Sarcophagidae of the main insect pests in China. As one of the chief editors of Flies of China (Xue and Chao 1998), he helped prepare the most significant publication on Chinese Diptera ever produced. As a major contributor to that work, Chao summarized the taxonomy of the Tachinidae of China that he had worked on since 1960. In Flies of China, Chao et al. (1998) recognized 5 subfamilies, 191 genera, and 754 species (including 30 new species) of Tachinidae, gave provincial distributions for each species, included information on the biology of certain species, and provided keys to the identification of species, genera, tribes, and subfamilies. Later, in Fauna Sinica Insecta (Chao, Liang, Shi and Zhou 2001), Chao and coauthors reviewed 146 species belonging to 39 genera of Exoristinae and cited observations and research methods pertaining to the parasitic way of life and ecological behavior of tachinids (e.g., Blepharipa tibialis (Chao, 1963)). Chao authored or edited 25 monographs and 120 academic papers on taxonomy, biology and ecology throughout his career. He received 15 awards from the Government of P.R. China, Shanxi Province, the Minister of Education of P.R. China,
and the Chinese Academy of Sciences.

Chao was Associate Editor-in-Chief of Acta Zootaxonomica Sinica (AZS) from 1979 to 1996, and a member of the Editorial Board of Entomotaxonomia from 1979 to 2007. He was Editor-in-Chief of AZS from 1997 to 1999, and a member of the Editorial Board of AZS from 2000 to 2004. His efforts in later years were reduced because of ill health.

Prof. Chao was a serious scientist who spared no effort in the performance of his duty. He was a kind teacher, and patient with every student. Prof. Chao’s memory and achievements will live on forever!

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The Tachinid Times

Cataloguing the Tachinidae (by J.E. O’Hara)}

There are an estimated 10,000 described species of Tachinidae belonging to about 1520 recognized genera (O’Hara 2007). This immense family of flies is even more diverse than suggested by these numbers because many undescribed species are known to exist in all regions except in the relatively well known Nearctic and Palearctic regions. Our understanding of the Tachinidae is hampered not just by these undescribed taxa but by the discordance among the six regional catalogues (listed in O’Hara 2007). Taken together, these catalogues geographically provide world coverage of the Tachinidae, but the earliest dates from 1971 and the most recent from 2004, so the earlier ones are much less complete and modern than the later ones. There are also differences in the concepts of genera and tribes among the regional catalogues. One catalogue in particular, the Neotropical one (Guimarães 1971), is so overburdened with small and meaningless genera (erected primarily by C.H.T. Townsend during the early 1900s) that it is almost incomprehensible to everyone except Monty Wood.

The regional catalogues also vary with respect to the amount of type information they provide. Three catalogues (Crosskey 1973, 1976, O’Hara and Wood 2004) cite primary type data (number, sex, and depository of holotypes, syntypes, lectotypes and neotypes) and type localities for their nominal species (valid species and synonyms), but these catalogues together only document type details for 25% of the world’s named tachinids.

This situation is about to change because of two catalogueing projects, one underway and the other about to begin later this year. The former will result in a catalogue of the Tachinidae of China and the latter will produce a catalogue of the world Tachinidae.

The catalogue of the Tachinidae of China is being prepared by myself, Hiroshi Shima and Chuntian Zhang. China is an especially interesting country to treat separately for a number of reasons. From a biodiversity perspective, China has a huge Tachinidae fauna that is only partially known. From a biogeographic perspective, China is one of the few countries in the world straddling the boundary between two regions, in this case the Palearctic and Oriental. From an agricultural and economic perspective, knowledge of China’s native flora and fauna is necessary to permit the identification of exported invasive alien species and their parasitoids, and to guard against invasive organisms reaching China from abroad. The fragility of China’s vast wealth of native species, in a country with a human population of 1.3 billion and a soaring economy, lends added urgency to our efforts to document the country’s biodiversity.

The most significant advance in dipterology in China was the 1998 publication of the 2-volume set, *Flies of China*, edited by W.-q. Xue and the late C.-m. Chao (see biography earlier in this issue). Chao et al. (1998) wrote the 546-page chapter on Tachinidae, recognizing 754 species and 191 genera. A great amount of systematic work has been published on the Tachinidae of China since the publication of *Flies of China*, and that work overlooked some species, so now the number of species known from China is approaching 1100. Although this is a remarkable increase in ten years, the current total is not high for the size and geographic diversity of China and many species undoubtedly remain to be discovered and named.

One of the interesting aspects of our Tachinidae of China project is that distributional data is being gathered on a provincial level from virtually every available paper and book that has data on the tachinids of China. From this work a picture of tachinid biodiversity in China is emerging, including areas of high endemity, species-rich and species-poor provinces, and information about the pattern of Oriental vs. Palearctic species throughout China. A paper on this subject will be given at the International Congress of Entomology in Durban in July 2008 (O’Hara, Shima and Zhang, in prep.). Completion of the catalogue is planned for fall 2008.

The world Tachinidae project will begin after
pletion of the catalogue of the Tachinidae of China, and will benefit from experience gained during the first project. It is difficult to comprehend the magnitude of this project, for it will catalogue not just the 10,000 names of valid species, but the thousands of synonyms and thousands of generic names. An optimistic guess might put the length of this project at five years, but it could take seven or eight. The team involved in this project comprises myself, Monty Wood, Vera Richter, Hiroshi Shima, and Shannon Mahony.

The reason our world catalogue will take so long to complete is that virtually every original description of a species or genus, and every designation of a type species or a lectotype or neotype, will be checked for accuracy in the original source. Providing accurate information on types, type depositories, type localities, and distributions is also time-consuming and tedious work, not all of which is as straightforward as one might think (see below). Modern technological advances make it possible for just about anyone to compile names from the Zoological Record, to scan catalogues, and to gather information from secondary sources to produce an unimpressive world catalogue in record time (as we have seen lately), but it is our aim to prepare a more proper and thorough catalogue that will hopefully garner more praise than scorn.

I will now briefly review a few of the challenges that we face with both the Chinese and world catalogues.

**Tachinid Classification.** The Tachinidae of China catalogue has some difficulties associated with merging taxa from two regional catalogues, but these problems are manageable, especially with Hiroshi Shima’s years of experience working with the tachinid fauna of the region. Of a more insidious nature are misidentifications, caused by inexperienced workers or the near total reliance on the literature for identification (there being, at least historically, little access to primary types residing outside China). For the cataloguing of the world Tachinidae, the greatest difficulty we will face is the modernizing of the classification of the Tachinidae of the Neotropical Region. Here we will rely heavily on Monty Wood’s 40 years of experience with the fauna.

**Database.** Monty Wood and I used Platypus® as a database platform for our catalogue of the Tachinidae of America north of Mexico (O’Hara and Wood 2004) (Fig. 1), with a custom output designed by Jennifer Read (AAFC, Ottawa). That program is now out of development and the Tachinidae of China catalogue is being compiled mostly as a text file. The distributional component of Tachinidae of China is kept in a FileMaker Pro® database developed by Shannon Mahony. For the world Tachinidae, a robust database will be absolutely necessary and at this stage it is looking as though this database will be custom-designed by Shannon.

**Literature.** Our manuscript on the Tachinidae of China cites over 500 references; for the world Tachinidae several thousand references will be cited. I am fortunate that I work for an institution that has a good entomology library, with strong holdings of older literature and good journal coverage up to the 1980s (when library support began to diminish). My predecessor, Monty Wood, also made a concerted effort to gather tachinid literature otherwise not present in our library or our reprint collection in the Diptera Unit, so there are relatively few tachinid publications that are not immediately at hand in Ottawa. Chien-ming Chao kindly sent me reprints of his papers and books on the Tachinidae of China, and I made an effort to accumulate other literature on Chinese Tachinidae as it was published during the last twenty years, so the Tachinidae of China project began with good holdings of Chinese literature in Ottawa. Chuntian Zhang has helped supply us with missing literature and we have also purchased a number of books on regional faunas throughout China. A few of the old and new books vital to the Tachinidae of China are shown in Fig. 2.

**Collections.** Recording type data includes citing type depositories. This information is not always given in the original publication and can involve some sleuthing to determine. The locations of the collections of the more prominent dipterists can be found online or in reference works like “Litteratura taxonomica dipterorum (1758–1930)” (Evenhuis 1997). Although collections around the world are databasing their holdings, there are still relatively few with their types documented online. We will gather as much type data as we can from existing sources and will make enquiries of curators for additional assistance. We also plan to travel to certain institutions to record data from their primary types of Tachinidae.
Languages. Tachinids have been described in a variety of languages, complicating the recording of the necessary details for our catalogues. We, as authors of these catalogues, can comfortably handle a good portion of the languages involved and my colleagues in Ottawa can collectively read almost every language used in a tachinid publication. Such assistance from a colleague is fine for an occasional translation, but one cannot look for help of this sort on a daily basis. I have developed a “protocol” that others might find useful for dealing with multiple languages. The procedure is this: scan the desired text into Acrobat Professional® (preferably version 8), perform OCR (Optical Character Recognition) after selecting the desired language, select and copy text, go to the Internet and paste text into “Babel Fish Translation”, select ‘from’ and ‘to’ languages, and hope for an intelligible translation. Do not expect descriptions to work because of the specialized terms. If Babel Fish does not give an acceptable result, then ‘Google’ the desired language and try a dedicated language translator. Version 8 of Acrobat Professional® has incorporated many languages not included in Version 7. Sample translations from Simplified Chinese and Russian are shown in Figs. 3–5.

Nomenclatural issues. It is especially important to have a good grasp of the Code (ICNZ 1999) when dealing with a catalogue of huge proportions because decisions on sticky nomenclatural issues can affect not just a few species but hundreds. For example, we need to take a carefully reasoned approach to Recommendation 73F (“Avoidance of assumption of holotype”), which recommends that a type series should be interpreted as consisting of syntypes and not a holotype if no information about the size of the type series is given. This may not be the best approach for authors of species whose collections have been well managed and where many species are represented by single specimens traditionally regarded as holotypes.


Figure 3. Passage on Phebellia clavellariae (B. & B.) in Chao and Chen (2007: 936).

Figure 4. Babel Fish translation of the distribution of Phebellia clavellariae (B. & B.) given in Simplified Chinese in Chao and Chen (2007: 936) and shown in Fig. 3.

Figure 5. Babel Fish translation of the distribution of Torocca munda Walker given in Russian in Richter (2004: 370).

Another problem is that of unjustified emendations (Article 33). Most dictionaries define an emendation more or less as: “An intentional change to a previously proposed name”. Names of taxa were frequently changed by subsequent authors if the Latin or Greek spellings were not quite right, but such changes are not allowed under the
Code and are termed “unjustified emendations”. These unjustified emendations are nomenclaturally important because they are available names, unlike unintentional subsequent spellings (errors). However, in the eyes of the Code, an emendation is only officially “unjustified” (meaning the name only becomes available), when it is “demonstrably intentional”. There have been hundreds of intentional emendations to tachinid names that do not meet the strict provisions of Article 33.2.1. For example, many fly names proposed with the ending “-mya” have had their ending emended to “myia” (meaning “fly” in Greek) by subsequent authors to make them grammatically correct. The change is only an “unjustified emendment” if the author said he/she made the change on purpose, or cited both the original and emended spellings, or treated two or more names in a similar way. So, an emended name can appear in the literature multiple times before becoming officially an unjustified emendment. Although it would be nice to record all the “demonstrably intentional” unjustified emendations by author and date in our catalogues, this would be a herculean task for a very small gain. We will cite unjustified emendations by taxon name without author and date except for those names that are senior homonyms, which as available names take priority over junior homonyms.

The rules governing lectotypes underwent some changes in the 1999 Code (Article 74). Certain provisions for lectotype designations after 1999 (Art. 74.7) have been softened by a subsequent ruling, but there are still some difficulties concerning the implementation of Article 74.5, the section governing lectotype designations before 2000. Wittingly or unwittingly, the wording was changed from the 1985 Code to exclude unintentional lectotype fixations. Authors following older versions of the Code legitimately accepted the mention of a “type”, “typus”, “holotype” or “Ht” as the lectotype fixation of a single specimen in a series of syntypes if that specimen could be singled out from the others. For example, the mention of the sex of the type might restrict the term to a single specimen, or the cited depository might have only one specimen standing under the specified name. Unfortunately, the current Code did not “grandfather” lectotypifications already documented and accepted in the literature. Hence, as an example, Crosskey’s (1971) meticulous documentation of Townsend’s mention of a “Ht” (or “Ht male” or “Ht female”) for many non-Palearctic Old World species described by Macquart and Bigot, in which some lectotypifications are accepted and others rejected, could be considered a wasted effort. Townsend routinely cited holotypes regardless of whether syntypes were known and regardless of whether he had seen them. It would be no trivial matter to determine the individual merits of each mention of a “Ht” among the many hundreds cited by Townsend in his Manual of Myiologia (1934–1942) alone (Fig. 6); that is to say, which mention of a “Ht” had actually restricted the usage of the term to a single specimen thereby providing a lectotype fixation according to Crosskey and others following pre-1999 Codes. This is a mute point now because the 1999 Code does not allow Townsend’s lectotypifications to be accepted because he had not “explicitly indicated that he or she was selecting from the type series that particular specimen to serve as the name-bearing type”. However, rather than start all over again with the taxa dealt with by Crosskey (1971), for example, one could interpret Crosskey’s review of Townsend’s lectotypifications as lectotype fixations of Crosskey (1971), thereby at least preserving the lectotypes in the sense intended by Crosskey and negating the need for further action with these nominal species.

**Genus Masistylum Brauer & Bergenstamm**


_Gt_ — Pachystylum arcuatum Mik, Verh. Z. B. Ge., XIII, 1940 (1865),

_Ht_ — Origin, Austria; location, Vienna.

Figure 6. Entry for Masistylum B.& B. in Part VIII of Townsend’s (1939) Manual of Myiologia, showing his typical use of “Ht” for type data of the type species (“Gt”, or genotype, Pachystylum arcuatum Mik).

**Locality.** There is more to recording distributions and type localities than one might think. Place names change over time, borders between countries shift or disappear, and some recorded localities represent such tiny places that they seem not to be recorded anywhere. Place names written in foreign languages over 100 years ago pose their own special problems because the translated name may represent a place that now has a different name. Any serious cataloguer will want to include both original and modern place names in their type locality citations. Deciphering place names used to require the cataloguer to own or have access to a stack of atlases and a shelf of gazetteers, but now most localities can be tracked down on the Internet. I prefer to find any given locality in several sources before confirming its modern name and location because online searches are so powerful that the same name may be found in different places with alternate spellings. One of the best sites is MSN Encarta® World Atlas that finds places under multiple spellings and shows the location on a zoomable map. Alternate locations are shown in a window below the map. Fig. 7 shows the result for “Peking”, the old name for Beijing. Enter “Peking, China” and the search will be confined to China. I also like WorldWide Index at Tageo.com, where searches are conducted by country.
Figure 7. Result of search for “Peking” using online MSN Encarta® World Atlas.

References


Yellow pan traps for collecting Tachinidae – further results (by H.-P. Tschorsnig)

Some particulars on the use of yellow pan traps (YPT) were already given by Tschorsnig (2002). The present short contribution gives further results and thoughts on this useful collection method for Tachinidae.

Table 1 lists results of systematic yellow pan trap collections made by me at a Spanish locality (Prov. Salamanca, Villar de Ciervo, Las Coronas). The collection site
on which the traps have been placed is about a hectare large. It is situated on a large gentle hill (720 m altitude) which is covered by patchy wood of holm oak (*Quercus ilex rotundifolia*) with shrubs of broom (*Cytisus multiflorus*) and grassy areas. Between 15 and 27 yellow pan traps were placed on the ground between the trees or shrubs over a period of 4–10 days per each excursion from 1999 on. The traps were emptied every day (or – in rare cases – every two or three days).

**2)** It seems that YPTs work better in cold or cloudy weather than on warm sunny days. My best results were in March/April when the weather was so cold that the water of the dishes was frozen on the surface in the early morning hours. A trial with YPTs on two days on “Las Coronas” during warm and sunny weather in August 2000 was very disappointing, and I know many other frustrating results from YPTs which were tried by me at other European places during warm and dry weather.

The following, different case shows how YPTs work in direct comparison with Malaise traps (MTs). Insects were systematically collected in five combined YPT-MTs on La Palma (Canary Islands) during 1999–2001. The corresponding YPT was placed directly under the middle wall of each MT. The material was collected by T. Domingo-Quero, and the tachinids from this investigation were recently identified by H.-P. Tschorsnig (see Tschorsnig et al. 2007). Table 2 gives the number of specimens in relation to the altitude of the localities, as well as the percentage YPT-specimens/total number of specimens. It is obvious at first glance the YPTs were clearly more effective than Malaise traps in high altitudes. A possible explanation would be that YPTs are more efficient in cold weather (which prevails in high altitudes).

So my advice for optimizing the yellow pan trap method for collecting Tachinidae is as follows:

### Table 1. Tachinidae collected in Western Spain (Villar de Ciervo, Las Coronas) in yellow pan traps.

<table>
<thead>
<tr>
<th>Date</th>
<th>Exposure period (days)</th>
<th>Average number of specimens per YPT per day of exposure</th>
<th>Number of species collected in YPTs</th>
<th>Estimated temperature in relation to the average seasonal condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>First half of exposure period</td>
<td>Second half of exposure period</td>
<td>First half of exposure period</td>
<td>Second half of exposure period</td>
<td></td>
</tr>
<tr>
<td>May 1999</td>
<td>4</td>
<td>0.2</td>
<td>5</td>
<td>cold</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1</td>
<td>2</td>
<td>very warm</td>
</tr>
<tr>
<td>Febr. 2001</td>
<td>4</td>
<td>5.1</td>
<td>7</td>
<td>cold</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.7</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>April 2001</td>
<td>10</td>
<td>4.4</td>
<td>15</td>
<td>“normal”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.5</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>March 2002</td>
<td>4</td>
<td>15.6</td>
<td>20</td>
<td>cold</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.8</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>April 2002</td>
<td>4</td>
<td>18.0</td>
<td>20</td>
<td>cold</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12.7</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>June 2003</td>
<td>10</td>
<td>0.7</td>
<td>15</td>
<td>warm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.3</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>May 2005</td>
<td>6</td>
<td>2.0</td>
<td>19</td>
<td>“normal”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.0</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>May 2007</td>
<td>6</td>
<td>3.3</td>
<td>29</td>
<td>cool</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.5</td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 shows considerable differences in the average number of collected specimens (0.1–18.0 specimens per YPT per day of exposure). Those differences are due to the species composition and the population density of the single species, which vary seasonally and from year to year, and they are of course also influenced by the weather conditions during the exposure. It is impossible to isolate the different ecological factors in a field investigation, but there are two relations which I feel can nevertheless be inferred from Table 1:

**1)** It is obvious that distinctly fewer specimens are collected in the second half of the exposure period than in the first half; this is not quite as evident with the number of species, but still remarkable. An explanation is perhaps not so difficult: “stationary” specimens are collected first and are not so quickly replaced by subsequent migrating specimens, so after a certain time there are less specimens available which can enter a trap (in most cases this effect was already noticeable after one or two days of exposure).
1) When collecting at a given locality it would be more effective to choose a different place for the traps after an exposure of 1–3 days. This should yield better results than a long-time investigation with the traps in exactly the same place.

2) Yellow pan traps should preferably be operated during cold or cloudy weather, spring is better than summer (because there are more cold days), and their placement on colder mountains is possibly more effective than on warm plains.

References

**Lixadmontia franki** Wood and Cave released to control the Mexican bromeliad weevil (by R.D. Cave)

The Mexican bromeliad weevil, *Metamasius callizona* (Chevrolat), has been destroying 12 of south Florida’s 16 native species of bromeliads since 1989. In 1993, a tachinid fly parasitizing the bromeliad-eating weevil *Metamasius quadrilineatus* Champion was found in the montane forests of Honduras. It turned out that the fly was a new species, and was recently described and named *Lixadmontia franki* Wood & Cave in honor of University of Florida Professor J. Howard Frank. Early observations in the laboratory indicated that the fly readily parasitizes the larvae of the Mexican bromeliad weevil, thus becoming the focal point of a biological control program directed against the “evil weevil”.

![Figure 1. Cage for exposing weevil-infested pineapple crowns to *Lixadmontia franki* in the laboratory. Photo by R. Cave.](image)

Female *L. franki* are ready to find hosts approximately eight days after mating. It is unclear yet whether the female fly deposits mature eggs or neonate larvae deep among the bases of the leaves of a weevil-infested plant. Whichever the case, the young maggot burrows through the macerated plant tissue and frass to contact and penetrate the host to live as an endoparasitoid. Preferred hosts are attacked while in the 3rd to 5th instar. Parasitized weevils continue to feed and often advance to the next instar; they may even construct a pupal chamber made of macerated plant tissue and saliva. However, parasitized weevils always die before pupating. Usually, only one mature *L. franki* larva emerges from a parasitized host, but it is not uncommon to see two or three larvae come out of a cadaver. On occasion, as many as 5–9 maggots may emerge from a single host; in these cases, the resulting adult flies are much smaller than their solitary counterparts. One to two days after emerging from its host, the fly larva will pupate. Total time from penetration of a host to pupation is 2–3 weeks at 21°C; pupal incubation time is 3 weeks.

The technology for producing large numbers of *L. franki* in the laboratory was initially developed at the Escuela Agrícola Panamericana in Honduras. Larvae of *M. quadrilineatus* were placed inside pieces of bromeliad stem set in plastic cups. Weevil feeding on the plant material was necessary for successful parasitism. Most final instars of the parasitoid exited their host 13–16 days after initial exposure of hosts to the parental flies. This technology was subsequently refined and expanded in the quarantine facility at the University of Florida’s Hayslip Biological Control Research and Containment Laboratory at the Indian River Research and Education Center in Ft. Pierce. Pineapple crowns obtained from local grocery stores are exposed to *M. callizona* females for 1 week. The pineapple crowns are held at 25°C for 3 weeks, at which time the weevil larvae inside the crowns should be in the 3rd instar. Twelve infested crowns are placed five days per week in a large parasitization cage (Fig. 1) containing 150–300 adult *L. franki* of mixed ages. Because the parasitization cage is located in a greenhouse with temperature (18–23°C) and relative humidity (>80%) controlled, natural sunlight enters the cage. We have noticed flies mating more frequently on sunny days than cloudy days and more often during the afternoon hours. The pineapple crowns remain in the cage for 10 days. Afterwards, the crowns are placed in a smaller cage to monitor the emergence of any adult flies that were hiding in the crowns at the time of their removal from the parasitization cage. Weevil larvae are collected from the pineapple crowns, placed in plastic cups and fed fresh pineapple leaves twice weekly. Puparia of maggots that emerge from hosts are held in cups with moistened paper towel and held in a rearing room at 21°C and with >70% RH. As adult flies emerge, they are sexed and either
placed in the breeding colony or accumulated in a small portable cage to await release in the field.

From June 2007 to January 2008, 13 field releases of *L. franki* adults were made at six sites throughout south Florida. A total of 313 flies were released on June 29, September 21 and December 14 at Lake Rogers State Park (Hillsborough Co.) (Fig. 2). At Loxahatchee National Wildlife Refuge (Palm Beach Co.), 333 flies were released on July 20, October 12 and January 11. A total of 350 flies were released at the Enchanted Forest (Brevard Co.) on August 3, October 26 and January 18. At the Big Cypress National Preserve (Collier Co.), 209 flies were released on August 29 and November 21 (Fig. 3). Additional releases include 105 flies on October 5 at Highlands Hammock State Park (Highlands Co.) and 51 flies at Savannas Preserve State Park-Miller Tract (St. Lucie Co.) on November 16. The number of flies released on a date varied from 51–164 with an equal sex ratio or slight female bias. Total number of flies released during the period was 1,359. The tree vegetation at these sites varies from mixed pine-oak to oak-palm to cypress. Flies taken to the release sites were 5–10 days old as adults. Releases always took place at about 9:00 am in an area where a large weevil population was known to exist.

![Figure 2. Ron Cave and Howard Frank releasing *Lixadmontia franki* at Lake Rogers State Park, 29 June 2007. Photo by Celia Branch.](image)

Evaluation of establishment of *L. franki* is conducted by University of Florida graduate student Teresa Cooper and begins 6 weeks following a release. The procedure uses sentinel pineapple crowns infested with 3rd instar weevils. These are placed at the release site in 0.6 x 0.6 x 0.1 m trays. Six crowns are placed in each tray and six trays are placed in the site each evaluation period. The trays are suspended in trees with at least five medium to large bromeliads and marked off to each cardinal direction from the center of where the fly was released. Two trays are suspended near the central point of the release site.

The sentinel pineapple crowns are collected after they have been in the field for 2 weeks, and then taken to the laboratory where they are held in cages for emergence of adult flies. Once the sentinel plants reach an advanced stage of decomposition, they are dissected and all weevil larvae are removed and placed in plastic cups with food. The larvae are monitored daily for pupation (= unparasitized) or emergence of fly larvae (= parasitized). Establishment is determined by the presence of the fly’s F2 generation in the exposed weevil hosts in the sentinel pineapple crowns.

![Figure 3. Mike Burton (behind cage) and Teresa Cooper releasing *Lixadmontia franki* in a cypress swamp in the Big Cypress National Preserve, 29 August 2007. Photo by Heidi Rhoades.](image)

So far, *L. franki* has only been recovered at one site in one evaluation period, at the Lake Rogers Park following the first release on June 29. Two adult females emerged from the sentinel pineapple crowns and host cadavers were found in the decomposed plant material. Since *L. franki* originates from cool, shady, moist, high elevation tropical forests, there has been concern about the fly’s ability to adapt to a hot, sea level, subtropical environment. This recovery confirms that released *L. franki* females are able to find hosts in native bromeliads and host cadavers were found in the decomposed plant material. Since *L. franki* originates from cool, shady, moist, high elevation tropical forests, there has been concern about the fly’s ability to adapt to a hot, sea level, subtropical environment. This recovery confirms that released *L. franki* females are able to find hosts in native bromeliads during the humid but hot Florida summer, their adult progeny are able to find mates in subtropical oak hammocks, and the F1 females are able to locate infested pineapple crowns to produce a second generation. As additional releases continue, establishment may be aided by the cooler but drier winter and spring months.

The ultimate goal of the project is to reduce the populations of the Mexican bromeliad weevil such that it is no longer a significant ecological pest of an important...
part of Florida’s natural heritage, its native bromeliads. Once this goal has been achieved, a program for repopulating devastated areas with small plants grown from seed specifically collected from a number of hard-hit areas can begin.

### Tachinid collecting in southwest New Mexico and Arizona during the 2007 NADS field meeting (by J.O. Stireman III)

#### Introduction

The 2007 field meeting of the North American Dipterists Society (NADS) was held August 13–16 in southwestern New Mexico, centered in Silver City (at Western New Mexico University), and the surrounding Gila National Forest. This was the first NADS meeting that I have been able to attend, and I think I can speak for all in saying it was enjoyable, productive, and interesting; an overall success. A more detailed account and evaluation of this meeting is available in the 2007 Fly Times article (O’Hara 2007).

Although the function of the NADS field meeting is partly to encourage interaction and scientific discussion and to serve as a forum for presentation of research and updates of dipterological activities, collecting remains an integral part of the meeting. The focus of my collecting was Tachinidae, the family on which I focused ecological and systematic studies while a graduate student in Arizona. This family appears to be particularly diverse in the southwestern region of North America, perhaps due to incursion of more tropical species and genera into this region and to the diversity of habitat types. Jim O’Hara, organizer of the NADS meeting and fellow tachinid admirer, has focused considerable attention on this region, making many trips over the years and describing many new taxa (e.g., O’Hara 1984, 1993, 2002). Here I provide an overview of the species that I collected during the NADS meeting in the area of southwestern New Mexico and southeastern Arizona.

#### Methods

All tachinids were hand collected with an insect net from foliage, rocks, or the air, except a few species that were collected in association with carrion baits that Terry Whitworth was kind enough to separate from his calliphorids and pass on to me (see Signal Peak collection and August 13, Cherry Creek collection in Table 1). Most collecting occurred between 9 am and 3 pm, however, the Molino basin collections were between 5 and 7 pm, and the Box Canyon specimens were collected at a UV light between 9 and 11 pm. I spent only one half day on the productive Gomez peak hilltop, and this occurred after Jim O’Hara and Monty Wood had each been there at least once in preceding days collecting large numbers of tachinids. It is possible that they may have depleted the numbers of some of the rarer species on that particular hilltop.

Identifications were made with generic and species keys and descriptions from the literature (see O’Hara and Wood 2004) with particular reliance on Monty Wood’s (1987) key to Nearctic genera. Specimens were also compared to previously identified material in my collection. These identifications should be considered preliminary as I have yet to verify most of them with reference to reliably identified specimens in a major collection. For many groups, I was unable to make a specific identification, or I felt uncertain about the identification made (these are indicated by question marks). Some specimens appeared to be quite similar to described taxa, but differed in one or more obvious characters. These may represent intra-specific variants (as I usually had limited specimens to examine), or distinct species. They are indicated by (“nr.” species epithet).

#### Results and Discussion

In spite of the relatively limited collecting effort, a total of 139 individual tachinids were collected over a period of five days, representing an estimated 62 species (many of them unidentified morphospecies) (Table 1). I was only able to focus on collecting (i.e., spend at least 4 hours) on two of the five days, and these were spent at Gomez Peak (NM) and Cherry Creek (NM), (about 6 hours collecting each). Thus, these sites represented the bulk of the diversity and number of tachinids collected (44% and 28% of the total tachinids collected, respectively). Given the limited time I spent collecting and the limited number of sites I visited, along with my observations of tachinids collected by other dipterists at the meeting, this appears to be a small fraction of the local tachinid diversity in the region.

A few notable tachinid taxa included: *Euchaetogyne roederi* (Williston) (a large *Belvostia*-like dexeine tachinid that was common at the Cherry Creek site, but that I have seen nowhere else; Fig. 1), *Pararchytas apache* Woodley (described from the area by Norm Woodley, a NADS participant), the *Dolichocodia* specimen (bearing a remarkable resemblance to a calliphorid; I am uncertain whether the specimen belongs to this genus), and the attractive *Uramya* species (in which the males bear tail-like extensions of tergite 5).

Overall, there was a strong male bias in the collected specimens (72% male) as generally tends to be the case with hand collecting. As one might expect, this male bias was particularly strong for the hilltop site (Gomez Peak; 95% male), but it was also present at the creek-side site (Cherry Creek; 61% male). Interestingly, some small collections that were made in the afternoon (Molino Basin) and at a UV light (Box Canyon) were dominated by females (33% and 25% male, respectively), though the sample sizes were quite small.
Interestingly, there was relatively low overlap between the taxa collected hilltopping on Gomez Peak and those collected by sugaring and hand collecting at Cherry Creek, despite the relatively close proximity of these sites (ca. 10 km apart). In fact, only a single species was shared between the two sites (Peleteria malleola), resulting in a Jaccard similarity index of 2.3%. The Gomez peak site was overrepresented by hilltopping Dexiini (e.g., Pitlodexia), Tachinini (e.g., Peleteria) and Gonini (e.g., Patelloa, Gaediopsis), whereas at the creek side site Blondelini were more abundant. It is unclear whether the large Tachininae found at carrion baits indicate a special attraction of those taxa to carrion, as it may be that smaller tachinids were relatively ignored by the collector who was focusing on Calliphoridae. More comprehensive sampling of these habitats would almost certainly increase this overlap, but it is likely that additional habitats not sampled would also have distinct communities with relatively little overlap. These results also reaffirm the importance of using multiple collecting strategies when seeking to maxi-

### Table 1. Species of Tachinidae collected during August 12–17, 2007 in southern New Mexico and Arizona. Collections are broken down by site and sex (male or female).

<table>
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<th>Species</th>
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mize species diversity. It would be interesting to examine species overlap between these collections I made and those of other collectors who attended the NADS field meeting, given that we collected at many of the same sites. I suspect that there would be considerable variation in the taxa collected, attesting to the rich and varied tachinid fauna of the region.

![Figure 1. Euchaetogyne roederi (Williston) from Cherry Creek, Gila National Forest, NM. (Photo by Steve Marshall.)](image)

Acknowledgements

I would like to thank Jim O’Hara for doing a great job organizing the NADS field meeting in New Mexico and my lab technician Hilary Devlin for helping to compile the species lists.

References


Some interesting Tachinidae from Israel (by C. Bystrowski and T. Zeegers)

The tachinid fauna of Israel is relatively well known due to the many contributions by J. Kugler. However, during the last twenty years little attention has been paid to the Israeli tachinid fauna.

In 2006, the first author together with Krzysztof Szpila from Nicolaus Copernicus University in Toruń (Poland) (Fig. 1) collected flies during a 20-day expedition to Israel (8–28 May 2006).

The Golan Heights region, numerous localities in the Negev Desert and some places near Eliat were visited. The most interesting place in Negev Desert seems to be En Avedat National Park (Fig. 2) near Sede Boqer, where we spent more than two weeks.

In addition to our collecting, the first author studied the Tachinidae collection in the National Collection of Insects at Tel Aviv University (TAU). During the two days of investigation two new species for the fauna of Israel were found: *Graphogaster buccata* and *Zeuxia tricolor* (see below).

In this contribution, we mention some of the most interesting species found or recorded as new for the fauna of Israel.

![Figure 1. Cezary Bystrowski (left) and Krzysztof Szpila, southern Dead Sea area (16.v.2006). (Photo by K. Szpila.)](image)

Metacemyia aartseni Zeegers, 2007


Only very recently described by Zeegers (2007) from Yemen. First record for Israel. It now seems that *M.
*aartseni* might occur much wider on the Arabian Peninsula. The species is quite similar to *M. calloti* (Séguy, 1936). In direct comparison, the head profile is different (Fig. 3); in *M. aartseni* the height to width ratio in lateral view is even higher than in *M. calloti*. Other structural differences can be found in the key by Zeegers (2007).

**Figure 2.** Vadi Nahal Zin in En Avedat National Park near Sede Boqer. (Photo by C. Bystrowski.)

*Cestonia grisella* Mesnil, 1963
1♂: Israel, En Avedat, near Sede Boqer, Negev, 17.v.2006, leg C. Bystrowski.
2♀♂: Israel, En Avedat, near Sede Boqer, Negev, 24.v.2006, leg C. Bystrowski. Originally described from Tadzhikistan. First record for Israel, as far as we are aware.

**Amphicestonia dispar** Villeneuve, 1939
Already mentioned for Israel by Herting (1984).

**Figure 3.** Heads of females of *Metacemyia* in profile. Left: *M. aartseni* from Yemen. Right: *M. calloti* from Yemen. (Photo by T. Zeegers.)

*Steleoneura czernyi* Stein, 1924
Specimens were collected on the typical “hilltopping” place—the stones and walls of a scenic point near Hazewa. Already mentioned for Israel by Herting (1984).

**Opesia grandis** (Egger, 1860)

**Cestonioptera mesnili** Villeneuve, 1939
First record for Israel. Species known from North Africa (Tunisia).

**Zeuxia tricolor** Portshinsky, 1881
First record for Israel. Species known from Europe: Bulgaria; Asia: Turkey, Armenia.

**Graphogaster buccata** Herting, 1971
First record for Israel. Species known from Europe: Finland, France, Germany, Switzerland, Italy and Greece.

**Acknowledgements**

The first author would like to express special thanks to Dr. Amnon Freidberg (Curator of the National Collection of Insects, Tel Aviv University) for all of his help during the visit and study of the Tachinidae collection and to Prof. Yoram Ayal, Mitrani Department for Desert Ecology, Ben-Gurion University of the Negev, for access to excellent facilities and for providing a base for field research.

Expeditions was supported by Grant no. 272-05-0431 from the Danish Natural Science Research Council to Thomas Pape, and the Forest Research Institute in Sękocin Stary (Poland).

**References**


**Internet as a source of tachinid faunistics (by T. Zeegers*)**

*With the assistance of R. Andrade (Portugal), L. Bouwmans (The Netherlands) and A. Wet (Israel).

The Internet is now well established as a relevant source of scientific information. Recently, the Internet has also become a valuable source of original data. This is mainly due to the generally good quality pictures made possible by the latest generation of digital cameras.
Dipterists and even non-dipterists post these pictures at special websites in order to get them identified by specialists.

As an example, I discuss some cases of tachinid records from the website www.diptera.info, which is based in The Netherlands and therefore is European oriented. Of course, common and conspicuous species such as *Eriothrix rufomaculata* (Degeer, 1776), *Tachina fera* (Linnaeus, 1761) and *Epicampocera succincta* (Meigen, 1824) are often posted. It is remarkable how many Tachinidae actually can be identified with reasonable certainty, if one has thorough knowledge and experience with the given fauna. Of course, difficult groups like *Siphona* can hardly ever be identified from pictures.

*Phasia aurigera* (Egger, 1860) is an example of a species in which the identification is straightforward, even from pictures. In 2006, a large influx of this conspicuous species reached the eastern part of The Netherlands. It was found by several dipterists. However, the size of this influx became only apparent by the many records posted on www.diptera.info. To put it bluntly, it seemed that every entomologist with a camera photographed this species in September in the given area. The number was remarkable, since the first record of *Phasia aurigera* from The Netherlands dates back only as far as 2005. Meanwhile, in 2007 this species reached Denmark for the first time. Again, it was posted at www.diptera.info. This rapid expansion resembles the expansion by *Phasia barbifrons* (Grischner, 1887) in the early 1990s. If the same pattern is followed, then *Phasia aurigera* should reach Britain within five years. I bet the first record will be on the Internet.

![Figure 1. Abdomen of the male *Campylochaeta ?inea* from Portugal, showing distinct marginal setae on syntergite 1+2.](image)

*Notes on the egg production of Nemorilla pyste* (Walker) and *Nilea erecta* (Coquillett) (by N.G. Wiman)

The proportion of the total lifetime complement of eggs that are mature upon emergence to the adult stage is an important foundation of parasitoid ecology. Parasitoid egg maturation strategies vary from proovigenic, where the lifetime egg complement is developed and present at emergence, to synovigenic, where eggs are matured from basal oocytes over the course of adult life (Flanders 1950). Very few parasitoids are truly proovigenic; most species can be classified along a gradient of synovigeny, from weakly synovigenic (near proovigenic), to highly synovigenic (Jervis et al. 2001). Parasitoid longevity, expected host encounter rate, egg resorption, and nutritional needs of parasitoids are related to the rate and timing of egg production (Ellers et al. 2000, Jervis et al. 2001). Egg production also has behavioral implications because it is an important determinant of egg load, which can affect parasitoid decisions such as when to superparasitize a host (e.g., Fletcher et al. 1994).

*Nemorilla pyste* and *Nilea erecta* have disparate egg maturation strategies. The differences provoke some interesting questions about their ecology, and ultimately, their role and value as biological control agents of obliquely-banded (*Choristoneura rosaceana*) and Pandemis (*Pandemis pyrusana*) leafrollers (Lepidoptera: Tortricidae) in Pacific Northwest orchards.

*Nemorilla pyste* is a winthemiine, and the dehiscent eggs are large (~0.7mm) relative to female flies (4.0-7.5mm, O’Hara 2005). The lack of uterine incubation in this species necessitates the allocation of substantial
material into the chorion so that the eggs are durable enough to prevail through the external incubation period on the host. The size and hardiness of the eggs suggest that eggs represent substantial reproductive investment, and this may be the reason that female *N. pyste* are apparently capable of maturing only 4–8 eggs in each ovary at a time (Fig. 1). Virgins apparently have only 1 or 2 mature eggs per ovary at emergence. Average lifetime fecundity of *N. pyste* in the lab is 104 eggs per female, so this species is highly synovigenic. These results should be regarded as preliminary, and thus far, my efforts to count the basal oocytes and ovarioles have been unsuccessful.

By contrast, in *Nilea erecta*, an eryciine, the eggs are small (~0.2mm) relative to females (4.0-6.5mm, O’Hara 2005). The cylindrical membranous eggs are fully incubated in the uterus and are distributed onto foliage where they hatch in a short time. Each ovary of this species contains hundreds of eggs in various stages of development (Fig. 2). The developmental stages of the eggs are clearly visible along each ovariole, with the larger, more developed eggs closer to the oviduct at the base of the ovary. Clearly, *Nilea erecta* is much less synovigenic than *N. pyste*. However, lifetime fecundity has not yet been determined for this species because of the difficulties involved. The act of oviposition is rapid and therefore easy to miss. Parasitism is not a good indicator of fecundity because maggots are responsible for host penetration, and they are not always successful.

These ovigenic differences between *N. pyste* and *N. erecta* suggest that these flies are quite different ecologically and practically from an applied perspective. Based on the analysis of Jervis et al. (2001), one might predict from the degree of synovigeny that *N. pyste* is long-lived, a frequent feeder, and is probably not able to respond to increases in host density since egg production is constrained. *N. erecta* however, is probably relatively short-lived, a less frequent feeder, and may be capable of responding to increases in host density by ovipositing at a greater rate. I will be testing these predictions in the laboratory.

**Figure 1.** Ovipositor and ovaries (arrows) of a freshly emerged *N. pyste* female stained with acid fuchsin.

**Figure 2.** A single ovary of a freshly emerged *Nilea erecta* female stained with acid fuchsin.

### References


### ANNOUNCEMENTS

**Request for specimens – Theo Zeegers**

I have finished my study on the Tachinid of Yemen. Now, my interest have moved to the north of the Arabian Peninsula, with my source, to the United Arab Emirates. Any material from Arabia is highly appreciated.

### 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/Bib/biblio.htm. Articles from The Tachinid Times are now included in this tachinid bibliography. 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 Mahony for maintaining our EndNote® libraries of tachinid literature and for performing the online searches that contributed most of the titles given below.


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