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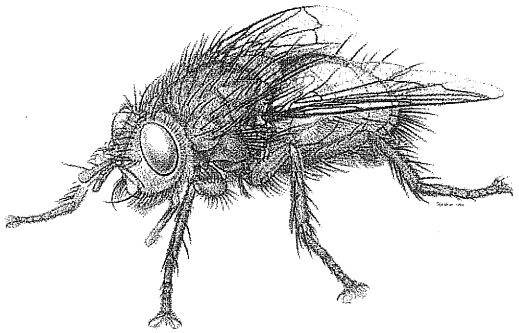

Jim O'Hara, editor
Invertebrate Biodiversity
Agriculture & Agri-Food Canada
C.E.F., Ottawa, Ontario, Canada, K1A 0C6
Correspondence: oharaj@agr.gc.ca or oharaje@hotmail.com

This year's issue of **The Tachinid Times** is one of the largest yet, with a variety of articles and notes on the Tachinidae by a number of contributors. Following the articles, I have as usual gathered together as much of the tachinid literature published since the last issue as I could find by database searches and other means. The bibliography is followed by the mailing list of this year's issue.

The Tachinid Times is primarily an online newsletter but continues to be offered in hardcopy to provide a permanent record in a few libraries around the world and for persons wishing to receive a print copy for their own files. Both versions are based on the same PDF original and have the same pagination and appearance except that the figures are in colour in the online version and in black and white in the printed version. The online version of this issue is available as a PDF file (ca. 2.5 MB in size) on the North American Dipterists Society (NADS) website at: http://www.nadsdiptera.org/Tach/TTimes/TThome.htm.

If you wish to contribute to **The Tachinid Times** next year, then please send me your article, note or announcement before the end of January 2007. 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 from 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 files apart from the text.

The Tachinid Times is purposely not peer-reviewed to retain its status as a newsletter and avoid attracting articles that are more properly published in recognized journals. However, I personally review and edit all submissions, and the newsletter as a whole is reviewed internally within my organization before it is posted on the Internet and distributed in hardcopy. Articles in **The Tachinid Times** are cited in *Zoological Record*.

I would like to thank Dave Ladd and Shannon Mahony for their assistance with the preparation of this issue, especially the bibliography. I would also like to thank Bruce Cooper for his 16 years of assistance with this newsletter and wish him well for a long and enjoyable retirement after 40 years of employment with Agriculture and Agri-Food Canada.

Phytomyptera nigrina (Meigen), a parasite of first generation European grapevine moth larvae in several vineyards in the Roussillon area

(by D. Thiéry[1], T. Yoshida [1]* and M. Guisset[2])

1. UMR 1065 INRA-ENITAB Santé Végétale, INRA Bordeaux, BP 81, 33883 Villenave d'Ornon Cedex, France; thiery@bordeaux.inra.fr
2. Chambre d'Agriculture, 19 avenue de Grande Bretagne, 66000 Perpignan, France.

* Present address: Systematic Entomology, Graduate School of Agriculture, Hokkaido University, Sapporo 060-8589, Japan.

Abstract

We surveyed the occurrence of first generation larvae of *Lobesia botrana* (Lepidoptera: Tortricidae) in four vineyards around Perpignan (France). We report here a few observations concerning the occurrence of *Phytomyptera nigrina* as a larval parasite of this species. This parasite is not frequently observed in French vineyards, and to our knowledge this is one of the first observations of its occurrence. This study provides evidence that *P. nigrina* may help control the natural populations of the first generation of *L. botrana*, and possibly the second one too. The most significant percentage of parasitism by *P. nigrina* was observed in Terrats, with 27.7% of *L. botrana*

larvae parasitized.

Introduction

Lobesia botrana (Den. & Schiff.) (Lepidoptera: Tortricidae), the European grapevine moth, is one of the major pest of German, Swiss, French and Mediterranean vineyards. Females almost exclusively oviposit on flower buds before the grape flowering stage and later on all maturation stages of bunches. During the first generation, each larva builds a shelter, called a 'glomerula', to protect itself against parasitoids and predators (Bovey 1966, Thiéry 2005). It completes 2–4 generations per year in France, according to the latitude. The Roussillon vineyards (around Perpignan, France) frequently suffer high densities of *L. botrana* and sometimes 4–6 insecticide applications per year are recommended to control infestations. *Lobesia botrana* larvae complete five instars and the total development time from egg hatching to pupation is about 5-6 weeks under spring conditions.

Larval parasitoids occurring in vineyards

Several larval or pupal parasitoids may naturally control the population of *L. botrana* in European vineyards (Coscola 1980, Lucciano *et al.* 1988, Marchesini and Della Monta 1994, Thiéry *et al.* 2001, Thiéry and Xuéreb 2003, Xuéreb and Thiéry 2005). In France several species, mainly ichneumonids, braconids and pteromalids, are often reported in most of the vineyards, the most frequent and efficient being *Campoplex capitator* (Ichneumonidae), *Dibrachys cavus* and *D. affinis* (Pteromalidae), and to a lesser extent *Dicaelotus inflexus*, *Scambus elegans* and *Itoplectis maculator* (Ichneumonidae). *Phytomyptera nigrina* (Meigen) has been documented in Italian, Greek and Turkish vineyards (Lucciano *et al.* 1988, Kara and Tschorsnig 2003, Bagnoli and Lucchi in press, Roditakis, pers. com.) as a parasite of *L. botrana* larvae, but to our knowledge it has not been found in French vineyards. *Phytomyptera nigrina* was also reported as a parasitoid of the spring and autumn larvae of *L. botrana* occurring on an alternative host plant *Daphne gnidium* (Thymeleacea).

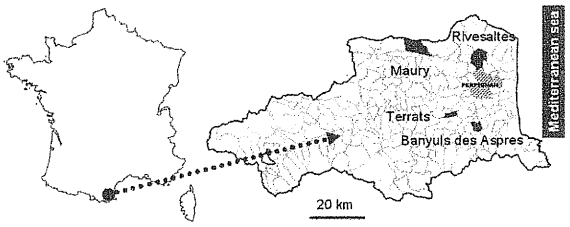

Figure 1. Location of the four sampling sites around Perpignan.

Materials and Methods

Sampling methods for *Lobesia botrana* larvae. Four vineyards were surveyed in the Perpignan (France) vineyard area: Rivesaltes (cv. chardonnay), Banyuls des Aspres (cv. carignan), Terrats (cv. carignan), and Maury (cv. grenache noir) (Fig. 1). Glomerulae occupied by *L. botrana* larvae were hand-collected on 12–13 June 2005 from vine stocks which were randomly selected in different vineyards (Figs. 2–3). The larvae collected resulted from oviposition that started on 26th of April in Terrats (first eggs visually observed), and a bit later in Maury (30th of April). Oviposition was not checked in Rivesaltes.

Figure 2. This picture in Terrats shows the typical appearance of a surveyed vineyard. The vineyards are classically planted with vine stocks trained as goblets (here Carignan variety) and wall vegetation is often present with several species of oaks (*Quercus suber, Quercus ilex*) and olive trees. Each larva of *Lobesia botrana* builds a silk shelter within a grape bunch. Nests were randomly collected by hand.

Figure 3. Typical nests (glomerulae) built by *Lobesia botrana* larvae. Arrow points to a larva. Pictures Dr T. Zahavi, Israel.

Weight and Emergence dates of *P. nigrina*. After pupation, *L. botrana* chrysalids were isolated in small glass tubes and each tube was labeled. Each chrysalid was weighed to the nearest .01 mg and tubes were checked daily for parasitoid emergence. Specimens of *P. nigrina* were sexed after death.

Identification of *P. nigrina*. Specimens of *P. nigrina* were identified by T. Yoshida and confirmed by Dr H.P. Tschorsnig (Stuttgart, Germany). The genus *Phytomyptera* can be easily identified using the key of Tschorsing and Richter (1998). *Phytomyptera s. str.* (i.e. not including *Elfia* Robineau-Desvoidy) in the Palaearctic Region can be

distinguished from other genera of Tachinidae by the combination of the following characters: arista bare and thickened at least on basal two-thirds, second aristomere 3—6X longer than wide, wing with vein M not reaching wingmargin and crossvein dm-cu absent, and a single large bristle at base of vein R4+5 (Fig. 4). *Phytomyptera nigrina* is very close to *P. vaccinii* Sintenis and they were mixed for a long time, but these two species can be distinguished by genitalic characters. The shapes of the gonopod (pregonite) and cercus are characteristic in the male and the shapes of sternites and subanal plate in the female help in the identification (Andersen 1988 and Fig. 4).

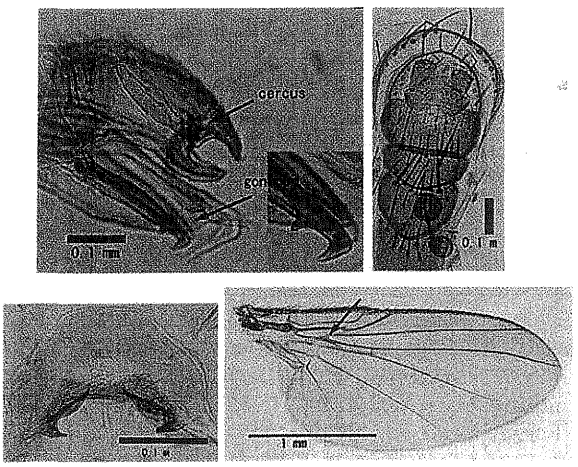

Figure 4. Morphology of *Phytomyptera nigrina*: top, male (left) and female (right) terminalia; bottom left, male sternite 5; bottom right, wing showing a single large bristle at the base of R4+5 (arrow), vein M not reaching wing margin, and crossvein dm-cu absent.

Hosts of *P. nigrina.* As far as we know, the reported hosts of *P. nigrina* are *Prays oleae* (Yyponomeutidae), *Gypsonoma minutana* (Tortricidae), *Lobesia botrana* (Tortricidae), *Adaina microdactyla* (Pterophoridae) and *Paranthrene tabaniformis* (Sesiidae) (Andersen 1988, Luciano *et al.*1988, Kara and Tschorsnig 2003, Georgiev 2000).

Results and Discussion

Total parasitism. In the four localities, the parasites emerging from *L. botrana* larvae were only *P. nigrina* and *C. capitator*, except for one specimen of *Bassus tumidulus* (Hymenoptera Braconidae) found in Terrats. *Campoplex capitator* was not found in Maury, and *P. nigrina* was not found in Rivesaltes. The total numbers of parasitized larvae were rather high in Banyuls des Aspres and Terrats (41.2% and 39.4%, respectively) and lower in Rivesaltes (16.7%) and Maury (5.2%). Interestingly, the total percentage of larvae parasitized in Banyuls des Aspres and Terrats were almost similar but the relative proportion of *C. capitator* and *P. nigrina* was reversed (Fig. 5).

The lowest proportion of parasitized *L. botrana* was observed in Maury. The comparison between the Maury and Terrats results is interesting because the host populations were of similar size and both received an insecticide application against *L. botrana* in spring 2005. Surprisingly, Terrats received constant insecticide application for several years while the vineyard surveyed in Maury used biotechnical options until 2005 (Bt and mating disruption). Maury differs from the other locations in having a less patchy vineyard structure and a lower plant diversity, which may explain the lower populations of parasitoids.

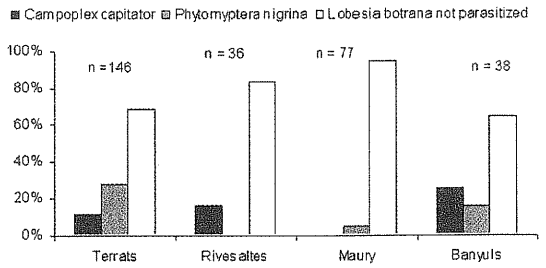

Figure 5. Percentages of *Lobesia botrana* parasitized by *Phytomyptera nigrina* and *Campoplex capitator* in the four vineyards surveyed, and of unparasitized *L. botrana*. N = total number of collected larvae of *Lobesia botrana* that reached the chrysalid stage.

Parasitism by *P. nigrina.* Parasitism of *L. botrana* larvae was 27.7% in Terrats, slightly lower in Banyuls des Aspres (15.8%) and even lower in Maury (5.19%). The parasitoid was not found in Rivesaltes, but the first adults of *L. botrana* started to emerge three days after our sampling, which indicates a host phenology earlier than in the other locations. Thus, we cannot exclude the possibility that *P. nigrina* individuals were present in Rivesaltes but emerged earlier.

The parasitism rate observed in Terrats is in agreement with that reported in the spring generation in Sardinia, respectively 25 and 24.1% in 1986 and 1987 (Lucciano *et al.* 1988). Twenty-eight *P. nigrina* (14 males and 14 females) were collected in Terrats. The female and male pupae respectively weighed 3.66 ± .86 mg (N = 13) and 2.94 ± .41 (N = 8) (mean ± Sd). The daily emergences of *P. nigrina* could only be monitored from two locations, Banyuls des Aspres and Terrats (Fig. 6). The number of individuals collected from Banyuls des Aspres was too low to permit a comparison between the dynamics of *P. nigrina* at these two localities. However, most of the emergences seemed to occur within one week and this timing suggests that adult *P. nigrina* are present in the vineyard at the beginning of July and could thus naturally

control the *L. botrana* larvae that are present there at that time.

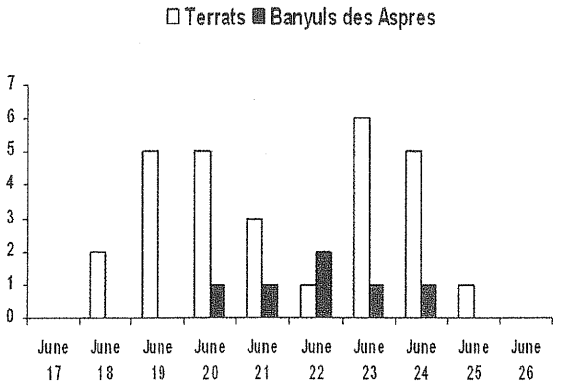

Figure 6. Number of individuals of *Phytomyptera nigrina* that emerged daily from parasitized pupae collected in Terrats and Banyuls in June 2005.

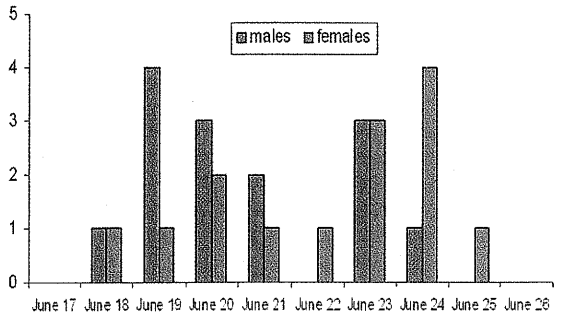

Figure 7. Number of male and female *Phytomyptera nigrina* that emerged daily from parasitized pupae whose larvae were collected in Terrats and Banyuls during June 2005.

Males of *P nigrina* in Terrats emerged earlier than females (Fig. 7): mean date emergences ± Sd: male = June 20 ± 1.97, female = June 22 ± 2.18; $Chi^2 = 14.75$, *df*.7, $P < .05$. This suggests a protandry in the population sampled.

Conclusion

Because significant parasitism rates by *P. nigrina* were observed, this parasitoid may perform efficient natural control of the European grapevine moth in the Roussillon area, especially by reducing the summer population. Such an efficiency was already observed in Sardinia and Tuscany (Lucciano *et al.* 1998, Bagnoli and Lucchi, in press). The fact that *P. nigrina* can be multivoltine is interesting for the control of later generations of the moth.

Acknowledgements

We thank Dr Hans Peter Tschorsnig (Staatliches Museum für Naturkunde, Stuttgart, Germany) for confirming the identification of *P. nigrina*. We are indebted to Mr Teruhiko Hironaga (Systematic Entomology, Hokkaido University) for his valuable comments and help with the identification. We are grateful to Mrs. Laure Eschbacher (INRA Bordeaux), Mrs Laure Berard-Delay, Anne de Chancel, Valérie Didier and Audrey Meroz (SPV Perpignan) for their efficient experimental contribution. The second author (TY) was supported by a Japan-France cooperative exchange programme funded by Renault cars. We also warmly thank the estates or vineries that kindly allowed us to harvest grape clusters: Château Mossé (Terrats), Domaine Duffaut (Banyuls des Aspres), Domaine Lloubes (Rivesaltes), and Mas Amiel (Maury).

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