Harmfulness of the American grape leaf miner *Phyllocnistis vitegenella* on the grapevine 'Merlot' (*Vitis vinifera*)

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The American grape leaf miner *Phyllocnistis vitigenella*

*Phyllocnistis vitigenella* Clemens (Lepidoptera: Gracillariidae) is originally from North America.

Found in Europe in the 1995 in the north-east of Italy.

In Switzerland, damages were observed for the first time in 2009 in Ticino (south part of Switzerland).
What must consider the development of an integrated protection strategy?

- Damage analysis
- Analysis of the compensation mechanisms of the plant
- Analysis of the ecological interactions
- Analysis of the interaction with the cultural practices

Decision rules

- Ecological
- Cultural
- Chemical
The aim of the study

Quantify the impact of *P. vitegenella* leaf damage on:

- plant growth
- gas exchange of leaf
- yield quantity and quality

To develop an integrated strategy for the control of *P. vitegenella*. 
The experimental design

The study was during 2011 under field conditions in a vineyard located in San Pietro di Stabio (Ticino)

- Untreated plot
- Treated plot
- 2 applications of Spinosad 0.3 l/ha

Choice at BBCH stage 51-53
- 20 plants in the untreated plot
- 10 plant in the treated plot

Regulation during the growth of:
- Number of shoots/plant
- Number of clusters/plant
- Number of main leaves/shoot
Damage analysis: population dynamic

**P. vitegenella** flight activity

- 2010
- 2011

Ripening period
Harmfulness Phyllocnistis vitegenella
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Damage analysis: evolution of the leaf damage

Ripening period
Damage analysis: influence on gas exchange

Main leaves

Lateral leaves

Measurement made during ripening period
Damage analysis: estimation of the leaf damage

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Damage analysis: dynamic of the damaged leaf area

![Graph showing damaged leaf area over time for untreated and treated plots. The ripening period is highlighted.]
Damage analysis: Influence on yield components

Results at harvest (September 28)

- Yield (kg/plant)
- Must soluble solids (Brix)
- Total acidity (g/l)

Comparison between Untreated and Treated samples.
Damage analysis: Influence on yield components

Data from August 11 and September 28

\[ y = 0.434x + 16.076 \]
\[ R^2 = 0.3766 \]
\[ n = 60 \]
Analysis of the compensation mechanisms of the plant

- Increase of gas exchange/leaf physiology
- Increase of the leaf area of lateral shoots
- Mobilization of the reserves stored in the roots
Analysis of the ecological interactions

Microhymenoptera (Eulophidae) were responsible of a parasitism variable between 5% and 33% (analysis made on 22 vineyards).
The prevalent species detected are:

*Chrysocharis nephereus*
*Minotetristichus ecus*
*Closterocerus trifasciatus*
*Closterocerus erxias*
*Neochrysocharis cf. formosa*
*Pediobius saulius*
*Cirrospilus sp.*

For more informations:
G. Pezzatti, C. Cara, L. Torriani, V. Trivellone, F. Müller, M. Moretti, M. Jermini
Factors affecting the parasitoid complex of *Phyllocnistis vitegenella* Clemens in vineyards of Southern Switzerland
Conclusion

These results showed that

*P. vitigenella* hadn’t negative influence on growth and yield quantity and quality on grapevine Merlot in Southern Switzerland.

Probably, the loss of the assimilating leaf area caused by *P. vitigenella* don’t induce compensation mechanisms.

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