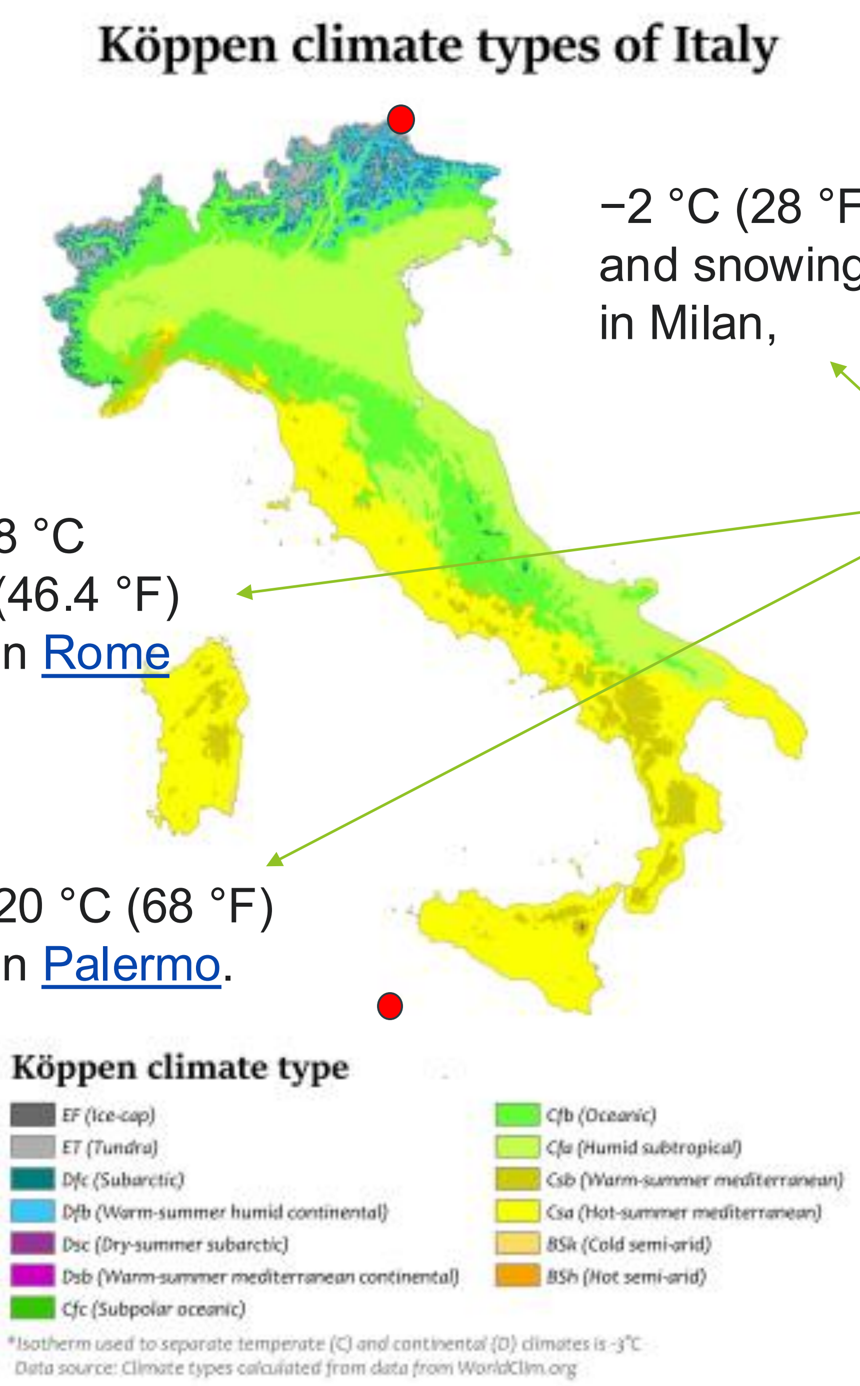
Main pests and pathogens in urban trees in Italy

Alberto Santini and Anna Maria Vettraino

MC members-Italy



−2 °C (28 °F) and snowing in Milan,

8 °C (46.4 °F) in Rome

20 °C (68 °F) in Palermo.

Italy lies between the 35°N of the island of Lampedusa and the 47°N of the Vetta d'Italia, which is located in the Aurine Alps (red dots).
Climate changes from sub-tropical in Lampedusa and part of Sicily to continental on the Alps.

Between the north and south there can be a considerable difference in temperature and rainfall, especially during winter.

High biodiversity of urban street trees in Italian cities

Main pests and pathogens recently impacting urban trees in Italy:

- *Anoplophora glabripennis;*
- *Anoplophora chinensis;*
- *Cydalima perspectalis;*
- *Rhyncophorus ferrugineus;*
- *Toumeyella parvicornis;*
- *Calonectria pseudonaviculata* (*Cylindrocladium buxicola*);
- *Seiridium cardinale;*
- *Ophiostoma novo-ulmi;*
- *Phytophthora cinnamomi* (important just for Phytophthora lovers);
- *Ceratocystis platani*

Canker stain of Plane tree: an increasing threat to urban forests (and not only in the Mediterranean Basin!)

Plane trees, a major component of urban forests in many cities all over Europe

The oriental plane (*Platanus orientalis*)

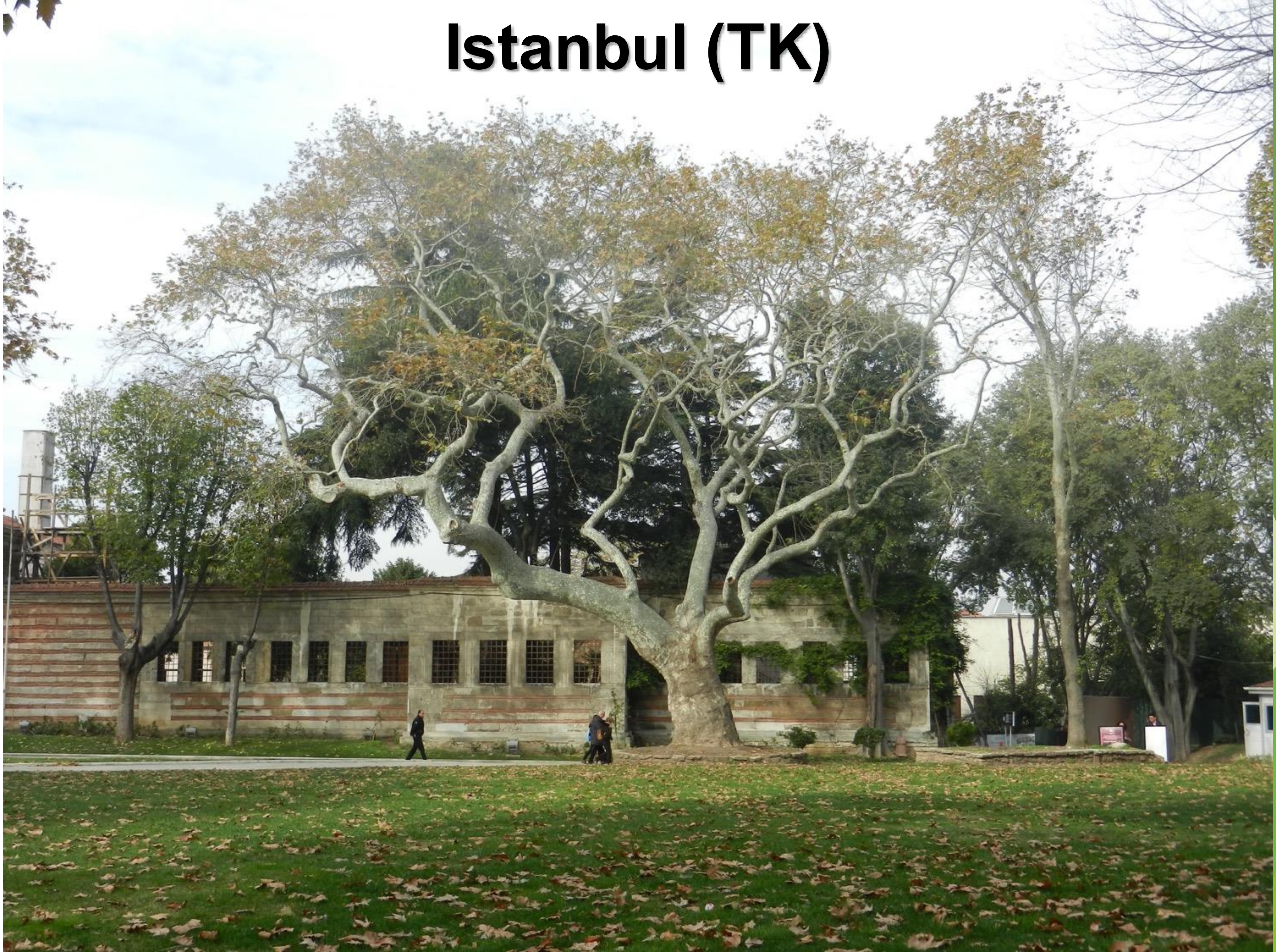
- ✓ Native to southeastern Europe and Middle East
- ✓ Planted in gardens and cities during Egyptian, Greek and Roman antiquity
- ✓ Widely planted as an urban tree in its native range

The London plane (*Platanus ×hispanica*, syn. *P. ×acerifolia*)

- ✓ Interspecific natural hybrid of the oriental plane and the American sycamore (*Platanus occidentalis*) (born in 1700s)
- ✓ Natural hybridization of the parental species during the 17th century
- ✓ Popularized during the 18th century and extensively planted in many cities, along roads and canals in Europe
- ✓ 40% of urban trees in Paris and more than 50% in London

Besnard et al 2002; Tsopelas et al 2017

Istanbul (TK)



London


Paris

Vienna

Malmö


Pietermaritzburg (SA)

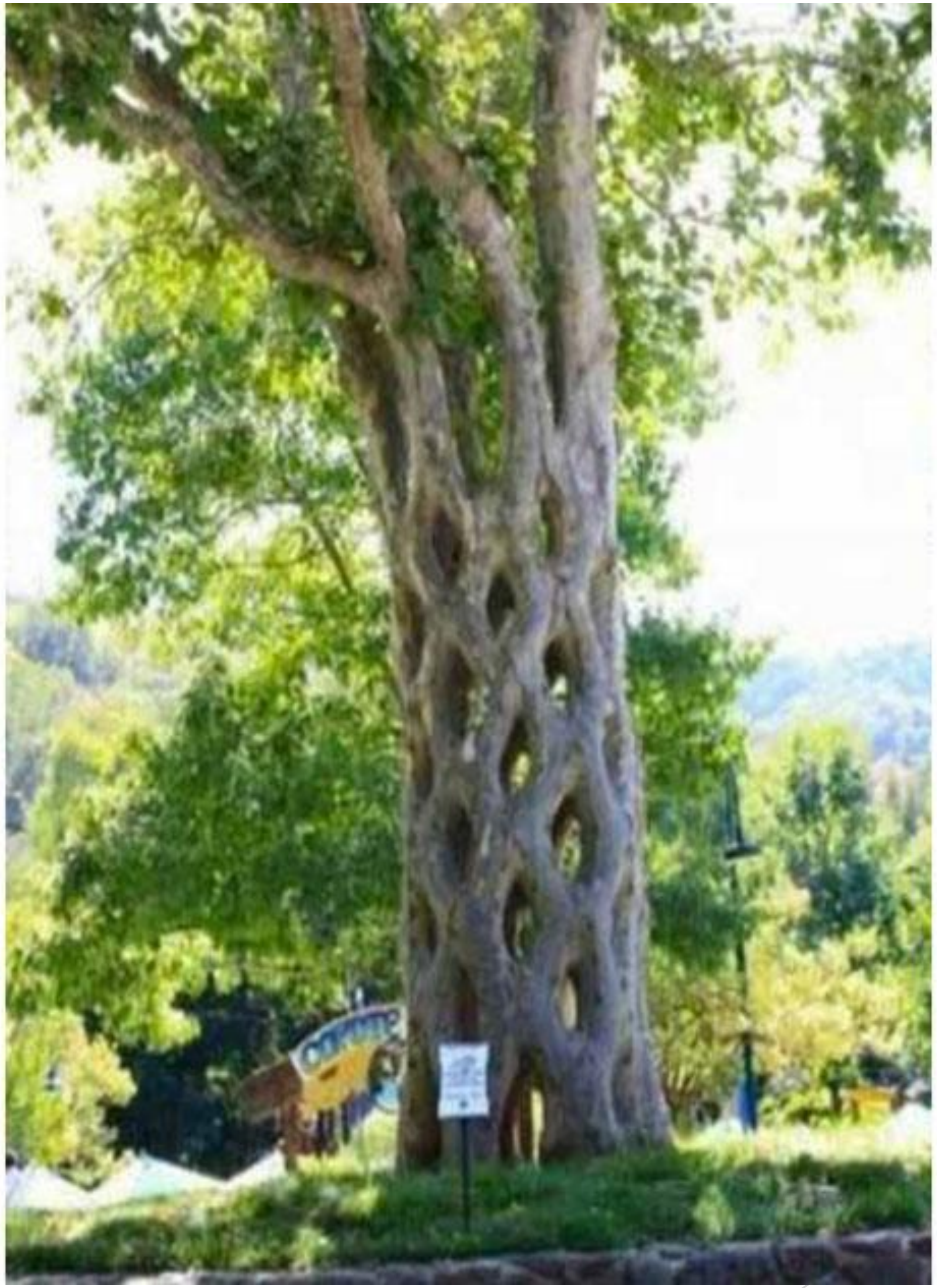
종합운동장 綜合運動場
Sports Complex
47 삼성역
Samseong Stn
청담사거리
Cheongdam Jct
은마아파트
Eunma Apt
250m

Seoul (ROK)

Pyongyang (DVR)

Qingdao (PRC)

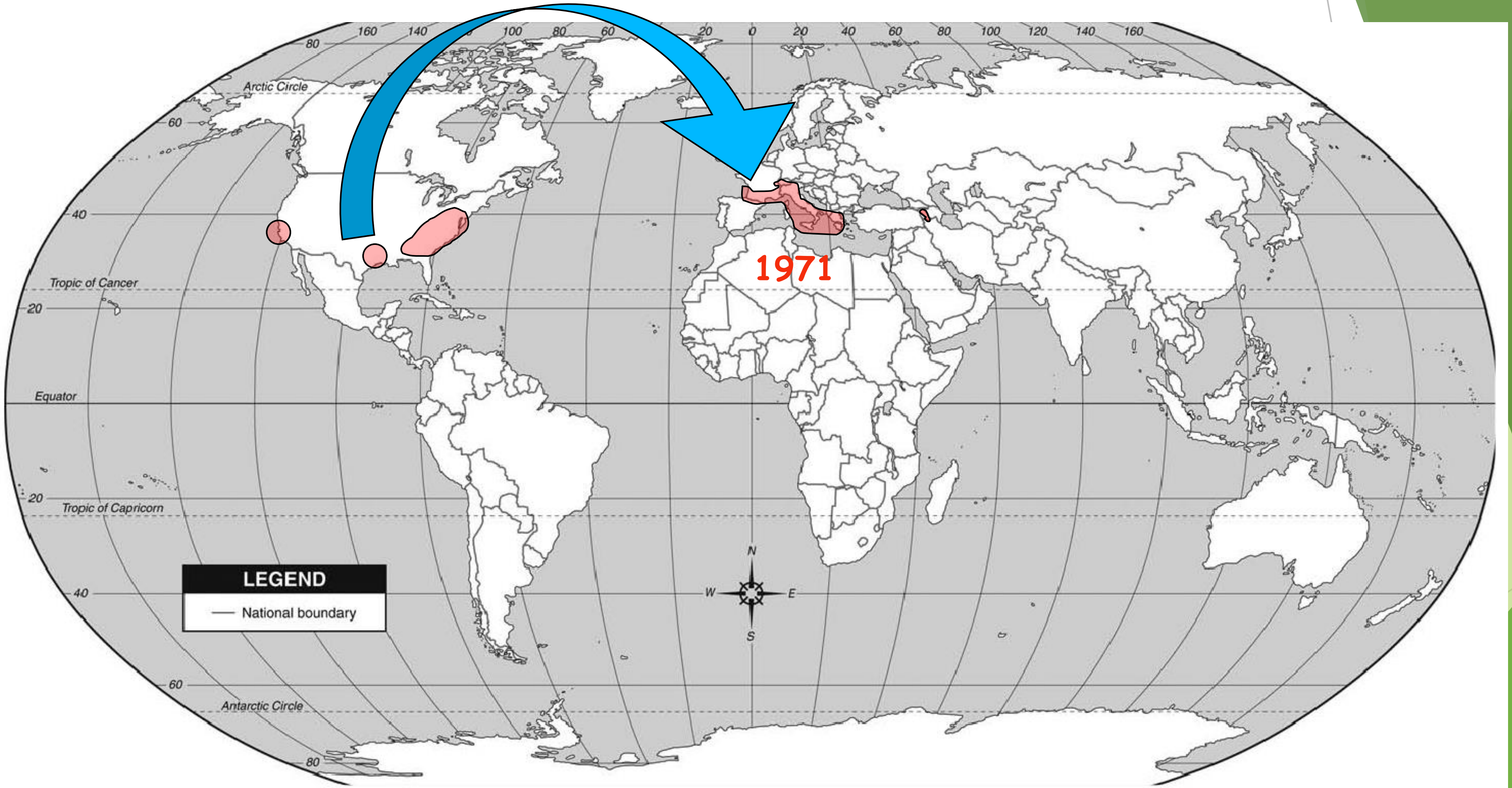
Canal du Midi

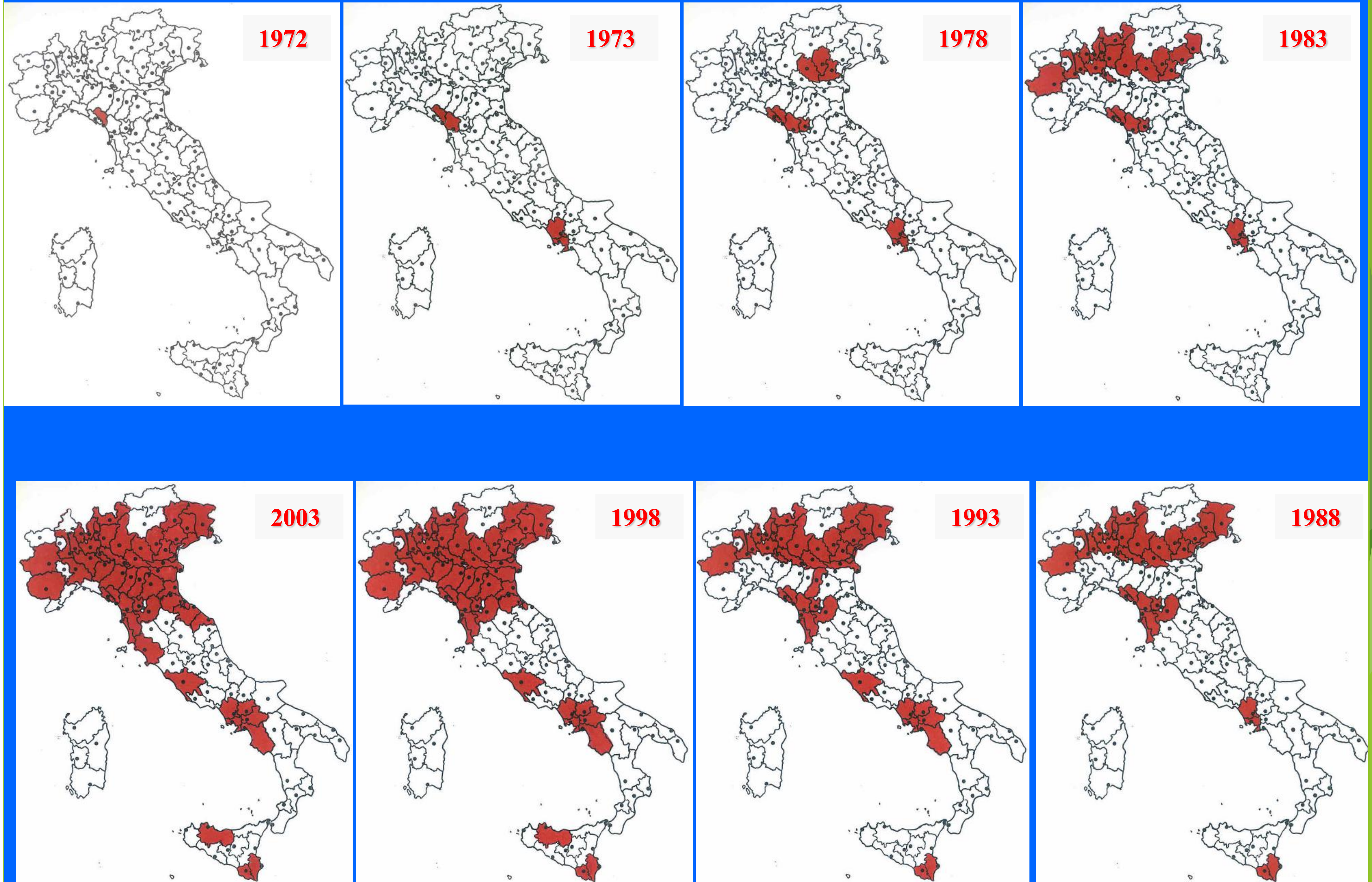




Canker stain of Plane tree

- ✓ Caused by the ascomycete fungus Ceratocystis platani
- ✓ Pathogen is native to North America
- ✓ American sycamore: fairly resistant (co-evolution)
- ✓ Oriental and London plane: very susceptible
- ✓ Usually fatal (1-5 years after infection)
- ✓ Accidentally introduced by the US army in Italy and France on infected plane wood packaging during WWII
- ✓ Clonal spread all over Italy and SE-France
- ✓ Recent spread to Greece, Albania and Turkey
- ✓ Dispersal: contaminated pruning tools, road construction machinery, rivers
- ✓ Quarantine pathogen -> stringent and costly eradication measures are implemented

Ceratocystis platani (J.M. Walter) Engelbr. & T.C. Harr. 2005

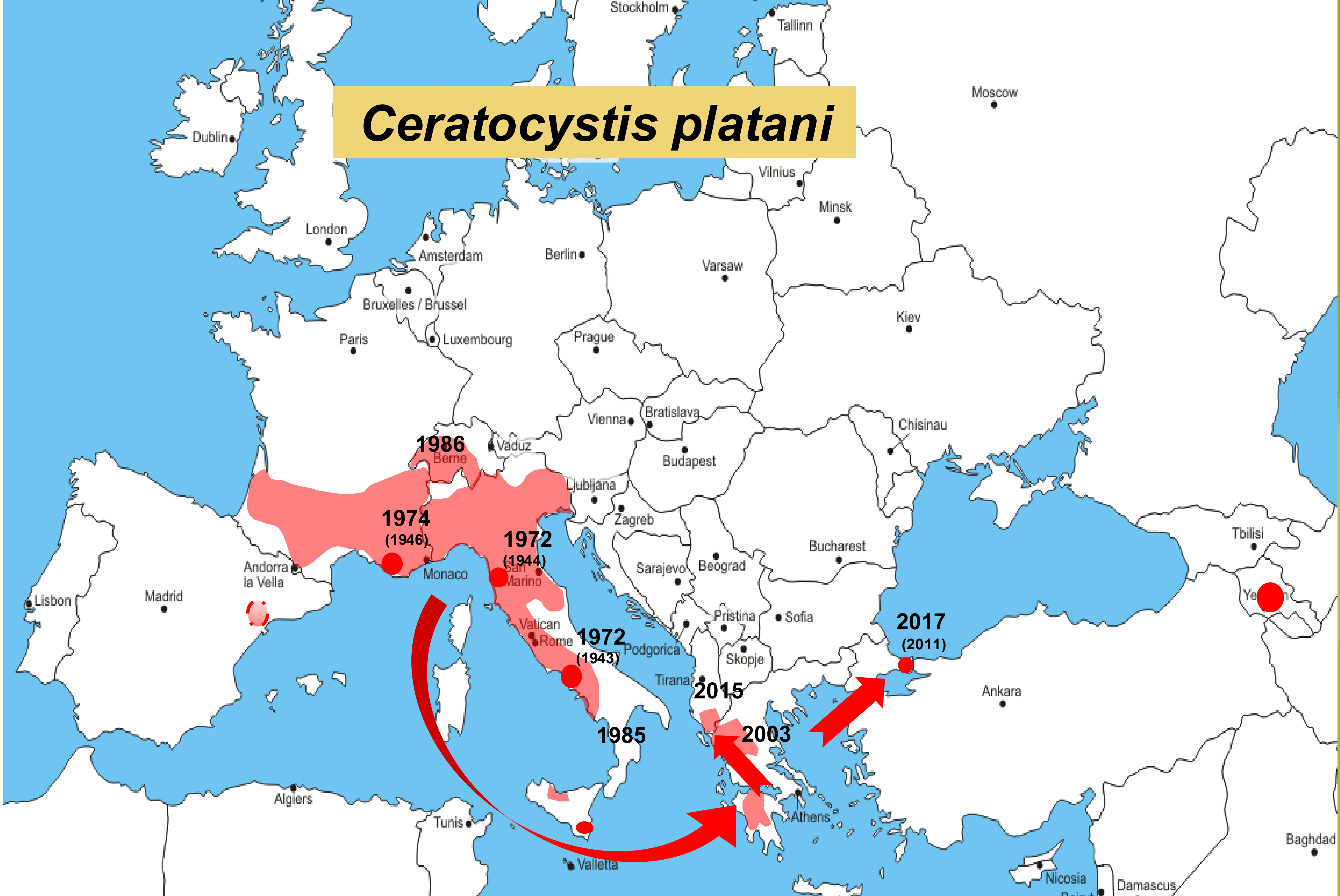



1972
1973
1978
1983
2003
1998
1993
1988

USA and NATO bases in Italy

http://debuglies.com/2016/09/10/italia-basi-us-nato/

Ceratocystis platani

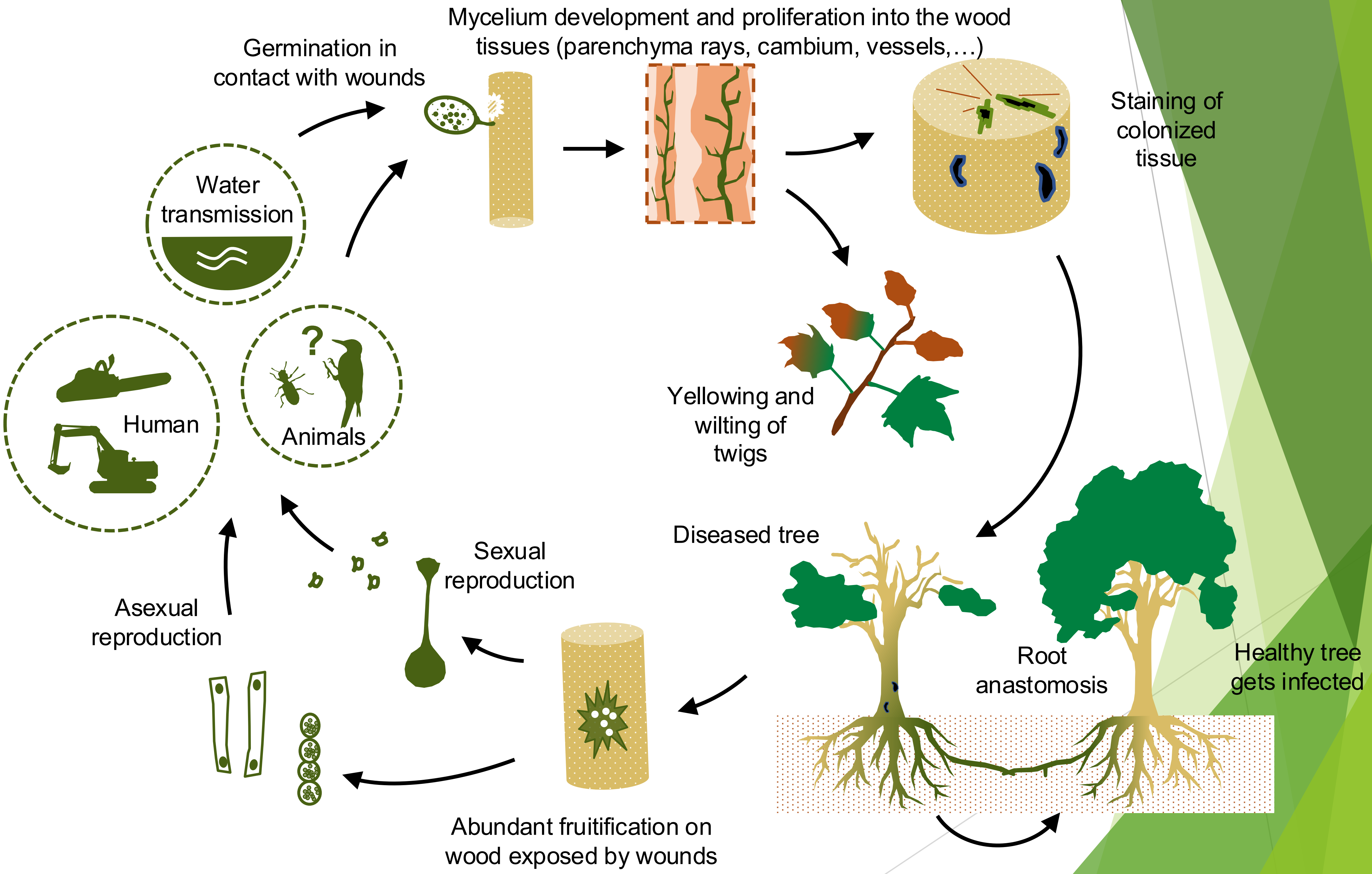


Evolution of plane tree health in Southern Europe in the past 10 years

The canker stain disease continues its inexorable spread

- ✓ The disease is devastating in Greece, on very old oriental planes of great aesthetic value
- ✓ 2011: first report from Istanbul (Turkey) confirmed in 2016
- ✓ 2014: first report from Albania
- ✓ 2006: Canal du Midi (S-France), 240 km-long canal, built in 1667, 42,000 plane trees, UNESCO World Heritage site
- ✓ > 26,000 trees felled between 2006 and 2020
- ✓ Several outbreaks in the northern half of France (Nantes and the Paris region) in 2019 and 2020
- ✓ Potential spread to N-Europe not limited by climate

Tsopelas et al 2015, 2017; Lehtijärvi et al 2018


Mycelium development and proliferation into the wood tissues (parenchyma rays, cambium, vessels,…)
Germination in contact with wounds
Staining of colonized tissue
Water transmission
Animals
Human
Yellowing and wilting of twigs
Diseased tree
Root anastomosis
Healthy tree gets infected
Sexual reproduction
Asexual reproduction
Abundant fruitification on wood exposed by wounds


May


Septembe
r


GENERALI

What can we do

A plane cultivar resistant to canker stain

- ✓ INRAE breeding program 1990-2000
- ✓ 960 *P. occidentalis x P. orientalis* hybrids screened
- ✓ One clone with quantitative resistance: ‘Platanor’
- ✓ ~ 10,000 trees have been planted in southern France and Italy
- ✓ Rare cases (0.3%) of canker stain symptoms and mortality were reported
- ✓ Replanting of ‘Platanor’ in soil heavily contaminated by *C. platani* following the uprooting of dead plane trees is not recommended

Vigouroux & Olivier 2004; ANSES 2019

Thank you!

Thanks to:

Pascal Frey, INRAE, France
Jean Pinon, INRAE, France
Maxime Guérin, Plante & Cité, France

Istituto per la Protezione Sostenibile delle Piante
Consiglio Nazionale delle Ricerche