

# Distribution of *Scaphoideus titanus* eggs on grapevine



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Many Authors assume that the vector of Flavescence dorée phytoplasma spread to Europe mainly due to the trade of propagating material infested with the overwintering eggs (Alma, 2004; Steffek *et al.*, 2007). This hypothesis is supported by two main considerations: first of all invasive European populations of the cicadellid are characterized by low levels of genetic diversity and differentiation (Santoni *et al.*, 2004; Bertin *et al.*, 2007; Papura *et al.*, 2007); furthermore the leafhopper tends to not disperse over long distances (Lessio & Alma, 2004, 2006).



In the context of the Euphresco-Propscaph project the Italian partners (CRA-ABP, CRA-PAV, CRA-VIT) were concerned with WP4 whose objective was the evaluation of the presence and distribution of *S. titanus* eggs on grapevine propagation plant material (Bagnoli & Gargani, 2010).

Surveys were performed by laboratory and field trials.

The tested material in laboratory came from an untreated and *S. titanus* infested vineyard of 'Trebbiano Toscano' variety located in Latium region (1 year and 2-4 year old wood) and from an abandoned and *S. titanus* infested vineyard of 'Kober 5BB' rootstock located in Veneto region (1 and 2 year old wood).



The vine wood material was gathered during the winter pruning period and then stored in climatic chambers at 4 °C, from the collection time to the beginning of the experiments, when the same material was cut into pieces of different length and put into plastic rearing boxes (cm 29x20x12) maintained in climatic chambers at 24 °C, 75 % RH and LD 16:8 photoperiod to obtain the first instar *S. titanus* larvae.



The presence and density of *S. titanus* eggs in the vine bark, because of the great difficulty to find out them, were indirectly evaluated through the almost daily finding, counting and removing of the newly hatched larvae within the rearing cages. To this purpose, a fresh grape vine leaf was put into each cage upon the wood to attract the first instar larvae and to permit an easier visual counting three-four times a week.



Specific field surveys were performed in two Latium vineyards of 'Trebbiano Toscano' and 'Cabernet Sauvignon' varieties to improve the knowledge about the egg distribution on the different woody parts of the vine plant. In May-June, in each vineyard, 9 plants were repeatedly treated with original devices suitable for catching *S. titanus* larvae hatched from eggs laid in the bark of the trunk, the cordon, the canes or the buds.

The laboratory tests on untreated vine wood materials are summarized in the table below.

Laboratory	Age of wood	Cages	Pieces per cage	Larvae per cm <sup>2</sup>
<i>“Trebbiano Toscano”</i>				
CRA-ABP	1 year (b.p.)	5	30	0.0002
CRA-ABP	1 year (c.p.)	5	30	0.0003
CRA-PAV	1 year (c.p.)	7	30	0.0002
CRA-ABP	1 year (d.p.)	5	30	0.0005
CRA-ABP	2-4 years	5	10	0.31
CRA-PAV	2-4 years	2	40	0.14
<i>“Kober 5BB”</i>				
CRA-ABP	1 year	5	30	0.0036
CRA-ABP	2 years	5	30	0.09

(In brackets, the different portions of the cane: b.p. = basal part; c.p. = central part; d.p. = distal part)

As concern the comparison of the *S. titanus* egg susceptibility between internode and node area of vine canes, the results are showed in the table below.

<b>Part of the cane</b>	<b>Cages</b>	<b>Pieces per cage</b>	<b>Larvae per cm<sup>2</sup></b>
<i>“Trebbiano Toscano”, one-year old wood, central part of the cane</i>			
internode	2	75	0
node	2	75	0
<i>“Trebbiano Toscano”, one-year old wood, distal part of the cane</i>			
internode	2	75	0
node	2	75	0.0007
<i>“Kober 5BB”, two-year old wood</i>			
internode	2	75	0.07
node	2	75	0.18

The field tests, performed in the two Latium vineyards, confirmed that the bark of the one-year old wood can be affected by *S. titanus* egg laying, as showed by the newly hatched larva found in a capture device applied on the bud area of a one-year old cane. However the experiments highlighted the importance of the bark of the cordon but also of the trunk as preferential sites for the species oviposition (see the table below).



Position of capture device	Capture devices (N.)	Larvae per cm <sup>2</sup>
trunk	6	0.09
cordon (2 years old)	6	0.11



## CONCLUSIONS

- The bark of two or more year old canes was confirmed to be the best site for *S. titanus* oviposition but some larvae emerged also from one-year old cane samples.
- The determination of the presence of *S. titanus* eggs in the bark of one-year old wood samples from untreated vineyards, confirmed the appropriateness of this type of material to be, in greater or lesser extent (depending on the different environmental conditions) an oviposition site for the *S. titanus* females.
- Effective phytosanitary integrated measures, capable of guaranteeing the absence of eggs of the insect in the propagation materials, must be implemented in the nursery industry growing, when it is in areas affected by the presence of *S. titanus*.
- The higher concentration of eggs was detected in the area surrounding the node that because its particular morphology, is probably more preferred than the internode, even in one-year old canes.
- Field investigations have confirmed that the two-year wood is the most preferred for oviposition but it was also clearly emphasize that the bark of the trunk is also greatly suitable for egg laying.
- These results provide a new starting point for further study on the relationship between the leafhopper and the characteristics of the agro-ecosystem with special reference to the susceptibility of the woody parts of different grapevine varieties to the egg laying taking into account the degree of temporal correspondence between the wood maturation and the presence of the cicadellid females in the vineyard.

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