

first time, to sequence from a vector the seven housekeeping loci that are used for Xf typing in plants.

However, this method is not sensitive enough to i) sequence all loci when the number of bacteria lower than 50 and ii) detect the few plant cells ingested by vectors. Thus, we developed a new approach based on the target enrichment of gene regions through hybrid capture by RNA probes. Probes were designed i) from the 7 loci of the MLST scheme and ii) from ca 30K sequences of *rbcl*, the most represented marker in international databases to target European plant species.

We recently succeeded in isolating the DNA of *Cistus monspeliensis*, the preferred feeding plant of *P. spumarius* in Corsica, from specimens sampled in the field when pollen was absent. Likewise, we identified *Vitis* and *Quercus* DNA from American vectors sampled in California. We will present the results of a larger experiment still in progress.

Our results show that the capture of Xf genes (and flanking regions) and *rbcl* from insects is effective, which opens up new avenues for the reconstruction of networks of interaction for vector-borne plant diseases.

Mark-Recapture Experiments to estimate the dispersal capacity of *Philaenus spumarius*

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The present work was presented in the framework of the Joint Annual Meeting of the EU Horizon 2020 Projects POnTE 'Pest Organisms Threatening Europe' (GA 635646) and XF-ACTORS 'Xylella fastidiosa Active Containment Through a multidisciplinary-Oriented Research Strategy' (GA 727987).

Abstract: The spread of the vectors is a key point in understanding the epidemiology of *Xylella fastidiosa* and in assessing vector control strategies. In Europe, the transmission of the bacterium is mainly due to spittlebugs. In particular, in the Apulia region (Italy) *Philaenus spumarius* has been proved to play the major role in transmitting *X. fastidiosa* subspecies *pauca*. Despite its importance, little information is available on the dispersal capacity of *P. spumarius*. To fill this knowledge gap mark-release-recapture experiments on *P. spumarius* adults were carried out in two agroecosystems: an olive grove and in a grass meadow, in the Apulia and the Piedmont regions (Italy), respectively. Dispersal capabilities of the vector were analysed in experiments performed from May to October in 2016 and 2017. Adults of *P. spumarius* of both sexes were captured in natural grassland habitats, marked with an aqueous solution of albumin and then released at a single point in the centre of the experimental area. The dispersal capacity was described estimating the probability density function describing the distribution of the end locations of insects relative to the source point (i.e. the dispersal kernel). Under the hypothesis of a random walk and applying a Gaussian kernel, diffusion rates in the two agroecosystems were estimated. Results showed a high variability in the estimated daily median distance from the release point, ranging from 19 to 51 metres. Considering that marked insects could disperse over an area wider than the experimental field, a correction for the truncated sampling bias has been included into the dispersal kernel, leading to a significant increase in the estimated daily median distances.

Phenology and host-plant association of spittlebugs in Mediterranean olive groves

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Abstract: Phenology and ecology of *Philaenus spumarius* and other spittlebug species were investigated during regular field surveys in 2016–2018 in four olive orchards located in coastal and inland areas of Apulia and Liguria regions of Italy, within the frame of an EFSA-funded project. Nymphal population in the herbaceous cover was estimated using quadrat samplings. Adults were collected by sweeping net on three different vegetational components: herbaceous cover, olive canopy and wild woody plants. Although the nymphs were polyphagous, they showed a strong host-preference for herbaceous plants of the Asteraceae and Fabaceae families in both the Liguria and Apulia regions of Italy: 72–88% of the total nymphs were indeed associated with these plant families. Nymphs of *Aphrophora* showed a similar host-preference, while those of *Neophilaenus* were strongly associated with Poaceae (85–100% of the nymphs were found on gramineous plants). *Aphrophora alni* and *N. campestris* showed a very low population density compared to *P. spumarius*. The average nymph population density of *P. spumarius* varied from 13 to 30 individuals/m² in Liguria according to the olive grove and the year, and from 5 to 19 individuals/m² in Apulia. Phenological data based on physiological time revealed that in Liguria the peak of abundance of *P. spumarius* nymph population was between 150 and 210 degree day (DD) while in Apulia the same peak was between 100 and 270 DD. This difference among locations could be explained by a non-linear component in the temperature-dependent development rate function of *P. spumarius*. The phenological pattern in the two regions is more similar if referred to chronological time. In fact, nymphs developed in Liguria between early March and end of May, and in Apulia between the end of February and mid-May. Field data are integrated with mesocosm and microcosm observations on the phenology and biology of *P. spumarius*.

Use of vibrations to manipulate the behaviour of the meadow spittlebug *Philaenus spumarius*

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Abstract: Sexually mature adults of the meadow spittlebug, *Philaenus spumarius* (Linn.), exchange vibrational signals through the host plants to communicate and achieve mating. Novel pest control strategies involve the manipulation of the sexual behaviour of the insect by means of species-specific mechanical stimuli transmitted to plants. Playback trials with mini-shakers were conducted to evaluate if the transmission of pre-recorded *P. spumarius* vibrational signals to a plant of *Helianthus annuus* could affect the behaviour of the insect and to evaluate the potential use of vibrations for management practices against this pest. In all the trials, vibrational signals emitted by the specimens were recorded with laser vibrometer. In all the trials, vibrational signals emitted by the specimens were recorded with laser vibrometer. *P. spumarius* males and females were tested with playback of two types of male calling signal, which are spontaneously emitted by males since their emergence in spring and differ for the presence/absence of pulses within them. The playbacks were played in June-July (n=30) and in September-October (n=20) to evaluate whether the role of the signals could depend on the time of the season. In August and September, pairs consisting of a female and a male were released on different leaves of a *H. annuus* plant and stimulated either with the playback of pre-recorded signals such as the male rivalry signal (n=20) or the FRjS (n=20) or with a broadband noise (n=20) to disrupt the pair formation process. Results of all the playback trials are presented as well as a fine description of the mating behaviour of the meadow spittlebug. Insights on the