

Survey of *Cacopsylla pruni* in different fruit tree producing areas of Spain

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Abstract

A survey was conducted in 2005 and 2006 in order to determine the presence and importance of *Cacopsylla pruni* populations in four different fruit tree producing areas of Spain affected by 'Candidatus Phytoplasma prunorum' and the relation with the incidence of the disease. The largest populations of *C. pruni* were found in Extremadura and the smallest in Aragón and Valencia. The mean percentage of individuals of *C. pruni* carriers of ESFY (European stone fruit yellows) phytoplasma was around 10% in Extremadura, 15% in the plot of Llobregat (Cataluña) and 7% in the plot of Miravet (Cataluña).

Key words: 'Candidatus Phytoplasma prunorum', ESFY, incidence, vectors, *Cacopsylla pruni*.

Introduction

'Candidatus Phytoplasma prunorum' (former: European stone fruit yellows phytoplasma, ESFY) belongs to the apple proliferation group (AP) (Seemüller *et al.*, 1998) or 16Sr X-B subgroup. The disease caused by this phytoplasma, previously known as apricot chlorotic leaf roll is widespread in Europe and has been known for many years.

The first description was published in Italy by Goidanich (1933). In Spain, the stone fruit disorders have been reported mainly in plums and apricots in Cataluña (Sala, 1935) and in Valencia (Sanchez Capuchino and Forner, 1973; Llacer *et al.*, 1986). In plum trees the symptoms are early blooms and shoots in January and February, responsible for a lack of fructification and substantial loss of production. In peach the symptoms are early fructification and premature blushing as well as irregularly distributed chlorosis in the tree during autumn.

Although various species of cicadellids have been described as potential vectors of the disease the only species identified as a vector of this phytoplasma is the psyllid *Cacopsylla pruni* (Scopoli). The identity of the vector of the ESFY phytoplasma was unknown until 1998 when Carraro and his collaborators demonstrated the transmission of ESFY through *C. pruni* to Japanese plum in Italy. This species has as primary host exclusively wild and cultivated *Prunus* species. It has one

generation per year and the adult hibernates in shelter plants, coniferous plants and other forest species. At the beginning of spring adults lay their eggs in cultivated or wild *Prunus*.

A survey was conducted in order to determine the presence and importance of the *C. pruni* population in four different fruit tree producing areas of Spain where the disease is widespread and the relation with the incidence of the disease studied.

Materials and methods

A survey was conducted in 2005 and 2006 in plots of plum, peach, apricot, nectarine and cherry trees in four different areas of Spain: Aragón, Cataluña, Extremadura and Valencia.

Insects were captured in the ESFY-infected plots on sticky yellow traps of 20 x 20 cm placed inside or nearby the plots. Traps were placed 0.5 and 1 m above the soil surface and were changed weekly between February and July. The insects were classified and analyzed by nested PCR using universal primers P1/P7 in the first step and the f01/r01 specific primers to AP group in the second step (figure 1) (Ahrens and Seemüller, 1992; Lorenz *et al.*, 1995; Smart *et al.*, 1996).

Results and discussion

Important populations of *C. pruni* were found in the area of Extremadura in the Vegas Altas (Zurbarán and Encomienda) plots and in plots of Llobregat (Barcelona) in Cataluña (figure 2; table 1). The population of *C. pruni* was lower in the area of Aragón and Valencia and in one plot in Tarragona (Cataluña).

In 2006 the number of *C. pruni* captured in Cataluña and Extremadura was slightly higher than in 2005. The ESFY vector has not yet been identified in the fruit tree area of Lerida where the incidence of the disease is low. Individuals of *C. pruni* were collected from March to July. The population maximum was reached in May and

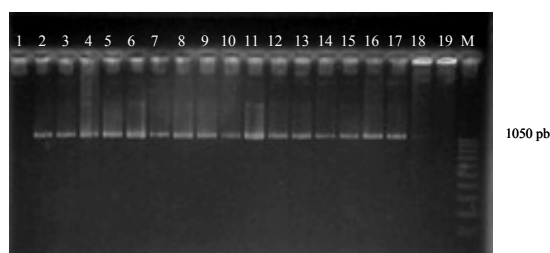


Figure 1. Detection of 'Ca. P. prunorum' in trees and insects by PCR using AP group specific primers.

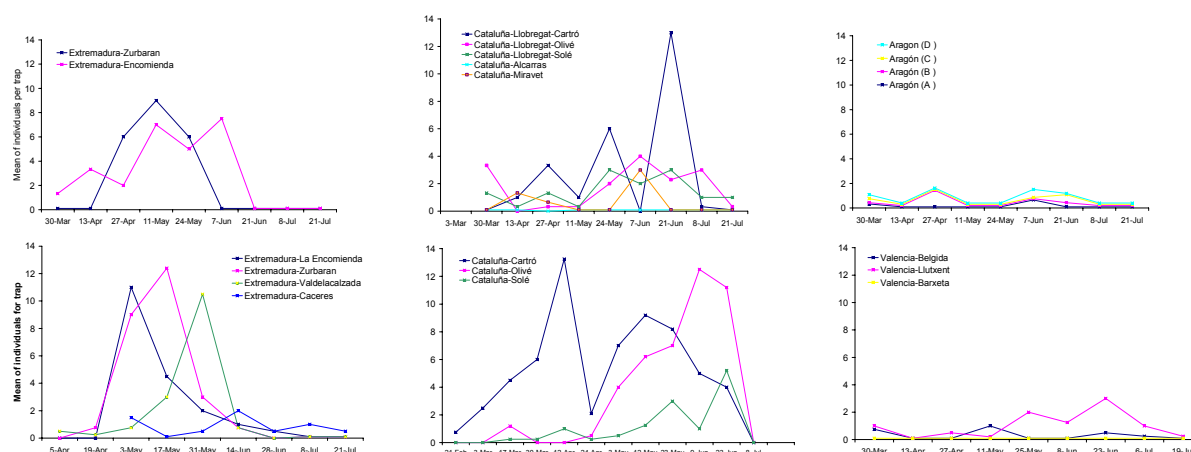


Figure 2. Evolution of the population of *C. pruni* in plum plots in Extremadura, Cataluña and Aragón in 2005 (above) and Extremadura, Cataluña and Valencia in 2006 (below).
(In colour at www.bulletinofinsectology.org).

Table 1. Incidence of trees with ESFY symptoms in different plots and individuals of *C. pruni* per trap.

Locations	Species	Incidence symptoms ESFY	Mean of <i>C. pruni</i> population per trap
Cataluña			
Llobregat (Barcelona)	<i>P. avium</i>	s.s.	13.25
Llobregat (Barcelona)	<i>P. cerasifera</i>	58%	12.50
Llobregat (Barcelona)	<i>P. salicina</i>	38%	4.50
Miravet (Tarragona)	<i>P. salicina</i>	5%	2.25
Alcarràs (Lleida)		1%	0
Extremadura			
Zurbarán	<i>P. salicina</i>	10%	12.40
La Encomienda	<i>P. persica</i>	25%	11.00
Montesinos	<i>P. domestica</i>	5%	3.50
Videlacalzada	<i>P. persica</i>	5%	10.40
Aragón			
Montañana	Experimental plot	3%	1.50
Santa Inés	<i>P. salicina</i>	1-5%	0.50
Valencia			
Llutxent	<i>P. armeniaca</i>	0-3%	3.00
Belgida	<i>P. armeniaca</i>	0-1%	0.75
Barxeta	<i>P. salicina</i>	0-1%	0.00

the two first weeks of June depending on the area. The mean percentage of individuals of *C. pruni* infected with ‘*Ca. P. prunorum*’ was around 10% in Extremadura, 15% in the plot of Llobregat (Cataluña) and 7% in the plot of Miravet (Cataluña).

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