Hawthorn psyllid fauna in northwestern Italy

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Abstract

Hawthorn is one of the natural hosts of Cacopsylla melanoneura (Förster), the main vector of ‘Candidatus Phytoplasma mali’, the causal agent of apple proliferation (AP) disease, a serious and growing problem for apple production in Europe, particularly in northern Italy.

Other psyllid species are acknowledged as hawthorn feeders, but no data are available on their presence and abundance in northwestern Italy. Samplings with yellow sticky traps and beat trays were carried out in two sites located in the Aosta Valley, containing wild Crataegus monogyna Jacquin plants and surrounded by meadows, wastelands, and vineyards, in the neighbourhood of apple orchards. C. melanoneura was the predominant species followed by C. peregrina (Förster) and C. affinis (Löw), while C. crataegi was sampled sporadically. Other six species are only occasional migrants.

The population dynamics of the two most abundant species, C. melanoneura and C. peregrina were investigated.

Key words: Crataegus monogyna, Cacopsylla melanoneura, Cacopsylla affinis, Cacopsylla peregrina, Cacopsylla crataegi.

Introduction

Hawthorn has always been considered as the primary host of Cacopsylla melanoneura (Förster), the main vector of ‘Candidatus Phytoplasma mali’, the causal agent of the Apple proliferation (AP) disease in northwestern Italy (Conci et al., 1993; Lauterer, 1999; Tedeschi et al., 2002; Tedeschi and Alma, 2004). The diffusion of the plant in the neighborhood of apple orchards induced us to investigate the hawthorn psyllid fauna to understand better the relationships between those insects and hawthorn plants and the possible implications in spreading the disease.

Materials and methods

The research was carried out from 2003 until 2005. Two sites with wild plants of Crataegus monogyna Jacquin surrounded by meadows, wastelands, vineyards, in the neighborhood of apple orchards were chosen in the Aosta Valley (northwestern Italy), at an altitude between 480 and 580 m a.s.l. Yellow sticky traps were firstly used to identify and quantify the psyllid fauna, and then, in addition with beat trays, to study the population dynamics of the most abundant species. In each site 3 traps (150x80 mm Rebell®giallo, Andermatt Biocontrol AG, Switzerland) were hung in the hawthorn canopy from mid February to end October. The traps were changed weekly. Beat tray samplings were carried out only in 2004 and 2005, weekly, during the same period. To identify psyllids, samples were classified examining male and female terminalia (Ossiannilsson, 1992).

Results

During the preliminary trap samplings, ten species of psyllids were identified (table 1).

<table>
<thead>
<tr>
<th>Species</th>
<th>No</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. melanoneura-C. affinis</td>
<td>3669</td>
<td>70.24</td>
</tr>
<tr>
<td>complex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cacopsylla peregrina (Förster)</td>
<td>1526</td>
<td>29.22</td>
</tr>
<tr>
<td>Cacopsylla crataegi (Schrank)</td>
<td>20</td>
<td>0.38</td>
</tr>
<tr>
<td>Cacopsylla pulchella (Löw)</td>
<td>2</td>
<td>0.04</td>
</tr>
<tr>
<td>Cacopsylla pruni (Scopoli)</td>
<td>2</td>
<td>0.04</td>
</tr>
<tr>
<td>Cacopsylla pyrisuga (Förster)</td>
<td>1</td>
<td>0.02</td>
</tr>
<tr>
<td>Baeopelma foersteri (Flor)</td>
<td>1</td>
<td>0.02</td>
</tr>
<tr>
<td>Psyllopsis fraxini (L.)</td>
<td>1</td>
<td>0.02</td>
</tr>
<tr>
<td>Trioza rhamni (Schrank)</td>
<td>1</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Table 1. Psyllid species caught on hawthorn plants by means of yellow sticky traps in 2003. Total number of adults collected.
(Tedeschi et al., 2002) and the presence period is almost the same on the two hosts. Overwintered adults arrive in mid February, while newly emerged adults move to alternative hosts at the beginning of June.

_C. peregrina_ overwinters as eggs on hawthorn plants, nymphs were observed in the second half of April, while adults emerged at the end of April, reaching a peak in the second half of May, then the population rapidly decreased because of migration to occasional plants as observed by Lauterer (1999). A second peak was observed in mid October, but _C. peregrina_ was still collected by traps until mid November.

In our regions the presence of _C. crataegi_, already known as a typical hawthorn feeder, is irrelevant, thus not worrying.

On the contrary attention should draw to _C. peregrina_ and in particular to _C. melanoneura_, because of the high density and the vicinity to apple orchards. From this point of view, _C. monogyna_ can be considered as a dangerous source for the AP phytoplasma vector, but further analyses are required to confirm this assumption.

**Discussion**

The present work points out the leading role of _C. melanoneura_ in the hawthorn psyllid fauna, but the difficulties in discriminating females of the _C. melanoneura-C. affinis_ complex influenced the research.

Studies to develop molecular tools to separate the two species _C. melanoneura_ and _C. affinis_ are in progress hoping to find an easy and reliable way of discrimination, compatible also with phytoplasma detection. Molecular analyses to detect the presence of phytoplasmas in the hawthorn psyllid fauna and, if necessary, transmission trials will better define the real risk of _C. monogyna_ as a possible source of phytoplasma vectors.

**Acknowledgements**

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**References**


Lauterer P., 1999.- Results of the investigations on Hemiptera in Moravia, made by the Moravian museum (Psylloidea 2).- Acta Musei Moraviae (Scientiae biologicae), 84: 71-151.


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