The Tachinid Times

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This issue marks the 10th anniversary of **The Tachinid Times**. Though the appearance of the hardcopy version of this newsletter has changed little over the years, the mode of production of the newsletter has changed considerably. The first few issues were produced before personal computers were commonplace in the workforce, and were compiled solely from letters sent by the readership. News items then began reaching me on diskettes, and now the Internet is the most common method used for submission of news.

A new medium for the exchange of information is now upon us in the form of the World Wide Web, and its potential for the dissemination of scientific knowledge is quickly being realized. Already there are "products" appearing on the WWW which are unavailable in hardcopy, and it will not be long before some scientific journals publish in electronic versions only.

One of the purposes of this newsletter is to provide a yearly listing of recent literature about the Tachinidae. This bibliography now covers the years 1980 to 1996 and is available from me in WordPerfect or ASCII format. With the advent of Web-based information systems, it seems appropriate to extend coverage of tachinid-related references to this medium. Beginning this this issue I will include a section immediately before the tachinid bibliography on tachinid-related URL's, and I welcome the readership to help me keep this list up-to-date.

The next issue of **The Tachinid Times** will be distributed in hardcopy and over the WWW in February 1998. Please send contributions for the next issue before the last week of January 1998.

Resolutions adopted by International Conference on Biological Control

An International Conference entitled, *Technology Transfer in Biological Control: from Research to Practice*, was held in Montpellier, France, 9-11 September 1996. The Conference was jointly organized by the International Organization for Biological Control (IOBC/OILB) and C.I.L.B.A./AGROPOLIS. Resolutions adopted by the participants are as follows (reproduced from *d'Agropolis, La lettre No. 38*):

- WHEREAS biological control and IPM have contributed significantly to environmentally compatible and sustainable pest management for over 100 years with minimal non-target effects;
- WHEREAS biological control and IPM are ecologically-based processes that depend on a strong research component;
- WHEREAS biodiversity is best preserved by using biological control methods against pest organisms;
- WHEREAS a clear commitment to implementing and advocating biological control is needed to ensure availability of sustainable, sound pest management practices which will contribute to improving overall human well-being and biological diversity in the future;
- WHEREAS classical biological control has proved particularly useful to protect subsistence crops in resource-poor regions;
- WHEREAS natural enemies remain the only efficient tool presently available for controlling pest problems occurring on a number of small-sized crops;
- WHEREAS there are still groups of pest species that have not been considered appropriate targets for biological control operations;

- WHEREAS an increasing number of pest species is being introduced to new biogeographic regions each year;
- WHEREAS the transfer in terms of biological control and IPM technologies has been uneven in different parts of the world;
- WHEREAS the search for, the development, and use of new biological control agents should continue to increase productivity, sustainability and yield significant economic benefits to the future;

The participants in the Montpellier IOBC/OILB Conference strongly recommend that:

1. biological control methods be considered for use against any target pest species, and in particular in environmentally sensitive areas;

2. existing, natural biological control be enhanced by adequate management of both crops and natural habitats;

3. adequate support be secured for all basic research disciplines needed to develop biological control solutions, with especial emphasis on systematics, technology implementation and evaluation techniques;

4. new technologies be developed in terms of augmentation, mass-production, formulation, and delivery;

5. education, training, and information efforts in biological control be given significant global commitment in terms of coordination and support, thereby recognizing that information should flow from research to the end-users and vice-versa;

6. awareness of biological control in society be considerably increased through appropriate media activities and publications written for general audiences;

7. biological control be better documented;

8. regulatory authorities develop systems that are science-based for registering biological control products and take into account the relative importance of each market niche, the intrinsic specificity of each active ingredient used, and the long history of safe use of biological control and IPM;

9. governments develop laws, procedures and support for biological control and IPM that maintain their safety record, increase public involvement and guarantee that they continue to contribute to human welfare.

Possible use of a tachinid in biocontrol program against bromeliad weevil (by R. Cave)

A project was initiated in 1996 to study the reproductive biology and mass rearing of a probably undescribed species of *Admontia* which parasitizes the larvae of the weevil *Metamasius quadrilineatus* Champion. This weevil infests cloud forest bromeliads in Central America, but a close congener, *Metamasius callizona* (Chevrolat), was found in south Florida in 1989 and is causing significant damage to native and commercial bromeliads in that state. The project is funded by the Florida Council of Bromeliad Societies, Inc. and collaborates with Dr. Howard Frank at the University of Florida. The research constitutes the thesis of an undergraduate student at the Escuela Agricola Panamericana, Zamorano. Intentions are to understand the reproductive biology of *Admontia* sp. and develop a culturing method in the laboratory in order to produce material for further studies and possibly introduce individuals into the field in south Florida.

Provided with a honey/water mixture, *Admontia* adults live for up to three weeks at 21ºC. Female flies enter plants at the base of leaves where they possibly larviposit near the tunnel of the weevil larva in the meristem. The parasitoid larva then would enter the tunnel to find its host. Parasitized weevil larvae form a pupation chamber made of plant tissue threads but are killed before pupating. *Admontia* larvae may pupate within or outside the host pupation chamber.

Recent changes at the Central Experimental Farm, Ottawa (by J.E. O'Hara)

The year 1996 was one of great change for Agriculture and Agri-Food Canada (AAFC). The three Centres formerly comprising the Research Branch of AAFC on the Central Experimental Farm were downsized considerably and then amalgamated into a single Centre, the Eastern Cereal and Oilseed Research Centre (ECORC). Within this Centre, Systematic Entomology continued with much the same mandate as before, though became part of the Crop Protection Program. Higher management has since discovered that their choice of name, Crop Protection Program, was not an improvement over the previous name, so in spring 1997 we will probably reassume the name Biological Resources Program for our systematic programs in entomology, botany and mycology. (Though we are an organization of systematists, "Biosystematics" has not been permitted in our title since the demise of our one-time name, Biosystematics Research Centre).

Systematic Entomology has been reorganized considerably. A new Study Management System has been implemented which tracks research throughout our Research Branch. Systematic Entomology now comprises four studies, namely biocontrol, pests, animal protection and biodiversity. Each study has clearly defined goals, milestones, products and clients. Scientists may belong to more than one study depending upon the projects he/she is involved in.

Of concern to this newsletter is the Biocontrol Study, of which I am study leader. There are currently several projects involving the Tachinidae in the Biocontrol Study. One is the preparation of electronically published

interactive keys (and perhaps hardcopy keys as well) to the tachinid and hymenopterous parasitoids of the Bertha armyworm (*Mamestra configurata*), diamondback moth (*Plutella xylostella*), obliquebanded leafroller (*Choristoneura rosaceana*) and western spruce budworm (*Choristoneura occidentalis*). Taxonomic revisions of certain problematic tachinid groups may be conducted in conjunction with the preparation of these keys. Another project is the cataloguing of the Tachinidae of America north of Mexico using the software program Platypus (developed by CSIRO in Australia). These projects will be completed over the next three years. A WWW homepage for the Biocontrol Study will be prepared by mid 1997.

Papers presented in Florence - XX International Congress of Entomology

Published in: "Proceedings of the XX International Congress of Entomology, Firenze, Italy, August 25-31, 1996." 820 pp.

Allen, G.R. Calling behaviour, age and survival in bush-crickets: the role of sound locating parasitic flies. P. 367.

Bennett, F.D. Biological control of stem borers by tachinid flies, past and present. P. 632.

Bratti, A. *In vitro* rearing of *Eucelatoria bryani* Sab. and *Exorista larvarum* (L.) (Diptera: Tachinidae). P. 614.

Figueiredo, D. and J. Araújo. Distribution of parasitism by *Lydella thompsoni* (Hert.) (Diptera: Tachinidae) in maize attacked by stalk corn borer, *Sesamia nonagrioides* Lef. (Lepidoptera: Noctuidae). P. 655. (Poster.)

Gaponov, S.P. Evolutionary trends in tachinid egg morphology (Diptera, Tachinidae). P. 123. (Poster.)

Jervis, M.A. and F.S. Gilbert. Mouthpart structure and function in insect parasitoids, with particular reference to feeding. P. 624.

Lehmann, G. The influence of a parasitoid fly on southern European bushcrickets. P. 374. (Poster.)

Liljesthröm, G. 1996. Estimation of threshold temperature and heat unit accumulation required for pupal development of *Trichopoda giacomellii* (Diptera: Tachinidae). [In Spanish.] Acta Ent. Chilena **20**: 19-22.

Mellini, E., Campadelli, G. and M.I. Dindo. Possibilities of mass production of the parasitoid *Exorista larvarum* (L.) (Diptera: Tachinidae) on oligidic diets. P. 615.

Murray, A.M. and W.H. Cade. Longitudinal studies of selection on the Texas field cricket: the significance of parasitoid flies. P. 367.

Nakamura, S. Can parasitoid flies regulate their clutch size in response to host density? P. 646. (Poster.)

Stark, D.M., Purcell, A.H. and N.J. Mills. Interactions between a tachinid parasitoid and a granulosis virus of the western grapeleaf skeletonizer. P. 673. (Poster.)

Valicente, F.H. Survey of natural enemies of *Spodoptera frugiperda* in the south of Brazil. P. 670. (Poster.)

Yagi, S., Shinbo, H. and S. Nakamura. *In vitro* rearing of parasitoids. P. 615.

Zuk, M., Simmons, L. and J.T. Rotenberry. Phonotactic parasitoids and calling behavior in the field cricket *Teleogryllus oceanicus.* P. 367.

Fourth International Congress of Dipterology (by A.C. Pont)

The 4th International Congress of Dipterology will be held in Oxford, UK, 6-13 September 1998. Chairman: Dr. R.P. Lane, Department of Entomology, The Natural History Museum, Cromwell Road, London SW7 5BD, UK (fax: +44 171 938 8937; e-mail: r.lane@nhm.ac.uk). Secretary: Dr. A.C. Pont, Hope Entomological Collections, University Museum, Parks Road, Oxford OX1 3PW, UK (fax: +44 1491 873749). To register your interest or for further information, please contact: Oxford International, ICD4, Summertown Pavilion, Middle Way, Oxford OX2 7LG, UK (fax: +44 1865 511570; e-mail: 101475.1765@ compuserve.com). There is also a WWW homepage on the Congress at: http://www.nhm.ac.uk/entomology/ diptcong.html.

Hilltopping Tachinidae from the Canary Isles (by H.-P. Tschorsnig)

During a two-week stay in April 1996 in Tenerife, I studied again Tachinidae on hilltops. I visited ten hills or mountains situated in the southern part of the isle between altitudes of 100 m and 2400 m, some of them several times. The lower hilltops were more or less covered by the typical Canarian succulent flora, the higher summits were almost bare. Unfortunately passing clouds made collecting sometimes difficult. I collected or observed 12 species, which were already known from the Canary Isles (Báez, Herting and Tschorsnig 1986), most of them not yet mentioned as hilltopping species in my last contribution (Tschorsnig 1996a). They show a different behavior:

- *Exorista sorbillans* (Wiedemann): usually sitting on leaves or stems of *Plocama pendula*, *Euphorbia obtusifolia*, *E. canariensis* or *Opuntia dillenii*. The species was common on a few lower hills (up to 400 m), but usually only one male specimen could be observed on each shrub.
- *Exorista kugleri* Mesnil: more or less constant on all lower hills (up to 400 m) but not common. The specimens were sitting on stones or on the bare ground. Collecting was difficult because of their shy behaviour.
- *Ceracia mucronifera* Rondani: not common, up to 400 m; sitting on rocks, stones, or on the bare ground, rarely

on plants.
- *Tachina canariensis* (Macquart): sitting on rocks, stones or plants; not common, between 400 and 1110 m.
- *Peleteria ruficornis* (Macquart): sitting on plants (*Plocama pendula*, *Euphorbia canariensis*) or on rocks; not common, up to 1110 m.
- *Linnaemya soror* Zimin: common, up to 1110 m. This species obviously belongs to the "visiting" male type as described by Monty Wood (1996). *L. soror* can be found sitting on branches of plants (usually *Euphorbia balsamifera* or *E. obtusifolia*) as well as on rocks, stones or on the bare ground, but not longer than a few seconds. Then the males fly around, obviously searching, and sit down again at another place. This behaviour is quite different from the other species. Collecting was only possible in the cool early morning or late evening hours, when the flies rested longer at their place. *L. soror* represents the only species of a "visiting" male type I could ever observe. What I wrote in my last paper (Tschorsnig 1996b) is not up-to-date in this respect.
- *Estheria simonyi* (Brauer et Bergenstamm): sitting on stones or on stems of *Euphorbia canariensis*, but common only in the morning hours (up to 10:30 a.m.). Astonishingly this typical Canarian species could be found from low hills near the coast up to mountains of 2200 m altitude.
- *Zeuxia aberrans* (Loew): sitting on rocks, on the bare ground or on stems or shrubs of *Euphorbia canariensis*, *E. balsamifera* and *E. obtusifolia*, up to 400 m. This species was common at noon.
- *Chetogena acuminata* Rondani, *Gonia bimaculata* Wiedemann, *Macquartia tessellum* (Meigen), and *Pales cyanea* (Macquart) could be found up to 1110 m, but only in single specimens; except for the latter species they are known as typical hilltopping species.

I am grateful to Marcos Báez for his help in obtaining the licence for collecting Tachinidae in Tenerife.

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Application of *Trichopoda giacomellii* for the possible biological control of the green stinkbug, *Nezara viridula,* in South Africa (by M.A. van den Berg and J. Greenland)

The green stinkbug is an important pest of various crops in South Africa. Feeding on kernels of the macadamia and pecan nuts are amongst the most important.

Various efforts have been made to establish *T. pennipes* in South Africa, but to date no evidence has been found to prove that establishment has taken place.
As a result of the positive reports received on *T. giacomellii* and the availability of this species, further work was conducted on the latter. By the end of January 1996 a rearing population of *T. giacomellii* was received for Drs. D. Sands and M. Coombs from Australia. *Trichopoda giacomellii* were kept in quarantine at the ARC Plant Protection Research Institute in Pretoria. The following generation parasitoids were released from quarantine in middle March and breeding was continued in Nelspruit. Breeding of *T. giacomellii* is considerably easier than that of *T. pennipes*. This is ascribed to them readily mating and laying eggs in captivity. During the winter and early summer the restricting factor for the increase of the parasitoids was the availability of stinkbugs. Releases have recently been started in macadamia orchards.

PERSONAL NOTES

Stig Andersen has recently published a book, "The Siphonini (Diptera: Tachinidae) of Europe" (1996, Fauna Entomologica Scandinavica **33**, 148 pages). This book provides keys and biological information about European siphonines, and discusses in some detail the relationships among the genera. The relationships between the Siphonini and related tribes are briefly discussed, but were explored in more depth in Stig's Ph.D. thesis and will form the subject of a later paper. Stig is currently working on the taxonomy of fossil insects.

Ron Cave is involved in the biocontrol possibilities of *Admontia* sp. as a parasitoid of the bromeliad weevil *Metamasius callizona* in south Florida, as outlined above. He is also preparing a manuscript on the parasitoids of the pierid *Leptophobia aripa* (Boisduval), a pest of crucifers. He has recorded six tachinid species and two sarcophagid species from this host. All are larval/pupal parasitoids.

Timothy Foard writes: I have completed my revision of the Nearctic *Spallanzania* species. Fifteen species are recognized, 8 of which represent new species, and are assigned to 3 subgenera: *Imaguncula* (2 spp.), *Acroglossa* (5 spp.), and *Spallanzania* s.s. (8 spp.). The genus reaches its greatest diversity in the southwestern United States. Its global distribution patterns suggest a transatlantic route of dispersal from its probable North American area of origin. *Spallanzania* has a rather advanced position within the Goniini with the subgenus *Imaguncula* possessing more ancestral traits than the other two subgenera. The two species of *Imaguncula* are very different from each other, each species sharing definite characters associated with one of the remaining subgenera. One species of *Spallanzania* s.s., a formerly undescribed species from Colorado, has an ovipositor modified into a piercing organ similar to that found in the phorocerine subgenus *Pseudotachinomyia* and represents an unusual departure from the conventional reproductive habits of the Goniini.

Jim O'Hara writes: My main emphasis last year was the creation of a "Biocontrol Study" within our Centre, which is discussed elsewhere in this newsletter in a section on recent changes at the Central Experimental Farm, Ottawa. In addition to tachinid projects within the Biocontrol Study, I am also working on a paper with David Barraclough to describe an unusual tachinid from Western Australia.

Hiroshi Shima writes: Last summer I stayed in the northwest area of Yunnan Province, China, from August 16 to September 26. This time I travelled from Deqin, close to Sichuan and Xizang (Tibet), to Ruili along the Burmese border. This area is close to Kambaiti, Burma, where many tachinid species were described by Mesnil, and I could collect some of these species. Some 1000 specimens were collected this time and most of them have already been sorted out. There are several interesting ones including a species unassignable to any known genus. This was the last of my field researches in southwest China, cooperated with Kunming Institute of Zoology. There remain many specimens to be worked.

I visited Beijing last December for a week to study *Carcelia* types described by Professor Chao and his colleagues. Professor Chao kindly arranged a guest house of the Chinese Academy of Sciences which was very close to the Institute of Zoology (only 5 minutes walk). Many of my questions were solved by seeing the types. In these years I am trying to revise the genus *Carcelia* of the eastern Palearctic and Oriental Regions. I have seen most types of species described from these areas, but I feel there are still problems on the treatment of *Senometopia*, *Carcelina*, *Calocarcelia*, *Euryclea* and *Carceliella*. I hope I can solve the problems and finish this work in this year.

Xuekui Sun successfully defended his Ph.D. thesis entitled, "Systematics of *Phasia* Latreille (Diptera: Tachinidae)" at the University of Guelph in spring 1996. The thesis is now being prepared for publication. A portion of the abstract follows (nomenclatural changes and new names excluded): "The genus *Phasia* is redefined and a revision exclusive of the Neotropical species is presented. Six species-groups are recognized on the basis of external and terminalic characters. Seventy-five species are described or redescribed, including 31 new species. Keys are provided for the identification of both male and female adults. A revised host list and geographical distribution maps are provided. A cladistic analysis of *Phasia*, based on 51 characters, is presented. The monophyly of *Phasia* is well supported by several synapomorphies. By comparing the cladistic relationships with the chorological patterns, hypotheses of historical zoogeography of *Phasia* are presented."

Jaromir Vanhara writes: During this year, Czech and Slovak dipterists will publish a new version of our Check-list of Czech and Slovak Diptera, including Tachinidae (which was prepared by J. Cepelak and me). I will be an editor of the whole volume.

Theo Zeegers writes: I got interested in the Tachinidae as early as 1985, but it has been my main field of interest since 1993. In 1996 I could work professionally on a revision of all the Dutch material of Tachinidae. Altogether, more than 20,000 specimens have been (re-)examined. A visit to Stuttgart (Tschorsnig & Herting) proved to be most useful. I hope to publish a new checklist on Dutch Tachinidae this year. At this moment 313 species are known from the Netherlands (the latest checklist by de Meijere (1939) contained only 187 species!). Compared with the neighbouring countries, the Dutch Tachinid fauna seems extremely rich.

I hope to work this year on a host catalogue of the Dutch Tachinidae and on some faunistic papers on the distribution and phenology in the Netherlands. I am also very interested in differences in period of flight between males and females (in most species the males precede the females by about ten days, but in some species there is no significant difference).

URL's on the World Wide Web (by J.E. O'Hara)

Home pages of researchers:

S. Andersen: http://www.aki.ku.dk/zmuc/ento/staff/sa.htm

J.E. O'Hara: http://res.agr.ca/brd/staff/english/html/ohara.html

T. Pape: http://www.nrm.se/en/pape.html

J. Roland: http://www.biology.ualberta.ca/roland.hp/roland.html

H. Shima (in Japanese): http://www.rc.kyushu-u.ac.jp/~shima/shima/shima.html

T.J. Walker: http://gnv.ifas.ufl.edu/~entweb/walker. htm

D.M. Wood: http://res.agr.ca/brd/staff/english/html/wood.html

N.E. Woodley: http://sun.ars-grin.gov/ars/Beltsville/barc/psi/sel/new.html

J. Ziegler: http://www.biologie.uni-ulm.de/extern/dei-eberswalde/dei-zieg.html

Selected tachinid references on the World Wide Web:

Diptera types in the Canadian National Collection of Insects. Part 4. Tachinidae: http://res.agr.ca/brd/tachinid/tacheng.html

The Tachinid Times newsletter: http://res.agr.ca/brd/tachinid/times

Tachinidae of the Long-Term Ecological Research (LTER) project on Shortgrass Steppe in Colorado, USA: http://sgs.cnr.colostate.edu/data/arthropo/aditachi.html

Web version of Tachinidae chapter by B.K. Cantrell and R.W. Crosskey (1989) *in* Evenhuis, N.L., editor, Catalog of the Diptera of the Australasian and Oceanian regions: http://www.bishop.hawaii.org/bishop/ento/ aocat/tachinidae.html

Primary types of the Tachinidae in the Ohio State University Insect Collection: http://iris.biosci.ohio-state.edu/types/ dips/tachinid.html

Biological control by *Ormia depleta* (red-eyed fly): http://gnv.ifas.ufl.edu/~ent1/mcricket/mcri0006. htm

Tachinidae collection of the University of Michigan, Museum of Zoology: http://insects.ummz.lsa.umich.edu/Species_Lists/Tachinidae.html

Tachinids attacking pests of Macadamia in South Africa: http://www.uq.oz.au/~gagkrego/acotanc/papers/vanden2.htm

InBio Tachinidae: http://www.inbio.ac.cr/papers/insectoscr/texto199.html

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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 me upon request (please send a diskette upon which I can copy the WordPerfect 6.1 file). I would be grateful if omissions could be brought to my attention.

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