High prevalence of resistant genotypes to *Xylella fastidiosa* in natural olive resources derived from the cultivar Leccino

La Notte P., Melcarne G., Mousavi S., Mariotti R., Abou Kubaa R., Altamura G., Giampetruzzi A., Ligorio A., Specchia F., Boscia D., Saponari M. , Saldarelli P.

4th European conference on Xylella fastidiosa 2023

EFSA EUROPEAN FOOD SAFETY AUTHORITY

IPSP Istituto per la Protezione Sostenibile delle Piante Consiglio Nazionale delle Ricerche

FORESTAFORTE Frantoio Oleario MELCARNE

CRSFA

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POnTE PestOrganisms ThreateningEurope

XF ACTORS Xylella Fastidiosa Active Containment Through a multidisciplinary-Oriented Research Strategy

BIOVEXO

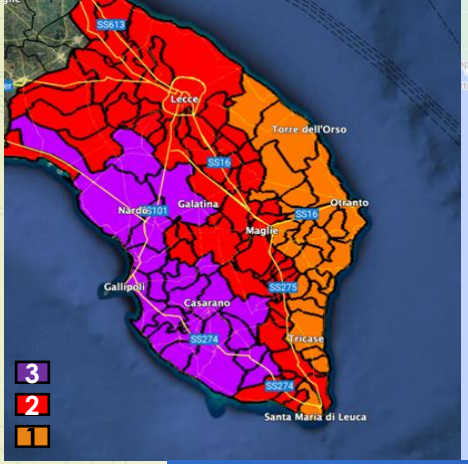
ResiXo

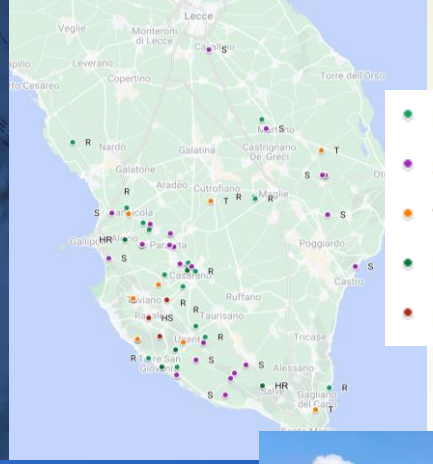
BIOSAVE Olive Biodiversity for Saving Salento from Xylella

BEXYL BEYOND XYLELLA

European Commission Horizon 2020 European Union funding for Research & Innovation

REGIONE PUGLIA

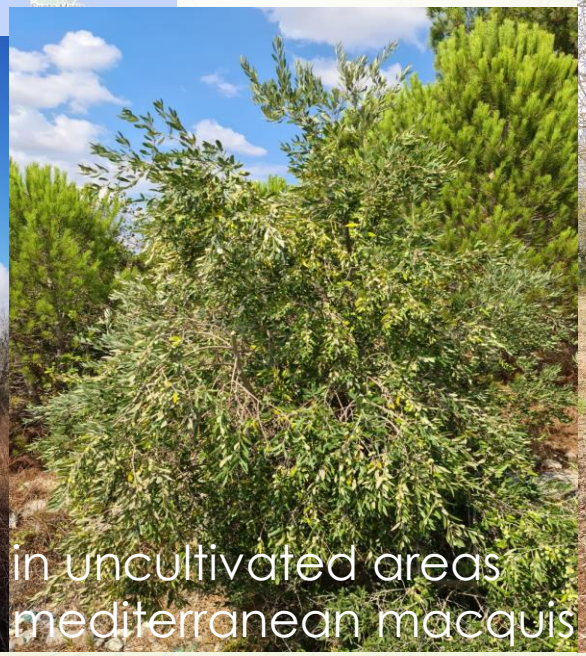


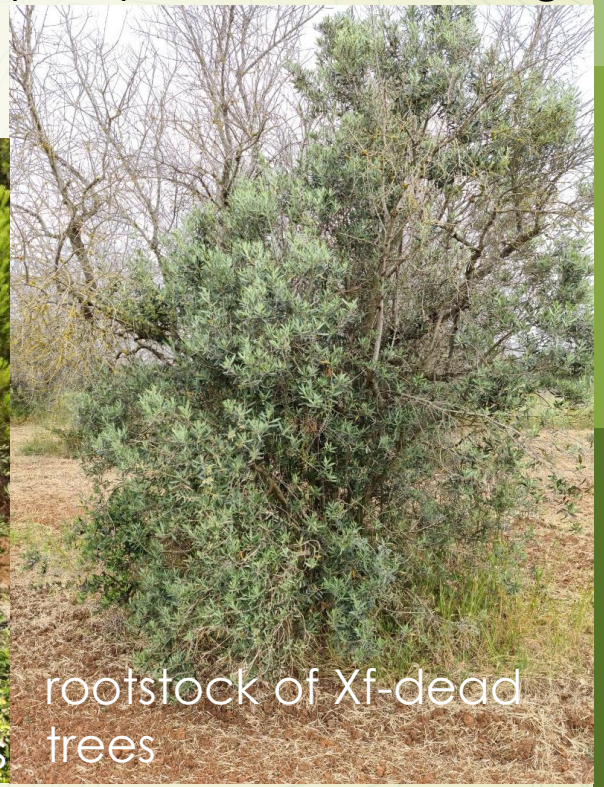


Spontaneous seedlings surviving to the infections

- Xf population size
- Symptoms (1>>>5)

Example of open-pollinated seedlings





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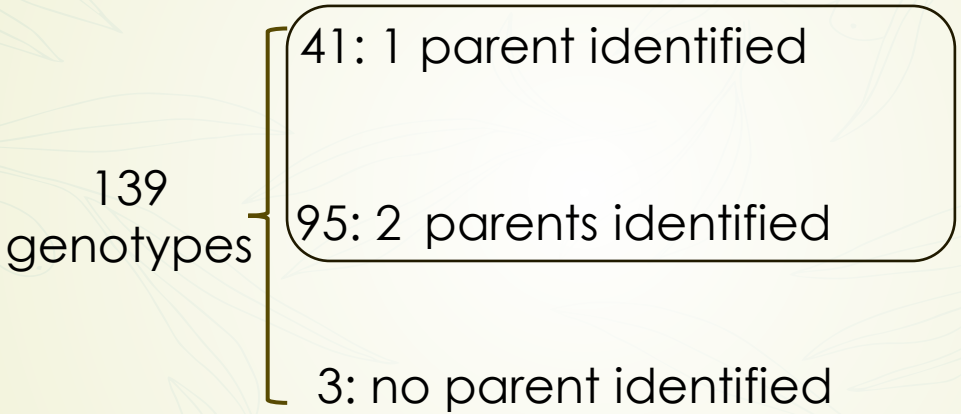
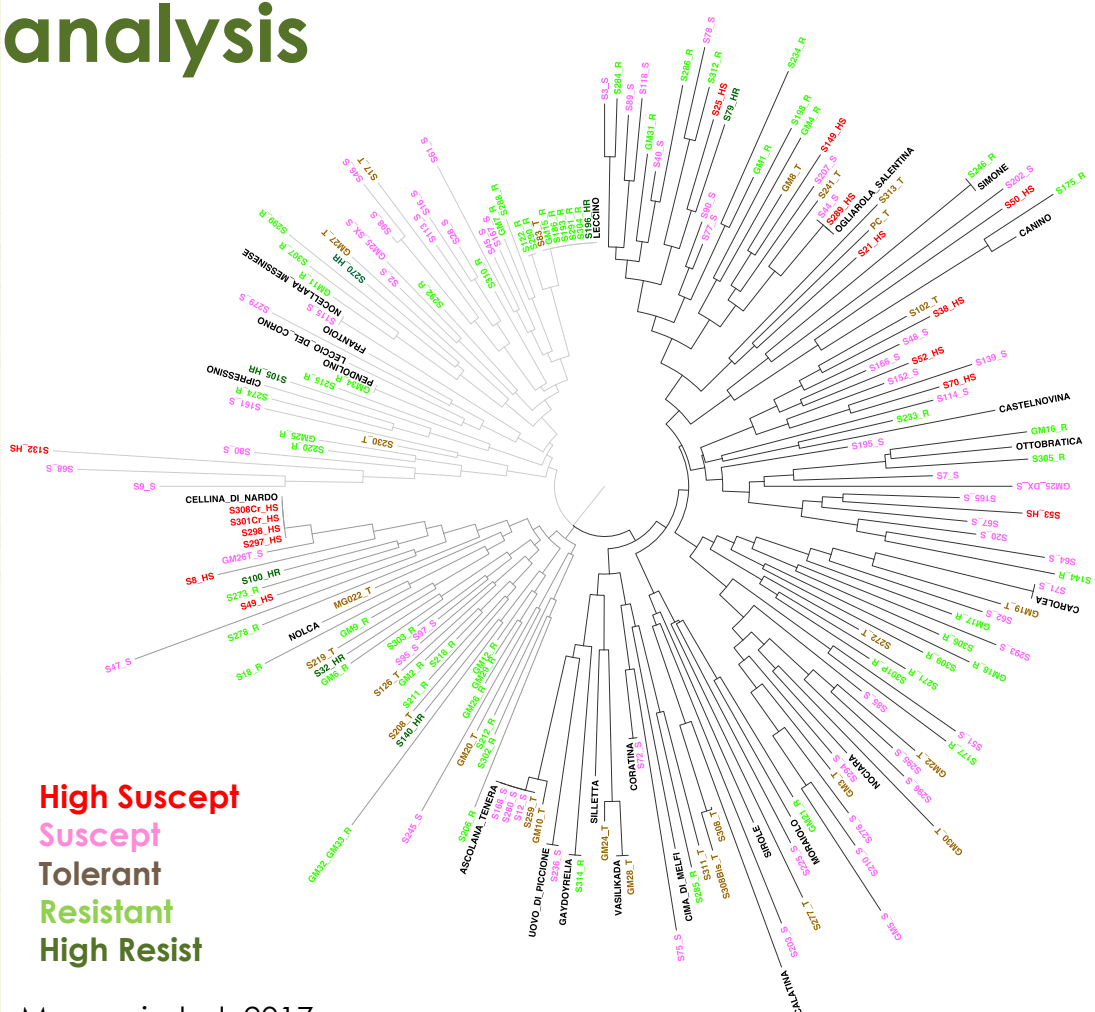
SSR paternity analysis



Mousavi et al. 2017

SSR analysis



High Suscept
Suscept
Tolerant
Resistant
High Resist

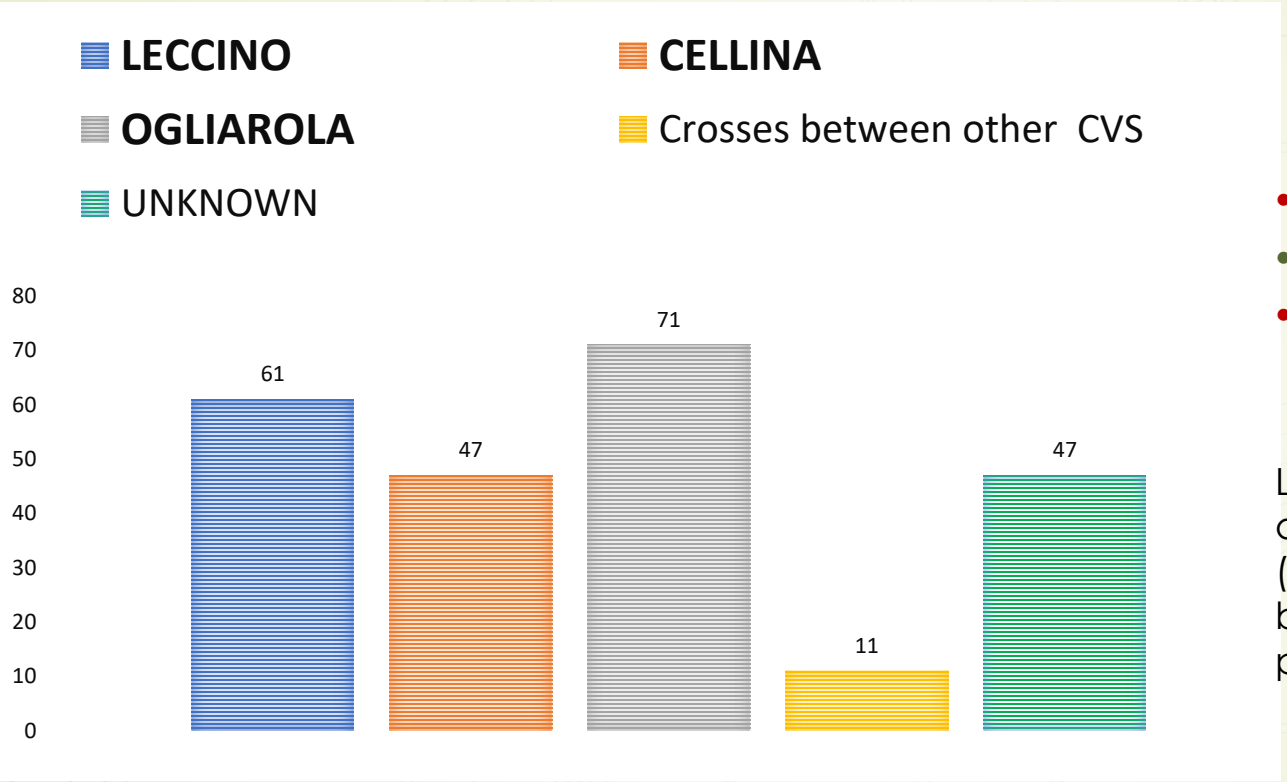
Mousavi et al. 2017

results SSR	n
unique SSR	139
known cvs	32
Total	171

NJ tree with diffused cvs

- SSRs do not correlate with phenotype
- 2 SSRs seem to correlate with S
- clustering with Italian cvs

Parentage analysis

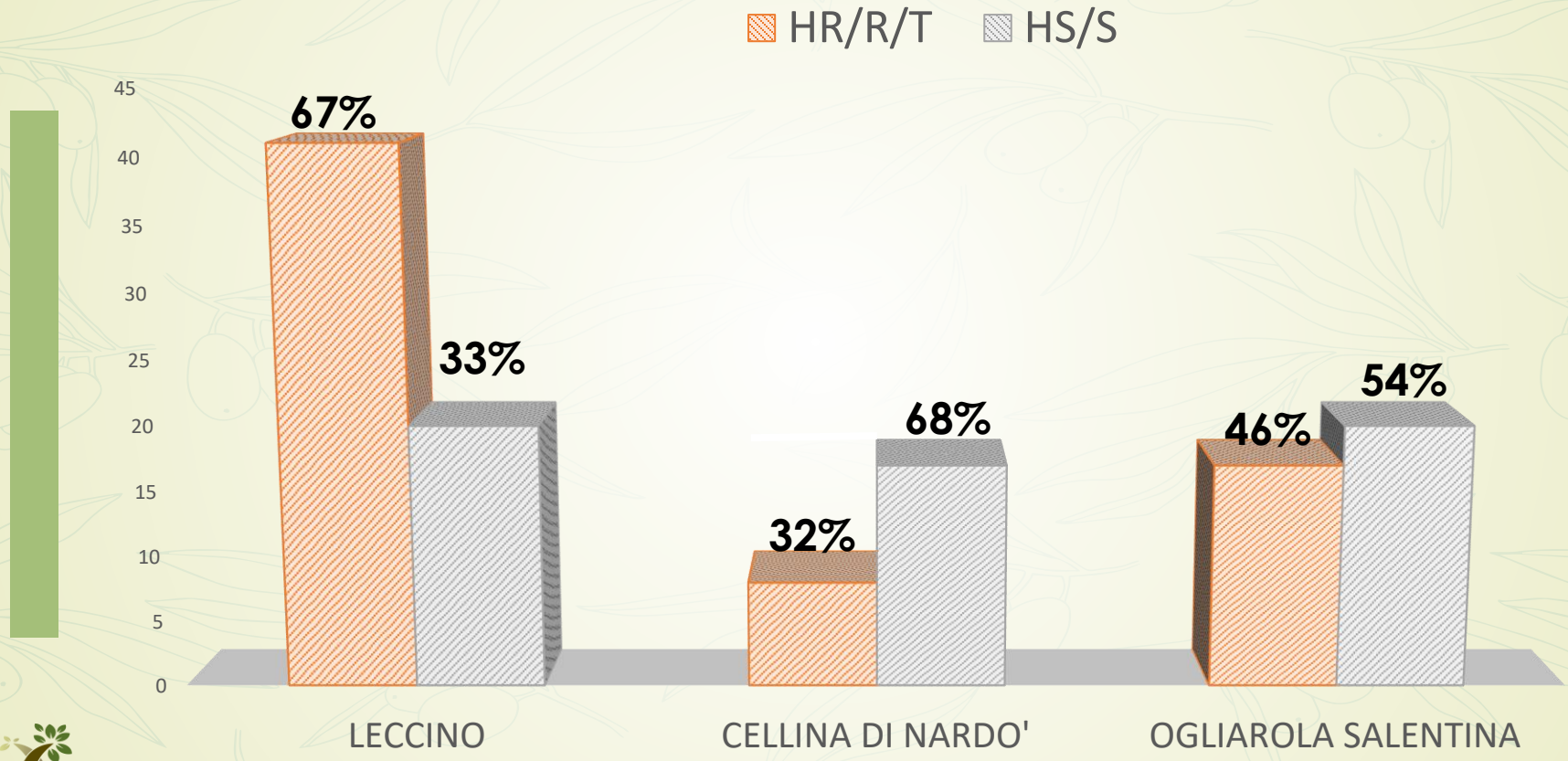


- **Ogliarola salentina**
- **Leccino**
- **Cellina di Nardò**

Large n. of seedlings with 1 or both unknown parents (high rate of cross-pollination between spontaneous plants)

Most frequently identified parents in open pollinated seedlings

Frequency of HR/R/T vs HS/S genotypes in relation to the three main parents



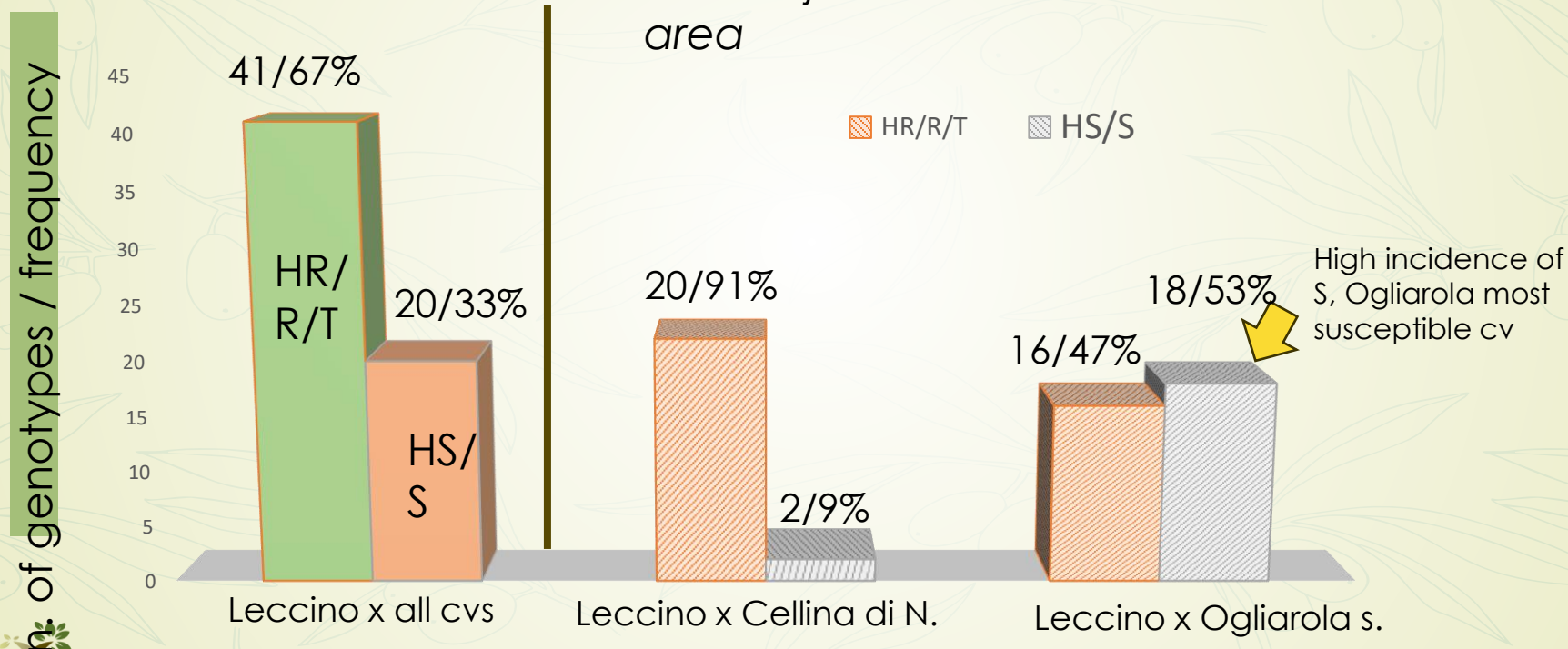
BEXYL

Crosses with Leccino gave more frequent HR/R/T

Xf phenotype response of seedlings (genotypes) having Leccino as parent

GENOTYPES with LECCINO with all cvs

GENOTYPES with LECCINO crossed with the two major SUSCEPTIBLE CULTIVARS of the area



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Three outperforming genotypes selected

s105

s215

s234

- Le x Cipressino
- Le x Og

- ❖ Low bacterial population
- ❖ Poor colonization
- ❖ Very limited symptoms

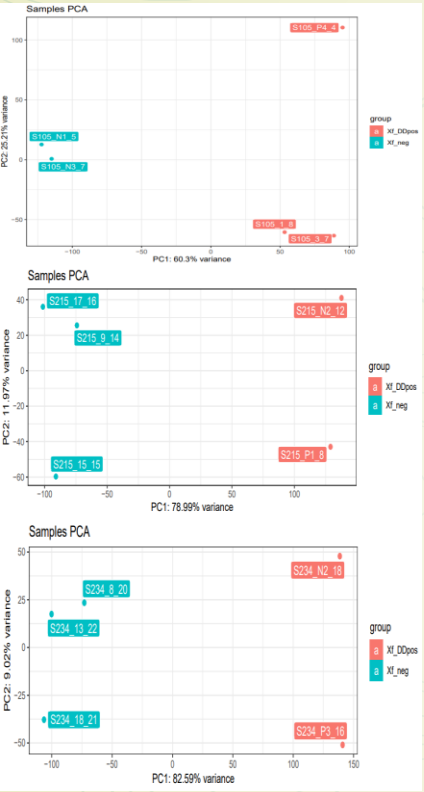
- **Field: gene expression between Xfpos and Xfneg tissues**
- Greenhouse: gene expression after artificial inoculation (ongoing)

Results (1year post-inoculation) of the pathogenicity test for one of the selected seedling

1ypi Cellina di Nardò (susceptible)

1ypi Leccino (resistant)

Three outperforming genotypes selected



Top loading genes driving PC1

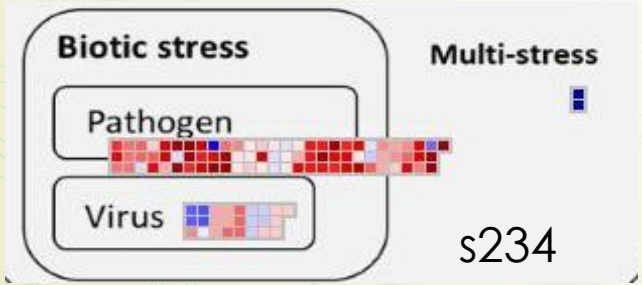
- probable 2-oxoglutarate-dependent dioxygenase (Jasmonic acid levels)
- sugar transport protein 13

Susceptibility genes

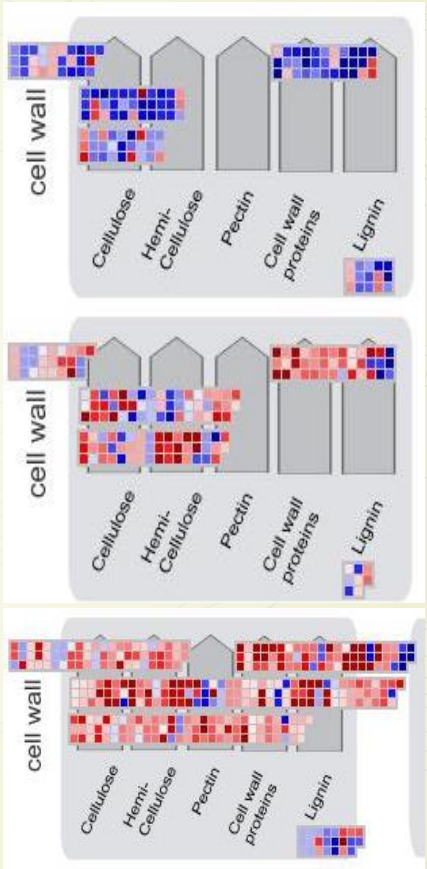
- **Field: gene expression between Xfpos and Xfneg tissues**
- Greenhouse: gene expression after artificial inoculation (ongoing)

Three outperforming genotypes selected

MapMan of Differentially Expressed Genes



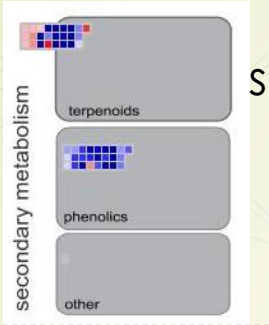
- ✓ RLKs
- ✓ WAK-like
- ✓ PG in.



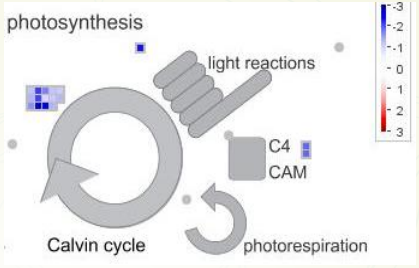
Cell wall

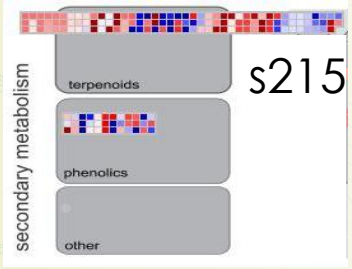
Three outperforming genotypes selected

MapMan of Differentially Expressed Genes



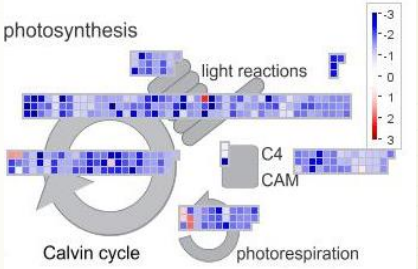
s105



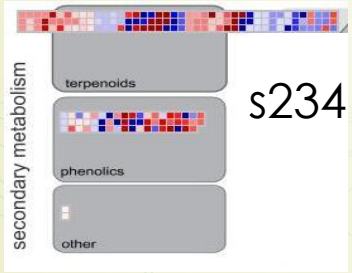


s215

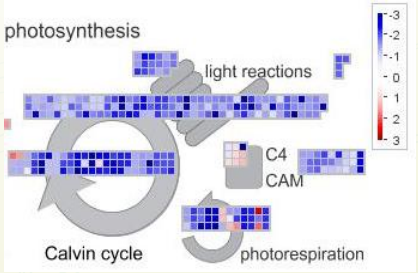
- ✓ DMR6-like
- ✓ PME inh.
- ✓ expansin



- ✓ chlorophyll a-b binding proteins (LHCB)
- ✓ Phosphoribulokinase (PRK)



s234



BEXYL

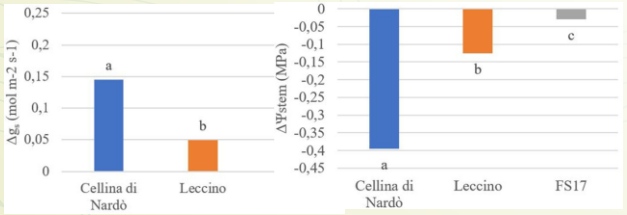
secondary metabolism

photosynthesis

Conclusions

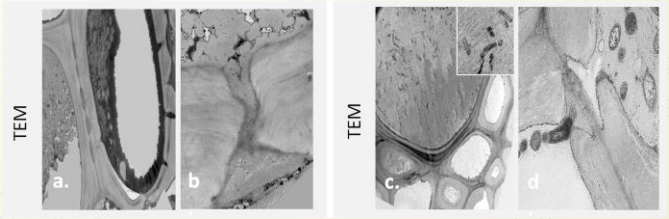
- ✓ Seedlings are from main cultivars in the area
- ✓ SSRs do not correlate with olive response to Xf (2 SSRs seem to correlate with S)
- ✓ ***crosses with Leccino gave more frequent HR/R/T***
- ✓ **Three outperforming genotypes selected**
- ✓ ***DEGs identified (known and susceptibility genes)***
- ✓ ***Multiple defense response (s105 ≠ s215 and s234)***
- ✓ ***a confirmation of previous findings***

stomata cond. water pot.



Surano et al., 2022

Leccino (R) Cellina (S)



Montilon et al., 2022

Thank you

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