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This year's issue of **The Tachinid Times** marks the eleventh year of the newsletter. Though now as much an electronic product as a hardcopy one, the original aim of the newsletter has not changed since its inception in 1988. It is still designed primarily as a forum for communication among researchers working with the Tachinidae, whether in the field of biological control, systematics, ecology, behaviour, or whatever. Research notes, field observations, biological control introductions, collecting trip summaries, overviews of meetings, requests for information or assistance, etc. are welcome subjects for the newsletter. However, new taxonomic changes will not be accepted because they are more properly published in a peer-reviewed journal, and similarly research findings should be of a review nature and not published solely in **The Tachinid Times.** As proclaimed in Issue 1, "Think about what you would like to see in this newsletter, then think about what you can contribute!"

For several years this newsletter has been produced in both hardcopy and electronic formats. Access to the latter is growing steadily and currently stands at about 50% of subscribers. Hardcopy distribution will continue for those who wish to receive this newsletter in that format. The mailing list is presently at about 100 subscribers in over 30 countries.

The next issue of **The Tachinid Times** will be distributed in hardcopy and over the WWW in February 1999. Please send contributions for the next issue before the last week of January 1999.

Tachinids as potential classical biological control agents for western corn rootworm in Europe (by U. Kuhlmann & W. van der Burgt)

The western corn rootworm, *Diabrotica virgifera virgifera* LeConte (Coleoptera: Chrysomelidae) is the most damaging pest of maize (corn) in the USA and Canada, costing up to one billion dollars per year through lost maize production and the expense of chemical control. In the early 1990s it was accidentally introduced from the USA to eastern Europe. The insect was first observed in 1992 close to the international airport at Belgrade in Serbia (formerly Yugoslavia), occupying an area of only about 60 hectares. By 1997 the pest had spread widely through Serbia, Hungary, Bosnia-Herczegowina, Romania and Croatia (also probably Bulgaria but not confirmed), and occupies an area covering approximately 20 million hectares. Within a few years, the pest will be present in Slovenia, Bulgaria, Austria, Italy, Moldova, Ukraine and the Slovak Republic, and eventually it will spread to all the maize producing countries in Eurasia.

It is thought that *Diabrotica virgifera virgifera* and corn evolved together in the tropics or subtropics of Mesoamerica (Mexico/ Central America) (Branson & Krysan 1981). There may be important natural enemies in local areas of cultivation in eastern Europe, particularly predators, but specialist natural enemies may be lacking, because they have been left behind in the area of origin of western corn rootworm. In the absence of natural enemies *Diabrotica* populations in eastern Europe are limited only by the availability of suitable food and the application of control treatments. Biological control has an important application in the management of invasive alien pest species in the agricultural crop environment, where it allows the safe and selective control of pest species and thereby protects local biodiversity. Biological control has the potential to reduce local and regional populations of western corn rootworm through the importation of specialized natural

enemies from the region of origin of this pest.

In its region of origin, the western corn rootworm is attacked by a range of predators and parasitoids, some of which appear to be specifically adapted for parasitizing the corn rootworm and related insects in the soil. Three tachinid parasitoids in the genus *Celatoria* are known from literature records to parasitize adults of single or related genera within the Galerucinae or Alticinae (Cox 1994). Regarding *Diabrotica* species, *Celatoria bosqi* Blanchard parasitizes *D. speciosa* (Germar) in Argentina, Uruguay, and southern Brasil (Herting 1975; Guimarães 1977; Heineck-Leonel & Salles 1997); *Celatoria diabroticae* (Shimer) attacks *D. undecimpunctata* Mannerheim in Oregon, USA (Herting 1975), *D. undecimpunctata howardi* Barber in Virginia, South Carolina and Mississippi, USA (Herting, 1975; Arnaud 1978), and *D. balteata* LeConte in South Carolina, USA (Elsey 1988); and the third tachinid *Celatoria setosa* (Coquillett) parasitizes *D. undecimpunctata* and *D. undecimpunctata howardi* in Indiana, USA (Arnaud 1978). In general, it seems that *Celatoria* species are more host specific compared to many tachinids. One might expect this given the elaborately modified piercing ovipositor of the females (O'Hara pers. comm. 1997).

The biology of *Celatoria setosa* was studied by Bussart (1937). This tachinid is a primary solitary endoparasitoid. Bussart (1937) describes that the adult fly is ovilarviparous and lays eggs under the elytra of the adult *Diabrotica*. After oviposition the first instar larvae hatch immediately from the chorion and quickly penetrate through the intersegmental skin. Adult females have a potential fecundity of approximately 100 eggs and presumably deposit one egg during a single oviposition on the host. Larval development lasts 18 to 27 days. After emerging from the adult beetle the tachinid larva soon forms a puparium on the plant next to the dead beetle or on the soil surface. Emergence of the tachinid flies from puparia occurs after 5 to 7 days in summer but will last up to 20 days in October. The larvae of *C. setosa* hibernate in the host tissue of the *Diabrotica* beetle. According to Bussart (1937), data indicates that five generations of *C. setosa* can be passed per year.

These tachinid parasitoids should be studied in more detail and considered for introduction into eastern Europe as potential classical biological control agents of *D. v. virgifera*. While the tachinids do not regulate the populations of *Diabrotica* species effectively in the USA, they are likely to have a significant effect upon the abundance of the western corn rootworm and could be more effective if they are introduced into a new environment in eastern Europe free from specialized natural enemies of the western corn rootworm.

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What's in a name? *Ceranthia samarensis* vs. *Aphantorhaphopsis samarensis* (by J.E. O'Hara)

The gypsy moth, *Lymantria dispar* (L.)., is a native European species which was accidentally introduced into Massachusetts, USA in the late 1860s. It has since spread throughout most of northeastern North America and has become one of the most serious defoliators of forest trees on the continent. In an effort to increase the parasitoid load on this pest, researchers have introduced into Canada from Europe a small tachinid fly known by the specific name *samarensis* Villeneuve.

The generic placement of *samarensis* has had a

checkered history among systematists in recent years, causing some confusion among applied entomologists as to the correct generic name to use in papers dealing with *samarensis* as a biological control agent. Because I am partly to blame for the generic name changes and I understand the reasons behind them, I will review the subject here so that researchers using the name *samarensis* can make informed decisions about the generic name they wish to use for this species. As you will see, my preference is for the name *Aphantorhaphopsis* Townsend, though even among some tachinid systematists the name *Ceranthia* Robineau-Desvoidy is still used in combination with *samarensis*.

Villeneuve (1921) described *samarensis* from Russia, in the genus *Actia*. Mesnil (1954) transferred the species to *Asiphona*, his new subgenus of *Siphona*, and retained this classification in his revision of Palearctic Tachinidae in the Lindner series (Mesnil 1963: 845). Andersen (1983), in a revision and phylogenetic analysis of Old World (mostly Palearctic) Siphonini, recognized *Asiphona* as a genus and *samarensis* as one of its species. Shortly thereafter Herting (1984) published his catalogue of Palearctic Tachinidae in which *Asiphona* was placed in synonymy with *Ceranthia* Robineau-Desvoidy, resulting in the binomen *Ceranthia samarensis*.

In my revision of the Siphonini (O'Hara 1989), I agreed with Mesnil and Andersen that *Asiphona* and *Ceranthia* should be kept distinct, though I found an older name that has priority over the name *Asiphona*: *Aphantorhaphopsis* Townsend. As unpleasant as the name *Aphantorhaphopsis* might be from an aesthetic point of view, there is no dispute that it embodies the same concept as *Asiphona* and thus replaces that name. I considered *Aphantorhaphopsis* and *Ceranthia* as two of nine subgenera of *Siphona* (as discussed below), but that proposal has met with mixed acceptance. The use of *Aphantorhaphopsis* in the same sense as *Asiphona* - either as a genus or a *Siphona* subgenus - has been adopted by Shima (1992), Belshaw (1993), Andersen (1996) and Ziegler & Shima (1996), but has not been followed by the dean of Palearctic tachinidology Benno Herting and his colleague Hans-Peter Tschorsnig, who continue to use the name *Ceranthia* in the broad sense (eg. Tschorsnig & Herting 1994). Applied entomologists working with *samarensis* have not been eager to change their usage either, and hence have continued using the combination *Ceranthia samarensis* (eg. Mills & Nealis 1992, Quednau 1993, Nealis & Quednau 1996).

The reason for recognizing two taxa, *Ceranthia* and *Aphantorhaphopsis*, is simply explained. *Ceranthia* in the restricted sense is easily characterized and almost certainly monophyletic. It is distinguished from other siphonines by the presence of a reduced maxillary palpus, by derived states of the male genitalia (shape of distiphallus and a large seta on pregonite), and a characteristically keeled sternite 7 in the female ovipositor. The species of *Ceranthia* are mostly parasitoids of the Geometridae. There are 10 described species in the Palearctic region, six in the Afrotropical region and one in the Nearctic region; the Nearctic region is known to have about seven undescribed species and other regions have undescribed species as well (O'Hara 1989).

Aphantorhaphopsis is not nearly as conveniently characterized as *Ceranthia sensu stricto*. It is a taxon of convenience. There are no known morphological features by which to characterize the taxon as monophyletic. It is, indeed, an assemblage of species grouped together by somewhat similar appearance and the absence of the derived states found in other members of the *Siphona*-group. As one might expect, hosts include a variety of families in the Macrolepidoptera. Twenty-one described species are recognized, all Old World in distribution. Resolution of the phylogenetics of *Aphantorhaphopsis* is hampered in part by the paucity of material in collections; some species are known only from holotypes - some male, others female. *Aphantorhaphopsis* is in need of a careful and thorough revision.

One other issue complicating the matter of *Ceranthia* vs. *Aphantorhaphopsis* is that of rank. Should these taxa (or taxon if one accepts *Ceranthia* in the broad sense) be of generic or subgeneric rank? Ranking is inherently subjective and I am not sure which choice is the better one. Mesnil (1954) erected *Asiphona* (= *Aphantorhaphopsis*) as a subgenus of *Siphona* without explaining why he did so. I (O'Hara 1989) also recognized subgenera of *Siphona* -nine in all- among them *Aphantorhaphopsis*. I am not fond of subgenera but I proposed this division of *Siphona* for reasons which I will briefly explain here:

1) Certain New World *Siphona*-group taxa like *Aphantorhapha*, *Pseudosiphona* and *Siphonopsis* are very similar morphologically but are distinct phylogenetically (i.e. each is monophyletic). Often the male genitalia must be dissected to place a specimen into the correct taxon. Should not genera be recognizable without dissection of male genitalia? These taxa are phylogenetically at the same level as *Ceranthia* and *Aphantorhaphopsis*, so if they are ranked as subgenera of *Siphona* then *Ceranthia* and *Aphantorhaphopsis* should be as well.

2) All zoogeographic regions of the world are rich in siphonines and a great many species remain to be described. With respect to the *Siphona*-group, a number

of new genus-group taxa (i.e. subgenera or genera) will be needed to accommodate the new species if strict monophyly is desired. Do we want a proliferation of genera which are most easily characterized by features of the male genitalia?

3) Philosophically I was more at ease with a non-monophyletic subgenus than genus. Therefore, a non-monophyletic *Siphona* (*Aphantorhaphopsis*) was less objectionable than *Aphantorhaphopsis*.

We thus have three choices of names for *samarensis*: *Ceranthia samarensis*, *Siphona (Aphantorhapopsis) samarensis*, or *Aphantorhapopsis samarensis*. Personally, I do not like the first; *Ceranthia* is a name best used for the monophyletic and well-characterized taxon discussed above, which does not include *samarensis*. The identity and predictive value of *Ceranthia* is "diluted" when combined with *Aphantorhapopsis*, and monophyly of the taxon is lost. The ranking of *Aphantorhapopsis* is not easily resolved. On one hand subgenera have merit, as reviewed above. On the other hand, workers in the Old World have fewer *Siphona*-group taxa to contend with (only three: *Siphona*, *Ceranthia* and *Aphantorhapopsis*) than workers in the New World (six taxa) so a subgeneric system of classification may seem overly complicated there from a regional perspective. Usage in recent years has been split: Shima (1992) and Ziegler & Shima (1996) have used *Siphona (Aphantorhapopsis)* whereas Belshaw (1993) and Andersen (1996) have used *Aphantorhapopsis*.

Maybe, for the sake of simplicity, *Aphantorhapopsis samarensis* (Villeneuve) is a better name than *Siphona (Aphantorhapopsis) samarensis* (Villeneuve). At this point in time there is no definitive answer. The name which will gain preeminence for this species will only be revealed with the passage of time and further scrutiny of systematists.

[Note: Opinions on this subject are welcome, and if received in writing by the editor will be published in a future issue of this newsletter.]

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Tachinids parasitizing soybean lepidopteran defoliators in Buenos Aires Province (by M.G. Luna)

[The following is part of a thesis work entitled "Estudios ecologicos de los Lepidopteros defoliadores de la soja y sus parasitoides" (Ecological studies on soybean lepidopteran defoliators and their parasitoids), by Dr. Maria Gabriela Luna.]

Defoliator Lepidoptera larvae were sampled on soybean agroecosystems, free of pesticides, from 1992 to 1996 in the northwest of Buenos Aires Province (Argentina) to determine species composition, abundance and parasitism by insect parasitoids. This Lepidoptera community had a maximum of 9 species, belonging to the families Noctuidae (5 species), Pyralidae (2 species), Tortricidae (1 species), Pieridae (1 species), and Arctiidae (1 species). Abundance of different species traditionally considered as pests was low throughout the study period, with *Rachiplusia nu* (Guenné), *Anticarsia gemmatalis* (Hübner) and *Spilosoma virginica* (Fabricius) being the most abundant. Neither individual species nor all species combined reached the economic injury level during the study period. All lepidopteran species except *Prodenia ornithogalli* Guenné were attacked by at least one primary endoparasitoid species and hyperparasitoids were not found. Approximately 29 parasitoid species were found, and belonged to Hymenoptera (15 species) and Diptera (approximately 14 species). Dipteran species belonged to the Tachinidae and were: *R. nu*: *Voria ruralis* (Fallén), 2 *Voria* spp., *Winthemia* sp., and 1 species not determined. *S. virginica*: *Lespesia aletiae* (Riley), *Patelloa similis* (Townsend), 2 *Chetogena* spp., *Lespesia* sp., *Sturmia* sp. and 2 species not determined. *C. lesbia*: *Chetogena* sp. Identification of tachinid species were mainly provided by Drs. Jim O'Hara & Monty Wood (Agriculture and Agri-Food Canada) and Dr.Gerardo Liljesthröm (CEPAVE). Though hymenopteran and tachinid species richness were similar, tachinid parasitism was lower. Parasitoid guild analysis (*sensu* Mills, 1994) showed that tachinid flies attacked different host niches than hymenopteran wasps. Thus, tachinid species comprised guilds that utilized late larval instars. This structure of parasitoid community of soybean lepidopteran defoliators suggests at least indirect interactions among parasitoid species. It is also interesting that *S. virginica* was attacked only by tachinids flies. Characteristically, *S. virginica* larvae are hairy and setae are presumably acting as a physical defence mechanism to avoid parasitoid attack, but tachinid females have oviposition strategies to circumvent it, such as laying eggs on leaves or host bodies. Finally, quantitative parasitoid webs (Memmott & Godfray 1994) in pesticide-free crops were relatively complex, as demonstrated by real parasitoid-host interactions. This study pointed out the potential of the parasitoid community for implementing biological control through conservation tactics. It also called attention to the indiscriminate use of pesticides in this agroecosystem which could adversely affect these established natural enemies.

All parasitoids obtained during this study have been deposited with the Division Entomologia, Museo de La Plata, Paseo del Bosque s/n (1900) La Plata, Argentina.

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Puparia and cephalo-pharyngeal skeleton of mature larvae of Tachinidae (by J. Ziegler)

My book on the puparia of Tachinidae is now published. Citation: Ziegler, J., 1998, *The Morphology of the Puparia and of the Cephalo-pharyngeal Skeleton of Mature Larvae of Tachinid Flies (Diptera, Tachinidae) and their Phylogenetic Significance*, Studia dipterologica Supplement 3, Ampyx-Verlag Halle (Saale), 244 pages, ISBN 3-932795-02-4. The book is in German with a brief English abstract of the most important results and a summary; there are 251 figures, including 245 new SEM pictures and drawings. It is available from: Dr. Andreas Stark, Ampyx-Verlag, Seebener Str. 190, 06114 Halle (Saale), GERMANY, Tel/Fax: +49 0345 5226726. Cost: DM 35.00 for subscribers of *Studia dipterologica* and DM 55.00 for other customers.

Summary: In striking contrast to the recognition of the importance of the Tachinidae, the division of the family into systematic subgroups is still at an unsatisfactory level. Many of the groups defined on the basis of adult characters are artificial concepts. For this reason a study has been made of the puparia and the cephalo-pharyngeal skeletons of mature larvae, to search for possible constitutive characters and to confirm (or otherwise) the family-group taxa of the existing traditional classification on the basis of synapomorphies. It is hoped that this will be a contribution to the creation of a phylogenetic classification of the family and will also shed light on the systematic position of the Tachinidae within the Diptera.

This book presents the results of the first comprehensive study of the puparia and the cephalo-pharyngeal skeletons of mature larvae of the Tachinidae. It therefore provides a basic introduction to the external morphology of tachinid puparia and of the cephalo-pharyngeal skeleton. Methods of preparation for light microscope and SEM study are described. A comparative study of 261 species of Tachinidae and also

of representatives of the Calliphoridae s.l., Gasterophilidae, Oestridae s.l., Rhinophoridae and Sarcophagidae (= Oestroidea in part *sensu* McAlpine 1989) and of the Anthomyiidae and Muscidae (= Muscoidea in part *sensu* McAlpine 1989) has been made, and the results of this study are presented here. In separate sections, the general morphology of the external skeleton of the puparia and of the cephalo-pharyngeal skeletons of mature larvae are discussed, with reference to their origin and function. Existing terminology has been accepted for the morphological characters, but new terms are introduced to replace certain inadequate or incorrect terms. Errors in the published literature are corrected. Typological classes are erected and/or transformation sequences formulated for important character states. The hypothetical groundplan condition for the Tachinidae is postulated, both for puparia and for the cephalo-pharyngeal skeleton. Based on this, 43 subgroups of the Tachinidae and 9 outgroups are characterised according to the characters of their puparia and cephalo-pharyngeal skeletons. A phylogenetic assessment is made of the characters in terms of the groundplan. Probable paraphyletic groups are discussed, and monophyla are defined. Finally, plesiomorphous and apomorphous characters within the Oestroidea are interpreted and their suitability as constitutive characters for higher taxa is discussed.

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Hilltopping observed at low altitude of the otherwise high-alpine species *Ancistrophora mikii* Schiner (by S. Andersen)

The genus *Ancistrophora* is a member of the tribe Graphogastrini (*sensu* Andersen 1988). It is exclusively European in distribution and contains only one very local species, *A. mikii* Schiner. It is a small black species with white-banded abdomen, easily recognized by stalked R5 of the wing in combination with narrow palp and long and slender, geniculate proboscis, which is folded back in resting position (see illustration in Tschorsnig & Herting 1994, Fig. 30); this type of proboscis is also found in *Siphona* Meigen (and a few other non-European siphonines) but the number of pseudotrachea in the labellum is very different (2-4 pair in *Siphona* and as many as 15 pair in *Ancistrophora*). The aedeagus is sharply L-shaped as in *Graphogaster*. The biology is unknown. The flight-period is from the beginning of July to mid August.

A. mikii has only been found in the Central Alps with the following known localities, all representing high altitudes above treeline. Italy: Gorizia (type-locality), Berniner-glacier (according to Bezzi 1918: locally common near the glacier and never found on flowers); Switzerland: Engadin, Berner Oberland (according to Tschorsnig & Herting 1994: found on lower plants and rocks, and locally not rare). I have seen a male specimen from Austria: Kärnten ("Corinthian Alps").

I found the species myself in July 1996 on a collecting trip to the Italian Alps (my usual vacation together with my family). One sunny day we rested at midday on a small road at about 1000m altitude between Capallo and Lake d'Idro (NW of Lago d'Garda). The road is situated on a south-facing and very steep slope of the mountain. The slope was very dry and densely covered with low vegetation (maquis). A large whitish rock was present where the road turned sharply and this very rock seemed to be the most exposed place in the landscape. On this rock more than one hundred males of *A. mikii* were aggregating, with individuals observed to "take stations" and "fight" for their positions. No mating was observed but females were present at the site as we collected in a short time 17 males and one female. This is the first report of hilltopping Graphogastrini, and probably also the species of *Graphogaster* are hilltopping. For example males of the extremely rare species *G. nigriscens* Herting have only been collected in Denmark from power pylons and observed there (but not reachable by net) on several occasions. Another aggregation of males of *G. vestita* Rondani was once observed by a colleague of mine on the highest top of a small mountain in Greece, at about 1500m altitude. In accordance with Monty Wood's "waiting male" type of mate-searching, the male frons in *Ancistrophora* and *Graphogaster* is distinctly narrower than the female frons and there is no difference in antennal size between the sexes.

Tachinidae Homepage on ECORC web site (by J.E. O'Hara)

A web site has been established on the ECORC (Eastern Cereal and Oilseed Research Centre) site for products of the research study *Identification Systems for Biocontrol Insects (ISBI)*. This web site can be viewed at: http://res.agr.ca/ ecorc/isbi/home/isbihome.htm. The site will be a major venue for technology transfer products relating to biocontrol insects, as reflected by our taxonomic expertise in the Braconidae, Chalcidoidea, Tachinidae, and Empididae. Products on tachinids may be reached from the Tachinidae homepage at:

http://res.agr.ca/ecorc/isbi/dipt/tachhom.htm. The Tachinidae homepage provides access to a page called "More about Tachinid Flies" (which gives a brief overview of the family), the Tachinid Times newsletter, Tachinid Bibliography 1980 - Present, database on the primary types of the Tachinidae in the Canadian National Collection of Insects, links to non-ECORC tachinid sites, and lists of tachinid parasitoids of bertha armyworm, diamondback moth, obliquebanded leafroller and western spruce budworm. In the next several years interactive keys to the tachinids of the aforementioned pests will be added to the site along with a checklist of the Tachinidae of America north of Mexico.

For those interested in parasitoids other than Tachinidae, a home page and associated web pages for the Chalcidoidea will be established soon on the ECORC site at http://res.agr.ca/ecorc/apss/chalhome.htm by my colleague Gary Gibson under the *Animal Protection Systematics Study* (http://res.agr.ca/ecorc/apss/apsshome.htm).

Tachinids attacking stinkbugs feeding on macadamia nuts in South Africa (by M.A. van den Berg and J. Greenland)

During the past season, large numbers of the introduced *Trichopoda giacomellii* (Blanchard) were released either as adults or as parasitized *Nezara viridula* (L.) and *Nezara pallidonconspersa* Stal stinkbugs. This was done in an unsprayed macadamia orchard in an attempt to establish this parasitoid. The work is continuing.

Tachinids bred from field collected pentatomid species that feed on macadamias are:
(1) *Bogosia bequaerti* (Villeneuve) bred from: *Bathycoelia natalicola* Distant and *Nezara viridula* (L.).
(2) *Bogosia* sp. bred from *Nezara viridula* (L.).
(3) *Cylindromyia eronis* Curran bred from *Bathycoelia natalicola* Distant.
(4) *Cylindromyia* sp. bred from *Nezara viridula* (L.).

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

This Congress will be held in Oxford, UK, 6-13 September 1998. I have been asked to organize the Tachinidae section with the assistance of the local organizer for this section, Nigel Wyatt. The section has yet to be finalized but we anticipate the following slate of participants and topics:
S. Gaponov - egg stage of Tachinidae.
J.E. O'Hara - online tachinid identification keys and related products.
V.A. Richter - remarkable distribution of two pairs of related species in Palaearctic tachinids.
H. Shima - generic definition of *Carcelia* genus-group.
T. Tachi - Siphonini of eastern Palearctic Region.
J. Ziegler may present a poster at the Congress on the morphology of the puparia of tachinids.

PERSONAL NOTES

David Barraclough writes: Although now largely devoted to acalyptrate systematics, I was busy with two tachinid publications during 1997. The first of these (derived largely from his Ph.D. studies) was the description of a tribally unplaced genus of Dexiinae from Melanesia. This paper was delayed for more than five years in the hope that further material would be found (each of the four species is known from a single specimen), but to no avail! I also recently completed a paper with Jim O'Hara describing a remarkable new monotypic genus of the endemic Australian tribe Myiotrixini (Tachininae) from Western Australia. The hosts of Myiotrixini are known to be native Australian cockroaches.

Serge Gaponov worked on a monograph of tachinid eggs during 1997. This monograph was completed in December and submitted for publication in VINITI. The eggs of other Diptera are now being investigated with the aim of documenting their morphology and generalizing about the egg stage in Diptera.

A.R. Lahiri writes: I continue to study tachinid flies collected from different parts of eastern India with the kind assistance of Dr. H. Shima. I have also been in touch with Drs. C.-m. Chao and B. Herting. Eventually, results of my studies will be published in the state fauna series of our House Journal.

William Nettles writes: I retired from USDA-ARS late in 1994 and have been working for more than two years as pro bono business manager of the Journal of Agricultural Entomology published by the South Carolina Entomological Society at Clemson, SC. Next year I hope to return to manuscript writing because I have an unusually large amount of unpublished data on tachinids, *Trichogramma*, etc.

My wife Pat and I live in western South Carolina near the Blue Ridge (Appalachian) Mountains and invite old friends to stop by whenever they come this way.

J.E. O'Hara writes: Last summer I visited Saskatchewan and Alberta in conjunction with two

projects: (1) a study of tachinid parasitoids of bertha armyworm (*Mamestra configurata* Walker) on the prairies, and (2) a study of sarcophagids associated with cattle feedlot operations near Lethbridge, Alberta. Additionally, several days were spent collecting tachinids in southeastern Alberta, including one arid site near the border with the United States where such atypically Canadian biota as yucca, scorpions, solpugids and rattlesnakes are to be found. David Barraclough and I collaborated on a paper about a bizarre tachinid from Australia, as mentioned in David's entry above. A large project was initiated with Monty Wood to catalogue the Tachinidae of America north of Mexico using the software program Platypus developed by CSIRO in Australia. This cataloguing project will take several years to complete, though a checklist of the Tachinidae of the region will be prepared for the World Wide Web in late 1998 or early 1999 after a manuscript Monty and I prepared on "Tachinidae (Diptera): nomenclatural review and changes, primarily for America north of Mexico" has been published. Development of a web site on Tachinidae is described elsewhere in this newsletter.

Hiroshi Shima writes: In 1997 I stayed in China from 15th June to 16th July to collect flies in the vicinity of Qinling Mountain, Shaanxi Province, central China. I collected more than 1,000 tachinid specimens, including an undescribed species of *Chrysomikia* and many other interesting species. The tachinid fauna in this area appears very similar to the Japanese one and many species originally described from Japan are to be found there, such as *Prodegeeria japonica*, *Drinomyia hokkaidensis*, etc.

John Stireman writes: I am a graduate student at the University of Arizona in Tucson. I have developed a keen interest in the biology of tachinid flies, especially in their evolutionary and ecological interactions with host species. My thesis research is focused on the ecological and evolutionary determinants of host range in the Tachinidae, and how host range and host location strategies are shaped by one another. I am taking a multidisciplinary approach toward understanding this relationship by examining the behavior of individual flies, the patterns of parasitism in a local lepidopteran community, and the evolutionary patterns of host range in a subgroup of the Tachinidae.

I have begun conducting behavioral assays with *Exorista mella* and *Carcelia reclinata* to examine how they locate their shared host, the arctiid moth *Grammia geneura*. I have also sampled the lepidopteran community at several sites in mesquite-oak grassland habitats here in southern Arizona, and I am building a tachinid-host database that includes information concerning parasitism rate, what the parasitized hosts feed upon, their density, microhabitat, and other ecological variables. Preliminary examination of this data indicates that ecological factors such as microhabitat of the host profoundly influence their susceptibility to various tachinid species.

At a larger scale, I plan to examine the evolution of characters concerning host range, host location, and reproductive strategies within a subset of the macrotype Goniinae. This will be accomplished by reconstructing the evolutionary relationships of included genera using molecular characters. The boundaries of the group to be examined must be determined by a preliminary analysis due to the lack of phylogenetic resolution within the Goniinae. I plan to focus on the tribes Exoristiini, Winthemiini, and/or Eryciini, with perhaps 20-25 taxa total to reconstruct a somewhat skeletal phylogeny. Though I can collect many specimens locally for this analysis, there are many taxa that should be included that I probably will not find, or do not exist locally. I would greatly appreciate any donations of specimens within these groups from those of you who collect or rear tachinids (identified at least to genus). Specimens in alcohol (100%) are best suited (aside from live) for DNA extraction and amplification, though I am currently trying to see if I can get usable DNA from pinned specimens. If you are interested in donating any specimens, or have any suggestions please contact me (Stireman@u.arizona.edu, or see Mailing List below for address). It is my hope that this preliminary phylogenetic reconstruction will not only allow me to examine patterns of character evolution, but also provide a framework for tachinid systematists to work with, and improve upon.

Claude Thireau writes: In a joint project (Canadian Forestry Service - Ministry of Natural Resources and Energy of New Brunswick) aimed at combatting the gypsy moth (*Lymantria dispar*) using classical biological control, we produced here at the Laurentian Forestry Centre 300 mated flies of the European tachinid parasitoid *Ceranthia samarensis* (Villeneuve) [also known as *Aphantorhapopsis samarensis* (Villeneuve)] that we released in New Brunswick in June 1997. We have not been able to confirm that successful parasitism occurred following that release. Not one puparium could be found in the tray traps placed under the trees on which about 20,000 young gypsy moth larvae were released. However, successful parasitism of gypsy moth by field-released parasitoid females was observed in 1991, 1995 and 1996 in Ontario (Nealis and Quednau 1996; see

reference in tachinid bibliography below). We are now planning our work for next summer (1998), and hoping for better success in our attempt to establish *Ceranthia samarensis* in New Brunswick. Anyone with expertise in the identification of tachinid puparia is asked to contact me by E-mail at: thireault@cfl.forestry.ca.

Theo Zeegers is working on the following projects: (1) Checklist of Dutch tachinids, likely to be published in *Entomologische Berichten*, (2) Difference in period of flight between males and females of Tachinidae, and (3) Population dynamics of one host with two parasitoids: one with microtype eggs and one with macrotype eggs (inspired by the important example of *Thaumetopoea processionea* with *Carcelia iliaca* as macrotype and *Pales processioneae* as microtype parasitoid).

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