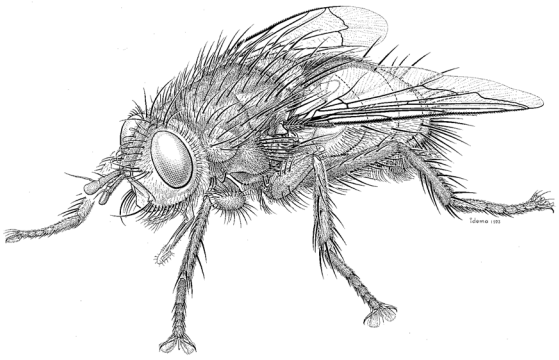
The Tachinid Times



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Welcome to the 25th anniversary issue of *The Tachinid Times*. Twenty-four years have passed since this newsletter first appeared in print. I was expecting it to last for a few years through the support of several kind contributors, but I did not hold high hopes for its longevity. A few lean years and it would be gone. Yet here we are in 2012, at issue 25 and the newsletter has endured. Its continuance is perhaps a sign that this informal venue for news on the Tachinidae has a small but stable niche within the broad spectrum of scientific endeavour. In the article that follows I give a brief history of *The Tachinid Times* and explain what motivated its start nearly a quarter of a century ago.

There would be no newsletter without submissions, and in this issue there is a wide range of articles to satisfy every taste. I would like to thank all the contributors for making this 25th issue a memorable one.

As I explain each year in this foreword, *The Tachinid Times* is primarily an online newsletter but a printed copy can still be sent to anyone would who like one. Hardcopies are also distributed to several libraries to provide a permanent record of this publication. Both online and print versions are based on the same PDF and thus have the same pagination and appearance. The online version is available on the North American Dipterists Society (NADS) website at: http://www.nadsdiptera.org/Tach/TTimes/TThome.htm.

If you wish to contribute to this newsletter next year, then please send me your article, note or announcement before the end of January 2013. This newsletter accepts submissions on all aspects of tachinid biology and systematics, but please keep in mind that this is not a peer-reviewed journal and is mainly intended for shorter news items that are of special interest to persons involved in tachinid research. Student submissions are particularly welcome, especially abstracts of theses and accounts of studies in progress or about to begin. I encourage authors to illustrate their articles with colour images, since these add to the visual appeal of the newsletter and are easily incorporated into the final PDF document. Please send images as separate image files apart from the text.

Looking back on 25 issues of *The Tachinid Times*
***by* Jim O'Hara**

Technology has come a long way since the inaugural issue of *The Tachind Times* was first distributed into the mail boxes of tachinid enthusiasts in the spring of 1988. Personal computers were popular but by no means universal, and e-mail and the Internet were some years away from being available to the public at large. Communication was, by and large, via letters mailed through the post. Correspondence generally flowed back and forth at intervals of approximately three weeks making literary exchanges a slow and tedious process.

During most of the 1980s I was a graduate student at the University of Alberta in Edmonton studying the Siphonini under the supervision of coleopterist George E. Ball, with D. Monty Wood (in Ottawa) on my advisory committee. I finished a Master's on North American

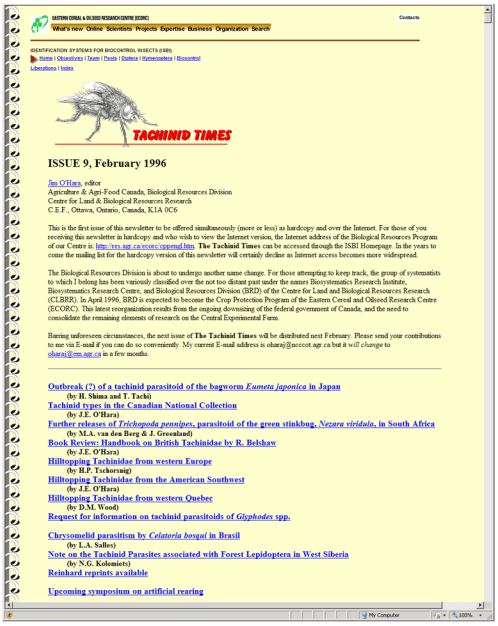
Siphona and proceeded to study the Siphonini for a Ph.D. degree. My study of the Siphonini led to an expanding network of contacts among tachinidologists around the world. I came to realize that there was a fair number of people out there with a small to large interest in tachinids, each with his or her own cohort of contacts. I also noticed in a few instances that related studies were being pursued by two people independently, neither knowing about the work of the other. Not uncommonly, a study would be published with only a few close colleagues knowing beforehand that it had been underway.

It seemed to me in the mid 1980s that the community of tachinid enthusiasts could benefit from a greater awareness of what people were working on. A newsletter devoted to the Tachinidae seemed like the logical solution. While I was finishing my Ph.D. in 1987, I shared these thoughts with Monty Wood and he revealed that he too had had the same idea of starting a newsletter. We decided to pursue this goal together and set about contacting as many people as we could, building a mailing list and soliciting submissions. It was a labourious task, sending and receiving letters, drafting the "news" for the first issue, and starting the first installment of the "Tachinid Bibliography" that has been a regular feature of *The Tachinid Times* since the very beginning. The first bibliography covered 1980–1986 and was jointly prepared by myself and Hans-Peter Tschorsnig, a regular contributor to the newsletter to this day (including this issue). The "Tachinid Bibliography" began in 1988 as a hardcopy list of about 440 references and has since grown to an EndNote database and online list of nearly 4500 citations for the period 1980–2011.

The Tachinid Times started as "a forum for the exchange of information and ideas about the Tachinidae" (1988: 1). The purpose of the newsletter has not changed from that first issue, but there has been a shift in content. In the early years there was more of an emphasis on personal accounts of what people were working on, under the heading "Research interests and biographic notes". The current "Announcements" section serves a similar purpose, but in this age of e-mail and the Internet there is a much greater opportunity for quick and easy communication within the tachinid community than there was in the late 1980s and early 1990s.

A key event in the history of this newsletter occurred in 1996 when the first issue (no. 9) appeared on the Internet shortly after its distribution in hardcopy (Fig. 1). From then on, the print runs and mailings of *The Tachinid Times* dropped steadily as more and more "subscribers" turned to the Internet to view the annual newsletter. The first few issues to be offered online were rather primitive, as dictated by the technology of the day and the resources I had at hand to produce them. They each consisted of a single html file with links at the beginning to permit the reader to jump down to a section within the continuous text.

The online html version of *The Tachinid Times* was great from a distribution viewpoint, but it was troublesome to cite. As more people began to submit research notes to *The Tachinid Times*, occasional citations started to appear in papers published in peer-reviewed journals. *The Tachinid Times* was not then, nor it is now, intended to compete with peer-reviewed journals for submissions on the Tachinidae, but it was evident that there would be some advantage in having the hardcopy and online versions of the newsletter more synchronized in their appearance and pagination. With this in mind, a PDF version debuted in 2001 (issue 14) and this format has continued to this day. Colour images made their first appearance as well in 2001 and I continue to stress the importance of illustrating submissions with pictures to give the newsletter a greater measure of visual appeal.


TACHINID TIMES

ISSUE 9, February 1996

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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 Program of our Centre is: http://res.agr.ca/ecorc/ctpenutl.htm. The Tachinid Times can be accessed through the ISBI 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 (SRD) 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 Cereal and Oilseed 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@acccot.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)
Tachinid types in the Canadian National Collection
(by J.E. O'Hara)
Further releases of *Trichopoda pennipes*, parasitoid of the green stinkbug, *Nezara viridula*, in South Africa
(by M.A. van den Berg & J. Greeuland)
Book Review: Handbook on British Tachinidae by R. Belshaw
(by J.E. O'Hara)
Hilltopping Tachinidae from western Europe
(by B.P. Tschorsnig)
Hilltopping Tachinidae from the American Southwest
(by J.E. O'Hara)
Hilltopping Tachinidae from western Quebec
(by D.M. Wood)
Request for information on tachinid parasitoids of *Glyphodes* spp.
Chrysomelid parasitism by *Celatoria bosqui* in Brasil
(by L.A. Salles)
Note on the Tachinid Parasites associated with Forest Lepidoptera in West Siberia
(by N.G. Kolomiets)
Reinhard reprints available
Upcoming symposium on artificial rearing

Figure 1. *The Tachinid Times* debuted on the Internet with issue 9 in 1996.

So what is next for *The Tachinid Times*? I have nothing special planned but will keep a watchful eye on new technologies that might offer advantages in presentation and distribution. From a content point of view, I do not envision any change in the near future. I would like to see the newsletter continue to cater to those who have a passion for tachinid flies and who want to share some of their experiences or discoveries concerning tachinids with others, outside of the formal setting of a peer-reviewed journal.

On the oviposition of *Phorocera grandis* (Tachinidae)

by **Hans-Peter Tschorsnig and Eiko Wagenhoff**

Introduction

During a recent outbreak of *Thaumetopoea processionea* (Linnaeus, 1758) in southwestern Germany there was a good opportunity to study the behaviour of the normally rare species *Phorocera grandis* (Rondani, 1859). This tachinid species was already observed near this host by the second author at Grezhausen near Breisach (southwestern Germany) in 2009 and 2010, and in the investigated area of this paper in 2010. Further material, recently identified by the first author, was collected in 2010 in Bavaria in numbers near nests of *T. processionea* by E. Feicht (Freising).

The genus *Phorocera* (subgenus *Phorocera* s. str. if following Wood 1972) has an outstanding and peculiar oviposition method, already pointed out in detail by Herting (1963). The females of this genus use a peculiar U-shaped sternite 7 with sharp edges to cut two short parallel slits in the integument of the caterpillar and to clamp the egg between these two slits.

Nothing was known previously on the oviposition behaviour of *Phorocera grandis* until a recent (June 2010) observation of this fly from the Netherlands on the Internet (http://diptera.info/forum/viewthread.php?thread_id=31404&pid=139205; identification of the fly confirmed by Theo Zeegers), where five females were reported obviously laying eggs on caterpillars of *T. processionea* in the evening. There is also a photo of a tachinid from northern Bavaria from 2009 (http://www.lwf.bayern.de/waldbewirtschaftung/waldschutz/aktuell/2010/38433/index.php) showing undoubtedly a *P. grandis* in "waiting-position" (see below). *Phorocera grandis* had not previously been recorded as a parasitoid of *T. processionea*, although *T. pityocampa* is a known host.

The oviposition of *Phorocera* (*obscura*) was observed and described in a few words by Silvestri (1941) and Herting (1963), see discussion below. The observations on the oviposition behaviour that follows were made by the first author in 2011. The second author contributed observations on eggs deposited in June 2010.

Materials and methods

The observations were made in the southwestern corner of a little oak forest ("Maisenhölzle") near Brackenheim (49.0974°N 9.0910°E), Baden-Württemberg, Germany. This wood is untreated by pesticides because it serves as an investigation area of the FVA (Forstliche Versuchsanstalt Baden-Württemberg) for the long-term observation of the processionary caterpillar under natural conditions. The abundance of the processionary caterpillar was high in 2011, such that single caterpillars, small colonies, small processions or entire nests could be found near the base of the oak trees. Observations were made and material was collected during bright sunshine in the late morning on 7, 10 and 12 June 2011. *Phorocera grandis* and another parasitoid of *T. processionea*, *Carcelia iliaca* (Ratzeburg, 1840), were common in this place at that time. Many observations were made in the field under natural conditions as well as at home where I brought together *Phorocera* and *Thaumetopoea* caterpillars. As a "laboratory", I used a glass-enclosed porch way. Caterpillars were offered to *Phorocera grandis* on bark or a stick, or were held near the fly with forceps. In this way I could observe many successful and unsuccessful attacks and filmed more than 20 encounters with a digital camera. The quality of the video was sufficient to precisely time the attacks, but not to see every small detail.

Pulling a nest down and opening it to observe what happens was not so successful because caterpillars and tachinids are very "nervous" at that moment, so that things happen too quickly and chaotically to permit sound observations.

I also collected dead *Phorocera* females and caterpillars into alcohol to better understand the position of both during the act of oviposition.

Oviposition

A typical ovipositing attack of a *P. grandis* female in the field is as follows: if the tachinid recognizes a moving caterpillar, usually from a distance of about 10–15 cm, the fly follows it on the bark of the tree, more running than jumping or flying (Fig. 1A–D). It takes a "waiting"-position lateral to the host larva, near the head or anterior thoracic segments (Fig. 1E) and may rest motionless in this position for one or several seconds or makes only minor corrections to this position. The usual distance between fly and host directly before the attack is about 1–2 diameters of the caterpillar (the long hairs of the caterpillar are about twice as long as the caterpillar diameter). In the majority of cases there is no reaction by the caterpillar, even if the fly touches its long hairs. The fly attacks with a quick short flight or jump (Fig. 1F, duration 0.05–0.15 sec) and grasps the caterpillar for about a second (0.8–1.3 sec) (Fig. 1G, H). The caterpillar shakes its anterior body strongly during this action, but the fly holds on and deposits its egg (eggs?). It was not possible to observe the action of the ovipositor because of the quick movements of both the fly and the host (in single frames of the digital recording it is visible that the abdomen is bent under the host, but exactly what happens cannot be seen). After oviposition, the *Phorocera* female immediately flies off (Fig. 1I), but usually lands again not far away (20–50 cm), ready to oviposit on the next caterpillar.

Movement of the caterpillars is obviously important as a stimulus for the ovipositing process. I observed attacks on motionless caterpillars only in two cases. It also seems that *Phorocera* has a slight preference for the first few cater-

pillars in a procession, possibly because they show the most distinctive movements.

If the starting point of the fly before the attack was not exactly lateral but slightly anterolateral or posterolateral (up to 45° deviation) to the contact zone with the caterpillar, then the fly usually corrected its position to exactly perpendicular as soon as it landed on the host's body.

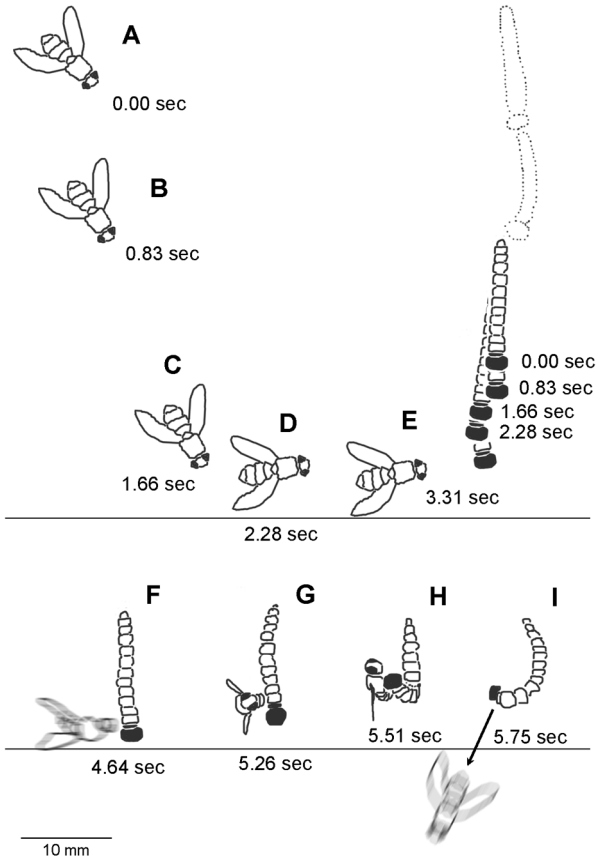

Figure 1. Attack of a *Phorocera grandis* female on a caterpillar of *Thaumetopoea processionea* on the bark of an oak, drawn from a video sequence filmed in the field (12 June 2011) with a digital camera. Only the first caterpillar of the procession is shown; legs of the fly and hairs of the caterpillar are omitted in the figure. The horizontal line gives the exact relative position.

Phorocera normally attack hosts that are flat on the bark, but I also observed successful attacks on caterpillars with the fore body erected in a "defensive position" at the moment of attack.

Besides this "standard procedure" I also observed many much shorter attacks (contact with the host 0.05–0.20 sec), but I do not think that the females were able to successfully oviposit in these cases. Such shorter attacks usually happen directly during flight, not from a waiting-position. For example, I observed, independently twice, that *Phorocer*a oviposited in a normal way (Fig. 1) on the first caterpillar of a procession, and – while still in flight – attacked for a very short time (0.05–0.1 sec) the second and third caterpillar. These short attacks were definitely too short for successful oviposition, and their purpose is not clear.

Under experimental conditions I observed that *Phorocera* females do the same action as described above, but – as a difference – they do not fly away immediately after ovipositing but may remain sitting for a few seconds on the caterpillar, which does not move or does so only slightly.

The deposition of the eggs cannot be proven in a strict sense because the caterpillars were not checked to determine if or how many eggs they had before and after the documented attacks, but it is very probable that a fly was successful after grasping a host for about a second. It was not possible to pick out caterpillars without eggs to offer them to the females experimentally, because the urticating hairs of the processionary caterpillars makes handling difficult.

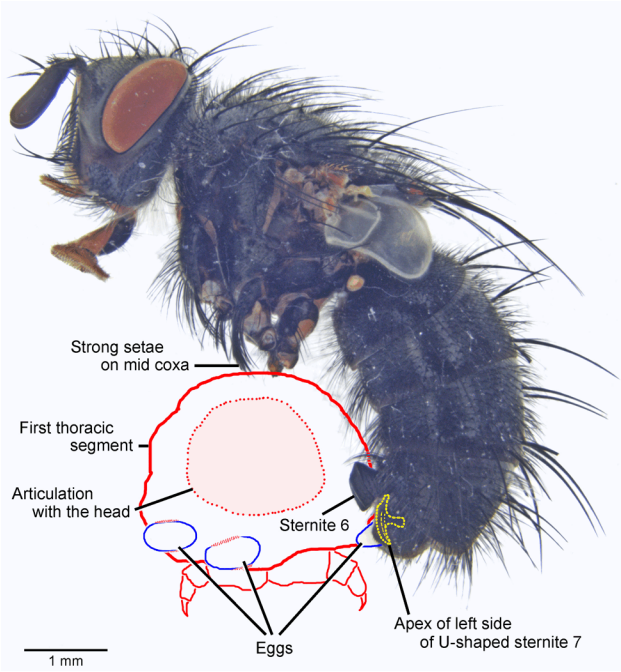

Figure 2. Semi-schematic lateral view of a *Phorocera grandis* female ovipositing on a caterpillar of *Thaumetopoea processionea* (see explanation in text). Hairs of the caterpillar and wings and legs (except coxa and trochanter) of the fly are not shown.

Despite the fact that it was not possible to observe exactly how the fly placed its eggs, several conclusions can be drawn from the position of the fly and the position of the eggs on the host body: Fig. 2 shows a *P. grandis* female ovipositing ventrally on the anterior part of the first thoracic segment of a caterpillar of *T. processionea*, based partly on observation (position on the body) and partly on inference (position of the eggs). Sternite 6 and the egg at the abdominal end of the fly is shown as it was found *in*

situ in a specimen stored in alcohol. The interrupted yellow contour gives the position of sternite 7 of this specimen (not visible in this view because the ovipositor is still retracted). The cut into the host must be made with the distal halves of the U-shaped sternite 7, but the precise movement of sternite 7 was not observable, so it remains unclear to what extend the ovipositor is expanded during oviposition and how flexible it is with respect to lateral movements. Furthermore it was not exactly observable to what extent the abdomen is bent and pressed against the host's body, or whether it makes lateral movements.

Also to be taken into consideration is that the caterpillar has long hairs on its dorsal and lateral surfaces, which are probably an annoying obstacle for oviposition. These long hairs might be a reason why the eggs are preferably laid on the ventral side of the host which has only scattered short hairs.

Distribution of the eggs

Table 1 makes clear that the ventral side of the first two thoracic segments is the preferred place for oviposition (about 70% of the eggs are in this position). The eggs are preferentially laid in the fold between the segments; Fig. 3 shows three eggs in typical exposure in the fold between first and second thoracic segments. Eggs between the ventral side of the head and first thoracic segment were sometimes arranged in a complete transverse row of 3, 4 or even 5 eggs (or even more in a single case, see discussion). Only very few eggs were found on the abdomen.

Table 1. Arrangement and number of eggs of *Phorocera grandis* on 149 caterpillars (L5 and L6) of *T. processionea*, collected in the field on 21 June 2010, and 7 and 12 June 2011.

	Between head and 1st thoracic segment	Between 1st and 2nd thoracic segment	Between 2nd and 3rd thoracic segment	Between 3rd thoracic and 1st abdominal segment	Total
Ventrally	127	97	15	8	247
Laterally	20	17	13	2	52
Dorsally	6	7	5	5	23
Total	153	121	33	15	322

Eggs of *P. grandis* were found on 33% of the caterpillars collected on 21 June 2010, on 52% of those collected on 7 June 2011, and on 70% of those collected on 12 June 2011. About two-fifths (44%) of the host larvae had only one egg, 29% had two eggs, 16% had three or four eggs, and 11% had even more eggs (up to nine). The superparasitization was less distinct in the year 2010 when the parasitization level was lower.

All eggs on the caterpillars were in a more or less transverse position to the caterpillar (maximum deviation up to 45° to the transverse axis of the host's body). This fully agrees with the observed fact that the female always attacks from the side.

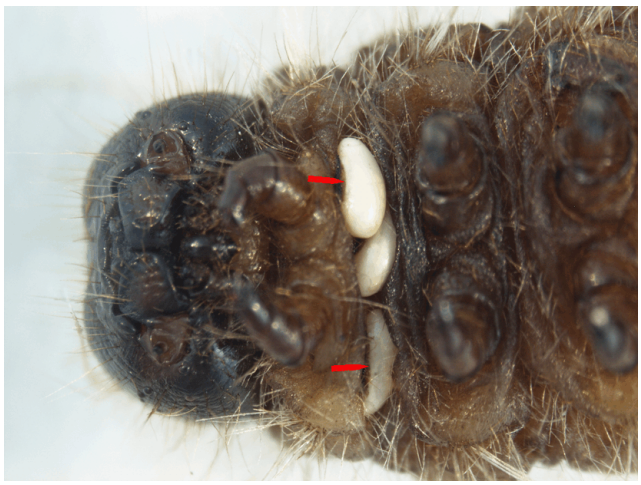

Figure 3. Eggs of *Phorocera grandis* on the ventral side of a caterpillar of *Thaumetopoea processionea*. The red arrows indicate the margin of the cut into the host's integument. (Photo by E. Wagenhoff.)

Morphological adaptations of the female

The body of *P. grandis* is well adapted for an oviposition perpendicular to the caterpillar. The flexion of the female abdomen, the posteriorly bent strong setae on the mid coxa and the massive V-shaped sternite 6 enable an effective clamping grip (Fig. 2) to give the fly a firm hold when the caterpillar shakes its body as a defensive reaction. I think that the function of the V-shaped sternite 6 of female *Phorocera* (Herting 1963: figs 4, 5; Wood 1972: figs 14, 15; Tschorsnig 1992: figs 1, 2; Tschorsnig and Herting 1994: figs 225, 226) is clear: it is pressed by the fly against the host's body and serves – at least in the case of *P. grandis* – as a wedge in the fold between the thoracic segments of the caterpillar to push these segments apart. In this way the integument of the host is stretched, enabling the fly to cut the two parallel slits with its sharp U-shaped sternite 7.

Discussion

According to Wood (1972), *Phorocera* consists of two subgenera, the Palaearctic *Phorocera* s. str. and the Nearctic *Pseudotachinomyia* Smith. In my opinion both subgenera could be – even if possible sister groups – treated well as separate genera because the female genital structure (specialized sharp-edged U-shaped sternite 7 and normal oval-shaped eggs in *Phorocera*, acute piercer and specially adapted elongated eggs in *Pseudotachinomyia*) and the mode of oviposition (for *Pseudotachinomyia* described by Wood 1972: 476, 477) are clearly different. All differences are well described and figured by Wood

(l.c.).

The female genitalia are known for four species of *Phorocera* ("s. str."): *P. assimilis* (Fallén, 1810), *P. obscura* (Fallén, 1810), *P. grandis*, and *P. atricans* Tschorsnig, 1992. *Phorocera liaoningensis* Yao & Zhang, 2009 from China is described from males only, but according to the figured male genitalia is surely a *Phorocera*. The female genitalia of *P. normalis* Chao, 1964, however, also from China, were neither described nor figured by Chao; the narrow pointed syncercus of the male assigned to this species by Yao & Zhang (2009: figs 5, 6) does not resemble *Phorocera*.

As the other known species of *Phorocera* (s. str.) have the same ovipositor structure as *P. grandis*, it can be supposed that the mode of oviposition is basically the same. There are however differences in the shape of sternite 6 (more massive and pointed in *P. grandis* than in the other species), and also in the position of the eggs on the host (preferably ventrally in *P. grandis*, dorsally and laterally in *P. obscura*). But also in *P. obscura* the eggs are transversely oriented and situated on the anterior thoracic segments (see figures in Silvestri 1941), so the attack must be from the side.

The role of sternite 7 as a cutting tool is clear (how it was used was already solved by Herting 1963), but – contrary to Herting (1963) – there is a different interpretation of the function of sternite 6. Herting (1960: 42; based on Silvestri 1941: 112) writes that the oviposition (of *P. obscura*) occurs with lightning speed ("con rapidità fulmea"). Herting (1963: 4), based on at least one personal observation (also concerning *P. obscura*) commented: "The entire oviposition takes place in a fraction of a second. The tachinid attacks the host at high speed and flies off immediately. The caterpillar responds heavily, but unsuccessfully, obviously too late" [translated from German]. I also observed such very rapid attacks in flight for *P. grandis*, but having seen and documented that a normal oviposition attack needs about a second, I doubt that such quick attacks led to successful ovipositions. Based on the observed "high speed attack", Herting (1963: 5) tried to explain the function of sternite 6. He assumed that the sudden [i.e., in flight of the tachinid] blow of sternite 6 is sufficient for the host's integument to be stretched. After what I observed with *P. grandis*, I feel for a successful oviposition it is necessary that the fly grabs the host and presses – at least for a short moment – sternite 6 against the body. Wood's (1972: 471) interpretation of Herting (1963) was that sternite 6 is "rapidly apply force to into the skin stretching it slightly ...", which is correct but this is not the same as what Herting meant in German "infolge der Schnelligkeit des Angriffs ein ziemlich heftiger Stoß ..." ["due to the speed of the attack there is a rather hard impact ..."]. Strong muscles that I found at the base of sternite 6 during a dissection are another indication that this segment is pressed into the host's body rather than delivers a "blow" to it.

Phorocera grandis needs freely moving caterpillars for oviposition. I made all observations in full daylight, but the species is perhaps also active in the evening (see observations in the Diptera Forum, as cited in the Introduction). There is currently no observation or indication that the species can also oviposit at night, and I presume this is not very likely because it seems to orientate visually.

The high degree of superparasitism that was observed in the field indicates that *P. grandis* females are obviously unable to recognize if there are already eggs on a caterpillar or not (superparasitism was also observed in *P. obscura*, see Silvestri 1941: figs. XLVIII, XLIX). I saw a field-collected caterpillar from Bavaria (leg. E. Feicht) bearing 15(!) eggs, 11 of them in two rows ventrally between the head and the first thoracic segment. For *Pseudotachinomyia*, in contrast, Wood (1972: 477) showed in the laboratory that this tachinid can obviously recognize and avoid superparasitism. According to the body mass of host and tachinid, it is unlikely that more than one specimen can develop in a single caterpillar (one parasitoid per host is also recorded for *P. obscura*, cf. Herting 1960: 42). It should also be mentioned that when *P. grandis* oviposits on *Thaumetopoea*, a high percentage of the caterpillars is already infected with first instar larvae of *Carcelia iliaca* and/or medium-grown larvae of *Pales processioneae* (Ratzeburg, 1840). The latter species was confirmed in a rearing experiment of three host nests from the investigation area; adults emerged in July 2011.

Carcelia iliaca has quite a different ovipositing strategy: it runs on the surface of the nests and tries to approach as near as possible to the caterpillars, but its small, fully incubated eggs are clearly laid on the silk of the nest. The tachinid larva hatches immediately and actively searches for the host. In this way *Carcelia* can – unlike *Phorocera* – reach caterpillars which are hidden in the nest. There are often several caterpillars sitting on the outside of the nests, and they twitch their bodies violently when *Carcelia* comes near. It might be possible that such caterpillars play a special role in the defence of the nest, preventing the oviposition of *C. iliaca* at least to a small extent, but this is currently no more than a hypothesis.

Carcelia is much more affected by caterpillar defensive behaviour than *Phorocera*, although successful defence reactions may also affect *P. grandis*, especially when *Carcelia* is active nearby.

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Notes on the Tachinidae of Armenia

by **Theo Zeegers**

Introduction

In the summer of 2011, I had the opportunity to visit Armenia and collect Diptera. The trip was focused on the eastern half of the country, with the village of Margahovit between Vanadzor and Dilijan as the base. In this contribution I present my results on the Tachinidae.

Short introduction to eastern Armenia

Armenia is largely a mountainous country with an average altitude of 1370m (Holding 2008). Many peaks are above 3000m. The mountain range is known as the Lesser Caucasus and is separated from the Greater Causasus by the large Georgian plain. The southern border of Armenia is formed by the valley of the Arax river at an altitude of about 1000m. A prominent position in eastern Armenia is taken by Lake Sevan at an altitude of 1923m. This region west and northwest of Lake Sevan is known for its rich deciduous forests, dominated by Persian oak (*Quercus macranthera*), eastern hornbeam (*Carpinus orientalis*), and to a lesser extent eastern beech (*Fagus orientalis*) (Shetekauri and Jacoby 2009). Although illegal timbering has diminished the wooded area, there are still some nice parts of primary woodland left.

Important contributions to the knowledge of the tachinid fauna of Armenia have been made by Richter (1967, 1972), who collected in the area. She ran a Malaise trap in 1965 at Hankavan [in Russian 'Ankavan'], which is only 18km southwest of our base at Margahovit.

Materials and Methods

All localities visited are shown in Fig. 1, with the corresponding dates and altitudes listed in Table 1. Diptera were collected between June 20th and July 10th. During this period a Malaise trap was kept running at Margahovit.

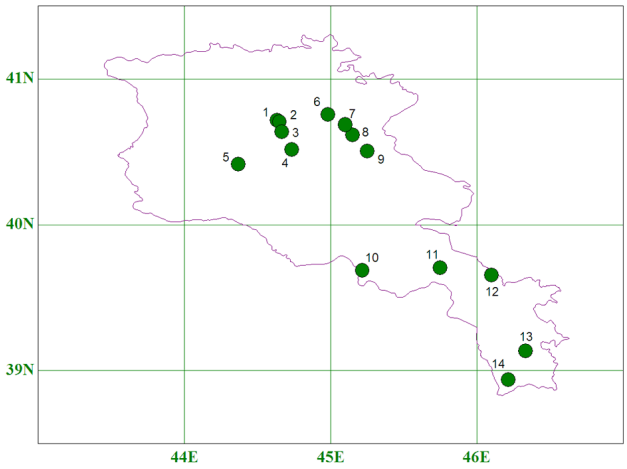

Figure 1. Collecting localities in Armenia. See Table 1 for a list of the localities and their coordinates.

I have followed Beglaryan (2011) in the transcription of names of localities. The transcription of Armenian names is by no means a trivial undertaking, since the Armenian alphabet consists of no less than 38 letters. The transcription from Russian transcriptions of Armenian names can differ.

Table 1. Information on collecting localities (see locations on map in Fig. 1).

1. Margahovit (Lori Prov.), 40°43′09.7″N 44°38′38.6″E, 1900–2300m, 20.vi–10.vii.2011 (also Malaise trap). Figs. 3–4.
2. Margahovit Pass (Lori Prov.), 40°42′N 44°39′E, 2100–2400m, 1–2.vii.2011.
3. Meghradzor, north of (Kotyak Prov.), 40°38′N 44°40′E, 1900m, 2.vii.2011.
4. Tsaghkadzor, Mount Teghenis (Kotyak Prov.), 40°31′N 45°44′E, 2300m, 3.vii.2011.
5. Alfabet Monument, north of Arhashavan (Aragatsotn Prov.), 40°25′N 44°22′E, 1750m, 30.vi.2011.
6. Gosvahank (Tavush Prov.), 40°45′N 44°59′E, 1500m, 6.vii.2011.
7. Barepat (Gegharkunik Prov.), 40°41′N 45°06′E, 1400–1700m, 5.vii.2011.
8. Drakhtik – Kalavan (Gegharkunik Prov.), 40°37′N 45°09′E, 2200m, 4.vii.2011.
9. Shorzha, at north shore of Lake Sevan (Gegharkunik Prov.), 40°30′40″N 45°15′31″E, 1910m and 2200m (hilltopping), 4.vii.2011. Fig. 5.
10. Noravank, Yeghednadzor (Vayots Dzor Prov.), 39°41′N 45°13′E, 1200m, 27.vi.2011.
11. Spardarian Lake (Syunik Prov.), east of Vorotan Pass, 39°42′N 45°45′E, 2100m, 27.vi.2011.

12. Base of Mount Tsghuk, northeast of Sisian (Syunik Prov.), 39°39′N 46°06′E, 2750m, 25.vi.2011 and 2900m, 26.vi.2011. Fig. 6.
13. Mount Khustup, west of Tsav (Syunik Prov.), 39°08′N 46°20′E, 2600–2700m, 22.vi.2011.
14. Lehvaz, north of Meghri (Syunik Prov.), 38°56′N 46°13′E, 700m, 24.vi.2011.

Collected material was identified using the keys for the Palaearctic Region by Tschorsnig and Richter (1998), Mesnil (1944–1975, 1980), Herting (1983) and relevant generic reviews. The classification follows Herting (1984).

Before presenting the total list of species, I start with notes on noteworthy species in alphabetical order. The list of species is arranged by subfamily and presented in alphabetical order within each subfamily.

Notes on noteworthy species

Eriothrix micronyx Stein, 1924
(syn. *E. zimini* Kolomiets, 1967)

A male of this species was found south of the camp at Margahovit at a ridge at about 2300m. It was recorded previously from the higher parts of the Alps (Tschorsnig and Herting 1994) and (as *E. zimini*) from the Abakan area of southwestern Siberia by Kolomiets (1967). It is apparently a rare boreo–montane species. The date of the new record is between those of Siberia (June) and the Alps (August).

Eliozeta sp.

The status of this taxon is currently under investigation.

Eurithia ?*consobrina* (Meigen, 1824)

The single male is very similar to *Eu. consobrina* (Meigen, 1824), but has a black palpus. Of course, this could be just individual variation of *Eu. consobrina*. However, there seems to be more subtle differences between this specimen and typical *Eu. consobrina*, as given below. Whether this specimen represents a taxon other than *Eu. consobrina* and whether this would be one of the names currently in synonymy with *Eu. consobrina* (such as *Eu. divergens* (Brauer, 1898) or *Eu. atripalpis* (Villeneuve, 1936)) remains an open question, awaiting the discovery of more material. Joachim Ziegler (Berlin) kindly informed me that all of his material from Iran belongs to typical *Eu. consobrina*. The two forms differ as follows.

1. Palpus black. Scutellum completely black. Wing veins black. Two central dark vittae before suture merging at about middle of the distance between anterior margin of scutum and suture. Abdominal tergite 4 with a nearly complete row of marginal setae. Median cleft of fifth sternite U-shaped, not reaching middle of sternite..... .....*Eu.* ?*consobrina* (male from Armenia)

1′. Palpus yellow. Scutellum brownish at apex. Wing veins yellow to brown. Two central dark vittae before suture separated. Abdominal tergite 4 with a pair of central marginal setae which are clearly separated from the 1–2 pairs of lateral marginal setae. Median cleft of fifth sternite V-shaped, reaching middle of sternite..... .....*Eu. consobrina* (Meigen, 1824)

Eurithia armeniaca Richter, 1972

Described by Richter (1972) from a *Quercus macranthera* forest at Hankavan. I found 1♂ in a very well preserved *Q. macranthera* forest north of Lake Sevan (near Barepat). My specimen differs in one aspect from the redescription by Mesnil (1944–1975): the ventral ('inner') seta of the middle tibia is present but quite weak and easily overlooked, its length hardly exceeding the diameter of the tibia (Fig. 2). Mesnil did not see this species himself and assumed, probably because Richter (1972) compared her new species with *Eu. caesia* (Fallén, 1810), that the ventral seta is strong. Richter (1972) herself did not mention the state of this seta.

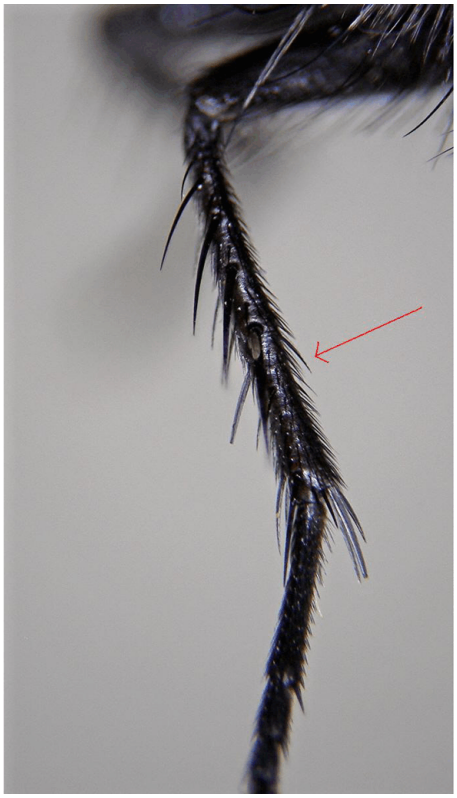

Figure 2. *Eurithia armeniaca*, right mid tibia, frontal (slightly dorsal) view. Red arrow points to the small ventral seta.

In fact, *Eu. armeniaca* more closely resembles *Eu. cristata* (Villeneuve, 1920). The genitalia are very similar, with the apex of the syncercus more slender and pointed in *armeniaca* than in *Eu. cristata* (the latter based on a specimen from Spanish Pyrenees in my collection). In *Eu. cristata*, the palpus is dark with a yellow tip, whereas in *Eu. armeniaca* it is completely black. This might provide the

most practical feature of distinction, since others (width of vertex, width of third antennal segment, presence of setulae on vein R_1) vary within the species themselves.

Eurithia fucosa Mesnil, 1975

This species was incorrectly identified as *Eu. cristata* (Villeneuve, 1920) by Zimin (1957) (in English in Zimin *et al*. 1988) as is apparent from the illustration of the male genitalia (pp. 511 [fig. 7], 534). This mistake had already been noted by Herting (1984). Zimin (1957) gave a record from Armenia from Lake Sevan, not far from the locality cited herein.

Germaria sp. nov.

This species has been identified by J. Ziegler as new to science. It belongs to the *G. ruficeps* complex. The specimens were found on flowers of Umbelliferae in mountain meadows (Figs. 2–3).

Zeuxia tricolor (Portschinsky, 1881)
(syn. *armeniaca* Richter, 1967)

Previously recorded from Armenia from Hankavan along the river Marmarik by Richter (1967) (as *Z. armeniaca*).

Figure 3. Meadow at mountain slope south of Margahovit (1923m, locality 1). The oxeye daisy, *Leucanthemum vulgare*, is the dominant flowering plant. Yellow arrow points to Malaise trap located between bushes and pond.

Subfamily Dexiinae

Athrycia trepida (Meigen, 1824)
1♀, Margahovit (Lori Prov.), 9.vii.2011; 3♀♀, same but 19–30.vi.2011, Malaise trap.

Dinera carinifrons (Fallén, 1817)
1♂, Margahovit (Lori Prov.), 9.vii.2011; 3♀♀, same but 10.vii.2011; 3♀♀, same but 19–30.vi.2011, Malaise trap.

Dinera ferina (Fallén, 1817)
1♂, Gosvahank (Tavush Prov.), 6.vii.2011.

Eriothrix micronyx Stein, 1924
1♂, Margahovit (Lori Prov.), 1950m, 10.vii.2011.

Estheria petiolata (Bonsdorff, 1866)
1♂, Margahovit (Lori Prov.), 30.vi.2011; 1♀, same but 9.vii.2011; 1♂, Shorzha (Gegharkunik Prov.), 2200m, 4.vii.2011.

Phyllomyia volvulus (Fabricius, 1794)
1♂, Margahovit (Lori Prov.), 9.vii.2011.

Prosena siberita (Fabricius, 1775)
1♀, Shorzha (Gegharkunik Prov.), 1920m, 4.vii.2011.

Ramonda spathulata (Fallén, 1820)
1♀, Margahovit (Lori Prov.), 19–30.vi.2011, Malaise trap.

Voria ruralis (Fallén, 1810)
2♀♀, Margahovit (Lori Prov.), 9.vii.2011.

Zeuxia erythraea (Egger, 1856)
1♂, Shorzha (Gegharkunik Prov.), 1920m, 4.vii.2011.

Zeuxia tricolor (Portschinsky, 1881)
2♂♂, Alfabet Monument, north of Arhashavan (Aragatsotn Prov.), 30.vi.2011.

Subfamily Exoristinae

Admontia maculisquama (Zetterstedt, 1859)
2♂♂, Margahovit (Lori Prov.), 7.vii.2011; 1♂, same but 10.vii.2011.

Conogaster pruinosa (Meigen, 1824)
1♀, Lehvaz, north of Meghri (Syunik Prov.), 24.vi.2011; 1♂, north of Margahovit Pass (Lori Prov.), 1.vii.2011.

Epicampocera succincta (Meigen, 1824)
1♀, Margahovit (Lori Prov.), 19–30.vi.2011, Malaise trap; 1♀, but netted, 10.vii.2011.

Figure 4. Meadow at Margahovit valley (just north of locality 1) with mass occurrence of *Gladiolus* and to a lesser extent dropwort, *Filipendula vulgaris*.

Exorista rustica (Fallén, 1810)
2♂♂, 1♀, Margahovit (Lori Prov.), 19–30.vi.2011, Malaise trap; 3♂♂, same but 7.vii.2011, Malaise trap.

Exorista xanthaspis (Weidemann, 1830)

4♂♂, Shorzha (Gegharkunik Prov.), 2200m, 4.vii.2011, hilltopping.

Hubneria affinis (Fallen, 1810)
1♂, Margahovit (Lori Prov.), 7.vii.2011; 1♂ (specimen with 4 posterior dorsocentral setae), same but 10.vii.2011.

Ligeria angusticornis (Loew, 1847)
1♂, Margahovit (Lori Prov.), 30.vi.–8.vii.2011, Malaise trap.

Masicera silvatica (Fallén, 1810)
1♀, Margahovit (Lori Prov.), 9.vii.2011.

Pales pavida (Meigen, 1824)
2♀♀, Margahovit (Lori Prov.), 19–30.vi.2011, Malaise trap; 1♂, north of Meghradzor (Kotyak Prov.), 2.vii.2011.

Phryxe erythrostoma (Hartig, 1838)
1♀, Margahovit (Lori Prov.), 30.vi–8.vii.2011, Malaise trap.

Spallanzania hebes (Fallén, 1820)
1♂, Shorzha (Gegharkunik Prov.), 2200m, 4.vii.2011, hilltopping.

Thelymorpha marmorata (Fabricius, 1805)
1♀, Margahovit (Lori Prov.), 20.vi.2011.

Figure 5. Hilltop at northern edge of Lake Sevan (2200m, locality 9). An excellent location for observing hilltopping Tachinidae.

Subfamily Phasiinae

Cylindromyia brassicaria (Fabricius, 1775)
1 pair *in copula*, Alfabet Monument, north of Arhashavan (Aragatsotn Prov.), 30.vi.2011.

Cylindromyia brevicornis (Loew, 1844)
1♂, Lehvaz, north of Meghri (Syunik Prov.), 24.vi.2011; 1♂, Shorzha (Gegharkunik Prov.), 2200m, 4.vii.2011, hilltopping.

Cylindromyia intermedia (Meigen, 1824)
1♂, Lehvaz, north of Meghri (Syunik Prov.), 24.vi.2011.

Cylindromyia montana Kugler, 1974
1♂, Shorzha (Gegharkunik Prov.), 2200m, 4.vii.2011, hilltopping.

Ectophasia crassipennis (Fabricius, 1794)
1♀, Margahovit (Lori Prov.), 10.vii.2011.

Eliozeta sp.
1♂, Lehvaz, north of Meghri (Syunik Prov.), 24.vi.2011.

Gymnosoma cf. *dolycoridis* Dupuis, 1961
1♀, base of Mount Tsghuk, NE of Sisian (Syunik Prov.), 26.vi.2011.

Phasia obesa (Fabricius, 1798)
1♀, Lehvaz, north of Meghri (Syunik Prov.), 24.vi.2011.

Figure 6. Alpine meadow at base of Mount Tsghuk (2900m, locality 12).

Subfamily Tachininae

Eurithia armeniaca Richter, 1972
1♂, Barepat (Gegharkunik Prov.), 5.vii.2011.

Eurithia caesia (Fallén, 1810)
1♂, Margahovit (Lori Prov.), 1.vii.2011; 4♂♂, same but 10.vii.2011; 2♂♂, north of Meghradzor (Kotyak Prov.), 2.vii.2011.

Eurithia ?*consobrina* (Meigen, 1824)
1♂, Margahovit (Lori Prov.), 7.vii.2011.

Eurithia fucosa Mesnil, 1975
1♂, Margahovit (Lori Prov.), 7.vii.2011.

Germaria sp. nov. (det. J. Ziegler)
1♀, Gosvahank (Tavush Prov.), 6.vii.2011; 1♂, Margahovit (Lori Prov.), 7.vii.2011; 1♂, same but 9.vii.2011.

Loewia phaeoptera (Meigen, 1824)
1♀, Mount Khustup (Syunik Prov.), just west of mountain top, 22.vi.2011.

Linnaemya rossica Zimin, 1954
1♂, Margahovit (Lori Prov.), 7.vii.2011; 2♂♂, 1♀, same but 10.vii.2011.

Linnaemya soror Zimin, 1954
1♂, Shorzha (Gegharkunik Prov.), 2200m, 4.vii.2011, hilltopping.

Lydina aenea (Meigen, 1824)
1♂, Spardarian Lake (Syunik Prov.), east of Vorotan Pass, 2100m, 27.vi.2011.

Macquartia dispar (Fallén, 1820)
4♀♀, Margahovit (Lori Prov.), 1950m, 19–30.vi.2011, Malaise trap.

Macquartia tessellum (Meigen, 1824)
1♂, Shorzha (Gegharkunik Prov.), 2200m, 4.vii.2011, hilltopping.

Nowickia ferox (Panzer, 1809)
1♂, Margahovit (Lori Prov.), 9.vii.2011; 1♀, same but 10.vii.2011.

Pelatachina tibialis (Fallén, 1810)
1♂, Margahovit (Lori Prov.), 19–30.vi.2011, Malaise trap; 1♂, base of Mount Tsghuk, NE of Sisian (Syunik Prov.), 26.vi.2011.

Peleteria rubescens (Robineau–Desvoidy, 1830)
1♂, Margahovit (Lori Prov.), 1.vii.2011; 1♂, same but 7.vii.2011; 1♂, 1♀, same but 9.vii.2011.

Tachina fera (Linnaeus, 1761)
4♂♂, Shorzha (Gegharkunik Prov.), 2200m, 4.vii.2011, hilltopping; 1♂, north of Margahovit Pass (Lori Prov.), 1.vii.2011.

Zophomyia temula (Scopoli, 1763)
1♂, Tsaghkadzor, Mount Teghenis (Kotyak Prov.), 3.vii.2011; 1♂, Shorzha (Gegharkunik Prov.), 1920m, 4.vii.2011.

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Eight "alien" tachinids in Europe?

***by* Hans-Peter Tschorsnig, Pierfilippo Cerretti and Theo Zeegers**

Eight tachinid species are listed in the recent compilation of Diptera as "alien terrestrial arthropods of Europe" by Skuhravá *et al*. (2010: 595–596). However, the citation of seven of the eight included species must be regarded as arbitrary. They are neither aliens "to" Europe [in the sense of true invaders from other continents] nor are they aliens "in" Europe [i.e., translocated by man outside of their natural range within Europe], as the term is defined in the introductory chapter of the book (Nentwig and Josefsson 2010).

Blepharipa schineri (Mesnil, 1939), *Catharosia pygmaea* (Fallén, 1815), *Clytiomya continua* (Panzer, 1789), *Phasia barbifrons* (Girschner, 1887), and *Sturmia bella* (Meigen, 1824) are common and widespread species in the Palearctic Region. A simple look into the existing catalogues, e.g., Herting and Dely-Draskovits (1993), would have shown this, and a study of the existing literature would also have shown that for the majority of the listed species neither their hosts are "unknown" nor their habitats. It is unjustified to treat species as "aliens" because of new European country records. It is normal that collecting efforts may yield new records, and it is virtually impossible

to decide (unless we have evidence of it) whether a new record is based on natural dispersal of a species, unintentional human activities, or if a species was already present in a country but – because of its rarity – simply overlooked before.

The distribution of the mentioned two rarer Palearctic species *Leucostoma edentata* (Kugler, 1978) and *Zeuxia zejana* Kolomiets, 1971 is less well known, but there is also neither a founded suspicion nor a proof that they might have invaded Europe from Asia because these unimpressive species may also have been present naturally in the Mediterranean area.

Using the same criteria as the authors obviously applied, i.e., a new record for a European country means an "alien" species, would result in nearly all European tachinids having to be placed on such a list. Needless to say this would not make sense.

Trichopoda pennipes (Fabricius, 1781), of eastern Nearctic origin, introduced into California to control coreid bugs (Pickett *et al*. 1996) is currently the only tachinid that is justified to be included in a list of European invaders. There is no doubt that this conspicuous species, known as accidentally introduced into Italy (cf. Colazza *et al*. 1996), is now established in Europe and is rapidly extending its range. Its typical host is the cosmopolitan pentatomid *Nezara viridula* (Colazza and Bin 1990; Colazza *et al*. 1996; Salerno *et al*. 2002; Groot *et al*. 2007; Cargnus *et al*. 2011); only *Graphosoma lineatum* became known as an additional host in a single case (Colazza *et al*. 1996).

In the Palearctic, *T. pennipes* is meanwhile known from the following countries and provinces [years of first observation – if available – in square brackets]:

Italy: [1983; new record, the oldest European record known thus far]: 1♂, 1♀, Tuscany, Grosseto Province, Uccellina, on *Echinophora* sp. (Apiaceae), 31.viii.1983, leg. Boni Bratalucci; [1988] (Colazza *et al*. 1996; Salerno *et al*. 2002).
France: Pyrenées Orientales [1995] (Tschorsnig *et al*. 2000; pers. comm. M. Martinez); Lot-et-Garonne [2003] (pers. comm. M. Martinez; pers. comm. G. Pennards); Hérault [2002] (pers. comm. M. Martinez); Gard [2002] (pers. comm. M. Martinez), Var [2008] (http://www.diptera.info/forum/viewthread.php?forum_id=5&thread_id=17128).
Spain: Gerona [1995] (Peris 1998; Tschorsnig *et al*. 2000); Barcelona [2003] (pers. comm. M. Carles-Tolrá); Madrid [2006] (pers. comm. Theo Zeegers); Sevilla [2007] (http://www.diptera.info/forum/viewthread.php?forum_id=5&thread_id=8225); Pontevedra [2008] (http://www.diptera.info/forum/viewthread.php?forum_id=5&thread_id=17942).
Slovenia [2003]: Groot *et al*. 2007.
The Netherlands [2005]: Zeegers 2010 (probably not yet established in this country).
Portugal: [2007] (http://www.diptera.info/forum/viewthread.php? forum_id=5&thread_id=8225; http://www.diptera.info/forum/viewthread.php?forum_id=5&thread_id=8971)
Israel [2010]: Freidberg *et al*. (2011).
Albania: according to Skuhravá *et al*. 2010, without reference.

Additional recent records from Italy, Portugal, France and Slovenia can be found in Cerretti *et al*. (2004), Cerretti (2010), Cargnus *et al*. (2011), and on http://www.diptera.info.

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Thoughts on how *Trichopoda pennipes* (F.) reached Israel

by **Cezary Bystrowski**

The tachinid fly *Trichopoda pennipes* (Fabricius), a parasitoid of hemipteran bugs, is probably an example of accidental but successful introduction into Europe that took place in the late 1980s near Rome, Italy (Colazza *et al*. 1996; Salerno *et al*. 2002). Since its introduction, the species has been recorded in Spain and France (Tschorsnig *et al*. 2000; Zeegers 2010) as well as Slovenia (Groot *et al*. 2007) and The Netherlands (Zeegers 2010). In 2010 the fly was also recorded in Israel (Freidberg *et al*. 2011). This interesting ongoing story caught my attention because of the very quick dispersion of the tachinid fly. The distance from its known range in Europe to the northern part of Israel, where it was recently discovered, is really huge. It is difficult to believe that *T. pennipes* can move all of that distance on its own so quickly. Unfortunately, we do not know whether the population in Israel began as the result of an accidental introduction (as in Italy in the 1980s) or whether long distance dispersal from Europe was responsible via Greece and Turkey, then Syria, Lebanon and finally northern Israel. This interesting question would have stayed only in my mind if not for an event that changed my opinion about the dispersal rate of this species in Europe. Some time ago, Bogusław Soszyński (a dipterist from Łódź, Poland) gave me a few specimens of Tachinidae collected from the coastal area of Croatia by his brother Mirosław. It is important to mention that Bogusław Soszyński is an amateur entomologist who has worked for years on hoverflies (Syrphidae). Some of his friends and family members often bring him flies collected from different parts of Poland and Europe. Can you imagine my surprise when I saw among his flies from Croatia six specimens of *T. pennipes* (Fig. 1) with their characteristic flattened bristles on the hind legs!? The oldest record from the Croatian material (1♀) was collected on 14–28 August 2005 from Biograd on the coast (N43°56′23″ E15°26′ 30″). The other five specimens (4♀, 1♂) were collected on 15–28 August 2007 from Novi Vinodolski (N45°08′10″ E14°46′40″). All of the flies from 2007 were collected on flowering plants, in wet meadows along a local river. The species was very abundant in these meadows according to M. Soszyński.

Italian scientists (Salerno *et al*. 2002) reported that more than 20% of the host *Nezara viridula* (L.) in the Rome area were parasitized by *T. pennipes* in the late 1990s. They did not find infested bugs in the northern part of Italy (Liguria) and only one infested specimen in Sicily. The information about parasitism in southern and northern Italy suggests a very slow dispersion of the species. However, a few years later *T. pennipes* was recorded in different parts of Europe, hundreds of kilometers away from Rome (Tschorsnig *et al*. 2000; Zeegers 2010). In Slovenia, the first official record of *T. pennipes* dates from 2003 (Koper) from the coastal part of the country, with subsequent records from Piren (2004–2005) (Groot *et al*. 2007). Finally, in 2009–2011, the presence of the species in northern Italy (Veneto, Friuli) was confirmed (Cargnus *et al*. 2011).

Figure 1. Six specimens of *Trichopoda pennipes* collected from Croatia in 2005 and 2007.

Mirosław Soszyński collected his first specimens of *T. pennipes* in 2005 in Biograd. The locality is more than 200 km south-east of Slovenia. The most interesting records,

however, come from the Iberian Peninsula and The Netherlands, mainly because of their long distance from Rome, and in my opinion show the great dispersion potential of the species. On the other hand, literature data indicates that the population of *T. pennipes* in Spain originated from an independent "fortuitous" introduction (Tschorsnig *et al*. 2000).

I think the actual distribution of *T. pennipes* is still insufficiently known. Numerous populations of *T. pennipes* in Croatia observed by Mirosław Soszyńki in 2007 suggest that the species is able to colonize distant territories (e.g., Greece) and may even be found in Turkey. The distance from Rome to Spain is approximately the same as from Rome to Athens and quick, successful dispersal of the species along the warm, coastal Adriatic area is very possible.

It is important to note that even intentional introductions of the fly have not always ended in full success. To this day we do not have the final report on the success of introductions of *T. pennipes* into South Africa (see preliminary reports by Berg *et al*. 1995, Berg and Greenland 1996) and the introduction of *T. giacomellii* into the same place (Berg and Greenland 1997). There have been no published reports on whether *T. pennipes* has become established in South Africa.

Figure 2. Hind leg of *Trichopoda pennipes* showing the row of distinctive flattened bristles.

We have two possible hypotheses concerning the presence of *T. pennipes* in Israel. The first is that the species reached the country by dispersal from Europe, most likely along the coastal area of Greece and Turkey. The alternative hypothesis is that colonization of Israel occurred as the result of an (accidental or not) introduction of infested hosts or *T. pennipes* adults or puparia. Of course, the second hypothesis strongly implies some sort of "human activity" or possibly commercial trade, but a human role in this case is the most important.

A testing of these hypotheses is still possible. *Trichopoda pennipes* must be found, in the coming one or two years, in Macedonia, Albania, Greece and Turkey. It is not a difficult task because this species is so characteristic and even people not working with Tachinidae are able to recognize the flies (Fig. 2). That is why I would like to invite dipterists or entomologists to help in this work. Especially people from the aforementioned countries are welcome. I think this can be treated as a kind of "homework" for the coming season for the readers of *The Tachinid Times*.

Acknowledgements

I am very grateful to Mirosław Soszyński and Bogusław Soszyński for all their information about the collecting place of *Trichopoda pennipes* in Croatia and for their donation of material to my private collection.

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Groot, M. de, Virant Doberlet, M. and Žuniè, A. 2007. *Trichopoda pennipes* F. (Diptera, Tachinidae): a new natural enemy of *Nezara viridula* (L.) in Slovenia – short communication. Agricultura (Slovenia) **5**: 25–26.

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New record of *Ectophasia crassipennis* (F.) as a parasitoid of *Rhynocoris annulatus* (L.) in Russia

by **Evgeniy Aksenenko and Sergey Gaponov**

An adult male of the true bug *Rhynocoris annulatus* (L.) (Heteroptera: Reduviidae) was collected on 9 June 2010 in the Voronezh Region of western Russia. It was found to have the egg of a phasiine tachinid attached to its underside between abdominal segments 6 and 7 (Fig. 1).

Figure 1. Predaceous bug *Rhynocoris annulatus* L. with egg of *Ectophasia crassipennis* F. on underside of abdomen.

After 10 days (on 19 June 2010), a tachinid larva emerged from the host and formed a puparium. One day later, the bug host died. The puparium was kept at a temperature of 27–30°C. An adult male fly emerged from the puparium on 29 June 2010 and was subsequently identified *as Ectophasia crassipennis* (F.) (Phasiinae: Phasiini). This is the first Russian record of *Ectophasia crassipennis* (F.) as a parasitoid of *Rhynocoris annulatus* (L.).

Corrections to "Nomenclatural studies toward a world list of Diptera genus-group names"

by **Jim O'Hara and Neal Evenhuis**

Two monographs have been published to date in this series. Here we record corrections to these works, many concerning the Tachinidae.

Corrections to Part I

Evenhuis, N.L., O'Hara, J.E., Pape, T. and Pont, A.C. 2010. Nomenclatural studies toward a world list of Diptera genus-group names. Part I: André-Jean-Baptiste Robineau-Desvoidy. Zootaxa **2373**: 1–265.

We thank Yves Cambefort (Museum National d'Histoire Naturelle, France) for correcting us on the orthography of Robineau-Desvoidy's name, which should be hyphenated as "André Jean-Baptiste Robineau-Desvoidy" and not as "André-Jean-Baptiste Robineau-Desvoidy", as we had written. This change should be made in the following places:

Page 1: cover
Page 2: copyright page
Page 3: line 27 down
Page 6: line 2 of Introduction
Page 8: figure caption and line 1 of biography
Page 224: line 1 down

Yves also spotted the following errors.

Page 11, line 7 down: "Ductrotray" should read "Ducrotay".
Page 11, lines 7–8 down: "Jean-Baptiste-Pierre-Antoine" should read "Jean-Baptiste Pierre-Antoine" [one hyphen deleted].
Page 13, line 27 down: "orgeuil" should read "orgueil".
Page 15, line 18 up: "Étienne-Geoffroy Saint-Hilaire" should read "Étienne Geoffroy Saint-Hilaire" [one hyphen deleted].
Page 23, line 6 down: "Venus Anadymene" should read "Venus Anadymène" [accent added].

Other corrections found by us are as follows.

Page 3, line 21 down: "Catalog of Diptera Genus-Group Names of André-Jean-Baptiste Robineau-Desvoidy" should read "Catalog of Genus-Group names of Robineau-Desvoidy".

Page 46: 62. Besseria Robineau-Desvoidy, 1830: 232. The type species, *Besseria reflexa* Robineau-Desvoidy, 1830, is given as a synonym of *Tachina melanura* Meigen, 1824. This is not correct; *Besseria reflexa* is a valid species.

Page 66: 145. Dufouria Robineau-Desvoidy, 1830: 257. The type species of *Dufouria* Robineau-Desvoidy, 1830 is given as "*Dufouria aperta* Robineau-Desvoidy, 1830 [= *Tachina chalybeata* Meigen, 1824], by subsequent designation (Duponchel *in* d'Orbigny, 1844b: 143). The subsequent designation by Duponchel *in* d'Orbigny (1844b) was made on page 144, not page 143.

Page 78: 195. Eurysthaea Robineau-Desvoidy, 1863a: 603. The originally included species and the type species is given as *Erythrocera scutellaris* Robineau-Desvoidy, 1830. The date is in error; *Erythrocera scutellaris* was described in 1849.

Corrections to Part II

O'Hara, J.E., Cerretti, P., Pape, T. and Evenhuis, N.L. 2011. Nomenclatural studies toward a world list of Diptera genus-group names. Part II: Camillo Rondani. Zootaxa **3141**: 1–268.

Michael von Tschirnhaus (Universtät Bielefeld, Germany) kindly brought to our attention a Rondani paper we

missed in "Complete Bibliography of Camillo Rondani". Here it is:
Rondani, C. (1871) Degli insetti parassiti e delle loro vittime. Enumerazione con note [part]. *Bulletino della Società Entomologica Italiana*, 3, 217–243.

Michael also alerted us to the following errors.

Pages 110, 263: 301. *Macrochetum* Rondani, 1856: 127.
Under "Current Status", change "*Elachiptera* Macquart, 1825" to "*Elachiptera* Macquart, 1835".

Page 207, right column, line 5 up: Change "ceralis" to "cerealis".

Pages 234, 252 (References): Rondani, C. (1869c)
"Di alcuni insetti ditteri" should read "Di alcuni insetti dipteri".

Page 255, 1877 publications, 2nd paper: Change "166–213" to "166–213, pls. I–IV".

Other corrections found by us are as follows.

Pages 4, 41, 258: *Brachychaeta* Brauer & Bergenstamm, 1889.
Brachychaeta Brauer & Bergenstamm, 1889 is listed as an unjustified emendation of *Brachicheta* Rondani, 1861 in the abstract (page 4), in the catalog section (page 41), and in the section "Explanations for New Synonymies Listed in the Emendations Sections" (page 258). These are correct entries, but there is also an incorrect entry in the section "Genus-Group Names and Misspellings Incorrectly Attributed to Rondani" (page 192): "[Brachychaeta] Brauer & Bergenstamm, 1889: 107". Delete this last entry. When we changed our interpretation of *Brachychaeta* B. & B. from a misspelling to an unjustified emendation we forgot to delete our original entry.

Page 33: 32. *Aporomya* Rondani, 1859b: 90.
Under "Emendations", change "*Aporomyia* Schiner, 1861: 457" to "*Aporomyia* Schiner, 1861b: 457".

Page 73: [Digonicheta] Rondani, 1868d: 577 [1872: 322].
Change "1872" to "1873a".

Page 149: 454. Policheta Rondani, 1856: 67.
Under "Emendations", change "*Polycheta* Schiner, 1861: 488" to "*Polycheta* Schiner, 1861b: 488".

Pages 155, 157, 159:
475. *Ptilocheta* Rondani, 1857: 13.
481. *Racodineura* Rondani, 1861e: 31.
488. *Rhynchista* Rondani, 1861e: 9.
Each of the above was proposed as a replacement name. According to our format, if a name being replaced was not preoccupied, then we gave the "Current Status" of the new name as "Unnecessary new replacement name for ...". In each of the above, the replacement name was identified as unnecessary but the name being replaced was preoccupied. Hence, the "Current Status" of each should read "New replacement name for...".

Page 167: 518. Spazigaster Rondani, 1843b: 43.
Under "Emendations", change "*Spatigaster* Schiner, 1861: 298" to "*Spatigaster* Schiner, 1861a: 298".

Page 173: 540. Strobelia Rondani, 1868b: 29.
The double space between this entry and the next one, "[Strongigaster] Rondani, 1868", is missing.

Page 184: 573. Tricoliga Rondani, 1856: 68, 225.
Under "Emendations", change "*Tricolyga* Schiner, 1861: 456" to "*Tricolyga* Schiner, 1861b: 456".

Page 187: [Viedmannia] Rondani, 1847: 67.
Change "1847" to "1847b".

Pages 232, 243 (References): Rondani, C. (1844c).
"Observations de C. Rondani (Parmesan)" should read "Observations de M. Rondani (Parmesan)".

Pages 233, 248 (References): Rondani, C. (1861c).
The accompanying plate is cited as "pl. XI A–B". It should read "pl. XI B". Plate "XI A" pertains to a fish paper.

Page 236 (References): Schiner, J.R. (1861).
Change date from "1861" to "1861a".

Page 236 (References): Insert new reference:
Schiner, J.R. (1861b) *Fauna austriaca*. Die Fliegen (Diptera). Nach der analytischen Methode bearbeitet von J. Rudolf Schiner. Mit der Charakteristik sämmtlicher europäischer Gattungen, der Beschreibung aller in Deutschland vorkommenden Arten und der Aufzählung aller bisher beschriebenen europäischen Arten. II. Theil. [Heft 6/7], pp. 441–656. "1862". C. Gerold's Sohn, Wien [= Vienna]. [4 December]
[Dated from Evenhuis (1997: 695).]

Pages 258, 266, 268: change "1861" to "1861b" in the following.
Aporomyia Schiner, 1861: 457.
Polycheta Schiner, 1861: 488.
Tricolyga Schiner, 1861: 488. Also change page from "488" to "456".

ANNOUNCEMENTS

Postdoctoral and Ph.D. positions in insect phylogenetics and evolution of Tachinidae

***by* John Stireman III**

Postdoctoral position

I am seeking a postdoc to join my lab at Wright State University in Dayton Ohio and collaborate on an NSF funded project focused on understanding the phylogeny and evolution of parasitoid flies in the family Tachinidae. See the NSF project summary below for a brief overview of our goals. The postdoc will participate in collecting expeditions to Australia, S. Africa, S. America, and elsewhere, acquire morphological and molecular data and conduct molecular

phylogenetic analyses (including genomic data), aid in development of web pages and identification resources, contribute to outreach activities, and help to develop grant proposals to secure additional funding. The successful candidate will be expected to interface with co-PIs and collaborators, become an integral member of the lab, and to help supervise and/or mentor students. The applicant should have experience with insect systematic and modern phylogenetic and comparative methods. Knowledge of and experience with Diptera is preferred.

Funding is available for up to two years, pending performance. The start date is flexible but ideally by summer 2012.

Please contact me (john.stireman@wright.edu) for more information prior to submitting an application. For primary consideration, applicants should apply by March 15, 2012. To apply, please send me the following.

1. A curriculum vitae.
2. Names of 3 referees willing to provide a letter of recommendation upon request.
3. A brief statement of research interests and goals and how they are related to the goals of the current project on tachinid phylogeny and evolution.

Ph.D. student opportunity at Wright State University: insect phylogenetics and evolution

I am seeking a Ph.D. student to join my laboratory studying the evolution and ecology of parasitoid flies. While the specific focus of the dissertation research is negotiable, the research assistantship will require contributing to a collaborative, NSF funded project focused on understanding the phylogenetics and evolution of parasitoid flies in the family Tachinidae. This important and fascinating group of insects has experienced a recent explosive radiation in diversity and exhibits an incredible diversity of reproductive strategies and host associations. However, the origins, relationships, and biogeography of the family are poorly understood (See the NSF project summary below for a brief overview of our general goals). The successful applicant will develop a thesis research project on insect evolution and systematics using phylogenetic, genomic, and comparative methods and will have the opportunity to participate in international collecting expeditions to Australia, S. Africa, SE Asia, and elsewhere.

At least four years of support are available through a combination of graduate research and teaching assistantships, and the student may start as early as summer 2012. The student will be enrolled in Wright State's Interdisciplinary Environmental Sciences Ph.D. Program. Application requirements include: Bachelors degree in Biology, Entomology, or related field; GRE scores within the last 5 years; minimum IBT TOEFL score of 100 and ability to pass a verbal English test (foreign students only). Preferred qualifications include: Master's degree or equivalent experience; a strong background in Entomology, with interest and/or experience in insect systematics and evolution; good communication skills. The current stipend is approx. $23,000 on a 12 month basis.

See http://www.wright.edu/academics/envsci/ for further information on the Environmental Sciences Ph.D. program at Wright State University, including program requirements, application procedures and stipends. Please contact me (john.stireman@wright.edu) for more information about research in the lab and the program prior to submitting an application.

Project summary: collaborative research on the phylogeny and evolution of world Tachinidae

Two years ago in *The Tachinid Times* (issue 23: 2–3) I wrote about a proposal that I submitted to the U.S. National Science Foundation with colleagues Jim O'Hara and J. Kevin Moulton to study the phylogeny and evolution of the Tachinidae. Funding for this project was recently granted. With the help of major collaborator Pierfilippo Cerretti, a post-doc, two graduate students (one each in the labs of Stireman and Moulton), several undergraduate students, and international colleagues, we hope to attain (or make significant progress towards) the following goals:

1. Robust reconstruction of phylogenetic relationships among major tachinid lineages.
2. Production of a stable, predictive classification of Tachinidae.
3. Focused phylogenetic analyses of two biologically interesting and agronomically important groups, the tribe Blondeliini and subfamily Phasiinae.
4. Analysis of the evolution of reproductive traits, oviposition strategy, and host associations and their effects on diversification and biological control success.
5. Dissemination of taxonomic and biological information on Tachinidae.

With the aid of a network of collaborators, relationships of world Tachinidae (200+ genera, 50+ tribes, all four subfamilies) will be inferred using 8–10 genes and a large (150+) array of morphological characters. RNAseq methods will permit new markers to be developed, establish robust basal relationships, and provide a foundation for future genomic research on the family. We hope to provide a broad scale phylogeny of Tachinidae with which we can revise existing classifications and analyze the evolution of key traits using comparative methods. An understanding of the phylogenetic relationships and evolution of Tachinidae will also inform broader issues in biology such as historical biogeography, ecological specialization, and adaptive radiation.

All data generated in this research will be made available to the greater scientific community via a wide range of web resources. Authoritative species web pages with

images and information on taxonomy, host associations, and distribution will be developed for all taxa used in phylogenetic analyses and we will expand an existing interactive key to genera to the Nearctic Region. In addition to presenting findings at national and international meetings, the PIs will organize a symposium focused on parasitoid Diptera for the International Congress of Dipterology (2014).

Virtual guide to the New Zealand genera of Tachinidae *by* Rudi Schnitzler

Over the next three years I will be developing a virtual guide to the New Zealand tachinid genera in the form of an interactive key. The key will cover around 60 genera and will be backed up by taxonomic profiles and high resolution digital images to confirm identification. The final key will be made publicly available on the internet and will be hosted by a Manaaki Whenua-Landcare Research NZ Ltd. website.

The aim is to contribute to a better understanding of this parasitic fly family in New Zealand and encourage future research on these fascinating and important flies. There are about 190 species recorded in New Zealand with 98% endemism at the species level and 90% endemism at the genus level (Fig. 1), and there are many more undescribed genera/species.

Figure 1. *Huttonobesseria verecunda* Hutton (Phasiinae: Cylindromyiini), a genus and species endemic to New Zealand.

As required by the grant I am seeking input from potential end-users into the initial development of the guide, in particular the types of information deemed to be important. I am specifically interested in the preferences of: a) type and format of the key, and b) what information would be most useful in the profiles for each genus.

I would appreciate any comments/input over the next few months and I will do my best to incorporate and acknowledge any suggestions. Please e-mail any comments to me at SchnitzlerR@landcareresearch.co.nz.

This project is being made possible through a Terrestrial and Freshwater Biodiversity Information System (TFBIS) grant from the Department of Conservation, New Zealand, and Manaaki Whenua-Landcare Research NZ Ltd. Auckland by allowing me the use of their facilities and the New Zealand Arthropod Collection (NZAC).

Checklist of Norwegian Tachinidae *by* Håkon Haraldseide

This online checklist (Fig. 1) is based on the previous list by Rognes (1986) and succeeding papers reporting tachinid species new to Norway. Additions since Rognes (1986) are marked with a number which refers to the relevant reference. Generic and specific synonyms and emendations are only included where the source records do not agree with the classification followed here. For earlier names used in Scandinavian literature, refer to Rognes (1986). Systematic arrangement and spelling of names follows O'Hara (2011), Cerretti (2010), O'Hara *et al*. (2009), Andersen (1996) (except some generic concepts) and Tschorsnig *et al*. (2004). The checklist is presented alphabetically by subfamily, genus, subgenus (where applicable) and species; tribes are omitted. The number of species listed is 220.

This checklist is available at: http://www.diptera.no/checklist-of-norwegian-tachinidae.html.

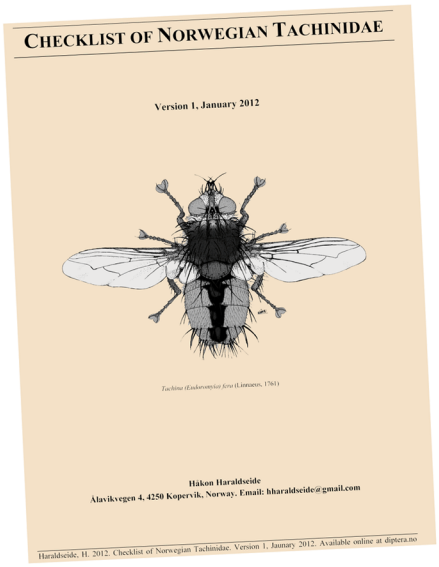

Figure 1. Checklist of Norwegian Tachinidae.

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Ph.D. thesis defended by Turgut Atay

Gazi Osman Pasa University, Tokat, Turkey
Supervisor: Dr. Kenan Kara
Degree awarded in 2011.

Title: Studies on Tachinidae species reared from different insect orders in Kelkit Valley (Amasya, Sivas, Tokat), Turkey. [In Turkish.]

A Ph.D. study was carried out to determine the Tachinidae species parasitizing different insect orders in the Kelkit Valley of Amasya, Sivas and Tokat provinces in Turkey. For this purpose, species belonging to different insect orders were reared under laboratory conditions. As a result of this study, 12 genera and 11 species belonging to the subfamily Exoristinae, 7 genera and 9 species belonging to the subfamily Phasiinae, and 1 genus and 1 species belonging to the subfamily Tachininae were found. Among them was one tachinid species recorded for the first time in Turkey. The tachinid species were identified and identification keys were prepared. Digital images were taken of important and distinctive morphological features of these species. In addition, four new host records were discovered. The results of this study have not yet been published.

I also collected approximately 1800 tachinid specimens with an insect net during my Ph.D. work in the Kelkit Valley. I am currently identifying this material. I plan to continue studying Tachinidae in other parts of Turkey.

Ph.D. thesis by Laura Depalo

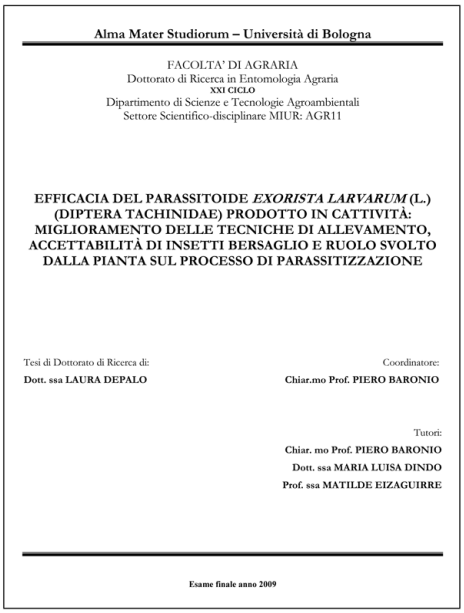
Dipartimento di Scienze e Tecnologie Agroambientali – Entomologia, Università di Bologna, Italy
Supervisors: Drs. P. Baronio, M.L. Dindo and M. Eizaguirre
Degree awarded in 2009 (Fig. 1).

Title: Efficacy of the parasitoid *Exorista larvarum* (L.) (Diptera Tachinidae) cultured in captivity: improvement of the rearing techniques, acceptance of the target insect hosts and role played by the host plant on the parasitization process. [In Italian.]

The thesis is 114 pages long and has an extended English summary on pages 94–112. The six chapters in the thesis explore the following topics:

1. *Exorista larvarum* biology and rearing techniques: state of the art.
2. *In vitro* rearing of *Exorista larvarum*: effect of short term storage at different temperatures on egg viability.
3. Acceptance and suitability of two lepidopterous species, *Spodoptera littoralis* (Boisduval) and *Pseudaletia unipuncta* (Haworth) (Noctuidae) by the parasitoid *Exorista larvarum*.
4. Role of the host plant in the parasitization process of two noctuid moths by *Exorista larvarum*.
5. Defensive behavior of different lepidopterous larvae against the attack of *Exorista larvarum*.
6. Concluding remarks on the prospects of using the Tachinidae in biological control, with particular reference to *Exorista larvarum*.

This thesis is available for download at: http://www.dista.unibo.it/didattica/dottorato_entomologia/Depalo.pdf.



Alma Mater Studiorum – Università di Bologna

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Dottorato di Ricerca in Entomologia Agraria
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Settore Scientifico-disciplinare MIUR: AGR11

EFFICACIA DEL PARASSITOIDE *EXORISTA LARVARUM* (L.) (DIPTERA TACHINIDAE) PRODOTTO IN CATTIVITÀ: MIGLIORAMENTO DELLE TECNICHE DI ALLEVAMENTO, ACCETTABILITÀ DI INSETTI BERSAGLIO E RUOLO SVOLTO DALLA PIANTA SUL PROCESSO DI PARASSITIZZAZIONE

Tesi di Dottorato di Ricerca di:
Dott. ssa LAURA DEPALO

Coordinatore:
Chiar.mo Prof. PIERO BARONIO

Tutori:
Chiar. mo Prof. PIERO BARONIO
Dott. ssa MARIA LUISA DINDO
Prof. ssa MATILDE EIZAGUIRRE

Esame finale anno 2009

Figure 1. Title page of thesis.

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Included here are references on the Tachinidae that have been found during the past year and have not appeared in past issues of this newsletter. This list has been generated from an EndNote® 'library' and is based on online searches of literature databases, perusal of journals, and reprints or citations sent to me by colleagues. The complete bibliography, incorporating all the references published in past issues of *The Tachinid Times* and covering the period from 1980 to the present is available online at: http://www.nadsdiptera.org/Tach/Bib/biblio.htm. I would be grateful if omissions or errors could be brought to my attention.

Please note that citations in the online Tachinid Bibliography are updated when errors are found or new information becomes available, whereas citations in this newsletter are never changed. Therefore, the most reliable source for citations is the online Tachinid Bibliography.

I am grateful to Alan Fleming for performing the online searches that contributed most of the titles given below and for preparing the EndNote® records for this issue of *The Tachinid Times*.

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Thanks for coming. See y'all next year.