The Tachinid Times

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This is the first issue of this newsletter to be offered simultaneously (more or less) as hardcopy and over the Internet. For those of you receiving this newsletter in hardcopy and who wish to view the Internet version, the Internet address of the Biological Resources Division of our Centre is: http://res.agr.ca/brd/home.html. **The Tachinid Times** can be accessed through the BRD Homepage. In the years to come the mailing list for the hardcopy version of this newsletter will certainly decline as Internet access becomes more widespread.

The Biological Resources Division is about to undergo another name change. For those attempting to keep track, the group of systematists to which I belong has been variously classified over the not too distant past under the names Biosystematics Research Institute, Biosystematics Research Centre, and Biological Resources Division (BRD) of the Centre for Land and Biological Resources Research (CLBRR). In April 1996, BRD is expected to become the Crop Protection Program of the Eastern Cereals and Oilseeds Research Centre (ECORC). This latest reorganization results from the ongoing downsizing of the federal government of Canada, and the need to consolidate the remaining elements of research on the Central Experimental Farm.

Barring unforeseen circumstances, the next issue of **The Tachinid Times** will be distributed next February. Please send your contributions to me via E-mail if you can do so conveniently. My current E-mail address is oharaj@ncccot.agr.ca but it *will change* to oharaj@em.agr.ca in a few months.

Outbreak (?) of a tachinid parasitoid of the bagworm *Eumeta japonica* in Japan (by H. Shima and T. Tachi)

The bagworm *Eumeta japonica* Heylaerts (= ?*E. variegata*) is one of the most common pests of many kinds of roadside trees of urban areas in southern Japan, west of Tokyo. This bagworm is never found in natural forests. In the fall of 1995, one of us (TT) collected many specimens of this bagworm near our University campus in Fukuoka and reared them to get some parasitoids. Unexpectedly, many individuals of an unknown tachinid soon emerged from the bagworms, for the only known tachinid parasitoid of the bagworm is *Exorista japonica* and its percentage parasitism had been known to be very low. Later this tachinid was identified as *Nealsomyia rufella* (Bezzi), a microtype Oriental tachinid known as a parasitoid of *E. variegata* in Malaysia (Crosskey, 1976). Most *E. japonica* overwintering around our campus were parasitized by this tachinid, and average percentage parasitism was almost 90% in Fukuoka.

Nealsomyia rufella is a micro-oviparous species. We observed that the females laid their eggs on leaves of host plants, close to the edges of leaves just infested by bagworms. This gregarious parasitoid, with 1 to 70(!) individuals per bagworm, had never been recorded from Japan, but was also found in other places of Kyushu, such as Kumamoto and Kagoshima, and also in Honshu, Hiroshima and Osaka; in the latter place this tachinid had not been recorded despite the very detailed study of parasitoids of this bagworm by Nishida (1983).

Most of the flies emerged in late autumn, and this winter we can find only empty puparia of the tachinid in the bagworm cases. At present we do not know how and in what host this tachinid is overwintering. The bagworm is univoltine: it overwinters in the larval stage, pupates in late spring, and produces offspring in early summer. If *N. rufella* is multivoltine, then it must have

alternative hosts in Japan. These are left for us to discover through further study.

References

Crosskey, R.W. 1976. A taxonomic conspectus of the Tachinidae (Diptera) of the Oriental Region. Bull. Br. Mus. (nat. Hist.) Ent., Suppl. **26**, 357 pp.

Nishida, E. 1983. Biologies and parasite complexes of two bagworms, *Eumeta japonica* and *Eumeta minuscula* (Lepidoptera, Psychidae), in Japan. Kontyu **51**: 394-411.

Tachinid types in the Canadian National Collection (by J.E. O'Hara)

Bruce Cooper and I have prepared a catalogue to the tachinid types in the CNC as Part 4 in the series, *Diptera types in the Canadian National Collection of Insects*. As of 31 December 1994, the CNC Tachinidae collection contains 897 holotypes, 239 associated allotypes, 35 lectotypes (no associated allolectotypes), 2 neotypes, and 117 species represented by syntypes. Literature citations to the original descriptions are given along with label data for the primary types and allotypes.

This catalogue will be available shortly (probably before the end of February 1996) on the Internet at the address: http://res.agr.ca/brd/tachinid/tacheng.html. The user will be able to search the catalogue online or download the complete catalogue for use on a personal computer. The online version can only be searched, not browsed. The user can print searches from the online version or can print a complete hardcopy from the downloadable version. Negotiations are presently underway with a local printer to allow users and libraries to purchase the catalogue as a soft-covered book on a "print on demand" basis (ordering information will be available on the Internet).

This catalogue is the first foray into electronic publishing for the authors and also for the Product Development Unit of our Centre. It is anticipated that the catalogue will operate properly online, but if you notice any problems or inconsistencies then please let me know so that they can be corrected.

Further releases of *Trichopoda pennipes*, parasitoid of the green stinkbug, *Nezara viridula*, in South Africa (by M.A. van den Berg & J. Greenland)

To provide constant available developing green- or sojabean pods for about 18 months, an additional 0.25 ha of green- or sojabeans were planted every 2-3 months from October 1993 to March 1995. In this manner a field population of the green stinkbug, *Nezara viridula* (L.), was maintained which could have acted as hosts for the tachinid *Trichopoda pennipes* F.

Introductions of *T. pennipes* were made from Italy during December 1993 and December 1994. After their progenies were released from quarantine, the parasitoids were reared at the ITSC in Nelspruit. During the beginning of 1994, 74 adult parasitoids were released and during the same period a year later, a further 241 adults.

Of the adult green stinkbugs collected in the sojabeans during February and March 1995, up to 33% were parasitized by *T. pennipes*. This is an indication that this parasitoid may have become established. This still has to be confirmed during the following season.

Book Review: Handbook on British Tachinidae by R. Belshaw (by J.E. O'Hara)

(Reviewed for the publisher.)

Citation: Belshaw, R. 1993. Tachinid flies. Diptera: Tachinidae. *Handbooks for the identification of British Insects* **10**, Part 4a(i). 170 pp. Available from the Royal Entomological Society of London, 41 Queen's Gate, London SW7 5HR. Cost: 23.20 pounds sterling.

This volume supersedes the one published by van Emden in 1954 in the same series. However, this is not just an updated version of the van Emden handbook, but a completely original work with similar goals to those of its predecessor.

As stated on the reverse of the title page, "The aim of the Handbooks is to provide illustrated identification keys to the insects of Britain, together with concise morphological, biological and distributional information." Belshaw's volume fulfils these aims in exemplary fashion. He begins with a biology section comprising overviews of tachinid life histories, hosts, reproductive strategies, location and selection of hosts, oviposition methods, and physiological interactions with hosts. There follows illustrated keys for the identification of the 241 species of Tachinidae recorded from Britain, with preambles on the systematics of the family and preparation of specimens. Much of the remainder of the book details the known biological information about each species, including hosts, distribution in Britain, habitat, and flight period. A Check List of species is appended.

The 40 years between the handbooks of van Emden and Belshaw was a period of substantial progress in the systematics of Palearctic Tachinidae. During this time most of the family was revised by Mesnil in Lindner's series, *Die Fliegen der palaearktischen Region*. Herting contributed greatly to the phylogenetics of the family with the publication of his work on the female terminalia in 1957, and he summarized the biology of Palearctic tachinids in a 1960 publication. Herting's 1984

catalogue of Palearctic Tachinidae brought into usage a modern classification that has not changed markedly during the past decade. More recently, Tschorsnig and Herting have compiled a huge database on the hosts of Palearctic Tachinidae (unpublished) and produced a comprehensive work on the tachinids of Central Europe (1994).

Belshaw has followed the classification of Herting (1994), retaining the same taxonomic order of subfamilies, tribes and genera in his extensive section on Species Biology and in his Check List, except for slight changes adopted because of recent revisionary work. Since Herting's catalogue is in universal usage in the Palearctic region, the same taxonomic arrangement in Belshaw's Handbook imparts to it a feeling of familiarity. Host information in the Handbook is taken in large measure from Herting's 1960 work on the subject and from the unpublished records of Tschorsnig and Herting.

Belshaw deviates slightly from Herting (1984) in the spelling of certain generic names. Belshaw has followed the International Code of Zoological Nomenclature in using original spellings whereas Herting emended names that were improperly spelled in their original form. For example, Herting emended names originally ending with "mya" and "cheta" to "myia" and "chaeta". Original spellings are becoming almost universally accepted. Belshaw perhaps overlooked the original spelling of *Huebernia*, which was proposed by Robineau-Desvoidy as *Hubneria*.

A nomenclatural change that has yet to be accepted in the Palearctic literature, including Belshaw's Handbook, concerns the name *Ernestia* R.-D. Robineau-Desvoidy described *Ernestia* and *Panzeria* in 1830 and synonymized the former name under the latter in 1863. Wood (1987, *Manual of Nearctic Diptera* **2**) remarked on this synomymy and used *Panzeria* as the valid name. According to the "principle of the first reviser" (Art. 24 of the ICNZ), Wood's usage is nomenclaturally correct.

I have saved for last my comments on the identification keys because these represent the most important element of this Handbook. The keys are arranged under three headings, with a key to families of British Oestroidea, a key to the genera of British Tachinidae, and a group of keys to species (mostly genus by genus). Line drawings of taxonomically-useful features are conveniently located in the outer margins and additional drawings are placed after the Check List. I tested the key on the following species known from Britain: *Exorista rustica*, *Compsilura concinnata*, *Admontia maculisquama*, *Timevia amoena*, *Phebellia stulta*, *Cyzenis albicans*, *Tachina (Servillia) ursina*, *Triarthria setipennis*, *Siphona geniculata*, *Lypha dubia* and *Wagneria gagatea*. The key worked very well, and seems to have been constructed with a view towards separating British tachinids using the simplest characters possible rather than by using generically diagnostic characters. Hence, the key will not work even at the generic level outside Britain (which it is not intended to do anyway), but should be fully satisfactory within Britain.

In conclusion, this Handbook is all that it purports to be. It is a fine addition to the Identification series and a credit to the author, Robert Belshaw.

Hilltopping Tachinidae from western Europe (by H.P. Tschorsnig)

When Monty Wood visited the Naturkundemuseum Stuttgart in 1982, he told me about his collections of Tachinidae on hilltops. Since then, I have tried to practise this method whenever I am in the field. Because of the lack of suitable localities in central Europe (most peaks are covered with trees), I collected mainly on mountains with poor vegetation in southwestern Europe (Alps, Pyrenees, various mountainous regions in Spain), whose altitudes vary between 190 m and 2830 m.

As there are nearly no records of hilltopping Tachinidae from Europe, I give here a list of species that have been collected more or less constantly during the last 13 years. I have not mentioned those species of which only single specimens have been found on one or two occasions; this concerns about 80 additional species.

Most of the tachinids were collected from stones, from the ground or from lower plants using a transparent plastic bag or a normal net; on one occasion I used a malaise trap. As expected, nearly all captures were of male specimens.

The arrangement of species follows Herting & Dely-Draskovits (1993). The first number given within square brackets is the total number of specimens observed or collected, the second number (after the slash) is the number of collecting days on which the species was found on hilltops.

Exorista glossatorum (Rondani) [7/6]
Exorista decidua (Pandellé) [11/4]
Exorista nympharum (Rondani) [26/8]
Chetogena acuminata Rondani [7/3]
Meigenia grandigena (Pandellé) [42/4]
Meigenia majuscula (Rondani) [65/17]
Aplomya confinis (Fallén) [69/20]
Phebellia strigifrons (Zetterstedt) [23/7]
Periarchiclops scutellaris (Fallén) [8/3]

Drino atropivora (Robineau-Desvoidy) [13/2]
Erycia furibunda (Zetterstedt) [15/7]
Platymya antennata (Brauer & Bergenstamm) [5/3]
Platymya fimbriata (Meigen) [27/7]
Eumeella perdives (Villeneuve) [49/7]
Pales pumicata (Meigen) [5/5]
Gaedia hispanica Mesnil [27/6]
Gonia bimaculata Wiedemann [7/2]
Gonia capitata (DeGeer) [30/9]
Gonia ornata Meigen [5/3]
Onychogonia cervini (Bigot) [13/4]
Onychogonia suggesta (Pandellé) [37/6]
Spallanzania sp. near *hebes* (Fallén) [4/2]
Tachina grossa (L.) [52/6]
Tachina casta (Rondani) [14/3]
Tachina fera (L.) [91/12]
Tachina magnicornis (Zetterstedt) [4/3]
Nowickia reducta Mesnil [52/10]
Peleteria abdominalis Robineau-Desvoidy [24/5]
Peleteria prompta (Meigen) [193/16]
Peleteria rubescens (Robineau-Desvoidy) [16/6]
Linnaemya comta (Fallén) [3/2]
Linnaemya soror Zimin [16/4]
Eurithia cristata (Villeneuve) [21/7]
Macquartia tessellum (Meigen) [134/12]
Mintho rufiventris (Fallén) [123/15]
Minthodes numidica Villeneuve [19/2]
Hyperaea femoralis (Meigen) [5/2]
Cyrtophleba riricola (Meigen) [9/4]
Leucostoma turonicum Dupuis [15/6]
Cylindromyia brevicornis (Loew) [91/12]

Hilltopping Tachinidae from the American Southwest (by J.E. O'Hara)

When I received the list of tachinids that Peter Tschorsnig had collected on hilltops in southwestern Europe, I decided to complement it with a list of tachinids that I have collected on hilltops in Arizona, New Mexico and West Texas.

I too was motivated by Monty Wood to collect on hilltops, though I did not start hilltopping until about five years ago. Thus, my data on hilltopping tachinids in the American Southwest is based only on my four most recent trips to the region.

Why this interest in hilltopping? Firstly, because quite a few tachinid species hilltop and consequently hilltops are good places to collect tachinids, and secondly the evolutionary aspects of hilltopping are intriguing. Species hilltop for mating purposes – the theory being that this behavior evolved in response to a need for an aggregration site that would enable the sexes to find each other easily. Males generally spend longer on hilltops than females, with the latter only visiting hilltops long enough to find a mate. Each species has a window of activity and a discrete location on a hilltop that are species specific.

No published lists of hilltopping tachinids are available from which generalizations about hilltopping behavior can be drawn. The lists presented here may serve as starting points in this regard.

The list of hilltopping tachinids presented here is based on few hilltopping experiences, so is quite preliminary. Additionally, there are apt to be some species listed which are not true hilltoppers, though I have excluded some species which seemed to be present on a hilltop incidentally and not for mating purposes. The numbers given within square brackets are explained in the preamble to Peter Tschorsnig's list.

Exoristini
Austrophorocera pellecta (Reinhard) [1/1]
Chetogena parvipalpis (Wulp) [4/2]
Blondeliini
Blondelia eufitchiae (Tnsd.) or *B. polita* (Tnsd.) [6/3]
Chaetonodexodes vanderwulpia (Townsend) [8/3]
Cryptomeigenia sp. [1/1]
Eucelatoria armigera (Coquillett) [2/1]
Euhalidaya genalis (Coquillett) [3/1]
Myiopharus prob. *ancillus* (Walker) [1/1]
Myiopharus levis (Aldrich & Webber) [2/2]
Myiopharus sp., probably undescribed [1/1]
Opsomeigenia pusilla (Coquillett) [3/2]
?Phyllophylopsis sp. [1/1] (Unique in CNC.)
Vibrissina mexicana (Aldrich) [2/2]
Zaira arrisor (Reinhard) [1/1]
Winthemiini
Masiphya sp. [1/1]
Eryciini
Aplomya theclarum (Scudder) [1/1]
Drino (Zygosturmia) incompta (Wulp) [3/2]
Eunemorilla effeta (Reinhard) [1/1]
Madremyia saundersii (Williston) [1/1]
Phebellia ?erecta (Sellers), [1/1]
Goniini
Belvosia bicincta Robineau-Desvoidy [8/1]
Chaetogaedia desertorum (Townsend) [24/3]
Chaetogaedia monticola (Bigot) [1/1]
Chrysoexorista ochracea (Wulp) [2/1]
Cyzenis nr. *ustulata* (Reinhard) [1/1]
Chrysoexorista sp. [11/1]
Gaediopsis setosa Coquillett [5/2]
Gaediopsis sierricola (Townsend) [28/4]
Gonia sequax Williston [6/1]
Leschenaultia adusta (Loew) [1/1]

Patelloa facialis (Coquillett) [16/3]
Patelloa pluriseriata (Aldrich & Webber) [4/1]
Phasiinae
Catharosia sp. [1/1]
Tachininae
Bombyliomyia soror (Williston) [2/1]
Deopalpus sp. [1/1]
Paradidyma singularis (Townsend) [3/2]
Peleteria (Oxydosphyria) iterans (Walker) [6/1]
Peleteria (Sphyromyia) sp(p). [13/4]
Xanthophyto labis (Coquillett) [1/1]
Dexiinae
Campylocheta sp. [1/1]
Euthera sp. [1/1]
Metaplagia sp., probably undescibed [3/1]
Mochlosoma illocale Reinhard [12/2]
Ptilodexia conjuncta (Wulp) [7/1]
Trafoia sp. [1/1]
Uramya halisidotae (Townsend) [1/1]

Hilltopping Tachinidae from western Quebec (by D.M. Wood)

The previous two contributions by O'Hara and Tschorsnig describing their hilltopping experiences prompted me to tabulate my own observations, made over the past 20 years, on two summits in western Quebec. Unlike eastern Ontario, which is the flat, almost featureless former bottom of the Champlain Sea, adjacent Quebec is dominated by the granite outcrops of the Canadian Shield, with scattered summits of old volcanoes (the Montérégiennes, scattered over the Eastern Townships southeast of Montreal) between the Shield and the foothills of the Appalachian Mountains. Hence, "hilltop collecting" cannot be carried out within a reasonable distance of Ottawa on the Ontario side, but Quebec is richly endowed with summits of many kinds. Unfortunately most of them are covered with trees, but one, Mt. Rigaud, only 110km west of Ottawa, is almost bare on top, with a few stunted Red Oak (*Quercus borealis*) barely 4m tall, forming the highest vegetation on the summit. Consequently it is easy to reach all parts of the canopy with a 3m long net, a ladder, or by climbing the trees. The summit of Mt. Rigaud (elevation 220m) is rather sharply pointed, with an area at the peak of only a few square metres. Years ago, a tower, consisting only of a skeleton of angle iron in the form of a cross, was constructed. The cross is now dilapidated but still standing, and males of a few species (*Billaea sibleyi*, the horse bot *Gasterophilus intestinalis*, and the sawfly *Cimbex* sp.) have been collected at the top of it, but the great majority of specimens and species are on or around the stunted oak trees below, and seem to ignore the tower. Perhaps it doesn't have enough substance to it, being made only of angle iron. Although the summit of Rigaud itself is bare, probably because there is not enough soil to support a forest, the mountain itself is entirely covered by Great Lakes-St. Lawrence forest, dominated by Sugar Maple, Beech, Red Oak, and White Pine. It slopes rather steeply to the north and south, and more gradually to east and west; nevertheless it is an isolated peak whose nearest neighbour is at least a kilometer away.

The other hilltop surveyed here is a more ordinary summit, amongst many similar peaks, in the Gatineau Hills 50km northwest of Ottawa. At 260m elevation, Masham is somewhat higher than Rigaud and this may explain some of the differences between the two. Masham has the advantage of proximity, being only 20 minutes walk away from my summer cottage at Duncan Lake near Ste-Cecile de Masham, Quebec, and has therefore been visited much more often than has Rigaud. I have spent several hours on most weekends during most of the collecting season (not as often during July when I have been in the Arctic) every year since 1973, and now find it difficult to obtain any new locality records. But as the list below will show, far fewer species have been taken there than at Rigaud in spite of this investment of time. This summit is also surrounded by a rather similar forest, but with a greater component of conifers, especially of Eastern Hemlock, Balsam Fir, and White Spruce, on the north-facing slope. The most striking difference between the two peaks is the presence on Masham of a covering of fully developed trees. The tallest, growing almost on the summit, is a White Pine, perhaps 12m tall; flies can usually be seen congregating on its topmost branch, but it has not been possible to capture them.

In the Manual of Nearctic Diptera, I (Wood 1987) described two types of mate-searching behaviour in tachinids, with associated antennal and frontal ratios. Both types occur on both Rigaud and Masham. The most common type, or at least the most easily observed, is the "waiting" male, in which the frons is usually narrower, and the eyes correspondingly larger above, than those of the female, but whose antennae are similar in size. These males wait at a particular site, which is usually leaves, but in early spring bare twigs, and for a few species, tree trunks. Several conspecifics may be waiting near one another, each flying out after every insect that passes, and often spending a lot of time chasing one another. If it is another conspecific male, a chase sometimes lasting more than a minute may take place, or more often, the two fly around for a few seconds and reestablish themselves, without one seeming

to have gained an advantage. For years, their half-hearted attempts to chase one another away and their apparent failure to do so led me to believe they were exceedingly stupid, and could not recognize another male from a female. A marking experiment using *Lespesia stonei*, however, has convinced me that aggression and territoriality motivate such interactions. In this species, one male succeeded in remaining the sole member of his species on a centrally-located hilltop site, although many times other males interacted with him in an apparent attempt to chase him away. These other males ended up taking stations nearby on the same hilltop, but not at the exact summit.

Because of the constantly changing position of the sun, species that choose sites amongst the lower branches of the canopy change their position throughout the day, "following the sun" so to speak. I am now attempting to map these changes; preliminary observations suggest that they choose a site from which the edge of the top of the canopy, or top of the tallest tree between them and the sun, is visible superimposed on the sun. Species that choose the topmost branch do not vary their position during the day, but may be present only at specific times. For example, *Euthera tentatrix* does not appear at its site, the uppermost branch of the tallest oak at Rigaud, until after 2 p.m., while *Eutrixa exilis* and *Ormia reinhardi* do not appear at this same site until 20 minutes after sundown (usually after 9 p.m. in mid-July). *Ormia* arrives consistently 10 or 15 minutes after *Eutrixa*, well after the last dragonfly and wasp have retired for the night, when it is almost too dark to see them, yet three mated pairs attests to the purpose of their visit! (and mine!).

The other type of mate-searching behaviour I alluded to in the Manual is the "visiting" male. Among the species that "visit" their sites, presumably inspecting them for waiting females (and females of several species have been collected perching at these sites), most have much larger third antellomeres than do the female, while the frons is usually wide, hardly different than in the female. Unless it is cold, when males stop occasionally and appear to sun themselves, males do not rest but arrive at the site, usually a prominent branch tip, often a leafless one, and briefly fly along, around, or over it, departing as abruptly as they appeared. Such sites must be discovered, with patience and luck, by staring at a potential site for several minutes in hopes of seeing a fleeing insect. If many other flies are present (and Rigaud is infested with hundreds of sarcophagids flying in all directions) such observations may be almost impossible. At least I offer this as my excuse for finding so few such sites at Rigaud. Most of the species at Rigaud that have not yet been associated with a mating station have enlarged male antennae and broad frons, and presumably belong to this type. Yet many of these males (many times more males than females) have been taken commonly on Mt. Rigaud at artificial "honey dew" (honey, Coca Cola, and water sprayed on foliage) and are presumably visiting the hilltop for mate searching.

All species whose males have "fissicorn" antennae apparently belong to the visiting type. I suppose that all these adornments are merely different ways of expanding the surface area of the third antennomere. (Hence they are probably not reliable as phylogenetic indicators.)

No territorial interactions among visiting males have been observed. Presumably territoriality is unnecessary, and some males are more successful than others based on timing of their visits. However, marking experiments with *Blepharomyia* n.sp. showed that the same males revisited the same site several times a day. Presumably they have a "trap line" they follow during the course of the day, but I have not been able to map such a course. Another advantage the "visiting" males may have over "waiting" males is the ability to hunt in overcast weather, but I have not conclusively shown this yet.

The inventory below lists **only** those species in which the males have been observed on more than one occasion waiting at or visiting a particular site, which I regard as a "mating station." This site may be as small as a single branch of a particular tree; but on a given date and time of day I can predict which species will be present there based on past records. Some of these sites have been used consistently every summer for 20 years (vegetation grows quite slowly in this part of Canada!). On one occasion, the leaves of the stunted oaks on Mt. Rigaud were stripped of their leaves by larvae of the Gypsy Moth (*Porthetria dispar*); on another occasion, a drought caused them to drop their leaves in June; on both occasions the otherwise predictable waiting or visiting behaviour did not occur and I have no idea what the males did instead. The trees leafed out within a couple of weeks and station-taking resumed as in previous years. In summary, a "mating station" is one that can be recognized and identified only by finding conspecific males of a given species there repeatedly.

Two or more species, always in different genera, may use the same mating station, and when together they seem oblivious to one another. However, closely related species do not use the same station. An example is the two species of *Blepharomyia* at Masham – *B. tibialis* was found waiting (but only for a few seconds at a time, moving restlessly from leaf to leaf) on the leaves of any hardwood shrub provided they were under the

overhanging branches of a White Pine; males of the other (*B*. n.sp.) did not wait, but visited twig tips (without or with leaves, depending on the time of May) in a clearing only a few metres from the station of *B. tibialis*, but over the years, some hundred specimens of each species have never "made a mistake" and were collected at the other's site. [On a hilltop in California I was able to detect the presence of three closely related species of *Metopomuscopteryx* by their different mating stations, in addition to three males of three other species, whose station I evidently did not discern.]

I have made only indirect mention of other insects that also behave as though they were waiting for mates. In addition to sarcophagids (see also Dodge and Seago 1954), which are probably the most abundant insects at Rigaud, oestrids (*Cephenemyia* and *Gasterophilus*), calliphorids, muscids, syrphids, phorids, tabanids, therevids, sawflies (Cimbicidae, Xiphridiidae, and Siricidae), and butterflies of various species, are also present (see also Shields 1967).

List of species of which males have been observed waiting at or visiting mating stations on two sites in western Quebec.

A – the topmost branch of the tallest tree.
B – the open, sunlit upper surface of the canopy extending away from A.
C – sunlit spaces within the canopy and on lower branches.
D – on the ground or on branches of herbs and low shrubs.
T – only on the surfaces of the largest tree trunks.
\+ – the species has been recorded (e.g., at an attractant or in a malaise trap), but its mating station has not been found.
\- – the species has not yet been recorded.

	Rigaud	Masham
Exoristini		
Chetogena claripennis	B	-
Austrophorocera einaris	D	-
A. stolida	B	-
Phorocera (Pseudotachinomyia) slossonae	B	+
P. (P.) convexa	+	C
P. (P.) exigua	+	C
Tachinomyia variata	+	C
Blondeliini		
*Aplomyiopsis vexans**	D	+
A. xylota	D	C
Blondelia hyphantriae	C	C
Cryptomeigenia demylus	A	+
C. muscoides	C	C
C. nigripes	C	C
C. theutis	C	C
Dolichotarsis livescens	D	+
Lixophaga opaca	+	C
L. unicolor	C	C-D
M. barbata	C	+
Medina quinteri	D	-
Myiopharus dorsalis	B	B
M. n.sp.	+	C
Opsomeigenia pusilla	B	-
Oswaldia albifacies	C	C
O. aurifrons	B	+
O. minor	+	C
Phyllophilopsis nitens	D	C-D
Zaira sp.	A	-
Winthemiini		
Hemisturmia tortricis	B	-
Nemorilla pyste	+	C
Winthemia datanae	B	B
W. occidentis	+	C
W. rufopicta	B	+
W. sinuata	D	D
Eryciini		
Drino bohemica	B	-
D. rhoeo	B	+
Drino n.sp.	+	B
Lespesia stonei	C	C
Nilea sternalis	C	+
N. valens	C	+
Phebellia epicydes	B	+
P. trichiosomae	B	+
Siphosturmia melitaeae	B	-
S. phyciodis	B	+
Sisyropa alypiae	C	-
Goniini		
Cyzenis browni	+	C
Euceromasia spinosa	C	-
E. sobrina	D	-
Frontiniella spectabilis	B	B
Eumasicera coccidella	-	C
Leschenaultia leucophrys	C	C
Platymya confusionis	B	D
Tachininae		
Epalpus signifer	C	C
Lypha intermedia	+	D
L. setifacies	+	T
Macquartia erythrocera	A	-
Oestrophasia signifera	C	-
Ormia reinhardi	A	-
Panzeria ampelus	D	C
P. johnsoni	D	C
Pelatachina pellucida	C	+

Pseudopachystylum debilis	B	-
Phytomyptera sp.	C	+
Goniocera io	+	B-C
Dexiinae*		
Chaetophlepsis semiothisae	+	C
C. teliosis	+	C
Billaea satisfacta	-	T
B. sibleyi	A	-
Zelia vertebrata	T	T
Thelaira americana	D	D
Blepharomyia tibialis	+	C
B. n.sp.	-	C
*Epigrimyia illinoiensis***	A	-
Eulasiona comstocki	B	+
*Euthera tentatrix***	A	-
Eutrixa exilis	A	-
Muscopteryx evexa	A	-
Uramya limacodis	D	C-D
U. pristis	C	-

* Although I previously (Wood 1985) included *Aplomyiopsis* in *Opsomeigenia*, I now believe this was a mistake. The genitalia of the two are quite different; those of *Opsomeigenia* are like those of *Eucelatoria*, while those of *Aplomyiopsis* resemble those of *Oswaldia*.

** The inclusion of *Epigrimyia* and *Euthera* in Dexiinae is based on their possession of an L-shaped phallus (a synapomorphy of the Dexiinae) and the presence of embryonated eggs in the uterus.

Conclusions

The nine species at Rigaud rated A – i.e. collected only from the top-most branch of the tallest oak, are all unknown from Masham, where the treetop is out of reach.

Nearly all of the species that have been observed at both Masham and Rigaud occur much higher up in the canopy at Masham, suggesting that they choose a site based on the ratio between the ground and the top of the tree. For example, the two species of *Panzeria* occur less than 1m from the ground at Rigaud but 2-3m at Masham. *Epalpus signifer* and *Blondelia hyphantriae* occur at 1-1.5m at Rigaud, but 3-4m above ground at Masham. Males of *Thelaira*, however, wait on herbs on the forest floor less than 1m above ground at both Masham and Rigaud.

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Request for information on tachinid parasitoids of *Glyphodes* spp.

Pradip Kumar has moved from India to Malaysia to provide research and development support (biological control of pests of mulberry) to a silk producing organization located in Sarawak (see address in mailing list). Tachinids are generally regarded as pests in the silkworm industry because of their parasitization of the silk producing caterpillars. However, Pradip Kumar is particularly interested in researching tachinids that are beneficial to the silkworm industry. In this regard, he would be grateful for information about tachinids that parasitize members of the pyralid genus *Glyphodes*. *Glyphodes* species are serious pests of mulberry, the host plant of silk producing caterpillars.

Chrysomelid parasitism by *Celatoria bosqui* in Brasil (by L.A. Salles)

The chrysomelid *Diabrotica speciosa* Germar is one of the most harmful insect pests of hortifruit crops in southern Brasil (lat. 32ºS, long. 51ºW; subtropical climate with high relative humidity). This pest occurs throughout the year, but is most abundant and damaging in late spring and summer. Among its natural enemies surveyed in this area, an adult parasitoid, the tachinid *Celatoria bosqui* Blanchard, was outstanding because it parasitizes *D. speciosa* throughout the year and has very high rates of parasitism. Annual average parasitism varied from 11-85%. Parasitism was highest in April (85%) and May (77%) and lowest during the summer months (November to January), with greater than 50% parasitism from March to September. The parasitoid occurred at every site and in each weekly sample throughout the year. Attempts are being made to establish a laboratory colony, but without full success so far.

I would like to offer this tachinid species to interested parties, collected from wild *D. speciosa* adults (no hyperparasitism observed). I would be pleased to send this small but very efficient fly. Any suggestions about how to rear this species would be extremely welcome.

Note on the Tachinid Parasites associated with Forest Lepidoptera in West Siberia (by N.G. Kolomiets)

My colleague Dr. Lidia N. Litvinchuk and I found some new rearing records of tachinid parasitoids of Siberian forest Lepidoptera. These new records represent new locality records (extreme West or North) for some species.

Bessa parallela (Mg.) from pupae of *Yponomeuta evonymella* L. Mass reproduction of host on introduced *Evonymus europaea* (3-10.vii.1995, Novosibirsk, Akademgorodok, 17 specimens).

Blepharipa pratensis (Mg.) from pupa of *Hyles gallii* Rott. (29.ix.1984, Novosibirsk, Akademgorodok, 1 specimen).

Blepharomyia pagana (Mg.) from pupa of *Biston hirtaria* Cl. (21.vii.1977, Volchikha, Altai Region, 1 specimen).

Blondelia nigripes (Fallén) from pupae of *Semiotisa liturata* Cl. (22.vi.-6.vii.1979, Volchikha, Altai Region, 3 specimens).

Compsilura concinnata (Mg.) from pupae of *Lymantria dispar* L. (6-19.vii.1995, Barabinsk, Novosibirsk Region, 8 specimens).

Exorista civilis (Rondani) from caterpillars of *Loxostege sticticalis* L. (22.ix.1985, Kashiry, Pavlodar Region, Kasakhstan, 2 specimens).

Exorista larvarum (L.) from pupae of *Lymantria dispar* L. (9-11.vii.1995, Barabinsk, Novosibirsk Region, 14 specimens).

Exorista xanthaspis (Wied.) from pupa of *Euproctis karghalica* Moore (31.vii.1987, Kluchi, Altai Region, 1 specimen).

Masicera silvatica (Fallén) from pupae of *Dendrolimus pini* L. (24.vii.1989, Borovoye, Kokchetav Region, Kazakhstan, 2 specimens).

Pelatachina tibialis (Fallén) from pupae of *Nymphalis xanthomelas* L. (12.vii.1966, Asino, Tomsk Region, 3 specimens).

Phryxe vulgaris (Fallén) from pupae of *Pieris napi* L. (3.vii.1995, Sokur, Novosibirsk Region, 2 specimens). Also from pupa of *Semiothisa liturata* Cl. (6.vii.1979, Volchikha, Altai Region, 1 specimen).

Senometopia excisa (Fallén) from pupae of *Cerura vinula* L. (15.iii.1978, Volchikha, Altai Region, 3 specimens).

Senometopia pollinosa (Mesnil) from pupa of *Semiotisa litarata* Cl. (7.vii.1979, Volchikha, Altai Region, 1 specimen).

Winthemia quadripustulata (Fab.) from pupae of *Ectropis bistortata* Goeze. Mass reproduction of host on *Larix* sp. (9-14.vi.1989, Romanovo, Altai Region, 4 specimens). Also from pupae of *Ectropis crepuscularis* Hbn. Mass reproduction of host on *Vaccinum vitisidaeus* (16.vii.1975, Blyi Yar, Tomsk Region, 3 specimens).

I will be donating my collection of Diptera to the Zoological Museum of the Institute of Systematics and Ecology of Animals, in Novosibirsk.

Reinhard reprints available

Sets of reprints of H.J. Reinhard which deal mostly with the taxonomy of Tachinidae and other muscoid flies are available from the Texas A&M University Insect Collection by contacting E.G. Riley. The most complete sets include 70+ papers. Sets will be given away on a first come, first served basis. (Contact Edward G. Riley, Department of Entomology, Texas A&M University, College Station, Texas 77843-2475, USA.)

Upcoming symposium on artificial rearing

Symposium on *Artificial Rearing of Insect Parasitoids and Predators* to be held as part of Section 20 "Entomophagous Insects and Biological Control", during the XXth International Congress of Entomology, Firenze (Italy), 25-31 August 1996.

This symposium will focus on any kind of requirements for obtaining oviposition and/or development in/on artificial rearing systems by parasitoids and predators. Physiological as well as behavioral requirements will be considered. The perspective of economical mass rearing systems for parasitoids and predators for augmentative biological control purposes should be envisaged too. The quality control of artificially-reared parasitoids and predators will also be a discussion topic.

If you are interested, to obtain information and reply form, please contact the organizers as soon as possible:

(1) Dr. Simon Grenier, Laboratoire de Biologie Appliquée, INRA, Bât. 406, INSA, 20 Ave. A. Einstein, 69621 Villeurbanne Cedex, FRANCE. [FAX: (33) 72438511; E-mail: sgrenier@jouy.inra.fr], *or*

(2) Dr. Patrick Greany, USDA/ARS, 1700 SW 23rd Dr., Gainesville, FL 32608, USA. [FAX: 904-374-5923; E-mail: pgreany@nerdc.ufl.edu]

PERSONAL NOTES

A.R. Lahiri writes: I am pursuing my studies on Indian Tachinidae, especially pertaining to northeastern

India. I have established contact with Dr. H. Shima who has very kindly been helping me confirm my identifications. Preliminary results indicate that this region is quite rich in tachinid fauna and some of the species reported from neighbouring states are also represented here.

Gerlind Lehmann writes: For two years I have been working on my thesis about "The influence of the parasitic phonotactic fly *Therobia leonidei* (Ormiini) on the acoustical communication of Ensifera (Orthoptera)". My experiments have been conducted in Greece with *Poecilimon thessalicus* and *P. mariannae* (Phaneropterinae), which are both hosts of *Therobia leonidei*. I reared the flies together with male *Poecilimon* in a big outdoor cage under natural conditions, and fed the flies with several types of fruit.

For my experiments I used only flies that had hatched out of caged hosts because, unfortunately, *Therobia* was not attracted to caged males in the field. All methods I am aware of (for example, Wineriter and Walker 1990) have not helped me to get an infestation of the calling males by the female flies. I am even not sure that the flies mated in the cage. Last year mating took place only once under the same conditions and I got three infested *P. thessalicus*. Is there anybody who has a good idea about how to get a successful infestation?

Rolando Lópes is conducting postdoctoral work on the Colorado potato beetle at the University of Massachusetts. He is researching control of the CPB using a combination of the ladybug beetle *Coleomegilla maculata* (which eats the eggs of the CPB), tachinids of the genus *Myiopharus*, and Bt. Rolando has recently been awarded the John Henry Comstock award from the Eastern Branch of the Entomological Society of America. The Comstock award is granted to a recently graduated PhD who has made a significant contribution to the science of entomology.

Jim O'Hara writes: 1995 was mostly a year of finishing off partially completed projects. Two of these have resulted in papers that are currently in press with the *Canadian Entomologist*, one on the New World species of *Triarthria* Stevens and the other on the genus-group and species-group names of L.P. Mesnil. As explained elsewhere in this newsletter, I am co-author with Bruce Cooper (of our Centre) of a catalogue on the Tachinidae types in the Canadian National Collection. This catalogue will appear soon on the Internet. Due to shifts in management policy, myself and others in our Centre will be moving into more "client driven" research during the next year, so future studies are a little uncertain at this point. However, systematic work will continue and so too my *Lypha*-group revision. Last spring I had the pleasure of visiting Texas A&M University in College Station to curate the tachinid collection, courtesy of a NSF Collection Improvement Grant held by the Entomology Department of that university.

Ana Maria Ávila Simões writes: I am an entomologist working on the Japanese beetle (*Popillia japonica* Newman) in Portugal. In our laboratory we are interested in the biological control of this insect on the island of Terceira, a Portuguese island in the Atlantic Ocean. I am working with the tachinid *Istocheta aldrichi* (Mesnil), a parasitoid of Japanese beetle adults.

Xuekui Sun writes: My revision of the fascinating genus *Phasia* is almost finished, although some problems are still not resolved, such as the sister group of *Phasia* and delineation of species groups within *Phasia*. My completed thesis will include about 80 species from the Nearctic, Palaearctic, Oriental, Afrotropical and Australian regions. An overview of the Neotropical *Phasia*, which includes over 30 described and undescribed species, will be provided. I hope to continue working on *Phasia* and other genera in the Phasiini in the future.

Jaromír VaÁhara writes: My tachinological activities in 1994 were only on the everyweek field trips level. I have obtained the excellent publications of P. Tschorsnig and R. Belshaw. I took part at three conferences; in Germany, they concerned floodplain forests, in Canada it was the 3rd International Congress of Dipterology and in Slovakia it was the 12th workshop of Czech and Slovak dipterists. This year (1995) I have prepared a study about rare families of flat-footed flies in central Europe.

Joachim Ziegler writes: The manuscript prepared by Hiroshi Shima and me on the Tachinids of the Ussuri area (Russian Far East) is almost finished. The southern part of the Russian Far East and adjacent areas form one of the most interesting areas in the Palaearctic Region. This part of the Manchurian Subregion is characterized by a diverse fauna composed of a mixture of Siberian and Oriental faunal elements. About 450 species are listed from the Russian Far East, and more than 350 species from Ussuria (some of them discovered in this area for the first time). In addition to

faunistic data, zoogeographical, ecological and morphological remarks are given. Seven species are described as new to science. The paper will be published in *Beitrage zur Entomologie* in 1996.

In *Studia Dipterologica* I have in print a list of Palaearctic tachinids which are parasitoids of the burnet moths (Zygaenidae), including the description of a new species of *Alsomyia* Brauer and Bergenstamm from Turkmenistan (Central Asia).

In 1995 I continued my work on databases, too. In 1996 I want to continue my paper on puparia and larval mouthparts. I need further puparia of Iceliini, Ormiini, Palpostomatini, Eutherini and nearly all other Phasiinae; also Doleschallini, Rutiliini, Oestrophasiini and other interesting groups and species. If you have any of these, I would be very interested in examining them. I would be very pleased if colleagues could lend me morphologically or systematically interesting puparia of tachinids (in 1996 it is possible without inquiry).

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As usual this section includes tachinid references that I have found during the past year for the period 1980 to present and which have not appeared in previous issues of this newsletter. A complete list of all references in the database (1980 to present) is available from the editor upon request (please send a diskette upon which I can copy the WordPerfect 5.2 file). I would be grateful if omissions could be brought to my attention.

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