

# **HYALESTHES OBSOLETUS : DISPERSAL FROM NETTLE AND TRANSMISSION EFFICIENCY OF STOLBUR PHYTOPLASMA TO GRAPEVINE**

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## **Introduction**

*Hyalesthes obsoletus* Signoret (Hemiptera, Fulgoromorpha, Cixiidae) is a European vector of Stolbur phytoplasma which is the agent of grapevine yellows called Schwarzhholzkrankheit, Bois noir or Legno nero (Maixner 1994, Sforza *et al.* 1998, Alma *et al.* 2002).

The planthopper seems to be polyphagous to herbaceous host plants, although preference host plant species may vary according to different geographical areas (Alma *et al.* 1987, Maixner *et al.* 1995, Sforza *et al.* 1998, Sharon *et al.* 2005).

In Italy *Urtica dioica* L. is a principal host plant of *H. obsoletus* (Alma *et al.* 1987) and it may support high population of the vector. Additionally this host plant has been found to host Stolbur phytoplasma (Alma *et al.* 2002, Langer and Maixner 2004).

We took advantage of the presence of an important nettle band adjacent to a vineyard located in Veneto Region (North-East Italy) to study the vector activity of *H. obsoletus*, in particular (i) quantify vector dispersal and vector daily flight activity from the nettle band to the vines, (ii) quantify the time required by the vector to transmit Stolbur phytoplasma to grapevine, (iii) quantify incidence of Stolbur phytoplasma in the population of *H. obsoletus* living on the nettle band.

## **Material and Methods**

For the study we considered a vineyard separated from a large nettle band with a 5m-large road. A high population of *H. obsoletus* occurred in the nettle band. The vineyard was planted with Merlot cultivar and cultivated with monocotyledons in the inter-rows (monocotyledons species seem not to be preferential host plants for the vector).

Transparent sticky traps (10.5 cm X 15 cm) were positioned (a) in the middle of nettles, (b) along the vineyard border (6m from the nettle band) and (c) inside the vineyard at distances of 16m, 26m and 36m from the nettle band. Insects were counted weekly during the flight activity.

To monitor the daily flight activity, 12 sticky traps were placed in a row along the nettle border and insects were counted every 2 hrs along the day. Counting was repeated on three different days.

Batches of 20 *H. obsoletus* were confined on grapevine cuttings (Chardonnay) for different inoculation access periods (iAP). Survival of insects was recorded. Cuttings were kept in an insect-proof greenhouse for symptom expression.

Individual insects and test plants were tested with PCR for the presence of stolbur phytoplasma according to Clair *et al.* (2003).

## **Results**

Captures of *H. obsoletus* were much more numerous on traps positioned in the nettle band than on those positioned on the border or inside the vineyard. Insect captures on traps followed a gradient as shown in Figure 1. Planthopper daily flight activity showed a peak late in the evening before sunset (Figure 2).

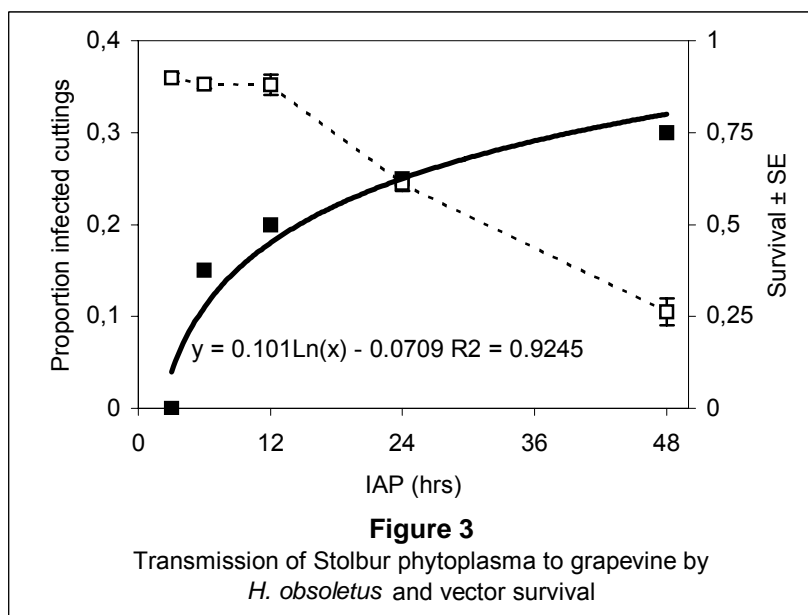
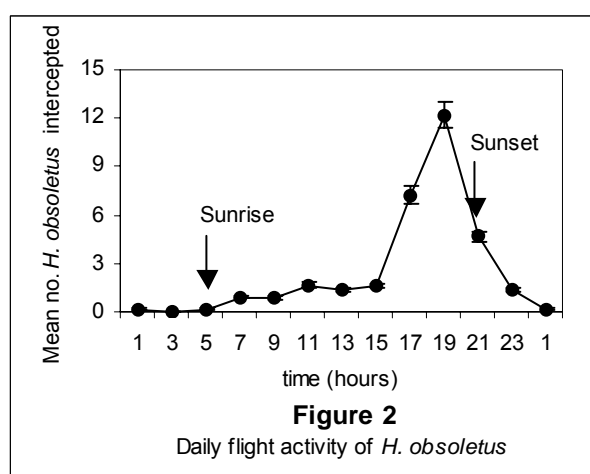
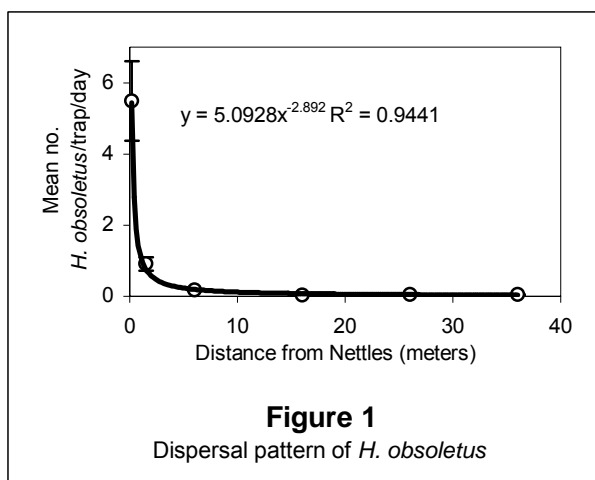
We detected Stolbur phytoplasma in 33 out of 114 adults of *H. obsoletus* (29%) during 2003, and in 26 out of 115 adults of *H. obsoletus* (22%) in 2004.

Transmission of Stolbur phytoplasma to grapevine cuttings exposed for IAPs of 3, 6, 12, 24 and 48 hrs, revealed that minimum IAP ranged between 3 and 6 hrs (Figure 3). *H. obsoletus* survived poorly on grapevine cuttings (Figure 3).

### Discussion

Insect vector activity depends upon several factors such as population vector density, transmission efficiency, vector infectivity and vector inter-plant movement.

Our data showed that populations of *H. obsoletus* might occur in very high density on nettle plants. The rate of stolbur phytoplasma infection in planthoppers ranged between 20 and 30% of insects tested, in accordance to previous reports (Sforza *et al.* 1998; Alma *et al.* 2002). Phytoplasma transmission may occur rapidly to grapevine, although dispersal of adults into the vineyard seemed to be limited in the observed conditions. The very low survival rate of the planthopper on grapevine cutting confirmed that grapevine is only an occasional host plant for the *H. obsoletus* (Maixner *et al.*, 1995; Sforza *et al.*, 1998).



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