Further acquisition on the response of a large number of olive cultivars to infections caused by *Xylella fastidiosa* subsp. pauca, ST53

Donato Boscia
CNR, Istituto per la Protezione Sostenibile delle Piante, Bari (IT)

2nd European conference on Xylella fastidiosa 2019
HOW RESEARCH CAN SUPPORT SOLUTIONS
Ajaccio, 29-30 October 2019


OGLIAROLA
LECCINO

Screening of olive cultivars for Xf pauca ST53

1) Fied surveys in the heavly infected area to evaluate cultivars in commercial plots & search for asymptomatic trees

- Data have been collected on Coratina, Frantoio, Kalamata, Fs17, Leccino and Cellina/Ogliarola

Limited to the cultivars already grown in the area

Symptoms scoring

qPCR for indirect quantification of the population size

Screening of olive cultivars for Xf pauca ST53

2) Evaluation of an high n. of cultivars in experimental plots

- Xf-free trees planted in areas with high pressure of inoculum

Incidence and progression of the infections **Symptoms scoring**

3) Evaluation of an high n. of cultivars in GH testing

- Potted plants subjected to needle-inoculation

Evaluation of systemic infections **Symptoms scoring**

DATA COLLECTED FROM COMMERCIAL PLOTS

- SEVERE SYMPTOMS
  - KALAMATA and CORATINA
  - OGLIAROLA AND CELLINA (Confirmation)
- ATTENUATED SYMPTOMS
  - FRANTOIO
- VERY MILD SYMPTOMS
  - LECCINO (Confirmation)
  - FS17

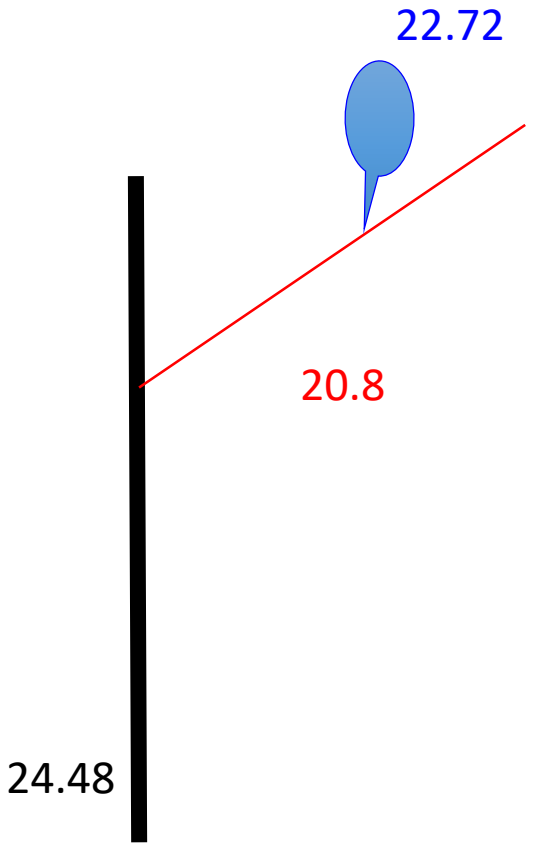
DATA COLLECTED FROM COMMERCIAL PLOTS

BACTERIAL POPULATION SIZE

- SEVERE SYMPTOMS
  - OGLIAROLA AND CELLINA

Cq values on the total DNA recovered from

- Leaves
- Young shoot (semi-hardwood)
- Mature cutting

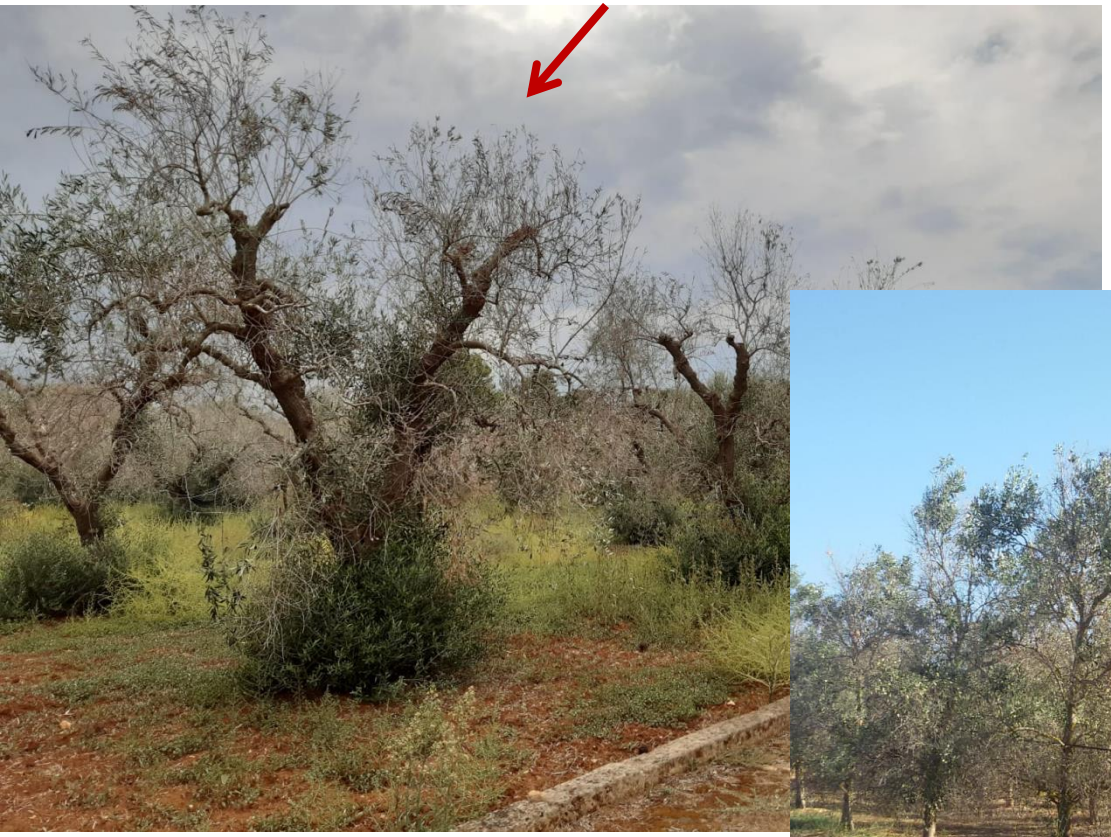


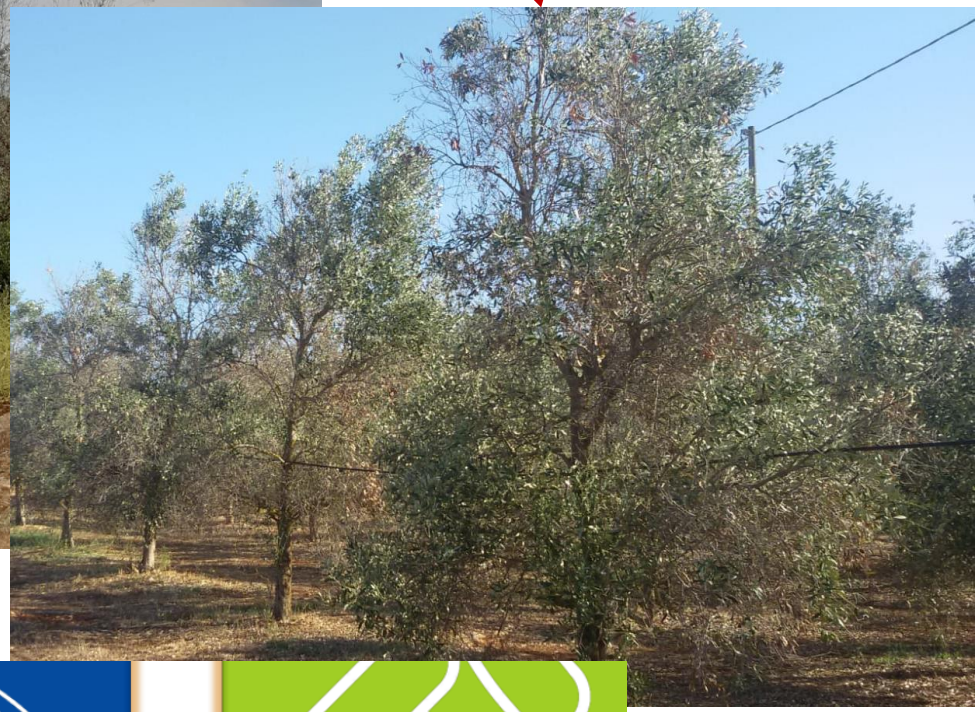
Cq = approx 10^6 – 10^7 cfu/ml

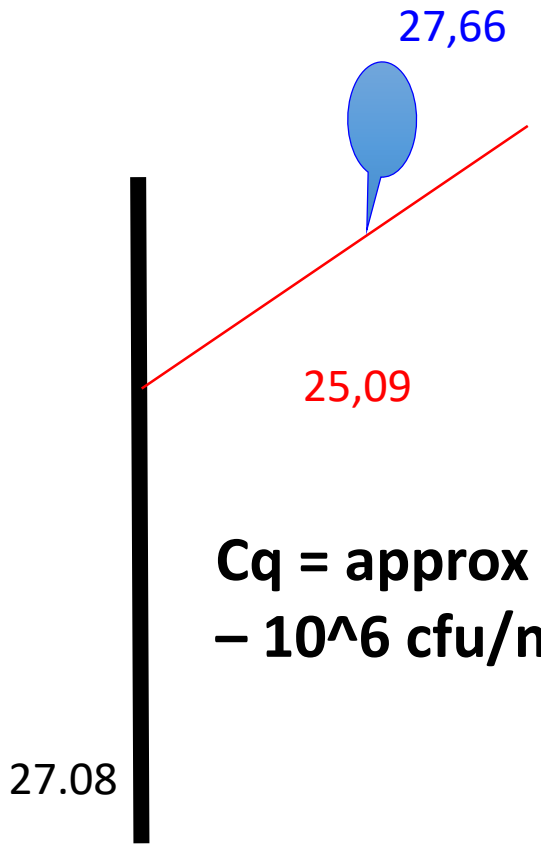
DATA COLLECTED FROM COMMERCIAL PLOTS

BACTERIAL POPULATION SIZE

- SEVERE SYMPTOMS
  - CORATINA AND KALAMATA





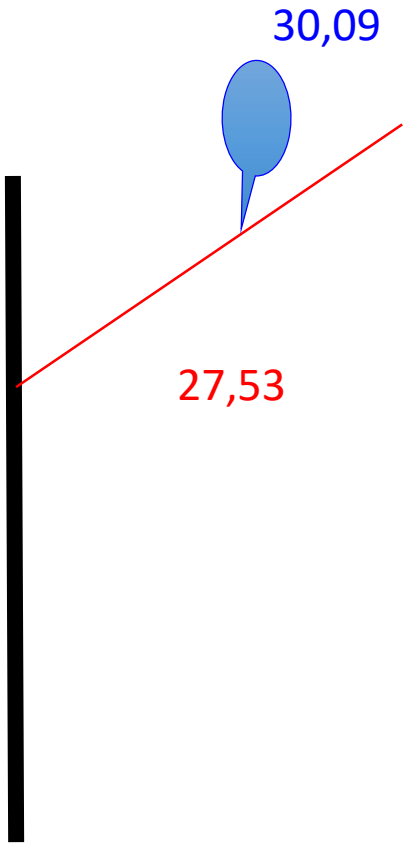


Cq = approx 10^5 – 10^6 cfu/ml

DATA COLLECTED FROM COMMERCIAL PLOTS

BACTERIAL POPULATION SIZE

- ATTENUATED SYMPTOMS
- FRANTOIO



Cq = approx 10^3 – 10^4 cfu/ml

DATA COLLECTED FROM COMMERCIAL PLOTS

BACTERIAL POPULATION SIZE

- MILD SYMPTOMS
  - **FS17**

Most of the leaf samples testing negative

Cq = approx 10^3 cfu/ml

OGLIAROLA VS FS17

DATA COLLECTED IN THE EXPERIMENTAL PLOTS

CURRENTLY 2 PLOTS HAVE >3 YEARS OF OBSERVATIONS

8 cultivars - EFSA 2015

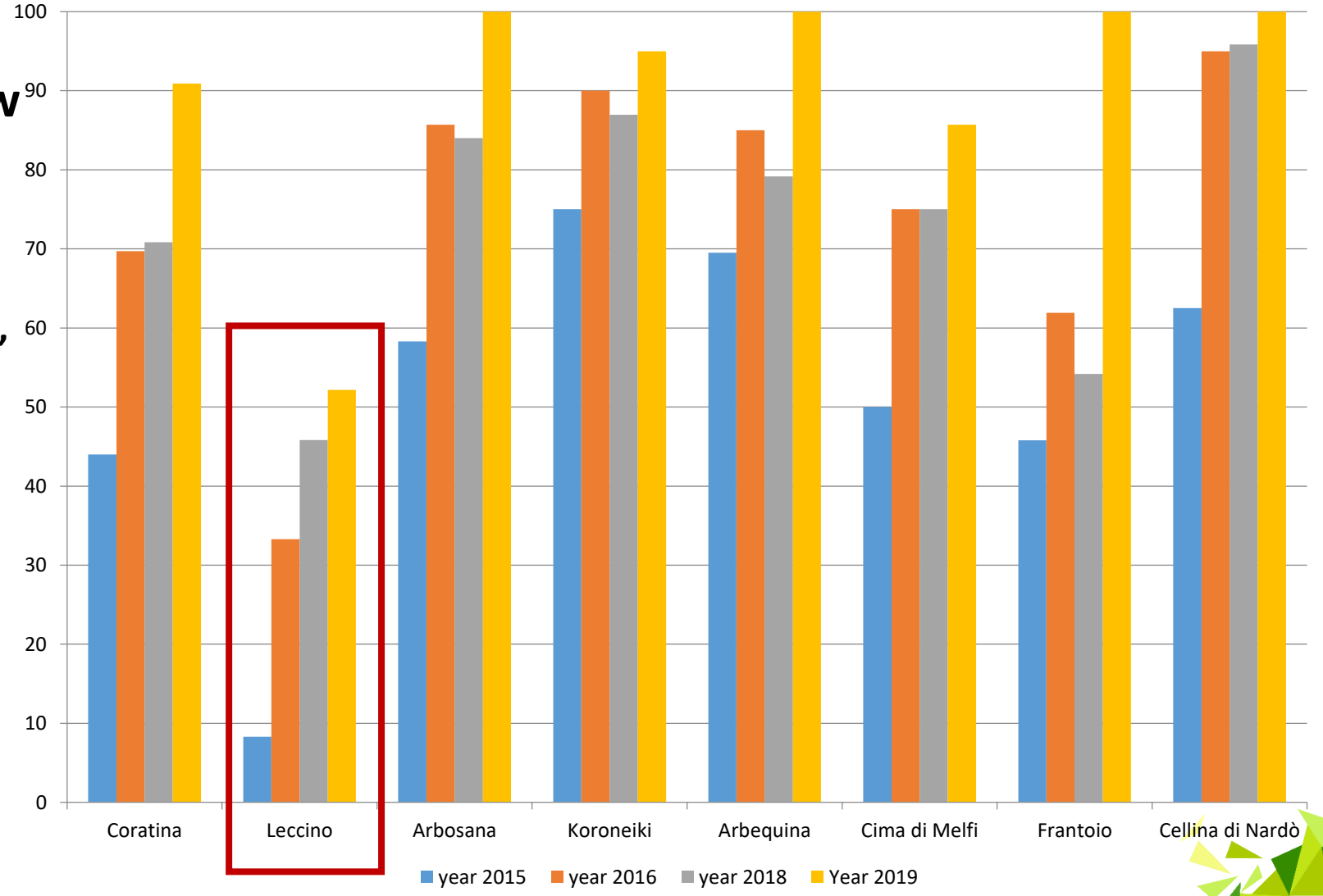
19 *cultivars – POnTE 2016*

PLOT 1: «EFSA» (2015)

% infections from 2015 up to now

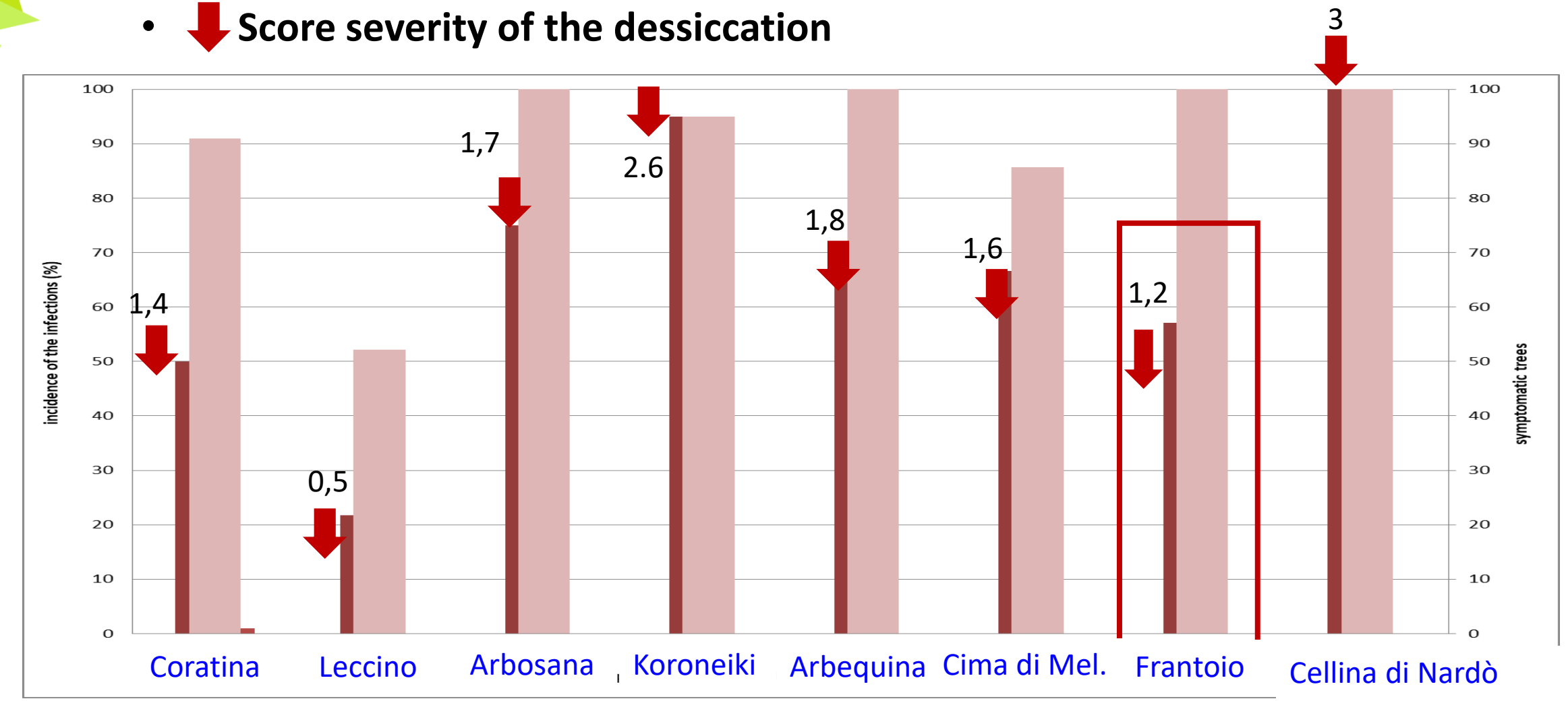
Lowest incidence of the infections in Leccino, although after 4 years >50%

None of the other cultivars showed similar low incidence



PLOT 1: «EFSA» (2015)

- % of symptomatic plants in relation to the infected plants
- ↓ Score severity of the dessiccation



Arbequina

SEVERITY 1.8

Arbosana

SEVERITY 1.7

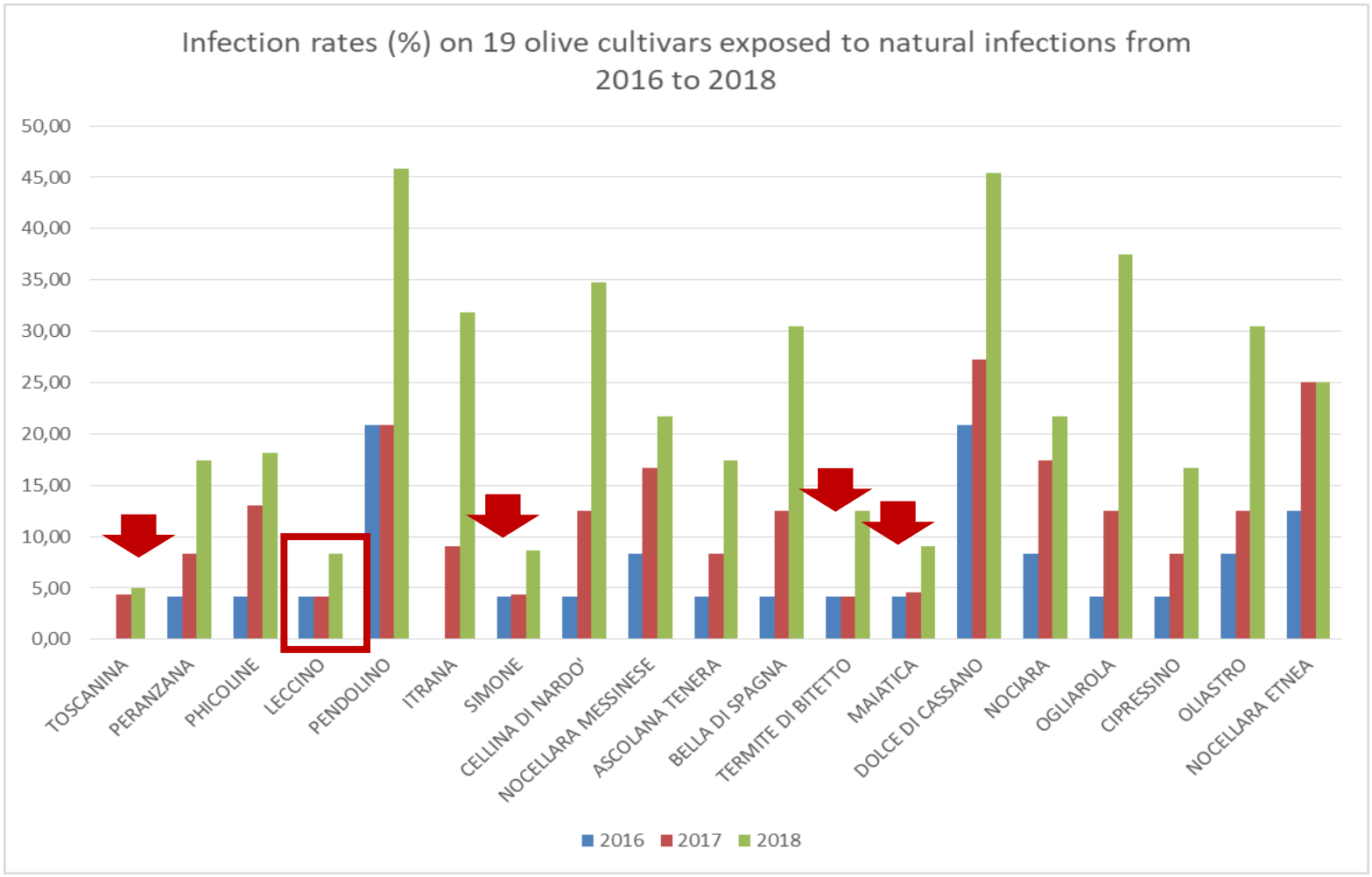
Koroneiki

SEVERITY 2.6

PLOT 2: «PONTE» (2016)

% infections after 3years

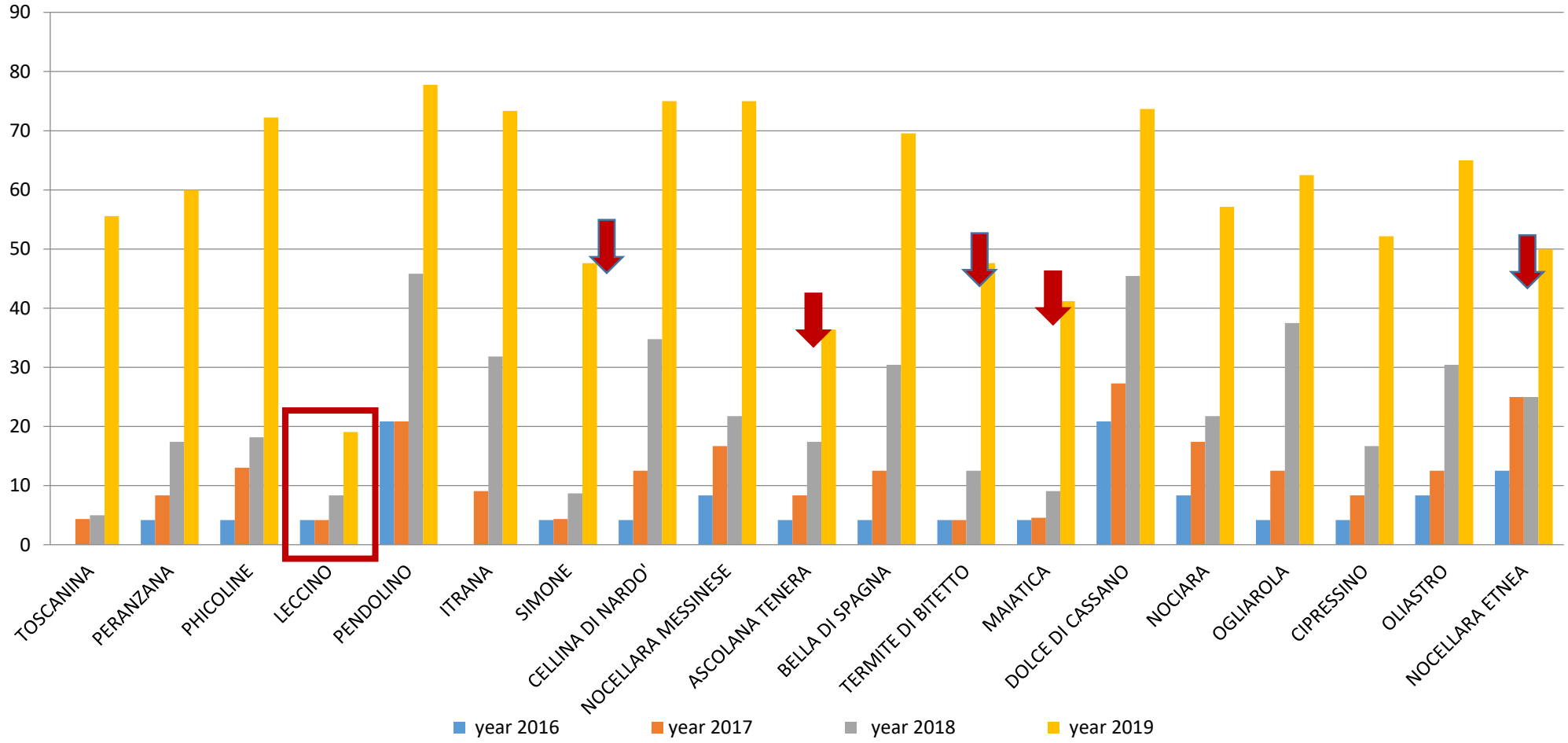
Some cultivars showed low infection rates as Leccino



PLOT 2: «PONTE» (2016)

Leccino ≈20%, only 5 cv < 50%

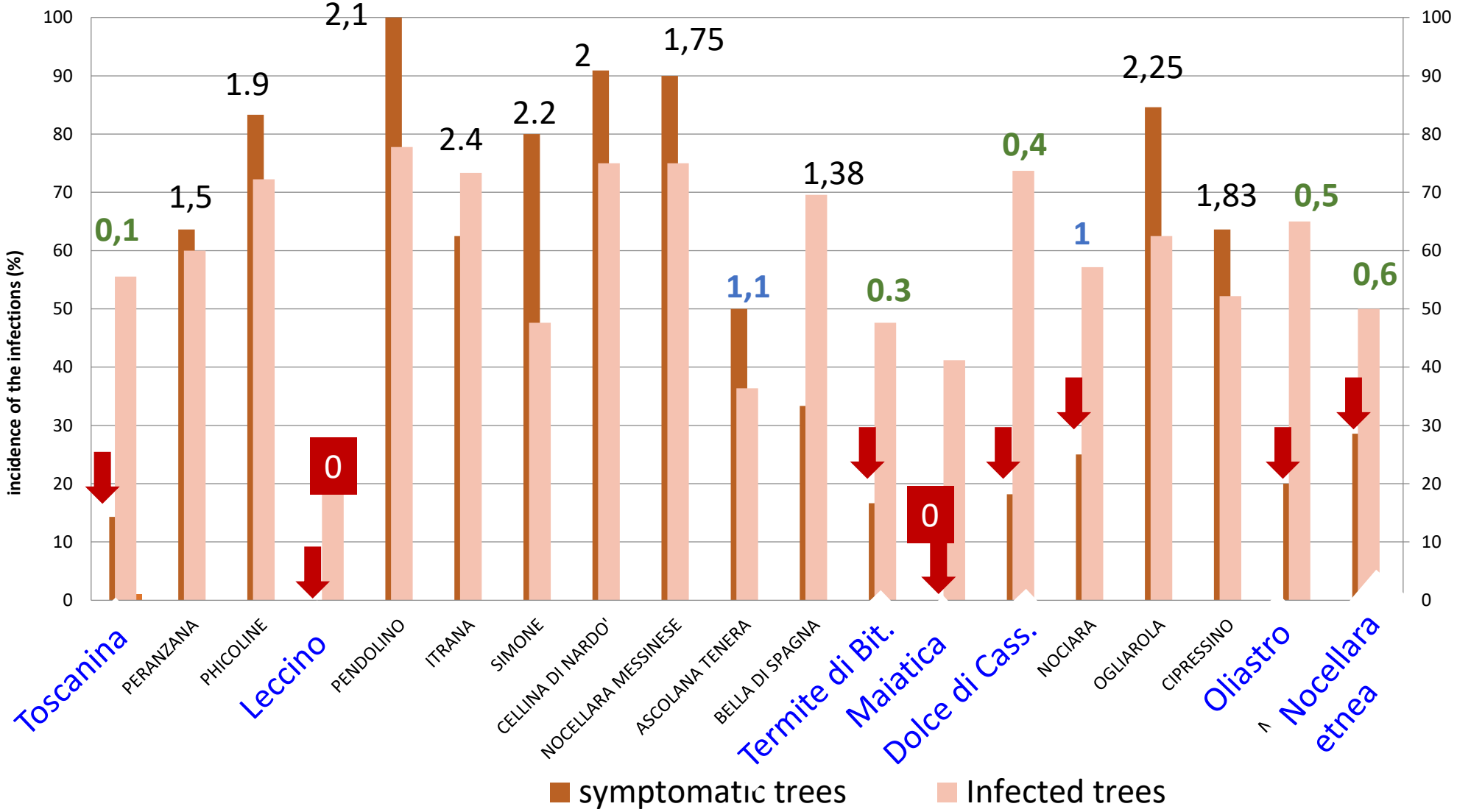
% infections after 4 years, drastically increased



PLOT 2: «PONTE»

Cultivars with low rate of symptomatic trees

Symptom scores >1,5 | Like Frantoio ≈1 | <1 | Leccino and Maiatica no symptoms



Simone

SEVERITY2.2

Termite di Bitetto

SEVERITY 0.3

Toscanina

SEVERITY 0.1

Maiatica

SEVERITY 0.0

DATA COLLECTED FROM THE GREENHOUSE TESTS

Major limitations

- *For some selection only few plants get systemically infected, i.e difficult to make assessment*
- *Conditions in GH are not always suitable for promoting appearance of symptoms*

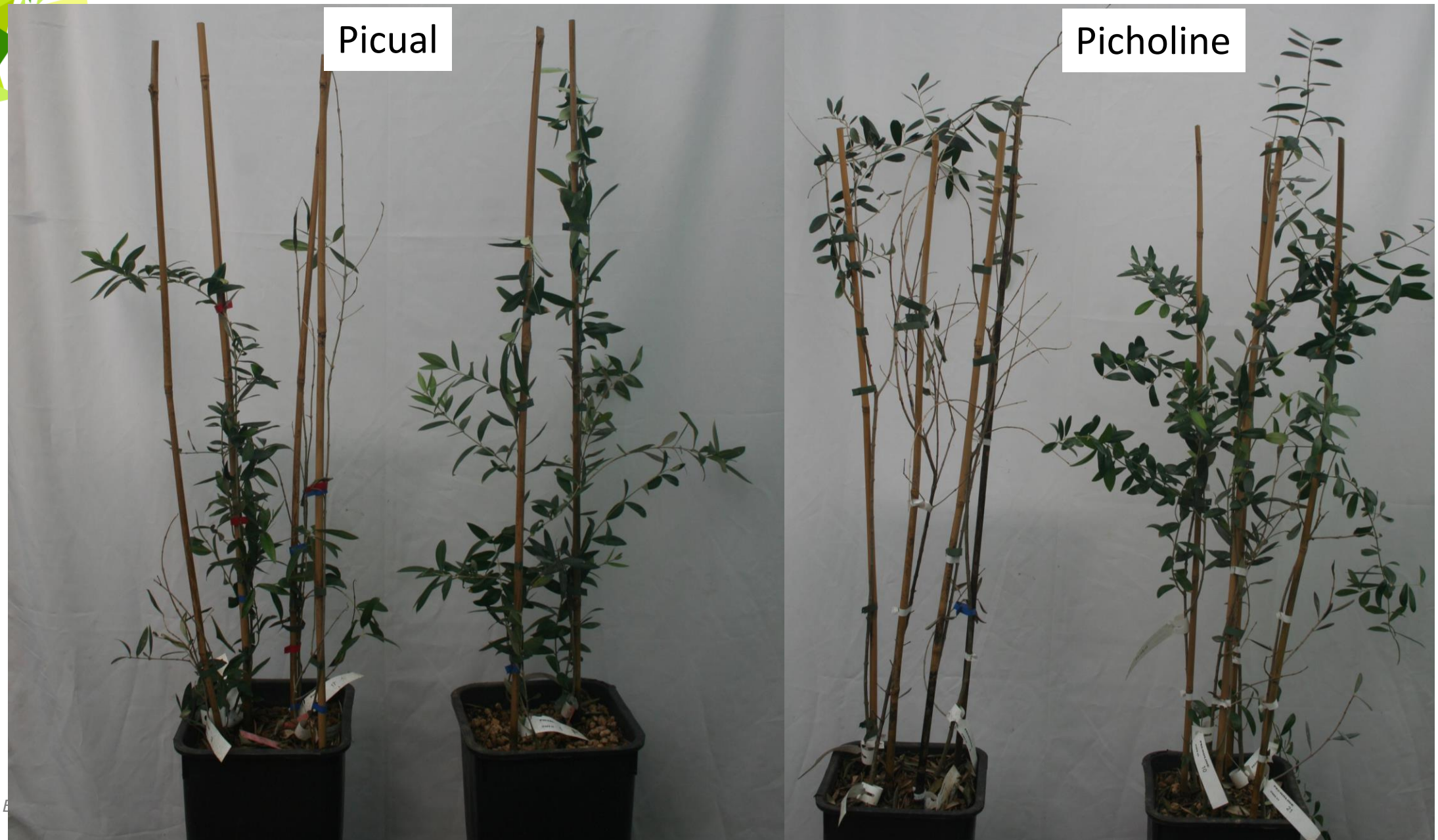
- *While it is possible to identify those susceptible , it is challenging to interpret the results on asymptomatic plants*

Currently we have more than 100 cultivars under testing, but so far for very few we can draw some conclusive assessment

EXAMPLE OF SYMPTOMS DEVELOPEMENT IN GH

Hojiblanca

EXAMPLE OF SYMPTOMS DEVELOPEMENT IN GH



EXAMPLE OF SISTEMICALLY INFECTED PLANTS WITH NO SYMPTOMS

Arbequina

! Field results different

Moraiolo

Tolerant?

CONCLUSIONS

- Field surveys confirmed the previous observations and provided new evidences of susceptibilities

- None of the 27 cultivars exposed in field conditions to 3/4 years of natural inoculum pressure were found to be immune

- Some cvs show promising characters of resistance / tolerance, however none of them perform better than the benchmark of the tests (leccino)

The team

- Saponari M, Altamura G, Abou Kubaa R, Saldarelli P, Zicca S, Boscia D, La Notte P, Specchia F

  CNR – Institute for Sustainable Plant Protection

- Palmisano F, Silletti MR, Pollastro P

  CRSFA «Basile Caramia», Locorotondo (BA)

- Roseti V, Montilon V, Manco L

  DiSSPA – University of Bari