The Tachinid Times

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This issue marks the eighth year of **The Tachinid Times.** It is the largest issue so far, with the largest mailing list as well (90). I hope you find this issue of interest. To keep this newsletter going, remember to contribute some news from time to time. As usual, the next issue will be distributed next February.

The Caterpillars and their Parasitoids of a Tropical Dry Forest (by D.H. Janzen)

Project name: The caterpillars and their parasitoids of a tropical dry forest, Guanacaste Conservation Area, northwestern Costa Rica.

Project goal: To determine the host-plant specificity of the entire set of macro caterpillars (and miners where feasible) for the tropical dry forest in the Guanacaste Conservation Area in northwestern Costa Rica (0-300 m elevation, six month dry season, total annual rainfall 800-2400 mm). Simultaneously, to map the host-specificity of the parasitoids of these caterpillars onto their hosts. The focus is on parasitoids that oviposit in or on caterpillars; those that oviposit into eggs and pupae are taken opportunistically. Tachinidae are major parasitoids in this system, along with Ichneumonidae, Braconidae, Eulophidae and a variety of hymenopterous hyperparasitoids. The project began in 1978 and will continue into the indefinite future.

Project support: Most of the funding has come from the US National Science Foundation (Biotic Surveys and Inventories), with important additions from INBio (Instituto Nacional de Biodiversidad, Costa Rica); Merck & Co.; the ICBG grant through NIH; Centre for Land & Biological Resources Research; AAC; and Systematic Entomology Laboratory of the USDA). Current NSF support is for three years beginning August 1994.

Basic methodology: A team of (currently 9) Costa Rican paraecologists range throughout all habitats night and day searching opportunistically and directedly for Lepidoptera larvae. These habitats are "wild", though they represent the earliest stages of succession to virtually undisturbed forest. When a caterpillar is found it is placed in a plastic bag with its presumed food (normally this is the plant on which it was found). If it feeds, it is then given a unique voucher number (e.g., 94-SRNP-7857; this would be the 7857th caterpillar recorded in 1994; SRNP stands for Santa Rosa National Park, which is today the Santa Rosa Sector of the GCA). That voucher number is written on the plastic bag. The collection information is recorded in field notebooks by the collectors, and this information is later computer-captured into a Filemaker Pro 2.0 flatfile database (details available on request). The larva is reared until it generates an adult, dies, generates a parasitoid, etc. Familiar species of Lepidoptera are identified in the field, and more confusable species are sent off to specialists. As the project develops, more and more species become identifiable in the field. Approximately 700 species of Lepidopterea are currently at the latter stage.

All parasitoids and their remains (cocoons, puparia, etc.) are preserved along with the adults. They receive the same voucher number as the caterpillar from which they came (eventually, individual bar codes will be assigned to each individual item – adult moth, pupal case, fly, puparium, head capsule, etc.). Adult parasitoids are sent at intervals to specialists in that group, and over the years worked closer and closer to formal identifications (as is usual in entomology). Monty Wood (non-*Belvosia* spp.) and Norm Woodley (*Belvosia* spp.) have been religiously and heroically doing the tachinid identi-

fications, first to morphospecies, and then group by group and species by species, getting them to have real Latin names. Manuel Zumbado (see below) is rapidly becoming a member of this identification team. The non-*Belvosia* tachinids are currently deposited in the Canadian National Collection in Ottawa but are on long-term loan as specimens belonging to INBio; the same may be said for the *Belvosia* at the USNM. When the study is completed, selected specimens will be donated to these institutions and the remainder returned to INBio.

Tachinidae: Over time we are generating an ever-improving photograph of the interactions between a given taxon and its hosts, and vice versa. No tachinid biology papers have yet been published from this study (though this study inspired the comments about Tachinidae by Gauld, I.D., Gaston, K.J. and D.H. Janzen in "Plant allelochemicals, tritrophic interactions and the anomalous diversity of tropical parasitoids: the 'nasty' host hypothesis", 1992, Oikos 65: 353-357). The first tachinid paper is likely to be on the systematics and biology of the 13 species of *Belvosia* in the study site.

It might be of interest to the group of newsletter receivers to hear a few quite general comments from the tachinid rearings:

1. The caterpillar database currently contains 44,214 records, and is growing at a rate of about 11,000 records per year. Of these 44,214 records, there were 3,067 caterpillars that generated tachinids (we will not get identifications for all of these because in some cases the fly larva died rather than develop to adult). This is 6.94% and appears to be a fairly robust figure, as it has stayed the same for the past three years. This figure pools across all caterpillar taxa and instars of caterpillars. By way of comparison, the combined figure of all Hymenoptera parasitoids in the same batch of caterpillars is 3-4%.

2. When rearing in the presence of micro-egg layers (*Belvosia*, etc.) there is a mild problem with the "percent caterpillar attacked" calculations because the food brought in for the caterpillar may have micro-eggs on it. Strictly speaking, the only way to avoid this distortion would be to have a caterpillar-free greenhouse where food is raised to feed to wild-caught caterpillars.

3. "Percent caterpillars attacked" is a calculation that is overall never strictly accurate in representing the real world, since the act of collecting the caterpillar removes it from attack through whatever would have been the remainder of its free-living larval life.

4. Some unknown number of caterpillars that "die of disease" were in fact killed by tachinid larvae that themselves died without the rearer being able to detect this parasitization.

5. *Belvosia* is extremely host-specific, and several species of *Belvosia* unambiguously seek the species of caterpillar rather than its host plant. Some other species of *Belvosia* are local habitat-specific.

6. Some tachinids are dumbfoundingly generalist, and far more generalist than are any species of caterpillar-attacking Hymenoptera. *Lespesia aletiae* is one such extreme generalist, with its hosts ranging from tiny Lycaenidae to huge Saturniidae. But not all species of *Lespesia* are that way. For example, one unidentified species of *Lespesia* attacks only *Rothschildia erycina*, a relatively scarce saturniid.

7. We almost never have two species of tachinids successfully emerging from the same species of caterpillar (we have no idea of how many unsuccessful cases there are).

8. The usual number of tachinid species using a given caterpillar species is in the 0-3 range. The local "world record" at this moment is nine species reared from one species of caterpillar (1447 wild-caught caterpillars of *Hylesia lineata*, a saturniid, with 137 of these caterpillars having been parasitized by some species of tachinid).

9. Virtually all species of Tachinidae show no dormancy as puparia except for *Metavoria*, which characteristically becomes dormant in the puparia and then members of a given clutch eclose at long intervals over a year or more.

10. We have a number of species of flies that apparently are remaining as dormant, or at least non-growing, very young instars (first?) until long after pupation of the caterpillar, and then turning on and eating and eclosing about the time that the unattacked pupal population is doing the same thing. These tachinids are therefore "dormant" during the second half of the rainy season and all of the six month dry season, though not as puparia.

11. All evidence points to massive migration of Tachinidae in and out of this dry forest, movement that is associated with the seasonal caterpillar population high (very high for the first two months of the rainy season, mid-May to mid-July) and low (very low for the rest of the year). Whether these migrants are just going up to the mountain tops (10-15 km to the east of the study site, Volcan Cacao and Volcan Orosi) and putting themselves in cold storage, or going over to the eastern side of Costa Rica and having more generations in the rainforest, I cannot say.

12. When rearing a clutch of puparia from a single caterpillar, if X of them eclose over 1-2 days and Y of them appear dead, do not throw them out. These "dead" puparia commonly have hyperparasites in them (Chalcidae, Perilampidae, Trigonalyidae), and the hypers tend

to use 1-3 weeks longer for development than do the flies.

13. The word "parasitoid" is convenient for us, but extremely inconvenient when talking with lay audiences accustomed to the dichotomy between predator and parasite.

Problems and requests: Since I spend 8-10 months of each year in Costa Rica guiding this project, among other things, I do not have time to get to libraries to try to keep track of current or even old literature on Tachinidae. I am focused on getting new information in the field. However, it is obvious that if I knew what is already known, I could do a better job of understanding what I see. The review paper that Brian Brown and Don Feener are writing on Tachinidae biology will obviously help me very much [Ed. note: the review paper will cover all Diptera parasitoids]. However, also, in this context it would be very much appreciated if any tachinidologist having papers dealing with the natural history of tachinids in general, and with any aspect of taxonomy of taxa that are Neotropical, would be so kind as to send me a reprint to my Philadelphia address. I will read them and learn from them. It would be much appreciated also if you would be willing to make a second mailing of the same reprints to Sr. Manuel Zumbado, Inventory Manager for Tachinidae (see address in mailing list), and introduce yourself at the same time. Manuel is extremely interested in tachinid biology and busily learning tachinid taxonomy on his own and through apprenticeship to Monty Wood and Norm Woodley.

Second, if you have any information at all on *Belvosia* anywhere, I would very much like to hear of it so that we have a chance to include it in the literature review of the biology of this genus at the beginning of the anticipated paper on *Belvosia* biology.

Third, if you have a specific request as to what we might know of a particular species or genus that we might have reared in this study, I will be happy to look it up in the database and try to get it to you. This will be easiest if the request is by e-mail, but it can also be by FAX. I can do the best job if you tell me why you want the information.

I hope that the database itself will be available over Internet before the end of 1995, through the INBio WWW server in Costa Rica. At that time you will be able to look up your own information.

For more details write to Daniel H. Janzen (addresses in USA and Costa Rica are given in mailing list). Dan will be in Costa Rica Jan-Aug 1995 and in Philadelphia Sep-Dec 1995.

Book Review: Catalogue of Palaearctic Diptera – Tachinidae, by Herting and Dely-Draskovits (by J.E. O'Hara)

(Reviewed for the publisher.)

The Tachinidae are catalogued along with the Anthomyiidae and Rhinophoridae in Volume 13 of the *Catalogue of Palaearctic Diptera*, issued 15 December 1993 by the Hungarian Natural History Museum (series edited by Á. Soós and L. Papp; Tachinidae authored by B. Herting and Á. Dely-Draskovits). The Tachinidae portion of the volume is the largest, with the taxonomic part occupying pages 118-458 and the bibliography and index (for all three families) covering the remainder of the 624-page book. The cost is $85.00US plus $5.00US for postage and handling, and may be ordered from the Hungarian Natural History Museum Library, Baross u. 13, Budapest VIII, H-1088 Hungary (FAX: 36-1-113-8820). Only the Tachinidae part of the catalogue is reviewed here.

Those familiar with Herting's (1984) *Catalogue of Palearctic Tachinidae* (Stuttg. Beitr. Naturk. (A) 369), know it to be an extremely fine piece of work in both substance and detail. It contains very few typographical errors or omissions. I am aware of only one valid Palearctic species missing from the text: *Carcelia dilaticornis* Mesnil (1950b, Rev. Zool. Bot. Afr. 43: 14), described from the Atlas Mtns. of Morocco. (This name is missing from the 1993 catalogue as well.) There are a few nomenclatural decisions that would not be sanctioned by the International Code of Zoological Nomenclature, but they are minor and reflect the personal opinions of the author.

If the reader is fortunate enough to have a copy of Herting's (1984) catalogue (now unavailable), hang on to it! The new catalogue by Herting and Dely-Draskovits is not an updated version. The literature has not been updated beyond that of the 1984 catalogue except that "some papers of fundamental nomenclatural or taxonomic importance have also been listed but no new taxa published after 1982" (p. 5). This statement is not accurate. Some papers dated as recently as 1987 have been added, but these are not more important than those excluded. For example, some of Shima's papers have been added and some not, but the included ones are not more significant than the others. Furthermore, some of the taxa described in the included papers are in the text and others are not! So, treat the bibliography with caution for entries after 1982.

The 1993 catalogue conforms in style to past volumes in the series. The typefaces are well chosen, permitting genera, subgenera, valid species, synonyms, etc., to be distinguished with ease. Some differences

from the 1984 catalogue are worth noting. Original spellings are used rather than emendations, so names like *Ceromya* and *Chetogena* are not spelled as *Ceromyia* and *Chaetogena* (this in keeping with the ICZN). Species described from (and limited to) Taiwan (as Formosa) have been deleted. The names of more than 1000 doubtful species have been added. The sex of primary types has been deleted. The names of generic synonyms are now grouped under the valid genus name rather than separated among the subgenera. Each entry is longer because an abbreviated journal title is included (useful for looking up descriptions quickly), and "Type-locality" is written out in full for each name (this could easily have been left out, with the type-locality understood to be the place names preceding "Distr."). The very useful 142 notes on taxonomy and nomenclature listed at the back of the 1984 catalogue have been removed; these notes may not belong in a proper catalogue but they are of special value to tachinid specialists. The index conveniently combines generic and specific names (these names were split between two indices in 1984), but unfortunately and necessarily includes the Anthomyiidae and Rhinophoridae.

On a critical note, the new catalogue has not been as meticulously proofed as its predecessor. The introduction, covering two pages, contains at least eight typographical or grammatical errors. The rest of the text is much better, though not as good as the 1984 catalogue. A check of the entries for the large genus *Exorista* revealed just one error – the page of description of *Exorista xanthaspis* (Wied.) should be 314 (as listed in 1984) not 341. A perusal of the index uncovered an unusual and recurring error in alphabetization. Long names beginning with the same letters as shorter names are frequently out of order. Among the s's, for example, *servadei* precedes *serva*, *socialis* is in a series of *socia*, *stackelbergiana* is in a series of *stackelbergi*, and *Steinia*, *Steiniella* and *Steiniomyia* are in a series of *steini*.

Despite the fact that this catalogue is outdated by 11 years, it is still an indispensable guide to the Palearctic Tachinidae. It is a reference work that belongs on the shelves of entomological libraries everywhere, as does the rest of the volumes in the series. Individuals already possessing Herting's (1984) catalogue may choose to pass on buying this catalogue unless they are tachinid specialists, for most users will not find the minor differences in substance worth the purchase.

Confusion in Paradise (by N.L. Evenhuis)

We've got a new introduction (relatively new – it's been here for a few years now) in Hawaii of a tachinid. I was only able to get it to tribe. I passed it along to Bryan Cantrell, who agreed with the tribe and said the genus was *Phasioormia*, but didn't know the species. I then had Hiroshi Shima here at the Bishop Museum and he agreed that it was *Phasioormia* and then told me about how they cue in on cricket calls. That got me to thinking that it was probably introduced along with the "pet cricket trade" here in Hawaii. So, we looked in the Oriental Catalogue and saw that only one species (*pallida*) fits the description of this little guy. So, I put the moniker on them in our collection . . .

Elmo Hardy, independent of my searching for an ID, had also received specimens for identification and sent them off to the guy in Florida who is working on these guys. He said it was the same as a species from Texas (*Ormia ochracea*). This difference of opinion was quite striking given that a specialist from the Orient thought it was an Oriental introduction, and a person from North America thought it was a North American introduction. So, I went to Norm Woodley with the specimens when I went there last year. He took a look at them and said they could be either one! It is possible then that *Phasioormia* is a synonym of *Ormia* and *pallida* may be a synonym of *ochracea*. But – and here's the big catch – somebody has to look at the types of each species and then compare them to what we've got here in Hawaii to be sure. The BMNH should have the *ochracea* specimen and the *pallida* specimen. Is there anybody out there who can do this for us poor Hawaiians who need to get a good name on this intro???

Conference Announcement (by J.P. Aeschlimann)

An international conference entitled "Technology Transfer in Biological Control: from Research to Practice" will be held in Montpellier, France, 9-11 September 1996. This conference is being organized by the International Organization for Biological Control (IOBC). The objectives of the Conference are:

1) To demonstrate the effectiveness of biological control using an array of successful, reliable examples,

2) To document the basic importance of biological control in developing IPM programs, and in sustainable agriculture,

3) To identify major problems in implementing biological control,

4) To promote interactions between entomologists, pathologists, weeds scientists and other scientists,

5) To provide a forum in which biological control researchers from the private and public sectors can meet with plant protection advisors, extensionists, teachers, producers, manufacturers, salesmen and policy makers.

Contact Jean-Paul Aeschlimann (address in mailing

list) for further information about this conference.

Third International Congress of Dipterology (by J.E. O'Hara)

This Congress was held 15-19 August 1994 at the University of Guelph (Guelph, Ontario, Canada). It was well attended (almost 300 people) and a great success. If a dipterist can attend only one meeting every four years, then this should be the one! This was my first International Congress of Dipterology, and I was most impressed by the large number of foreign delegates. Russia was particularly well represented, due in part to grants from the International Science Fund. Tachinidologists were not in full force at the Congress, unfortunately, but the high calibre of the meetings in general mostly made up for this shortcoming.

The Abstract Volume of the Congress is available on disk to anyone interested. The Volume is formatted as a WordPerfect 5.2 file, 800Kb, IBM format only. Just send me a blank 2Mb 3.5 inch floppy disk.

Paper presentations (presented during the Tachinidae session):

O'Hara, J.E. Systematics of the *Lypha*-group (Diptera: Tachinidae): developing cladistic order from taxonomic chaos.

Richter, V.A. Holarctic and endemic genera of tachinids (Diptera, Tachinidae) in the Palaearctic fauna: distribution patterns.

Wood, D.M. Relationships among Tachinidae of Northern Europe, Siberia, and Northwestern North America.

Poster presentations on the Tachinidae:

DeConinck, E. A SEM study of antennal structures in Tachinidae.

Gaponov, S.P. Egg morphology of the Blondeliini (Diptera, Tachinidae).

Paper presentations relating to the phylogeny of Tachinidae-group taxa:

Pape, T. Of mice and elephants: in quest of botfly ancestry.

Rognes, K. Phylogeny of the Calliphoridae and Mystacinobiidae (Diptera: Oestroidea).

The Apple Ermine Moth and its Natural Enemies in Central Europe (by U. Kuhlmann)

I have been working since 1992 on the population dynamics of the apple ermine moth (AEM) *(Yponomeuta malinellus* Zeller) and its natural enemies in central Europe for Agriculture Canada. AEM was accidentally introduced into British Columbia and Washington state in the early 1980s and developed into a serious pest of apple nurseries. *Yponomeuta malinellus* larvae feed in characteristic tents monophagous on apple leaf clusters and may defoliate entire trees during heavy infestations, thus causing economic losses. In Europe, AEM is attacked by a large number of parasitoids and predators. Results of surveys for natural enemies indicated that *Eurysthaea scutellaris* Robineau-Desvoidy is the only reared tachinid from observed AEM populations in the Rhine Valley and in Rhenish Hesse in Germany. This tachinid is one of the common larval parasitoids of AEM in Europe.

All collected AEM larvae and pupae were reared for parasitoids, separated by tents, under outdoor conditions at Delémont. Host and parasitoid emergence were recorded daily. The rate of parasitism was based on adult emergence. For instance, in the Rhine Valley the tachinid was present in 86% of tents with an average parasitism of 46%. It was less common in other populations, e.g. Biebesheim where it reached mean rates of parasitism of 4.6% in 1992, 0.7% in 1993 and 2.9% in 1994.

The blackish-grey microtype eggs are laid on host plant leaves and ingested by fourth and fifth instar host larvae. Mature larvae form their puparia either outside or inside the host pupae. In the latter case attack by the tachinid is discernible by brownish-yellow discolouration of the host pupal cocoon which in healthy individuals is white. Adults emerge 11-17 days after puparium formation. Adults emerged between the end of June to July, simultaneously with the host. They are obviously obligatory host-alternating. Alternate hosts in studied AEM population sites are unknown. From the literature *E. scutellaris* is known as a polyphagous parasitoid of Microlepidoptera. Therefore, this tachinid is not being considered for introduction into Canada as a biological control agent of the AEM.

Jorgensen collection of Tachinidae donated to the CNC (by J.E. O'Hara)

Newel Jorgensen of Eastern New Mexico University (Portales, NM) donated a fine collection of tachinids to the Canadian National Collection of Insects in the summer of 1994. The donation comprised approximately 5500 pinned specimens collected from throughout eastern New Mexico during the past four decades. The specimens are in excellent condition and represent an important addition to the Tachinidae collection of the CNC. Included in the collection are some specimens of rare and undescribed tachinids. Recently, I named a species *Frontiniella jorgenseni* (1993, Can. Ent. 125: 24) in Newel's honor, the holotype and allotype of which were collected by Newel from eastern New Mexico.

German version of Mihályi's tachinid book available (by F. Mihályi)

My book on the Tachinidae-Rhinophoridae in Fauna Hung. 161 was published in 1986. The Tachinidae part gives on 425 pages keys compiled from the chief works of European literature. Descriptions of 600 species and 800 drawings are mostly new and based on 25,000 specimens examined.

The book found appreciation among dipterists, but its language (Hungarian) restricted its use to Hungary. Therefore a German translation was made simultaneously by the author. Finding no publisher for it, the German manuscript edition containing the whole book, text and illustrations, is being offered for a low price. May it lend a helping hand to dipterists and make new friends of the Tachinidae.

The title of the book is: Mihályi, F. 1994. *Die Tachiniden Ungarns und des Karpatenbeckens*. Budapest. Manuscript Edition. The manuscript is 483 pp. + 70 pp. of figures. It can be ordered from: Mihályi Ferenc and Son, Hungarian Natural History Museum, Baross u. 13. H-1088, Budapest, Hungary. The cost is currently $47.00 US or 74DM, to cover photocopying, tax and postage.

***Chrysoteuchia culmella* (L.) (= *Crambus hortuellus* Hueb.) (Pyralidae), newly recorded host of *Eriothrix rufomaculatus* (by S. Andersen)**

(As recorded by Tschorsnig and Herting, 1994.)

Eriothrix rufomaculatus is one of the most common tachinids in Europe but its host has remained unrecorded in the literature. Long ago I gave Benno a note about a reared specimen in our collection in Copenhagen which was pinned together with the empty skin and cocoon of the host larva (found underground in meadow soil on 24.vi.1957 by the famous (deceased) Danish specialist on parasitic Hymenoptera, O. Bakkendorf). While revising old host records of Palaearctic Tachinidae, Benno remembered this rearing and suggested that we send the skin and cocoon to the German lepidopterist Prof. Hasenfuss in Erlangen. As a specialist on Lepidoptera larvae he immediately recognized this very common species (known as one of the most harmful webworms) solely by its cuticular structures. From this experience we could learn to always pin the host remains together with the reared fly.

***Trichopoda pennipes*, an adult parasitoid of the green stinkbug, *Nezara viridula*, in South Africa (by M. v.d. Berg, D. Farinelli & M. Maritz)**

Nezara viridula (L.), the green stinkbug, is a phytophagous pentatomid attracted to Leguminosae, and as such is considered to be a pest of amongst others, soyabeans worldwide, and macadamia nuts in South Africa.

The tachinid fly, *Trichopoda pennipes* F., adult parasitoid of *Nezara viridula*, was introduced from the USA and Italy in November 1993. The tachinid was reared with success, overcoming the problems of mating and emergence from puparia.

A greenbean field at Friedenheim, Nelspruit, was used for release of the parasitoid. A large cage was placed in this field and the plants in the cage sprayed with a chemical with a short residual action to kill other pests. After three days, 100 stinkbugs and 21 adult parasitoids were released into the cage. About six weeks later, when the next generation of parasitoids had laid eggs on the progeny of the stinkbugs, the cage was opened. The same procedure was followed to release parasitoids in two more cages in soyabeans. A total of 74 parasitoids has been released in this manner. Parasitized stinkbugs were seen in all the cages before they were opened.

Further introductions of *T. pennipes* were made during the end of 1994 and more releases will be made to increase the chances of establishing this parasitoid.

Tachinid Collection of the University of California, Riverside (by S.I. Frommer)

The entomological collections have moved to a new building. We welcome and encourage students and established scientists to visit us and study our collection. There is a reasonable amount of material in the Tachinidae housed in this collection and somewhat more than a cabinet of previously determined flies. Dr. Reinhard had determined the majority of our material but it has also been examined by J.H. Guimarães when he was a student at UCR. I estimate that there may be half of a CAS-style cabinet of undetermined material. The unfortunate thing is that no one here is well versed in tachinid taxonomy and that makes our undetermined flies hard to sort. The bulk of our material comes from southern California, Arizona, and Baja California.

The American Southwest Revisited (by J.E. O'Hara)

In September 1994, as in August 1993, I travelled to the American Southwest to collect tachinids. My collecting sites were chosen mostly in advance because my permits were quite specific for certain areas. I obtained permits for three special areas well known for their highly diverse flora and fauna: McKittrick Canyon (Guadalupe Mountains National Park, Texas), Aravaipa Canyon (Galiuro Mtns., Arizona) and Ramsey Canyon (Huachuca Mtns., Arizona). I even obtained a blanket

permit from the U.S. Forest Service to collect in the National Forests of Arizona and New Mexico. The Forest Service does not generally bother with permits for insect collecting in National Forests, but I thought a permit would be useful in case I was otherwise unwittingly in contravention of the now infamous Lacy Act.

I had very good collecting in 1993 in the Manzano Mountains of New Mexico, so I stopped there first on this trip. I reached the Fourth of July campground in the Manzano Mtns. at dusk on 7 September 1994, and collected in the vicinity of the campground throughout the next day. A bush that yielded many tachinids in August 1993 after "sugaring" attracted little this time. I am not sure why, although the sun did not seem to hit the bush as directly in September as it had the year before in August. Anyway, I was able to take more than 20 species of Tachinidae, including the first CNC (Canadian National Collection) specimen of a species of *Carcelia (Euryclea)*; it is probably undescribed, though close to the European species *C. falenaria* (Rondani).

On September 9th I met Newel Jorgensen in northern New Mexico near the town of Ocate, on the east side of the Sangre de Cristo Mountains. Newel had arranged for us to collect on nearby private land for a few days. Collecting was excellent; we caught more than 30 species of tachinids, including some rare and some undescribed species. The area is particularly interesting because it is near the southernmost point of the continuous Rocky Mountains. Thus, one might expect this to be the end point of some tachinid distributions; likely candidates that we took were *Eulasiona fumator* (Rnh.) and *Nilea rufiscutellaris* (Zett.).

My next major stop was the Guadalupe Mountains N.P. in Texas, on the border with New Mexico. The Park boasts one of the most visually stunning peaks in North America, El Capitan. I was particularly interested in low-lying McKittrick canyon, which has a permanent stream and is home to numerous plants and animals of some rarity. The weather in the Park was not ideal during my brief stay of several days, and consequently I collected relatively few tachinids (among them, one *Phytomyptera* sp. probably undescribed, from Choza spring). During my visit I was permitted to stay for a nominal fee at the Park's research facility called "Ship on the desert".

My all-time most productive locality was next: Cherry Creek campground north of Silver City, NM. Again, as on previous trips, I turned up some interesting tachinids I had not taken there before. I was eager to hilltop in the area (I had not done so before), and tried first Signal Peak. It is just north of Cherry Creek, and rises to 8900'. Fortunately, it is assessable by road. The top is broad and forested so hilltopping tachinids were not easy to find. The only tachinid of note was the rare *Ptilodexia contristans* (Wulp), which has been taken most often at high elevations. My next hilltop was the best of the trip: Gomez Peak, 7300', just north of Little Walnut Village (a suburb of Silver City). At least 25 species of Tachinidae were collected, including at least two undescribed ones and five rare. I also captured for the first time several males of a deer bot fly, *Cephenemyia jellisoni* Townsend (the infamous supersonic fly of C.H.T. Townsend, reputed by that father of "Myiology" in 1926 to zoom from hilltop to hilltop in New Mexico at speeds of up to 818 miles per hour!).

It was with much anticipation that I approached Aravaipa Canyon Wilderness in Arizona. I had not collected there before for several reasons: a permit to collect must be obtained and specific dates (not to exceed three days) booked in advance, the East Entrance is at the end of a fifty-mile-long dirt road that culminates in six creek crossings, and rain can easily cause the creek to swell and prevent crossings for days (especially when one is driving a low-clearance minivan). Once onsite I found Turkey canyon, a canyon perpendicular to Aravaipa canyon, to be the more suitable of the two for camping and collecting. Both canyons are remarkably diverse, even at the low elevation of 3300' (Aravaipa creek is a permanent stream while Turkey creek is intermittent). "Sugaring" was not effective, and I caught only about 25 species of Tachinidae in a couple of days. Except for a cattle rancher who passed by and a forest ranger who came to check on me, I saw no one during my stay. I did, however, see my first bobcat! I left on the morning of my third day, a day earlier than planned, due to the threat of rain. I am sure that under the right circumstances I could have done much better than I did.

My last major collecting locality was Ramsey Canyon in the Huachuca Mtns., about eight miles north of the Mexican border. The fauna of this canyon is incredible – one of the most diverse in the Southwest, with a number of Neotropical species that have extremely limited (and disjunct) ranges in the United States. For example, a bird called the Elegant Trogon (which I didn't see) and the ridge-nosed rattlesnake (which I almost didn't see soon enough). After a good deal of searching, I found a great spot for tachinids along a dry and rocky stream bed near a clearing about 1.4 miles up the Canyon (ca. 6300'). Though cloud and rain reduced my catch from what it could have been, I still managed to get 30 species of tachinids during three successive days of collecting. I caught the first known male of *Chromatocera fumator* Reinhard, which belongs to a group I am revising and was one of the objectives of my

trip. I also found a new species of *Xanthophyto*, and some other rare tachinids.

Harry R. Gross, Jr., 1939-1994

Harry Gross died on 3 May 1994 after a brief battle with cancer. Among his many accomplishments was the development of an innovative technique for the mass propagation of the tachinid *Archytas marmoratus* for augmentative releases. An obituary was published in the American Entomologist 40: 191 (1994).

PERSONAL NOTES

Stig Andersen provides a short summary of the results of his Ph.D. thesis: The principal manuscript deals with the extremely difficult tribe Siphonini which comprises very small blackish, partly yellow, species with more or less dense, white, grey, or yellow pollinosity. The adult female has only two spermathecae which is the most impressive derived character of the group. The eggs are stored and incubated in an enlarged uterovagina or ovisac, and larvae or egg-larvae (larvae ready to hatch from the membranous eggs) are deposited directly onto the skin of the host, or at least not far from the host. The normal hosts of Siphonini are Lepidoptera larvae, but in a few cases cranefly larvae are also parasitized. The MS is divided into a phylogenetic part and a taxonomic part.

In the phylogenetic part two keys are presented, one which keys out the larger groups of Tachinidae and another the larger groups of the subfamily Tachininae. The four subfamilies of Tachinidae are briefly characterized by their male genitalic characters and their reproductive biology which clearly place Siphonini in the subfamily Tachininae. A computer analysis based on the principle of parsimony ("Hennig86") was carried out using data from seven tribes of basic Tachininae which seem to be closely related and include the Siphonini. Thereby the tribe Leskiini came out as the sister-group of Siphonini. A close relationship between these two tribes, which are very similar in morphology and biology, has long been suspected, but never documented. The sister-group of Siphonini + Leskiini is suggested to be the Minthoiini, based on similar derived structures in the egg. All three tribes are presumably members of a larger, newly recognized group "Palpostomata". This group is based on the presence of a pair of posteriorly directed processes on the labellar disc of the adult fly. These processes are missing in Siphonini and Leskiini, but the two tribes are still included in the group, with the absence of the processes believed to result from a secondary loss. The phylogeny of the genera of Siphonini has also been revised by the parsimony analysis. Thereby two new groupings of genera have been defined by newly discovered, derived characters.

The taxonomic part deals with the systematics, biology and faunistics of the eight genera and 48 species of Siphonini which occur in Fennoscandia, Denmark and neighbouring parts of Germany and Russian Karelia. Five species are described as new to science and three species names, earlier placed in synonymy, have been re-established. Eight new synonyms have been established.

I am now working on the publication of the taxonomic part which is supposed to be published separately in a volume of the series *Fauna. ent. Scand.*, with a total of nine South European species included. I have to complete this work before 1 April 1995, when I take up again my work on amber insects.

Simon Grenier writes: I presented a communication during the 5th European Workshop on Insect Parasitoids held in Biri (Norway) in May 1994. My oral contribution was entitled "DNA content and regulation of the larval development of the tachinid *Pseudoperichaeta nigrolineata*, parasitoid of the European corn borer *Ostrinia nubilalis*." I discussed the endopolyploidy level in some nuclei of larval salivary glands and Malpighian tubules. This level varies in relation to the larval development steps described earlier. In the second larval stage the level can reach 2000 "n equivalent." This contribution was published by Grenier, Perru and Plantevin (1994) in a book on the proceedings of the Workshop [see bibliography section for full citation].

Kenan Kara writes: I am a Turkish Ph.D. student in entomology. My supervisor is Prof. Dr. Miktat Doganlar, a Hymenoptera taxonomist. We are studying tachinids of the Tokat district in the Middle Black Sea Region of Turkey.

My Ph.D. thesis is entitled, "The tachinid flies of Tokat district obtained from lepidopterous larvae, adult Hemiptera and Orthoptera." These hosts were reared under laboratory conditions. I obtained 18 tachinid species from caterpillars in 1993. In addition, I collected tachinids with a trap in 1994. I would like to thank Dr. Herting for his kindness in identifying these tachinids.

I am interested in the biology of tachinids. I would be pleased if tachinidologists could send me their papers on the biology and taxonomy of tachinids.

Jim O'Hara writes: I will have ready for submission in mid-February a manuscript on the genus-group and species-group names of Louis P. Mesnil, with information on type depositories and nomenclatural problems. Mesnil described more than 830 species-group taxa between 1936 and 1980! A joint paper with Bruce Cooper (CLBRR, Ottawa) on the tachinid types in the CNC is almost finished. A short paper on a new generic synonym of *Triarthria* Stevens, and redescription of a New World species, will follow. Though not yet finalized, I hope to travel in late spring to College Station, Texas, to curate the tachinid collection of Texas A&M University. While in Texas I would also spend a couple of weeks tachinid collecting. Last September, after the Diptera Congress in Guelph, I collected again in Arizona and New Mexico (as outlined elsewhere in this newsletter). Hopefully by the fall of this year I will be able to return to the systematics of the *Lypha*-group (a group of about 50 nominal genera in the Tachininae).

Thomas Pape writes: My first year at the Swedish Museum of Natural History has rushed by and looking back I find very little time spent on Tachinidae. The insect collections at the SMNH are fairly large, with close to one million specimens according to our own bold estimate. The Diptera collection, however, is in need of a thorough overhaul, and for a beginning I have pulled out whatever non-type material of the Tachinidae family group (Oestroidea) that I could find. This includes several drawers of unsorted Tachinidae caught by R. Malaise in north-eastern Myanmar [Burma] during 1934. As you may have guessed, this material was caught in a Malaise trap (THE original Malaise trap, which is still kept here in Stockholm!), and having been dried out from alcohol the material is not in the best of condition. Considering the current difficulties in collecting in this area, and the fact that the localities may have changed irreversibly through human interference, the material is certainly valuable. With little experience in sorting Oriental Tachinidae, I was especially pleased that Shima, coming from the Zoological Museum in Helsinki, paid me a visit for three days in late January. By sorting practically all (!) the Malaise specimens to either genus or species, he has substantially upgraded our tachinid collection. During November I collected in Malaysia, and in spite of nasty wet and misty weather, which made the pins rust and the specimens mold, I collected some 600 specimens of Tachinidae. Apart from spending much time collecting on hilltops, I also tried sprinkling a Coca-Cola/honey/water mixture on the vegetation (recommended by Monty Wood), but with absolutely no result – perhaps because of the rather misty weather. As for hilltopping in Cameron Highlands, Gunung Jasar (1696 m) was excellent and much better than the nearby and only slightly higher G. Beremban (1841 m) and G. Brinchang (2032 m). The easy access to Gunung Jasar by a mountain trail directly from nearby Tana Rata town, however, had the disadvantage of a continuous flow of tourists. Just like the tachinids, the tourists were most numerous during the few sunny hours around noon. One interesting catch on Gunung Jasar was four males of an undescribed species of *Prodegeeria* with grotesquely elongated fore coxae. All specimens were caught on separate days during one week, and on almost exactly the same spot. Catching these almost invariably resulted in the loss of both forelegs, which had to be picked up separately from the net.

Claire Rutledge sends the abstract of her recently completed Master's thesis, entitled, "Host-defense and host-size as determining factors of host specificity in *Eucelatoria bryani* (Diptera: Tachinidae)". Abstract: Elucidating the factors mediating host acceptance, and determining the limits of a parasitoid's host range are important prerequisites to releasing a parasitoid into a new area as a biological control agent. The role of parasitoid-host interactions and host-size were investigated in host-acceptance by the parasitoid *Eucelatoria bryani*. The interactions of *E. bryani* with two preferred hosts, *Heliothis virescens* and *Helicoverpa zea*, and a non-preferred host *Trichoplusia ni*, were quantified and documented. Two attack styles, one fast and one slow, were documented. *Trichoplusia ni*'s smaller size and greater intensity of defense were found to be the most probable reasons that it is not used more frequently as a host by *E. bryani*.

Curtis Sabrosky writes: The long project on an annotated catalog of family-group names in Diptera is in the final stages (preparation of the large Literature Cited). Entries are grouped under type genera. For good or bad, the family Tachinidae is far ahead of its competition, with 429 generic names. The nearest, in second place, has only 121 (Sarcophagidae)! One hundred families have ten or fewer, and 63 of these have only one to three.

Hiroshi Shima writes [letter of 16 January 1995]: It has been almost ten months since I left Japan on 28 March 1994. I am now at the Zoological Museum of the University of Helsinki, working on the type specimens of Burmese tachinids described by Mesnil. I stayed in London for five months and in Amsterdam and Eberswalde each for two months. I had short visits to

Copenhagen, Stuttgart, Dresden and Wien to see types of Oriental tachinids. My trip has almost finished now, and I am returning to Japan on January 25th.

During my visit to European museums I have seen more than 500 type specimens from the Oriental and Australian Regions (except the Australian continent). I made descriptions for each species, keys to species for large genera if possible, drawings of genitalia and heads where necessary, and took photographs of each type specimen. I hope to be able to publish the results of this visit in the near future and also feel some necessity to visit and examine again the type specimens of Mesnil, Baranov and Townsend in Ottawa and Washington.

I note here that the type specimens of the following species can be located in the museum/institute mentioned, although they were cited as "not located" in Crosskey's (1976) Conspectus:

1. *Voria edentata* Baranov, 1932. Holotype % in DEI, Eberswalde.
2. *Prohypotachina rutilioides* Townsend, 1933. Holotype % in Naturhist. Mus., Wien.
3. *Cuphocera? tricolor* Lichtwaldt, 1909. Holotype & in DEI, Eberswalde.

I am going to China (again!) from the end of February for about a month. I hope to collect in the southeastern part of Yunnan (north of Vietnam) this time. I also plan to collect in China this summer, but it is not definite.

Xuekui Sun writes: I am still working on *Phasia*. Based on morphological characters, I consider the genus *Phasia* to be a monophyletic group. The synapomorphic characters are: female with a piercing ovipositor, vein M ending in R_{4+5} long before wing margin, injection of eggs into the host, and egg shell thin. Unfortunately, the generic placement in subfamily Phasiinae is still very confused. It is necessary that a revision of the higher classification of Phasiinae be carried out.

In November 1994, I had a chance to visit the Natural History Museum in London and the Musée National d'Histoire Naturelle in Paris. Many types of *Phasia* were examined during my visits, and some new synonyms will be proposed in my Ph.D. thesis. For example, the Australian species *Hyalomyia rufiventris* Macquart (type %, Paris) has been split into five species by some authors, and the Neotropical species *Hyalomyia moerens* Wulp (1892; type %, London) also has the same problem. Crosskey's undescribed species of *Cylindromyia* from northern India (1976, Bull. Bri. Mus. (Nat. Hist.), Ent. Suppl. 26: 28) is also found in Yunnan, China, and might be *Cylindromyia agnieszkae* Kolomiets.

Finally, I would like to thank Profs. C. Dupuis, L. Matile, Dr. B. Pitkin, and Mr. N. Wyatt for their hospitality during my trip.

Joachim Ziegler writes: I have in press a revision of the European species of *Hyalomya* Robineau-Desvoidy. It will be published in *Studia Dipterologica* in January 1995. I am continuing my work on puparia, larval mouthparts and databases for only a small part of my time.

During the last two years I collected interesting tachinids in Europe (Central Europe, Alps, Spain) during my holidays, and in the Ussuri area (Russian Far East) sponsored by DFG (German Research Foundation). Ussuri is one of the most important areas for Tachinidae in the Palaearctic region. There is to be found a high tachinid diversity; Oriental elements from China, boreal elements from Northern Siberia, typical Siberian elements, and some endemic species. I will finish a manuscript on the Ussuri tachinids together with Hiroshi Shima in 1995.

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Included here are references to the Tachinidae that were published during the past year plus a few post-1980 publications overlooked previously.

The entire bibliography of 1980-present titles, as contained in issues 1-8 of this newsletter, is available in the form of a WordPerfect 5.2 file to anyone interested. Please send a diskette on which I can copy the file. The bibliography is as complete as I can conveniently make it but it is not a definitive list.

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