



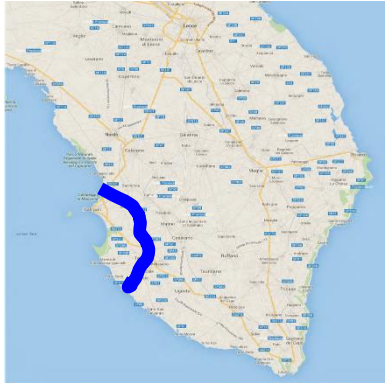
THE CURRENT STATUS OF XYLELLA FASTIDIOSA IN SALENTO (ITALY): ARE WE APPROACHING A NEW PHASE OF THE EPIDEMIC?

BOSCIA D., CAVALIERI V., DONGIOVANNI C., GIAMPETRUZZI A.,
SALDARELLI P., ABOU KUBAA R., AMOIA S., LIGORIO A.,
SURANO A., SAPONARI M.



4th European
conference on
**Xylella
fastidiosa
2023**

2013 - a new plant disease reported in Puglia: Olive Quick Decline Syndrome



October 2013

Identification of di *Xylella fastidiosa* in Salento in olive showing quick decline

Journal of Plant Pathology (2013), 95 (3), 659-668

DISEASE NOTE

IDENTIFICATION OF DNA SEQUENCES
RELATED TO *XYLELLA FASTIDIOSA* IN
OLEANDER, ALMOND AND OLIVE TREES
EXHIBITING LEAF SCORCH SYMPTOMS
IN APULIA (SOUTHERN ITALY)

M. Saponari¹, D. Boscia¹, F. Nigro² and G.P. Martelli^{1,2}



October 2013

2023

Most advanced outbreaks

Legenda

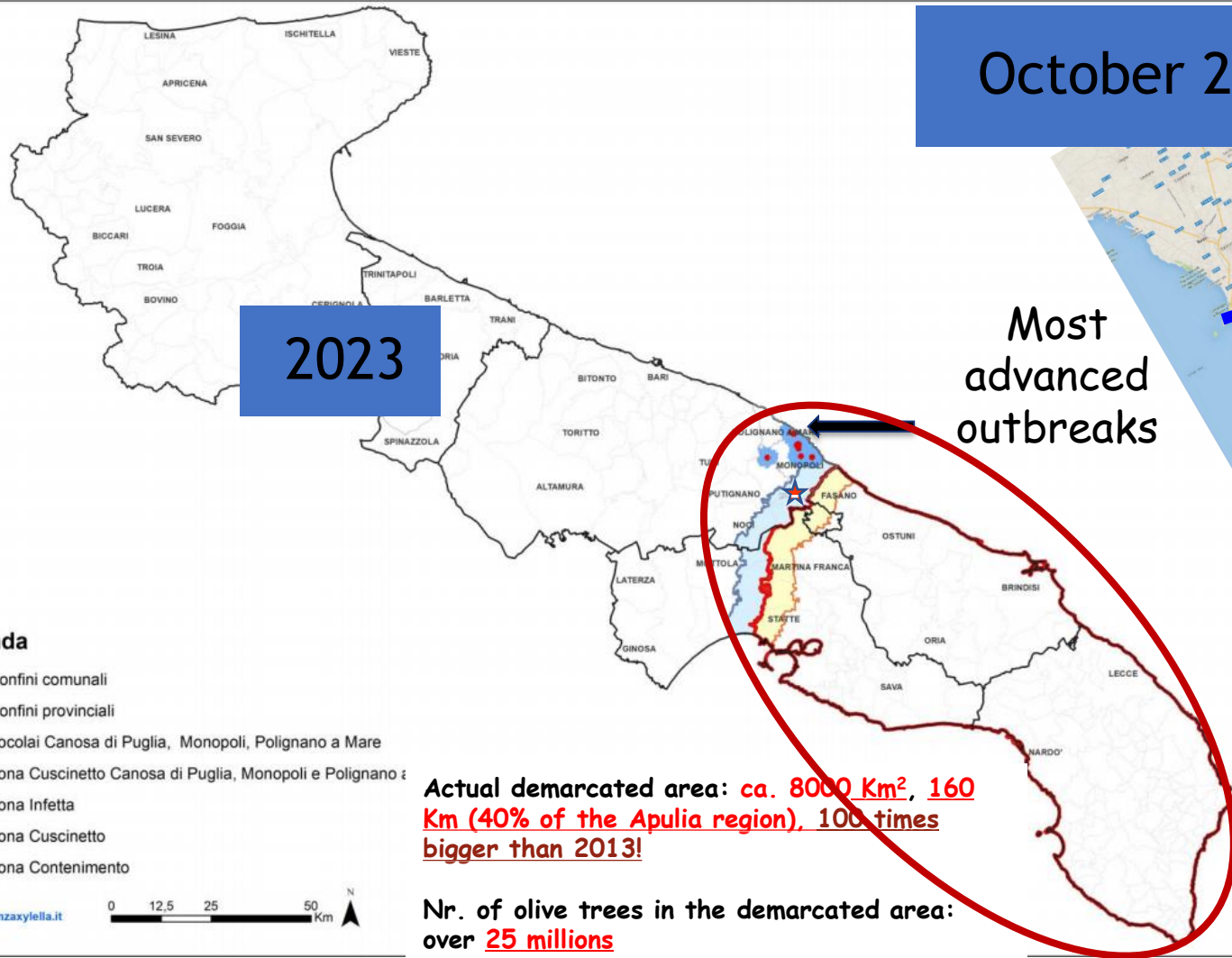
- Confini comunali
- Confini provinciali
- Focolai Canosa di Puglia, Monopoli, Polignano a Mare
- Zona Cuscinetto Canosa di Puglia, Monopoli e Polignano a Mare
- Zona Infetta
- Zona Cuscinetto
- Zona Contenimento

www.emergenzaxylella.it



Actual demarcated area: ca. 8000 Km², 160 Km (40% of the Apulia region), 100 times bigger than 2013!

Nr. of olive trees in the demarcated area: over 25 millions



THE CURRENT STATUS: TWO DIFFERENT SCENARIOS

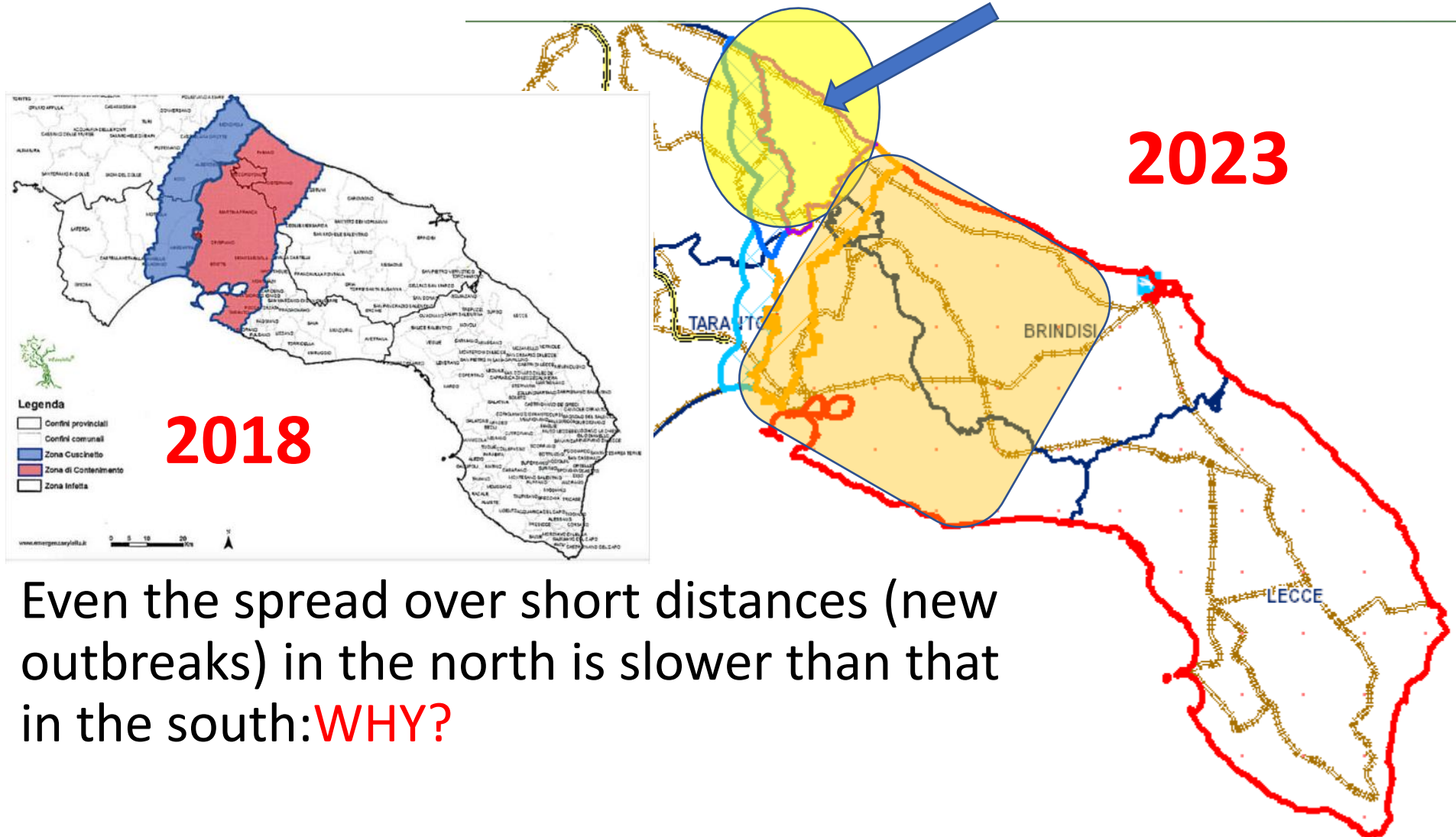
1) SIGNIFICANT SLOW DOWN OF
THE NORTHWARD DIFFUSION

2) MITIGATION OF THE
EPIDEMIC IN THE SOUTH



SLOW DOWN OF THE NORTHWARD DIFFUSION

Since 2018 only a limited diffusion has been recorded on the Adriatic side



SLOW DOWN OF THE NORTHWARD DIFFUSION

- **Climate less suitable**



Estimated climatic suitability map for *X. fastidiosa* subsp. *pauca* according to a SDM ensemble model (EFSA 2019)

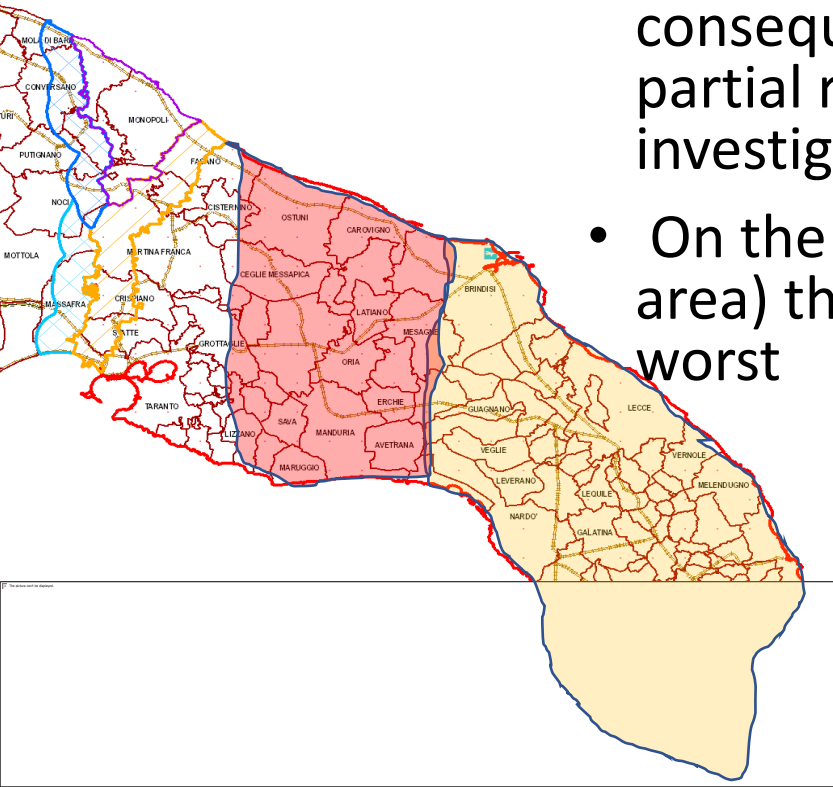
- Different management (different agronomic and phytosanitary practices)
- Actions of containment (monitoring and removal of infected plants, vector control)
- **Lower abundance of vector population**

CONCLUSIONS

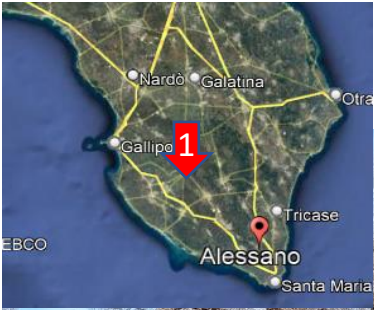
- A notable slow down of the northward diffusion has been observed in the past 5 years
- Several factors seem to contribute to this matter
- A relevant role seems to play the lower vector population abundancy and the different climatic suitability in comparison with the southern part of the Salento

Mitigation of the epidemic in the south (South of Brindisi)

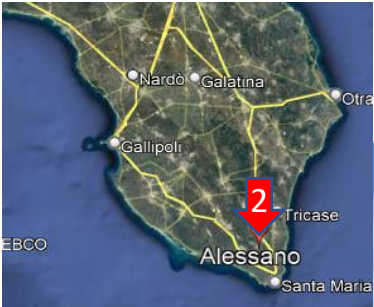
- New symptoms of dessication are milder and less frequent (see yellow area)
- in the last couple of years an increasing number of reports of symptoms remittance in survived trees has been recorded in adult trees (age up to 60-70 years old, not century old), more evident in cv. "Cellina" than in "Ogliarola"; as consequence, in some area phenomena of partial recovery are recorded and now under investigation
- On the contrary, in the northern territory (red area) the disease is active and turning to the worst



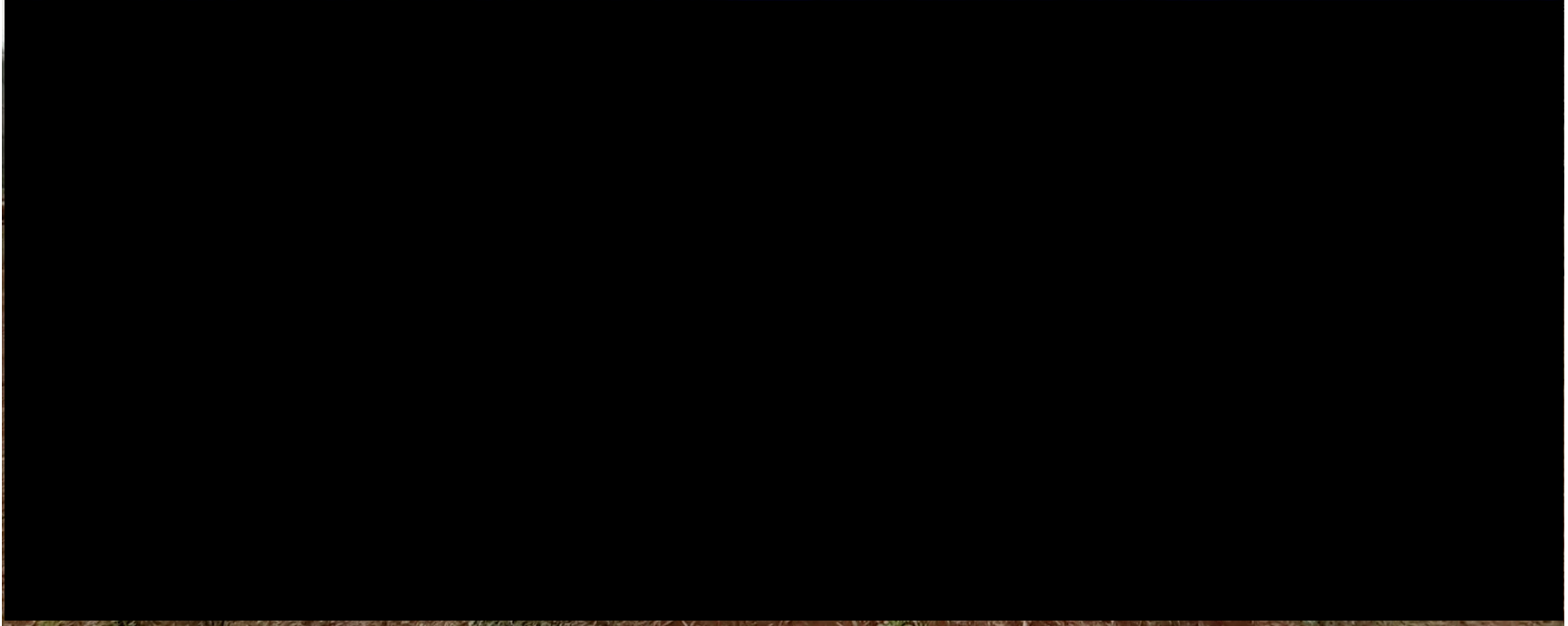
Few examples



Cv. Cellina di Nardò



JUNE 2023



What has changed?

Occurrence of relevant mutations in the *Xf* population?

As 10 years ago, all new isolated strains harbor ST53:

NO EMERGENCE OF NEW/DIFFERENT “ST” REGISTERED SO FAR.

NO EVIDENCES OF RELEVANT GENETIC MUTATIONS

NO EVIDENCES OF RELEVANT GENETIC MUTATIONS

Changes in the bacterial genome?

NGS: on a very limited n. of isolates (1 whole & 3 draft genomes reconstructed using different tools)

MLST typing: all isolates - **ST53**

So far, the only difference found with the reference strain «De Donno» is a deletion of 38nt repeat sequence

13,289,342 (96,82%) reads assembled to NZ_CP020870.1 chromosome

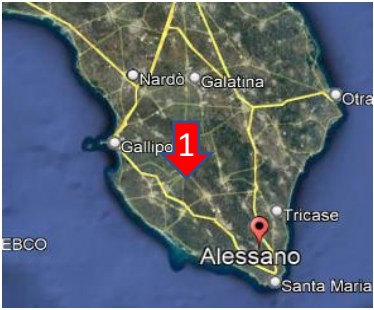
**However it corresponds to an intergenic region >>>
no effect on gene function!**

Wath has changed?

Reduction of bacterial titer in infected plants?

NO EVIDENCES OF SIGNIFICANT REDUCTION

MONITORING THE XF-STATUS OF THE PLANTS



Sampling and testing a representative n. of trees: standard detection & estimation of the bacterial multiplication rate by quantification of the bacterial RNA (encoding a microcin-like protein highly expressed in infected trees)

$8,30 \times 10^3$ CFU/ml

75%

$2,55 \times 10^4$ CFU/ml

93,75%

$9,15 \times 10^3$ CFU/ml

84,6%

$3,23 \times 10^4$ CFU/ml

100%



Drastic reduction of reservoir of inoculum: the reasons

- **Massal reduction of vegetation with high concentration of bacterium due to the infection**

Dr

- M
ba

Drastic reduction of reservoir of inoculum: the reasons

Drastic reduction of reservoir of inoculum: the reasons

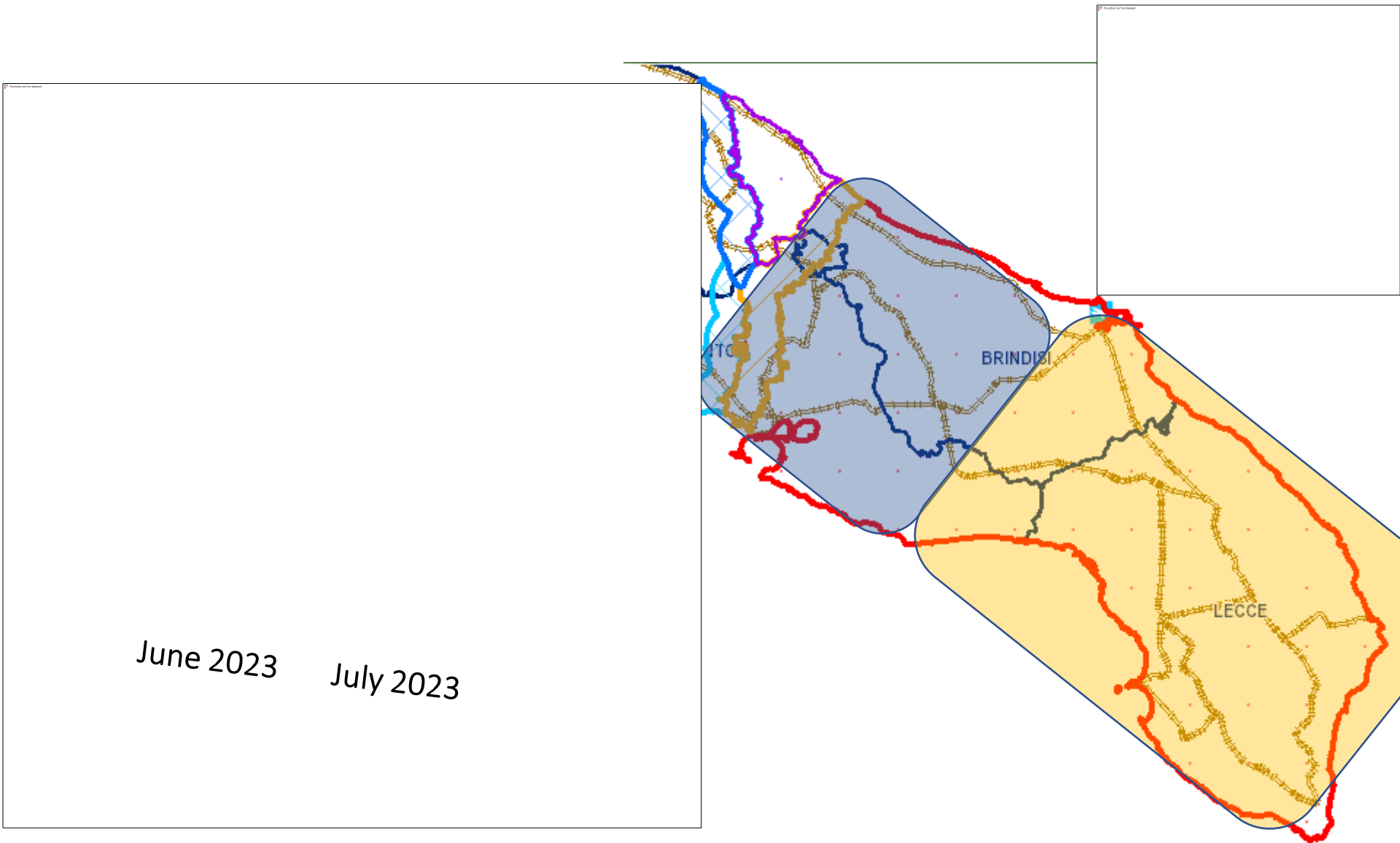
- Massal reduction of vegetation with high concentration of bacterium due to the infection
- Significant removal of severely damaged olive groves, often replaced (over 3 millions of plants) with resistant cultivars (low bacterium titre when infected)
- High frequency of fires in olive groves
- **Prohibition of planting highly susceptible cultivars**

Consequences:

Drastic reduction of infected vectors

Mitigation of the epidemic in the south

Comparison of % of infected vectors (qT-PCR) between southern (6 sites, 173 specimens) and northern (5 sites, 141 specimens) areas of the infected zone



CONCLUSIONS

Reservoir of inoculum drastically reduced!



Vectors efficiency dropped



Strong reduction of superinfections

In the meanwhile:

- 1) no significant mutations are recorded in the bacterial population (still only ST53)
- 2) the titre of bacterium in infected plants does not show significant reduction

MAJOR ROLE OF THE SUPERINFECTIONS?

Thank you for your
attention

