UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

Consiglio Nazionale delle Ricerche

Istituto per la Protezione Sostenibile delle Piante
Bari

Current situation on the outbreak of *Xylella fastidiosa* in Southern Italy

Donato Boscia
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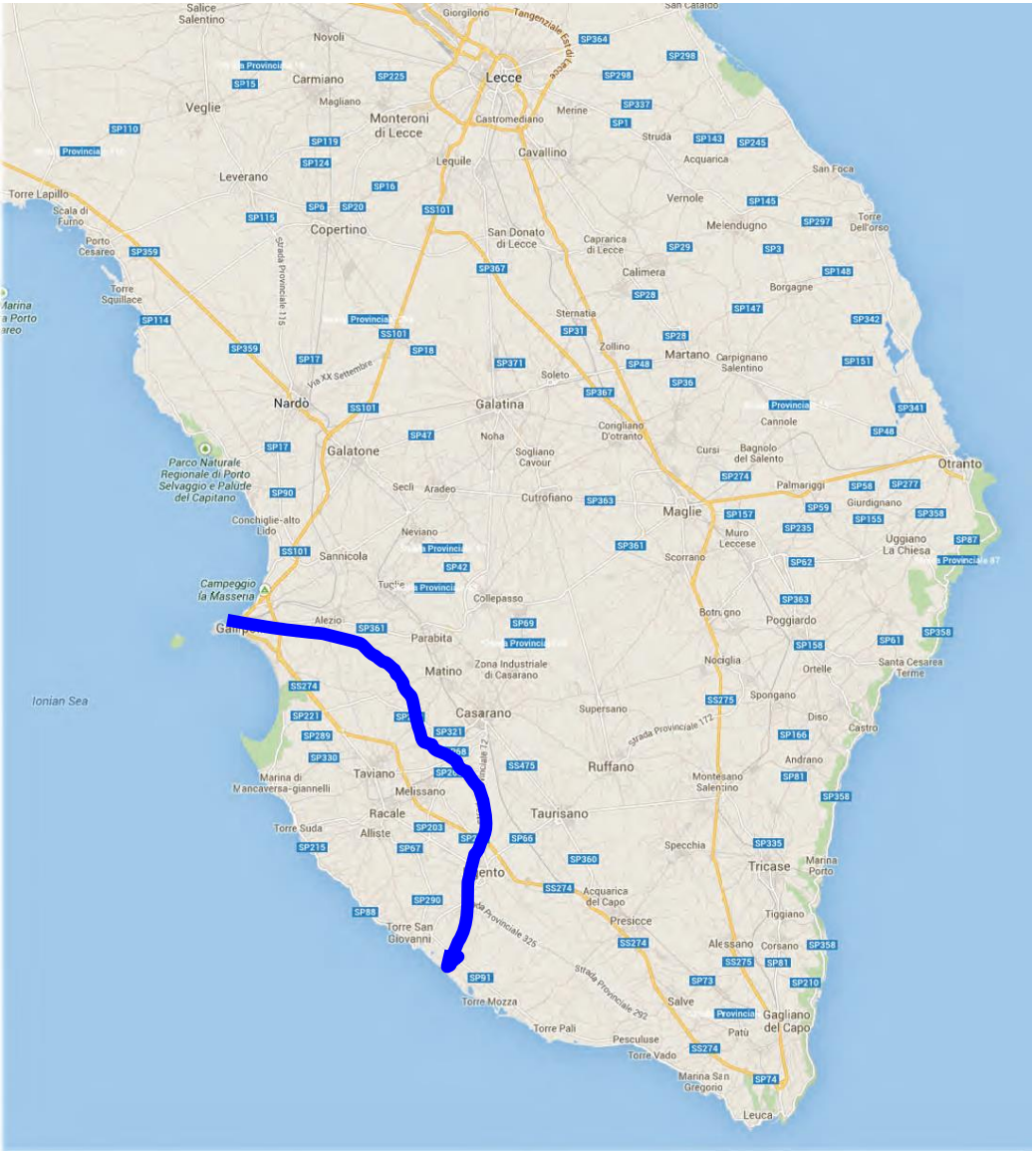


The "Quick decline syndrome" is a severe disease of olive that appeared a few years ago in a restricted area near Gallipoli (province of Lecce, Salento peninsula, southern Italy). It soon expanded in epidemic form in the area delimited by a **blue line** which, in 2013, amounted to *ca.* 8,000 ha

Olives trees in 2010

The same trees in 2013

Symptoms of the disease consist in the appearance of leaf scorching and dessication of small peripheral branches distributed at random on the canopy which, with time, extend to the rest of it

In the groves heavily affected by “quick decline” all plants are symptomatic

Final stage of a "quick decline" attack. Olives have been heavily pruned in the hope to stimulate new sprouting

The canopy was totally dessicated but the plants are not dead. They are pushing suckers from the crown

THE PUTATIVE ACTORS

Quick decline that affects aged olive trees is a complex disease in whose aetiology the following agents seem to be implicated:

(i) The leopard moth (*Zeuzera pyrina*)

(ii) A set of xylem-inhabiting fungi, especially of the genus *Phaeoacremonium,* among which *P. parasiticum* prevails. These fungi are frequent inhabitants of olive wood and the precursors of a commom wood condition of old trees known as wood decay

(iii) The xylem-limited bacterium *Xylella fastidiosa*

The Leopard moth (Zeuzera pyrina)

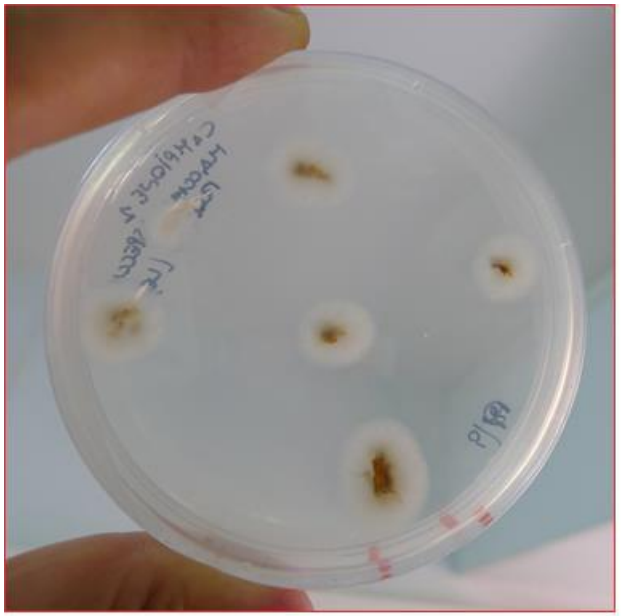
Adult

Larva

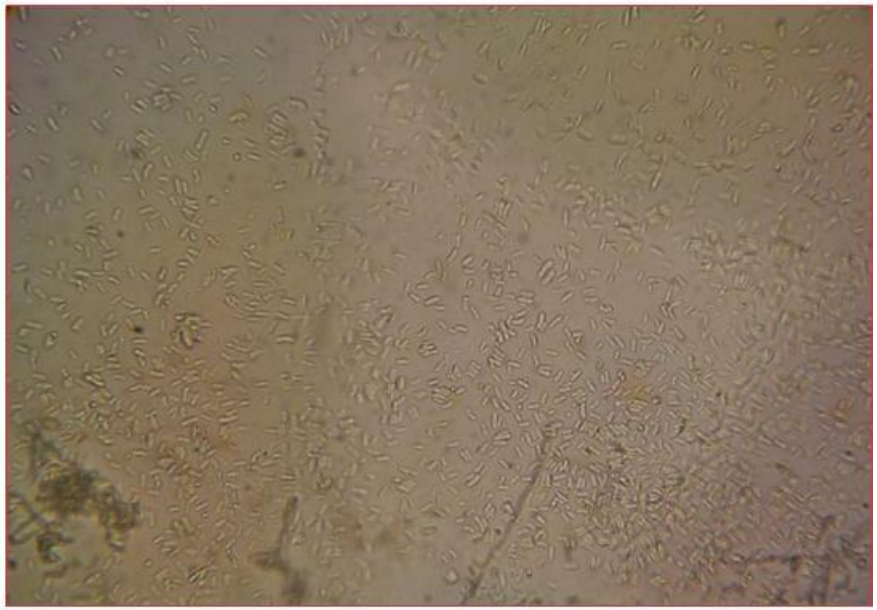
Galleries in a trunk

Entrance of the galleries drilled in the branches

The fungus (*Phaeoacremonium parasiticum*)



Colonies



Conidia

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

DISEASE NOTE

FUNGAL SPECIES ASSOCIATED WITH A SEVERE DECLINE OF OLIVE IN SOUTHERN ITALY

F. Nigro[1], D. Boscia[2], I. Antelmi[1] and A. Ippolito[1]

Phaeoacremonium parasiticum and the olive

Sectioned olive branch showing extensive necrosis of the sapwood colonized by *P. parasiticum*

Necroses start from *Zeuzera* galleries

Xylella fastidiosa

Gram-negative rod-shaped bacterium with a thick rippled cell wall that localizes in the xylem vessels and can be grown in axenic culture with difficulty. It is transmitted by xylem-feeding hemiptera (cicadellidae and cercopidae) and has a wide natural host range, i.e more than 150 herbaceous and woody species, some of which are of great economic importance (grapevine, coffee, citrus, stone fruits). Infection to olive is a rare event. Up to 2013 reported only from California

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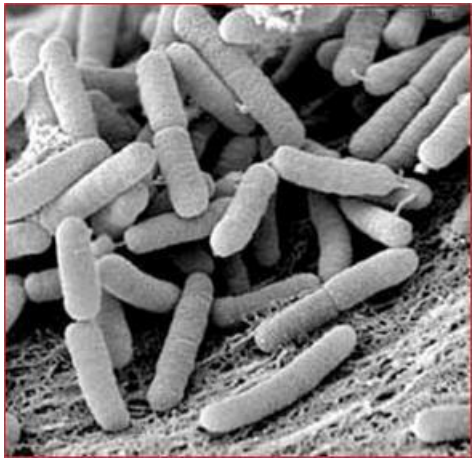
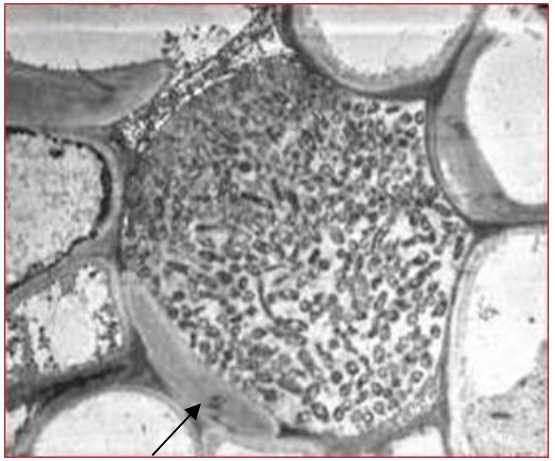
Journal of Plant Pathology (2013), 95 (3), 659-668

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. Saponari[1], D. Boscia[1], F. Nigro[2] and G.P. Martelli[1,2]



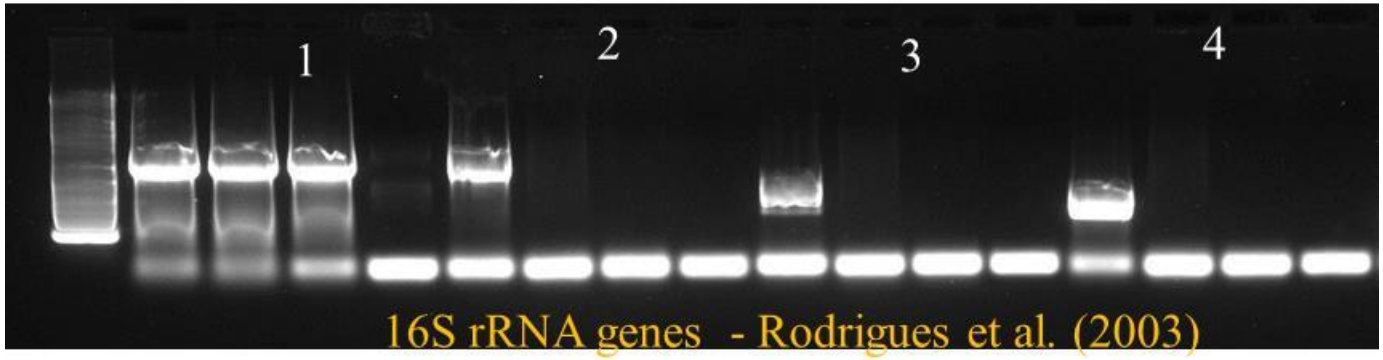


Role of *Xylella* in the genesis of quick decline

To know it, **one must await the results of pathogenicity tests** (graft-trasmission and infection with pure inocula from bacterial cultures).
It is possibile, however, to hypothesize for *Xylella* the role of aggravator.
In fact, it is conceivable that the invasion and clogging of xylem vessels that have escaped fungal colonization would impair water uptake with consequent collapse of the tree

Identification of Xylella in Salentinian olives: PCR

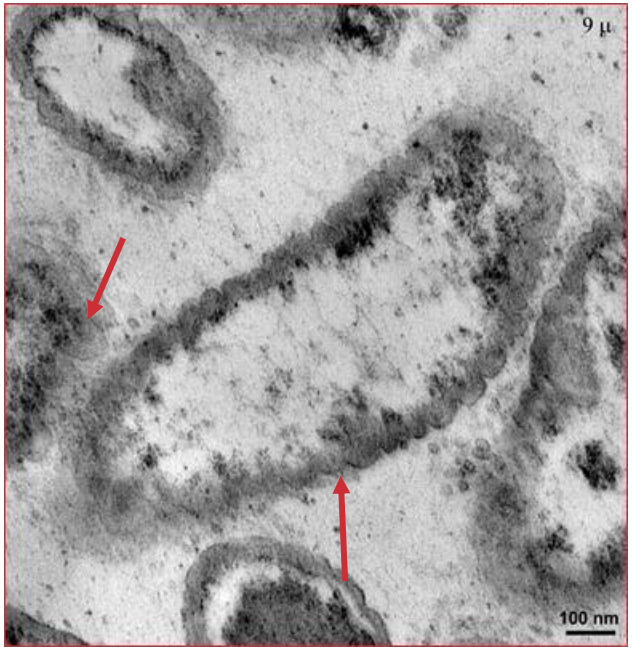
The type of symptoms and the velocity with which quick decline had spread from the first infection focus had suggested, at the end of September 2013, the analyis of symptomatic olives for the presence of *Xylella fastidiosa*. PCR tests using primers for the amplification of the 16S rRNA gene gave positive results that were later confirmed by thousands of additional tests.



1. 16S Universal for bacteria
2. 16S Xylella-specific (0067-1439)
3. 16S Xylella-specific (0067-0838A)
4. 16S Xylella-specific (0838S-1439)

Identification *of Xylella* in Salentinian olives: electron mycroscopy

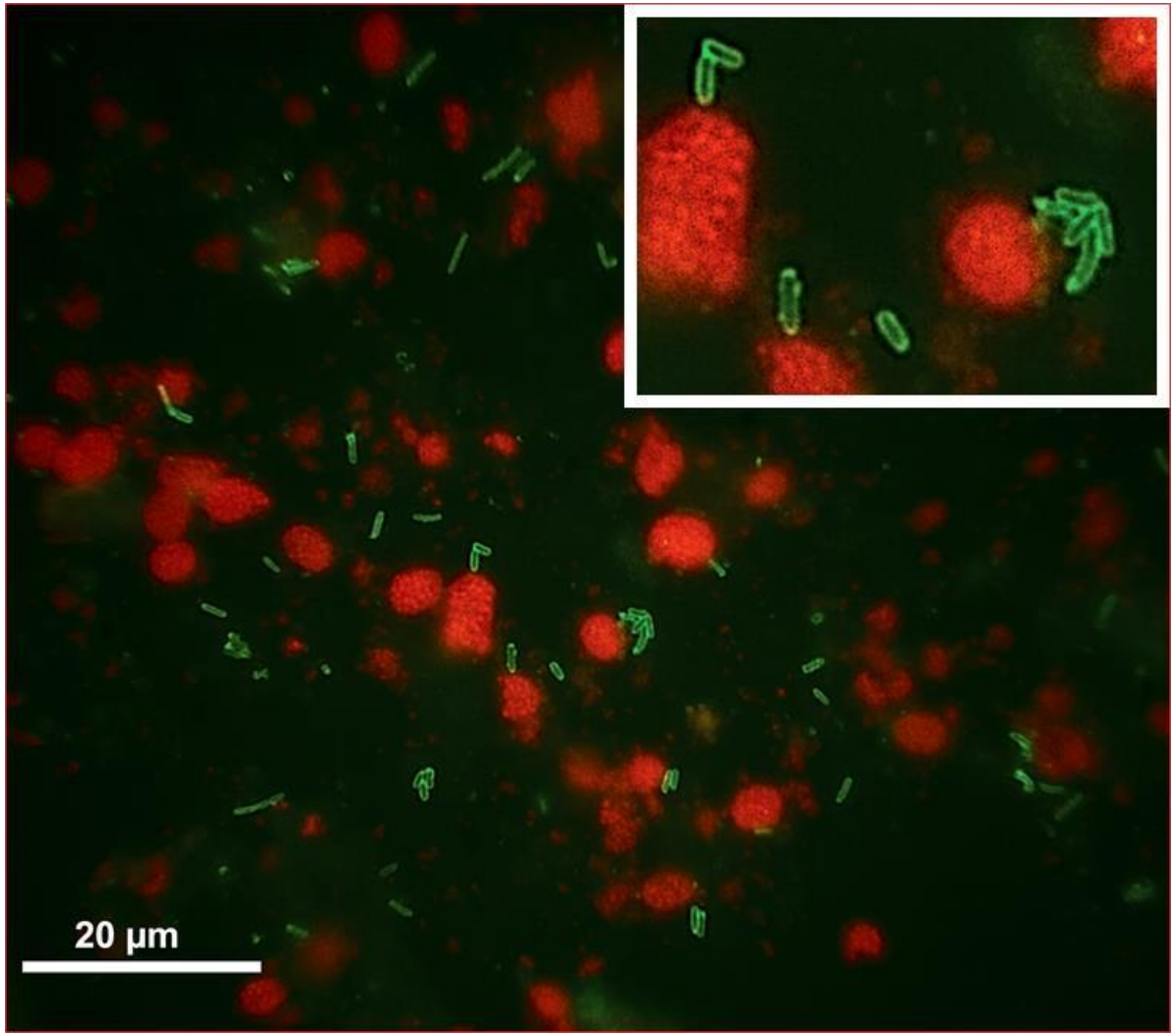
Bacterial cell showing the rippled cell wall typical of *X. fastidiosa*



Bacterial cells within a xylem vessel

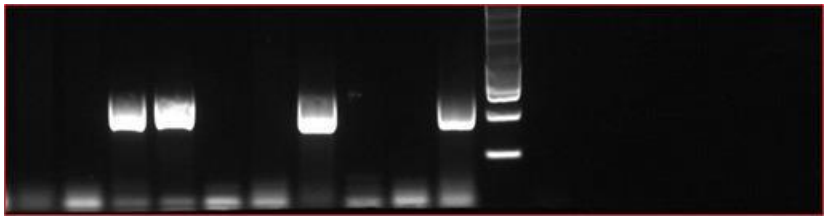
Identification *of Xylella* in Salentinian olives: immunofluorescence

Extract from the petiole of an olive leaf exposed to an immunoflurescent kit (Loewe)

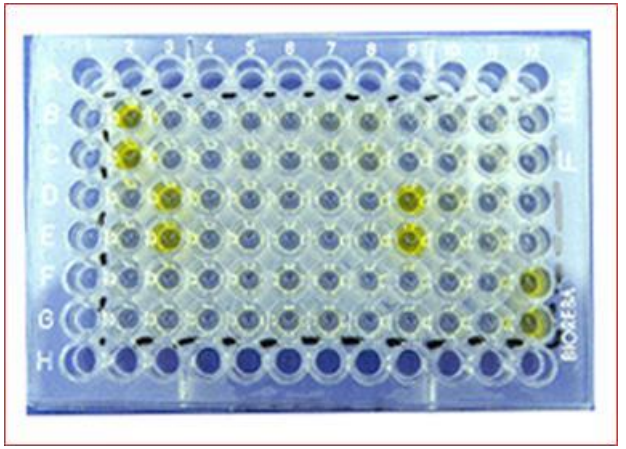


Diagnosis

The first tests were carried out with PCR using four different *Xylella*-specific primers



ELISA was adopted following the results of a ring-test in which three accredited laboratories participated. Doubtful results have always been checked by PCR

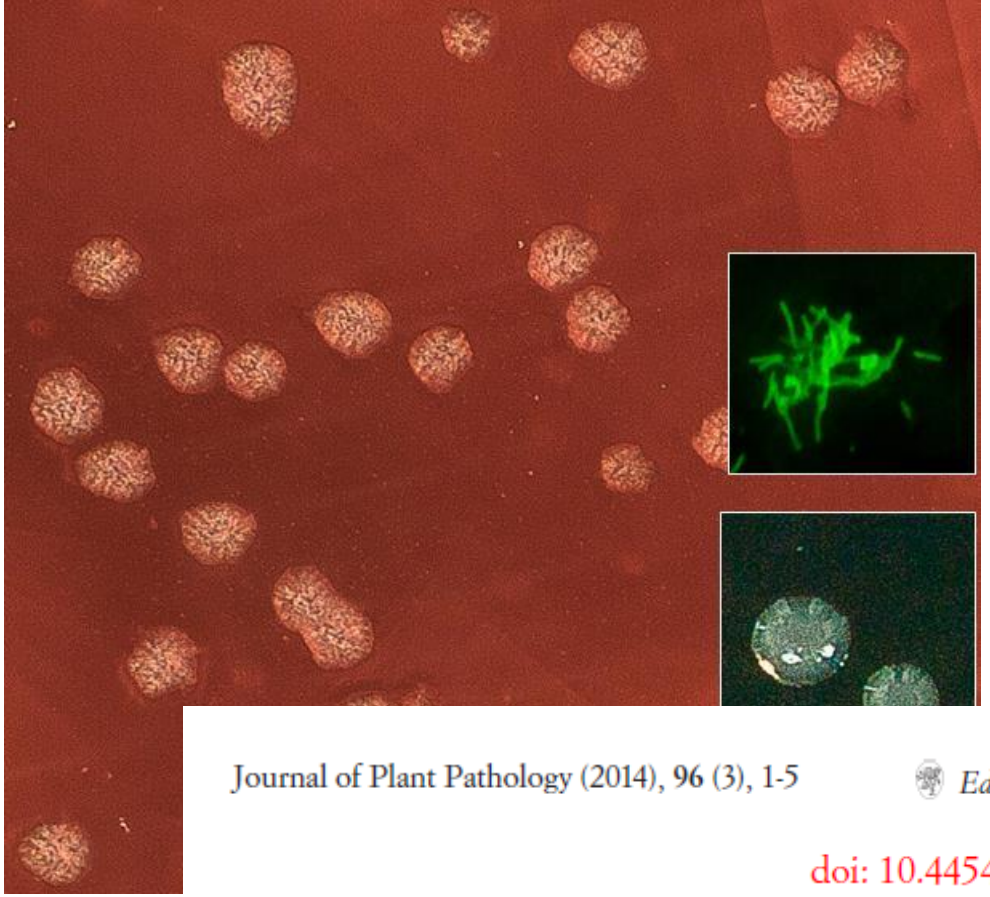


Journal of Plant Pathology (2014), 96 (1), 1-8 *Edizioni ETS Pisa, 2014* 1

LETTER TO THE EDITOR

DETECTION OF *XYLELLA FASTIDIOSA* IN OLIVE TREES BY MOLECULAR AND SEROLOGICAL METHODS

G. Loconsole[1], O. Potere[2], D. Boscia[1], G. Altamura[3], K. Djelouah[4], T. Elbeaino[4], D. Frasheri[4], D. Lorusso[4], F. Palmisano[3], P. Pollastro[3], M.R. Silletti[3], N. Trisciuzzi[3], F. Valentini[4], V. Savino[2] and M. Saponari[1]



Xylella was successfully isolated in culture
from several infected species

Journal of Plant Pathology (2014), 96 (3), 1-5 Edizioni ETS Pisa, 2014

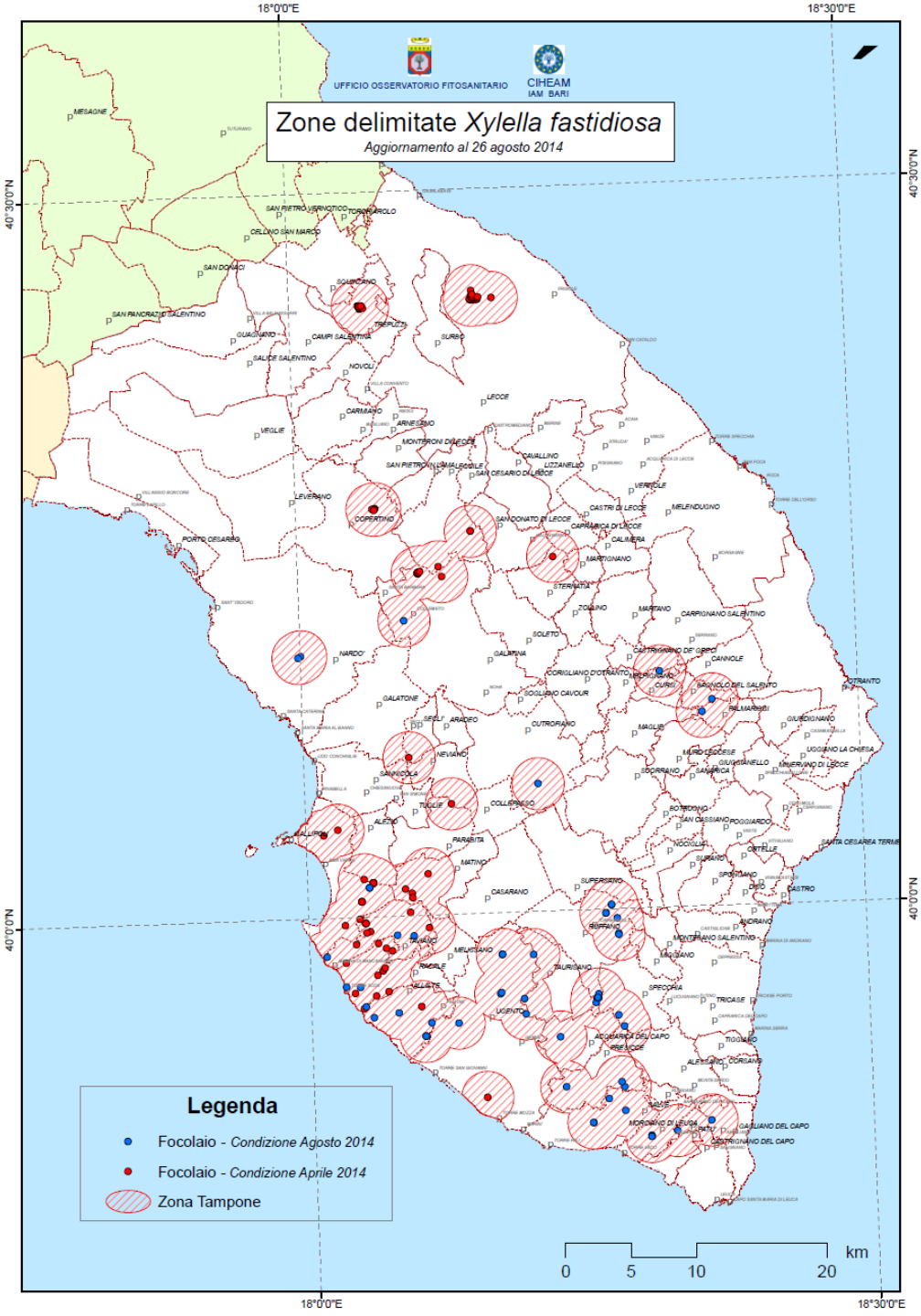
doi: 10.4454/JPP.V96I2.024

SHORT COMMUNICATION

ISOLATION OF A *XYLELLA FASTIDIOSA* STRAIN INFECTING OLIVE AND OLEANDER IN APULIA, ITALY

C. Cariddi[1], M. Saponari[2], D. Boscia[2], A. De Stradis[2], G. Loconsole[2], F. Nigro[1], F. Porcelli[1], O. Potere[1] and G.P. Martelli[1]

[1]*Dipartimento di Scienze del Suolo della Pianta e degli Alimenti, Università degli Studi Aldo Moro, Via Amendola 165/A, 70126 Bari, Italy.*
[2]*Istituto di Virologia Vegetale del CNR, UOS Bari, Via Amendola 165/A, 70126 Bari, Italy*


UFFICIO OSSERVATORIO FITOSANITARIO
CIHEAM
IAM BARI
Zone delimitate *Xylella fastidiosa*
Aggiornamento al 26 agosto 2014
18°0'0"E
18°30'0"E
40°30'0"N
40°0'0"N
Legenda
Focolaio - Condizione Agosto 2014
Focolaio - Condizione Aprile 2014
Zona Tampone
0
5
10
20
km

Host range

Oleander

Almond

Cherry

Polygala myrtifolia

Polygala myrtifolia

Westringia fruticosa

Westringia fruticosa

Acacia saligna

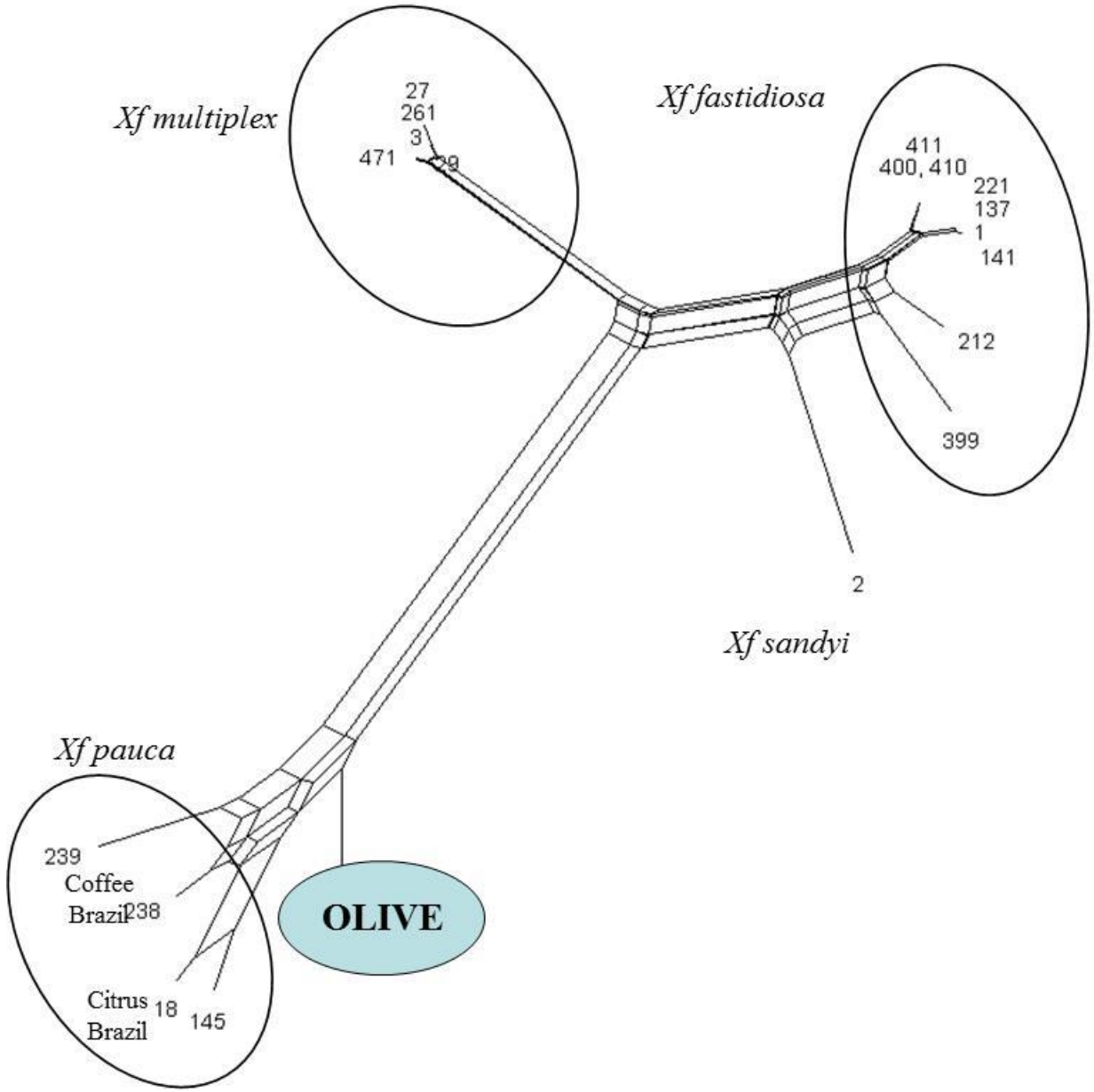
Spartium junceum

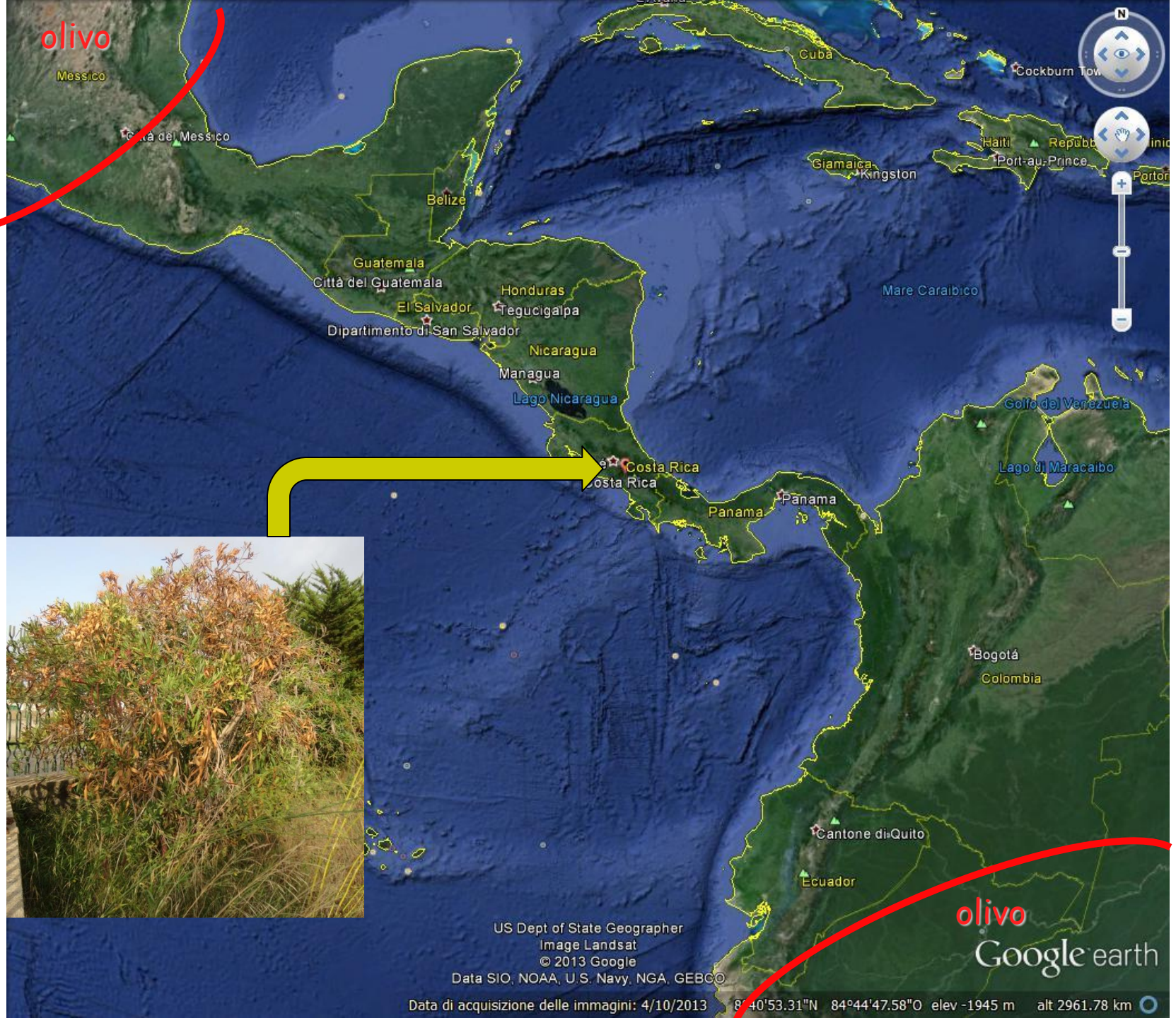
The monthly monitoring (since december 2013) of weeds (over 100 species) did not identify any further host of *Xylella fastidiosa*

Grapevine and Citrus were never found infected

Concatenated sequences of the seven genes showed that the Salentinian strain is a divergent variant of *Xf pauca.*

This variant proved to be **identical to a variant infecting oleander in Costa Rica**




olivo
Messico
Città del Messico
Cuba
Cockburn Town
Haiti
Port-au-Prince
Giamaica
Kingston
Belize
Guatemala
Città del Guatemala
Honduras
Tegucigalpa
El Salvador
Dipartimento di San Salvador
Nicaragua
Managua
Lago Nicaragua
Mare Caraibico
Golfo del Venezuela
Lago di Maracaibo
Costa Rica
Panama
Bogotá
Colombia
Cantone di Quito
Ecuador
olivo
US Dept of State Geographer
Image Landsat
© 2013 Google
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Data di acquisizione delle immagini: 4/10/2013
84°44'47.58"O elev -1945 m
alt 2961.78 km
Google earth

Epidemiology

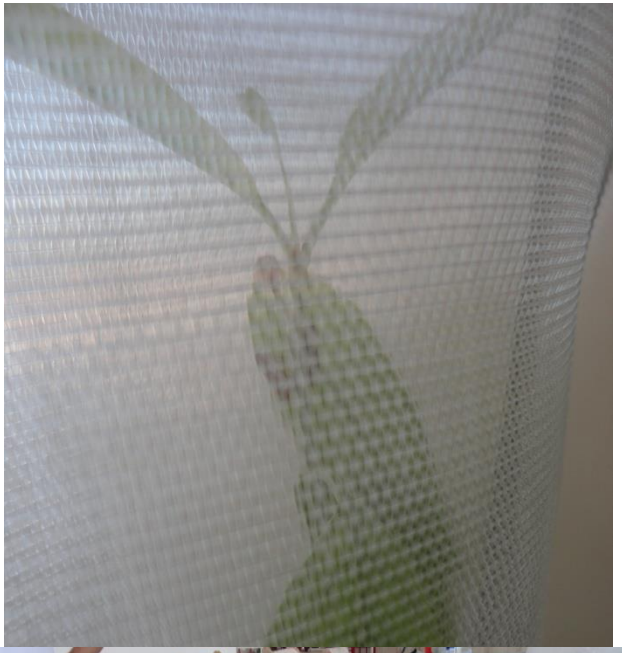
Epidemiological studies underway follow four different routes:

(i) Identification of natural sources of inoculum (natural flora)

(i) Capture of leafhoppers thriving on the natural flora, their identification and analysis for the presence of *Xylella*

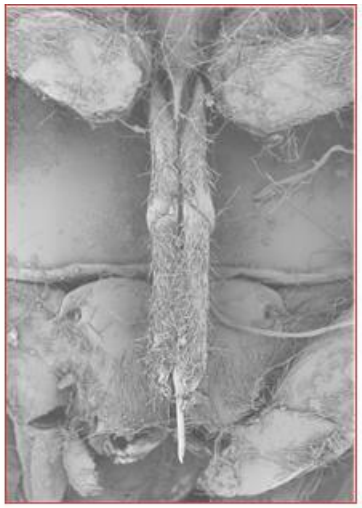
(iii) Transmission trials using *Xylella*-positive insects

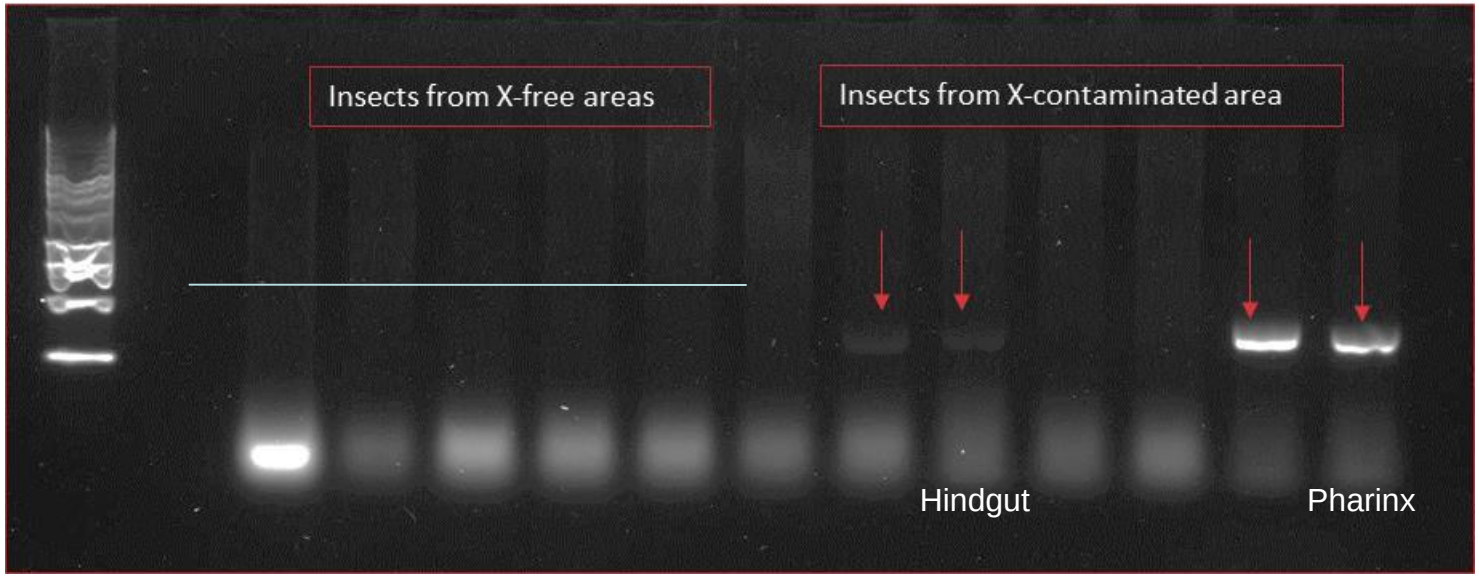
(iv) Placement of bait plants in infected olive groves



Vectors

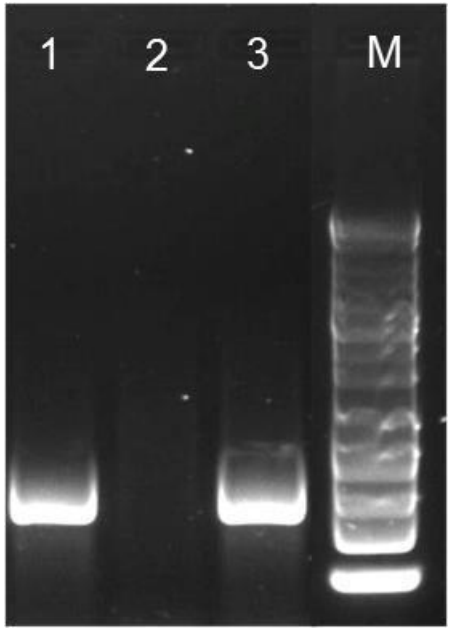
Xylella was identified in several individuals of *Philaenus spumarius* captured in diseased olive groves but in none of those found in *Xylella*-free areas

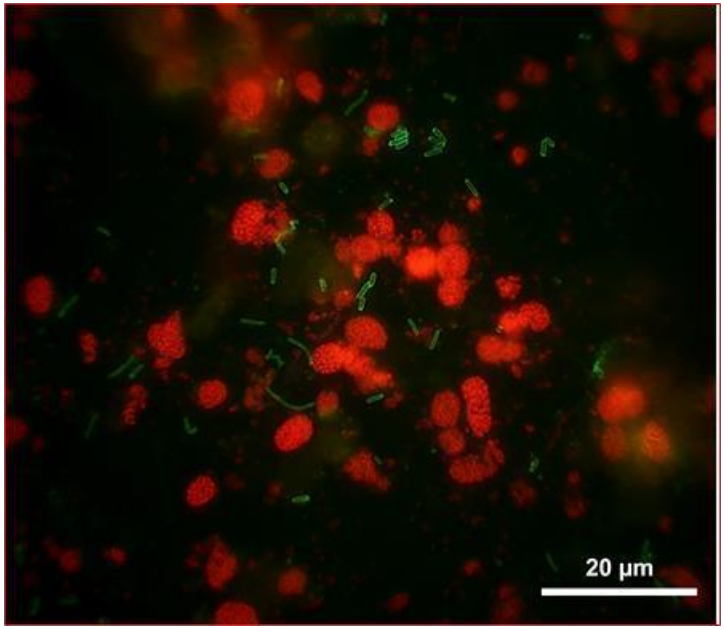




Transmission trials

Xylella-positive adults of *P. spumarius* that were allowed to feed on *Vinca rosea* seedlings were able to transmit the bacterium to two of five seedlings. Ascertained by PCR and immunofluorencence





1, Control(+); 2, Control(-);
3, *Vinca* exposed to *P. spumarius*

Infectivity and Transmission of *Xylella fastidiosa* by *Philaenus spumarius* (Hemiptera: Aphrophoridae) in Apulia, Italy

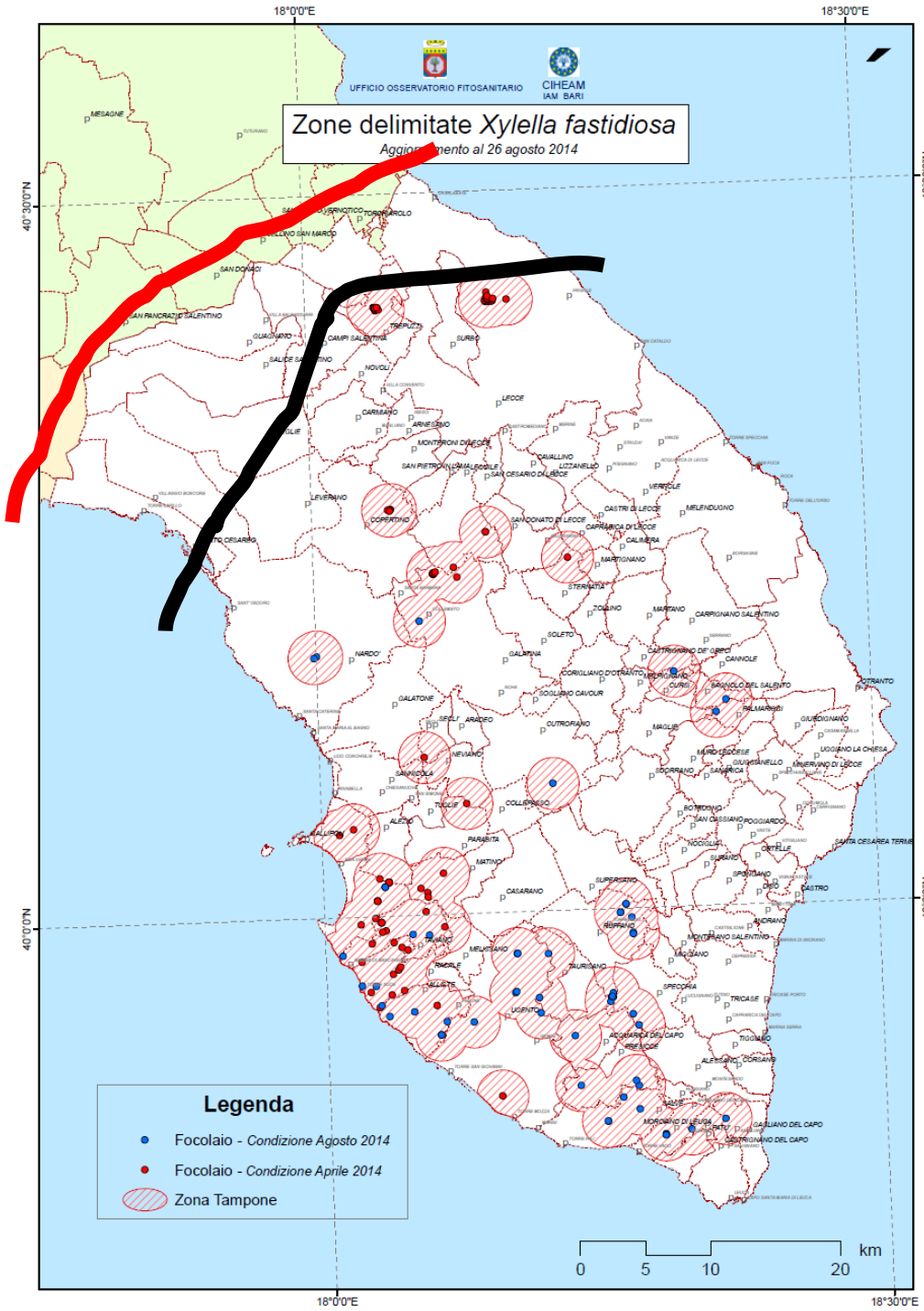
MARIA SAPONARI,[1] GIULIANA LOCONSOLE,[1] DANIELE CORNARA,[2] RAYMOND K. YOKOMI,[3] ANGELO DE STRADIS,[1] DONATO BOSCIA,[1] DOMENICO BOSCO,[4] GIOVANNI P. MARTELLI,[2] RODRIGO KRUGNER,[3] and FRANCESCO PORCELLI[2,5]

J. Econ. Entomol. 107(4): 1316–1319 (2014); DOI: http://dx.doi.org/10.1603/EC14142

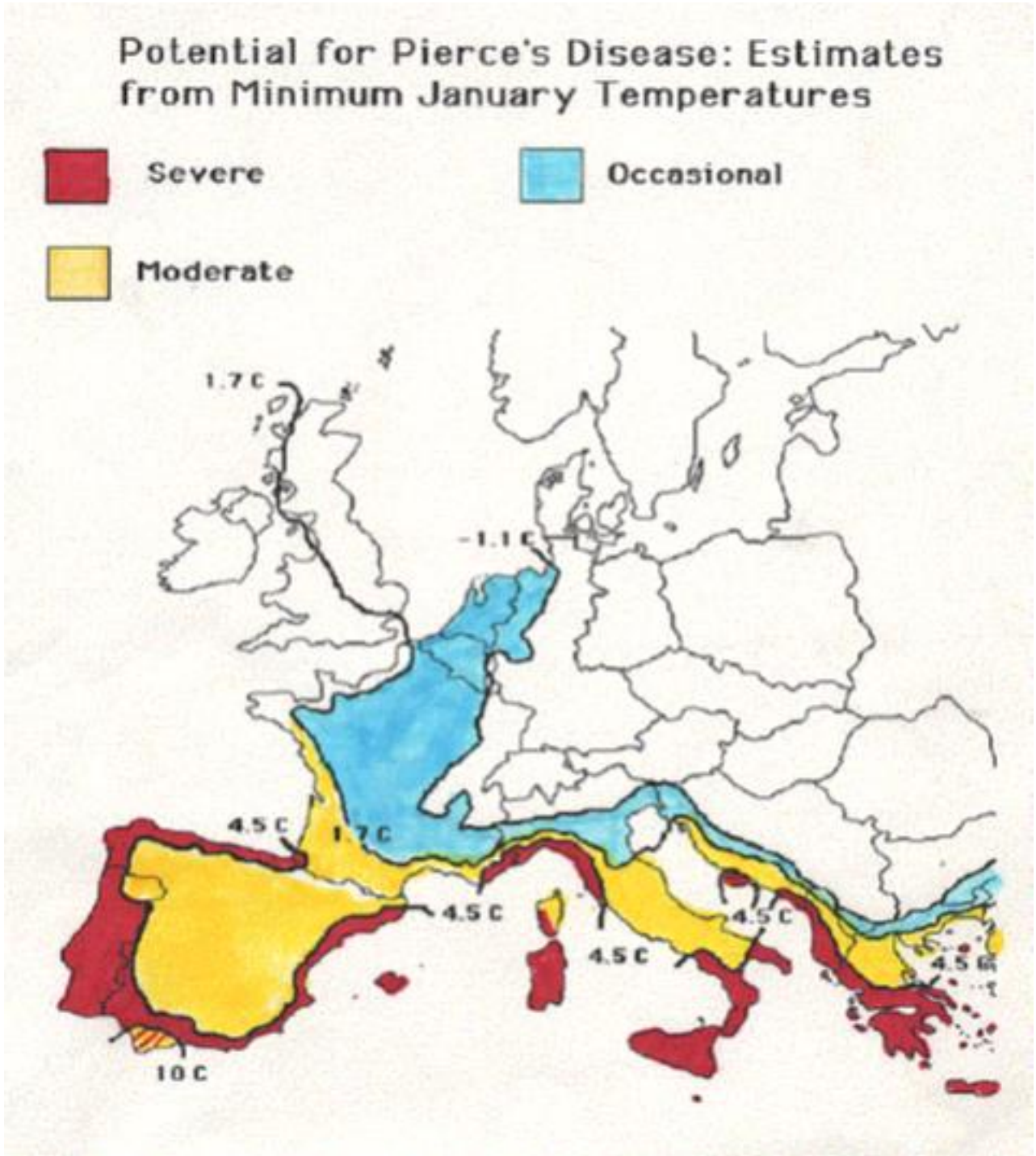
The control of vectors is actually considered the most effective action to contain the spread of the epidemic

Buffer zone

Security line



The influence of the climate


Potential for Pierce's Disease: Estimates from Minimum January Temperatures
Severe
Occasional
Moderate
1.7 C
-1.1 C
4.5 C
1.7 C
4.5 C
4.5 C
4.5 C
4.5 C
10 C

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Consiglio Nazionale delle Ricerche

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The Bari Research Team

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Boscia D., De Stradis A., La Notte P.,Loconsole G., Chiumenti M.., Saldarelli P., Saponari M.
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Palmisano F.
*(Centro di Ricerca, Sperimentazione e Formazione in Agricoltura «Basile Caramia», Locorotondo***)**

A.Guario
Plant Protection Service of Apulia Region