



# **Better Training for Safer Food** *Initiative*

**Don Walker**

**Priority pests for  
Commission Work  
Programme**

**Session 11**

# Contents

A quick look at a range of priority pests that are not covered in other sessions

- Citrus Huang long bing
- Citrus tristeza virus
- Citrus canker (*Xanthomonas citri*)
- Citrus black spot (*Phyllosticta citricarpa*)
- *Aromia bungii*
- *Popillia japonica*

Distribution, biology & symptoms



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# Citrus Huang-long-bing (greening)

# Citrus Huang-long-bing (greening)

## A devastating disease spreading worldwide

**October 1999: 7% HLB trees**



**January 2005: 100%**



Behai (China). Photo JM Bové - Inra

# Symptoms



## Yellow shoots on young trees



Sweet orange

Affect all Citrus sp but symptoms more severe on oranges, mandarins, tangelos

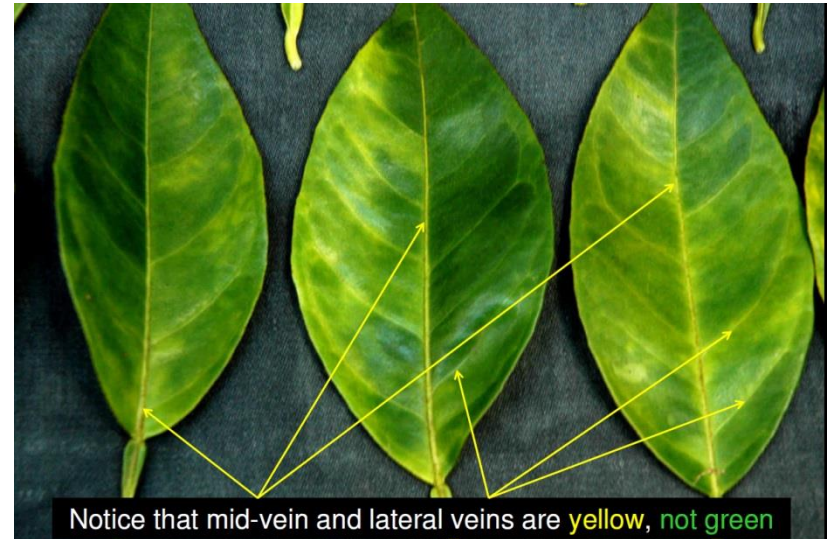
# Symptoms



## Blotchy mottle on leaves



Normal sweet oranges leaves

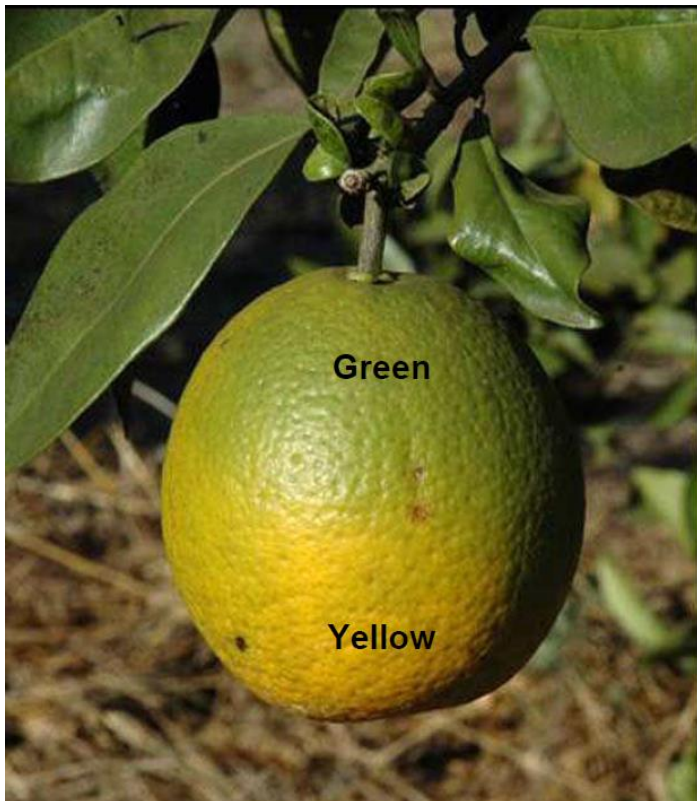


HLB infected sweet oranges leaves

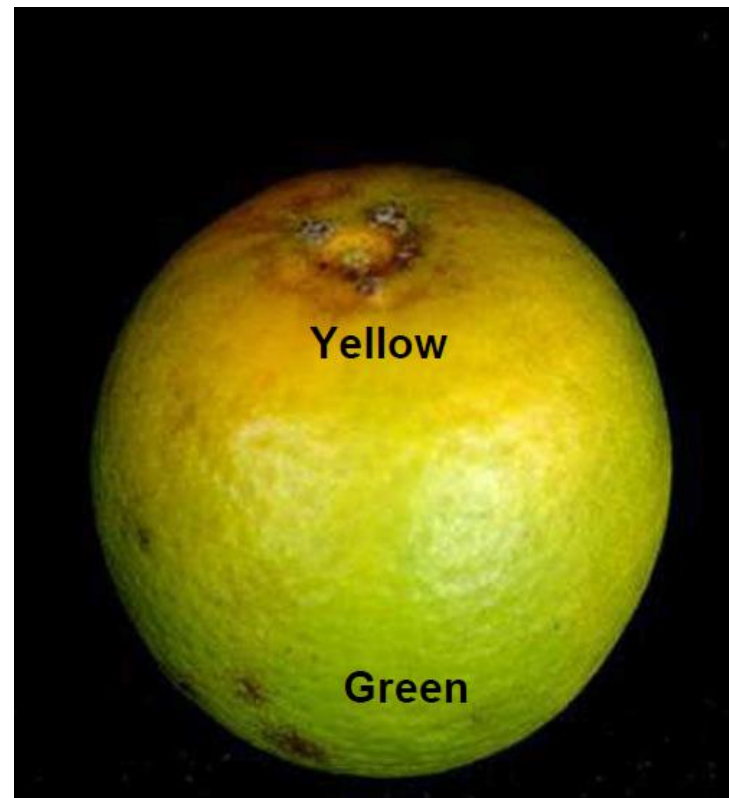
# Symptoms



## Color inversion in fruit



Normal fruit



HLB infected fruit

# Citrus Huang-long-bing (greening)

Causal agents:

'*Candidatus Liberibacter africanum*',

'*Ca. L. asiaticum*',

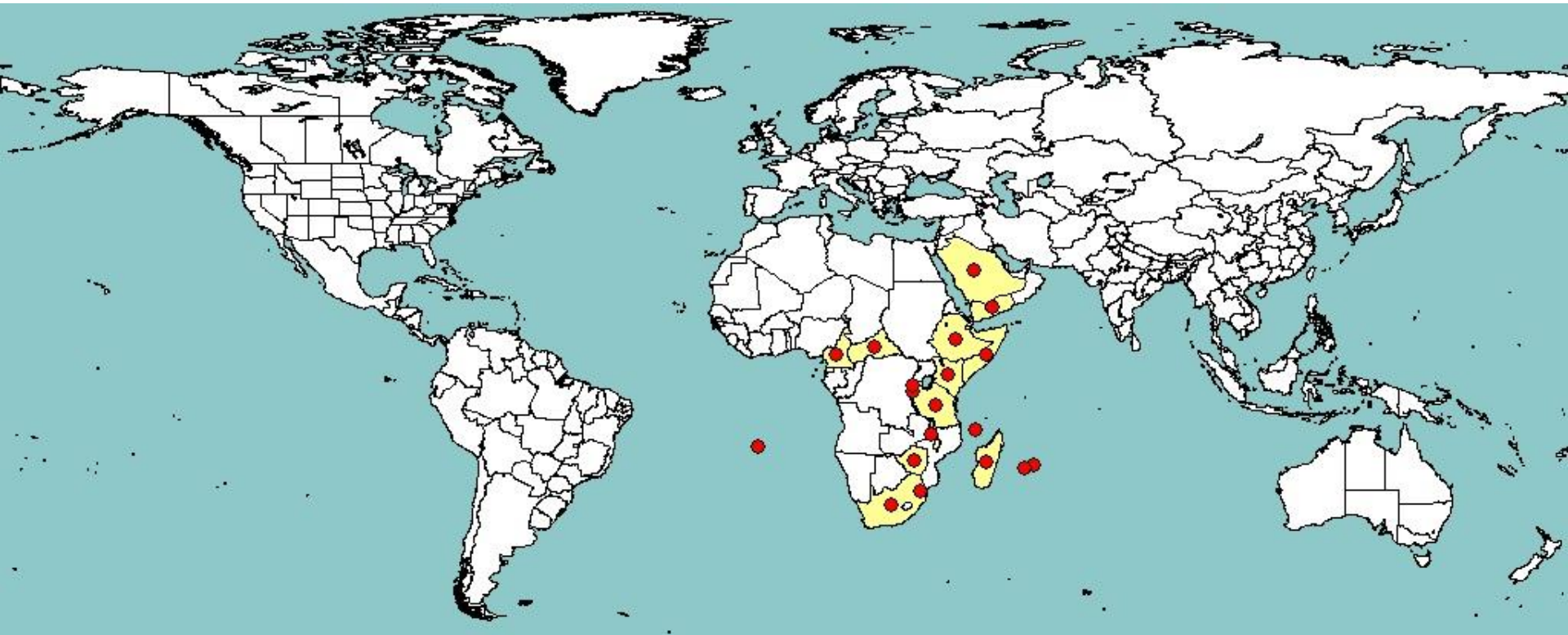
'*Ca. L. americanum*'

Transmitted by psyllid vectors *Diaphorina citri* and *Trioza erytreae*



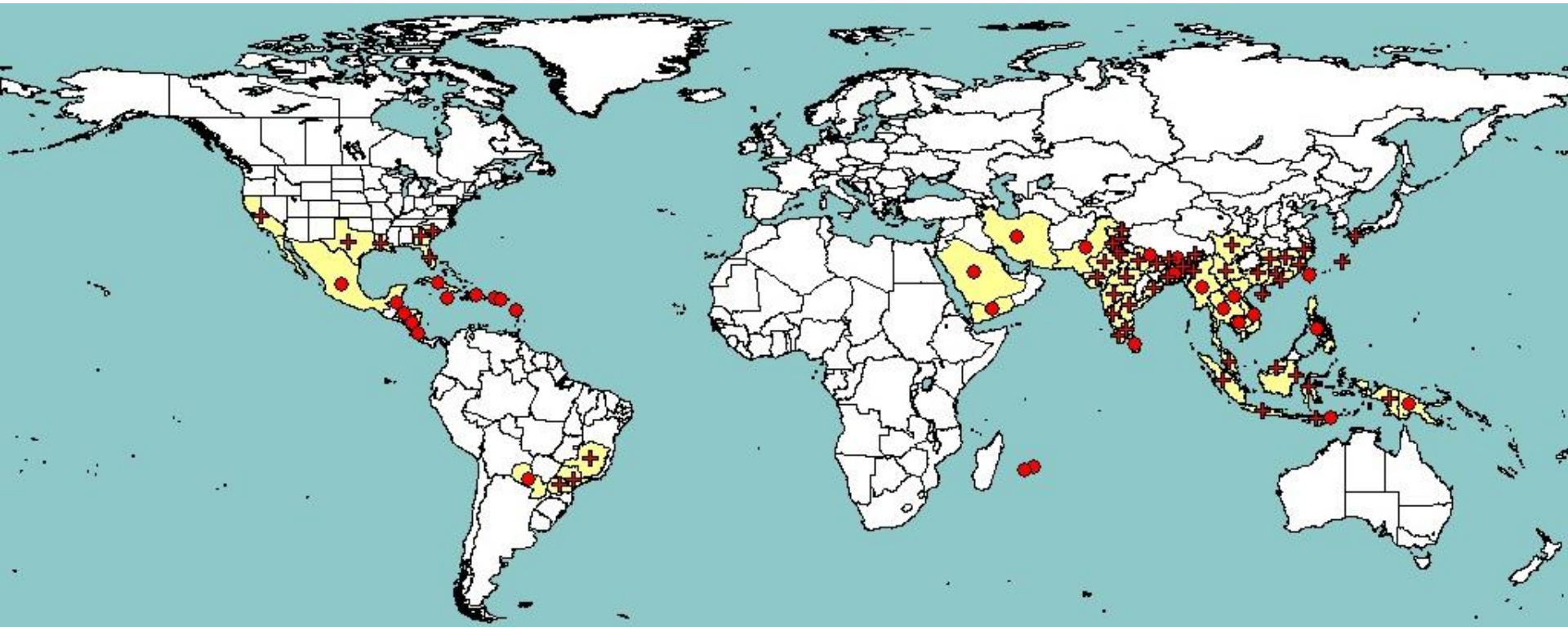


# *Liberibacter africanus*



Symptoms produced in cool conditions

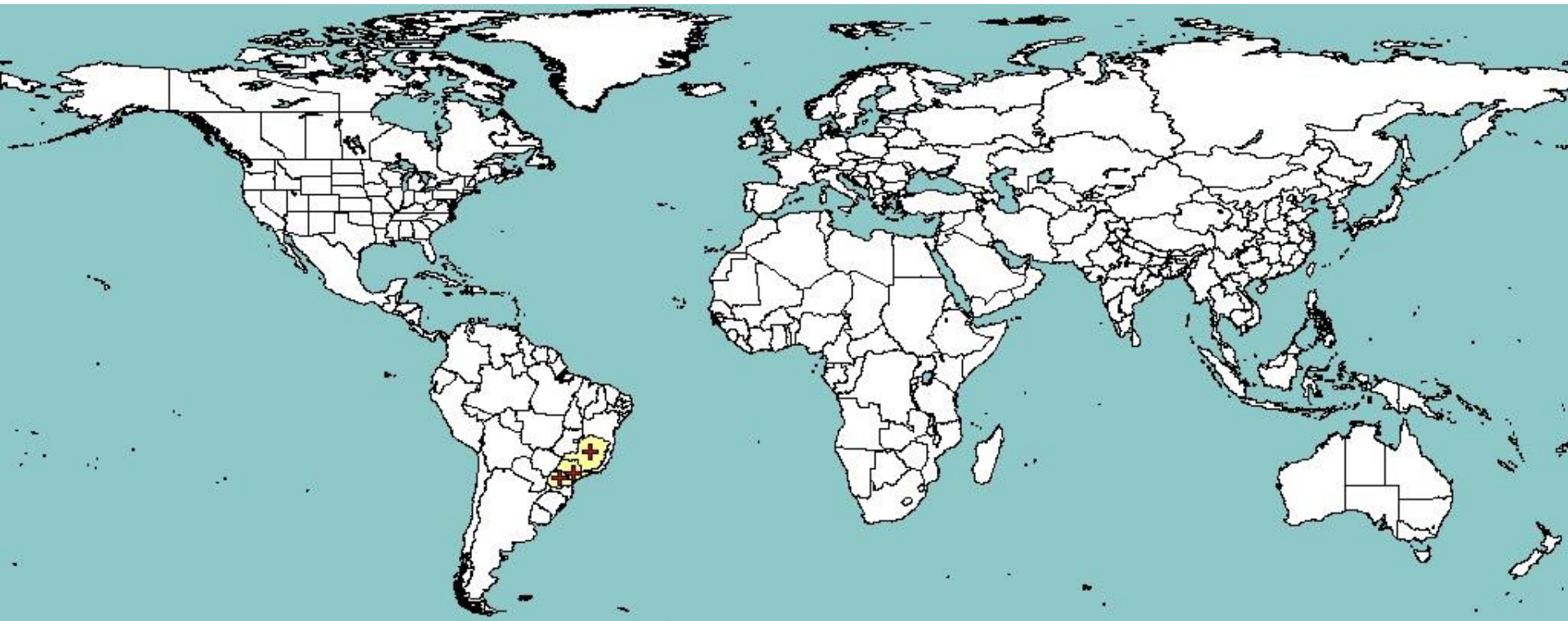
# *Liberibacter asiaticus*



First reported in South America (Brazil) in 2004, in USA (2005)

First reported in Iran in 2008

# *Liberibacter americanus*



First identified in 2004

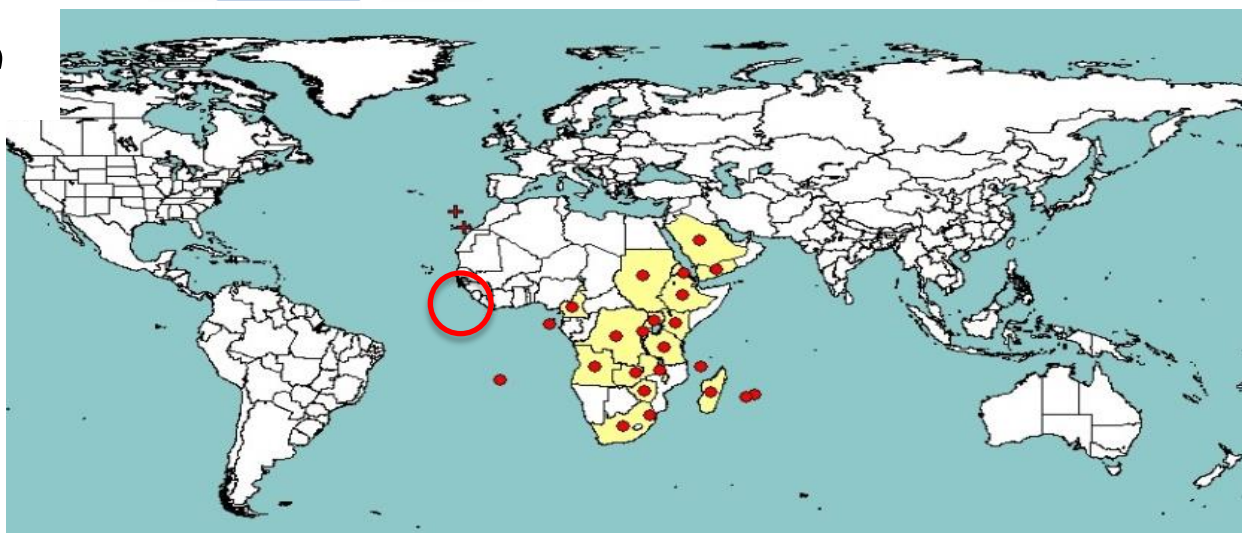
# Vectors



## *Triozia erytreae*



S.P. van Vuuren



- Vector of *Ls africanus* (experimentally *Ls asiaticus*)
- Established and widespread in Madeira (PT) since 1994
- First found in 2002 in Tenerife (Canary Isl, ES), under eradication
- **Found in 2014 in Spain and Portugal**

# Vectors

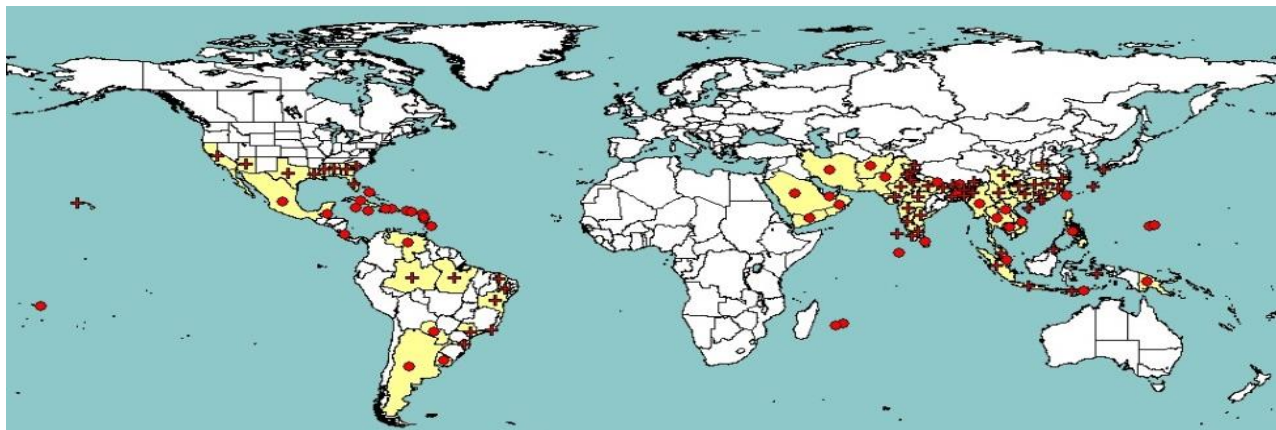


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## *Diaphorina citri*



JM Bové



- Vector of *Ls asiaticus* in Asia, America.
- Vector of *Ls americanus* in Brazil
- (experimentally can vector *Ls africanus*)
- *D. citri* present in Brazil since 1942, dramatic impact when HLB first introduced in 2004
- *D. citri* first reported in Iran in 2008
- Regularly intercepted on *Murraya* commodities (leaves, plants)



Food safety



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# Monitoring



*Trioza erytreae* (TRIZER) - <https://gd.eppo.int>



Food safety



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# Citrus tristeza virus

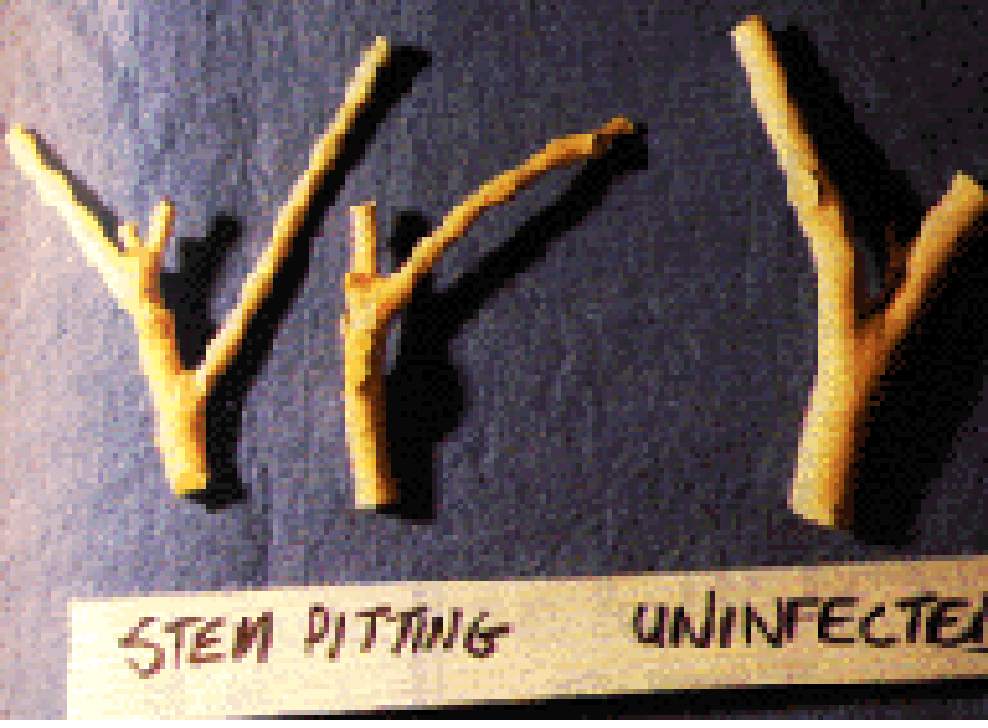


## Symptoms:

- Tristeza (decline)
- stem pitting
- Small fruit
- seedling yellows







UGA5202



Citrus tristeza virus (CTV000) - <https://gd.eppo.int>

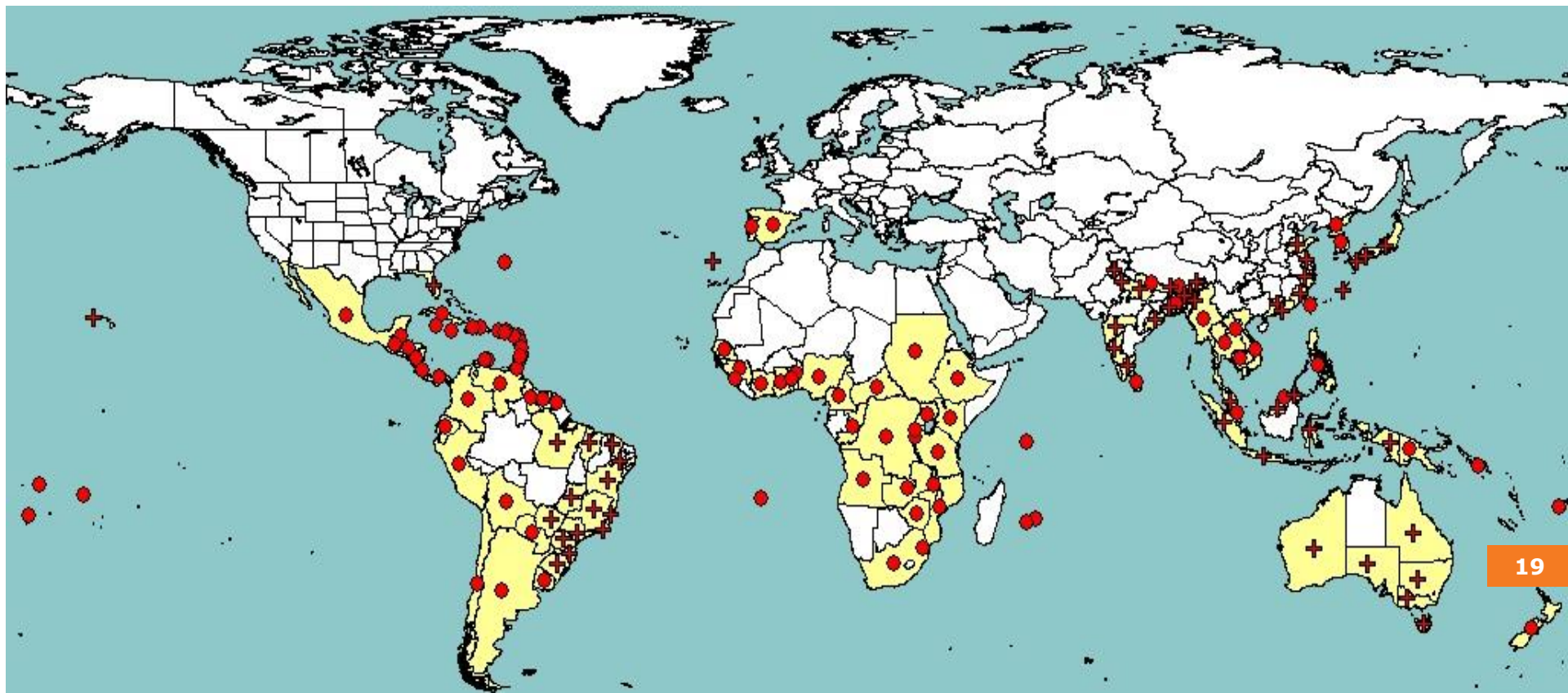


Citrus tristeza virus (CTV000) - <https://gd.eppo.int>



## Distribution

Present (restricted distribution) in the EU.



- Can be transmitted by local vectors (e.g. *Aphis gossypii*)
- The most efficient vector, *Toxoptera citricidus* (brown citrus aphid), only recently found in Spain (Asturias (2002) and other provinces) and Portugal (Madeira (1994), northern Portugal (2004))

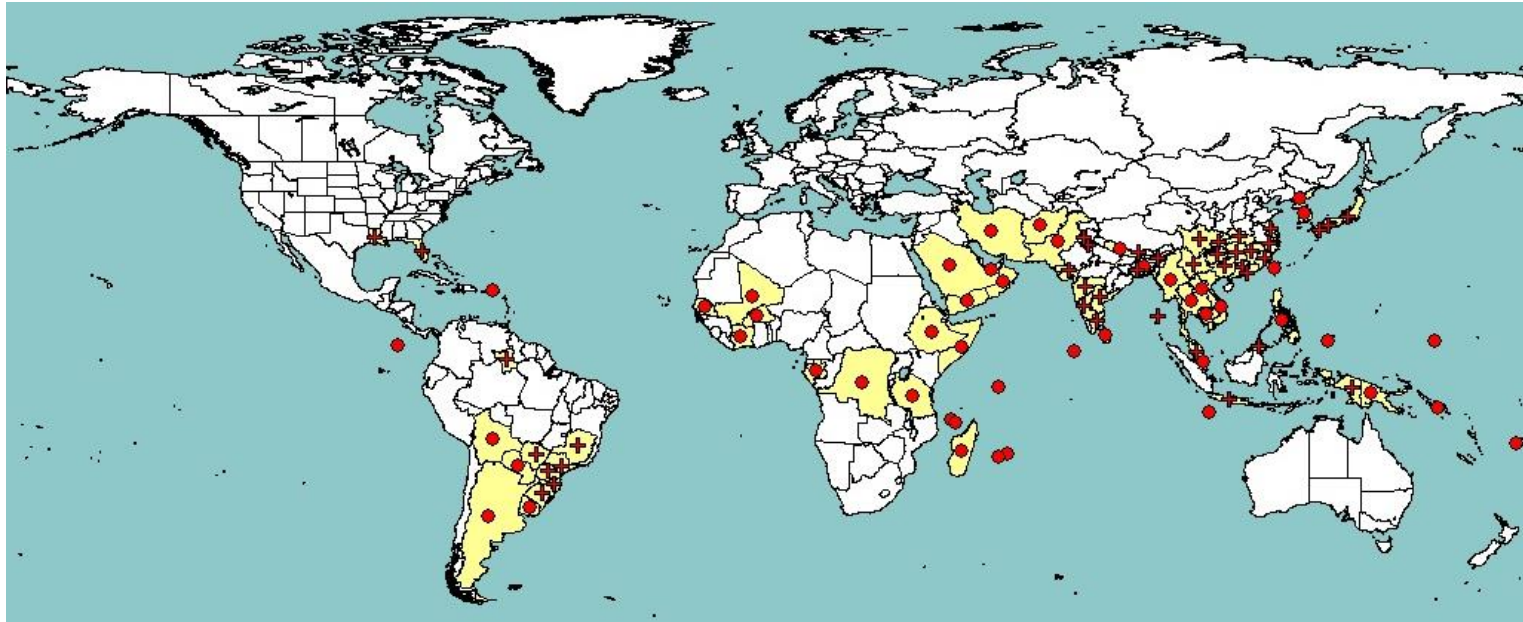


## Risks

- Risk of new strains
- Risk of epidemics increasing

BTSEF

***Citrus canker -  
Xanthomonas citri pv. citri  
Xanthomonas citri pv.  
aurantifolii***



Absent in the Euro-Mediterranean region  
Occurs in Asia, Africa, Americas

Spread by plants for planting.  
Frequently intercepted on fruit but transfer unlikely





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Spongy lesions  
on leaves



Stem canker  
(brown lesions  
under bark)

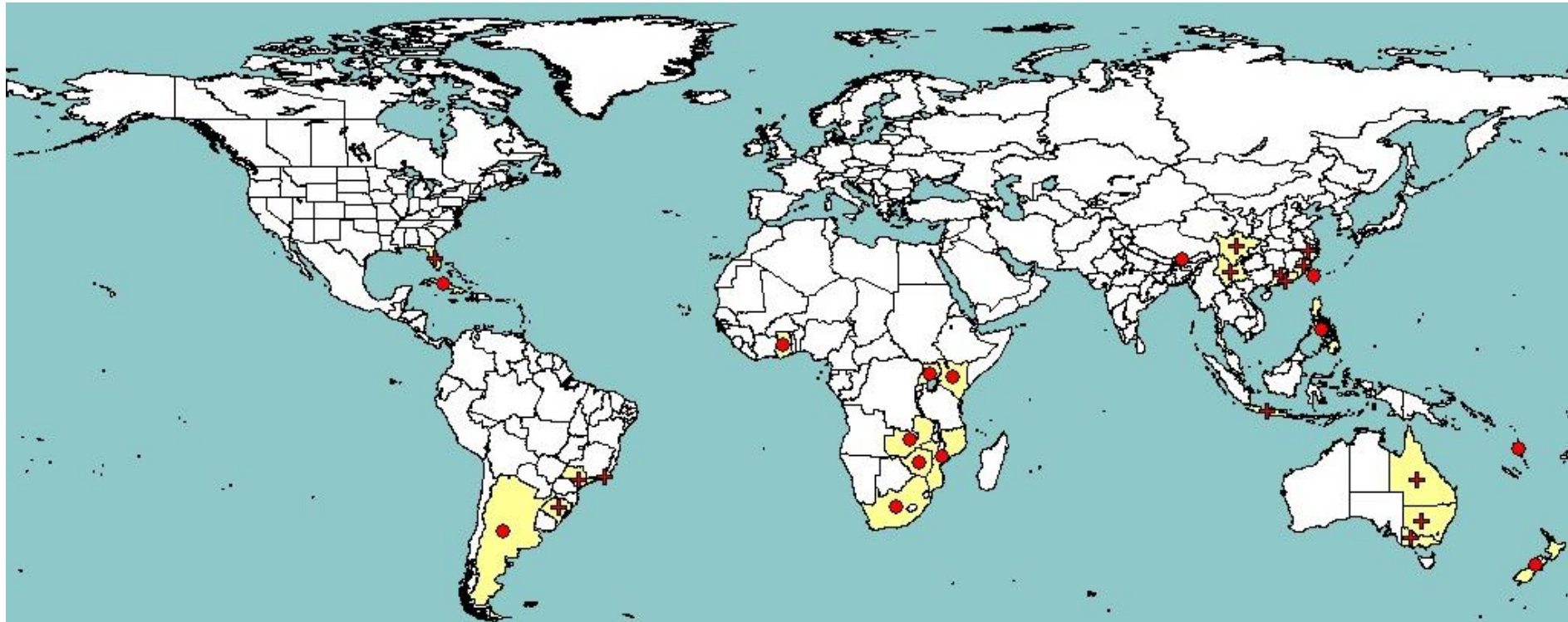


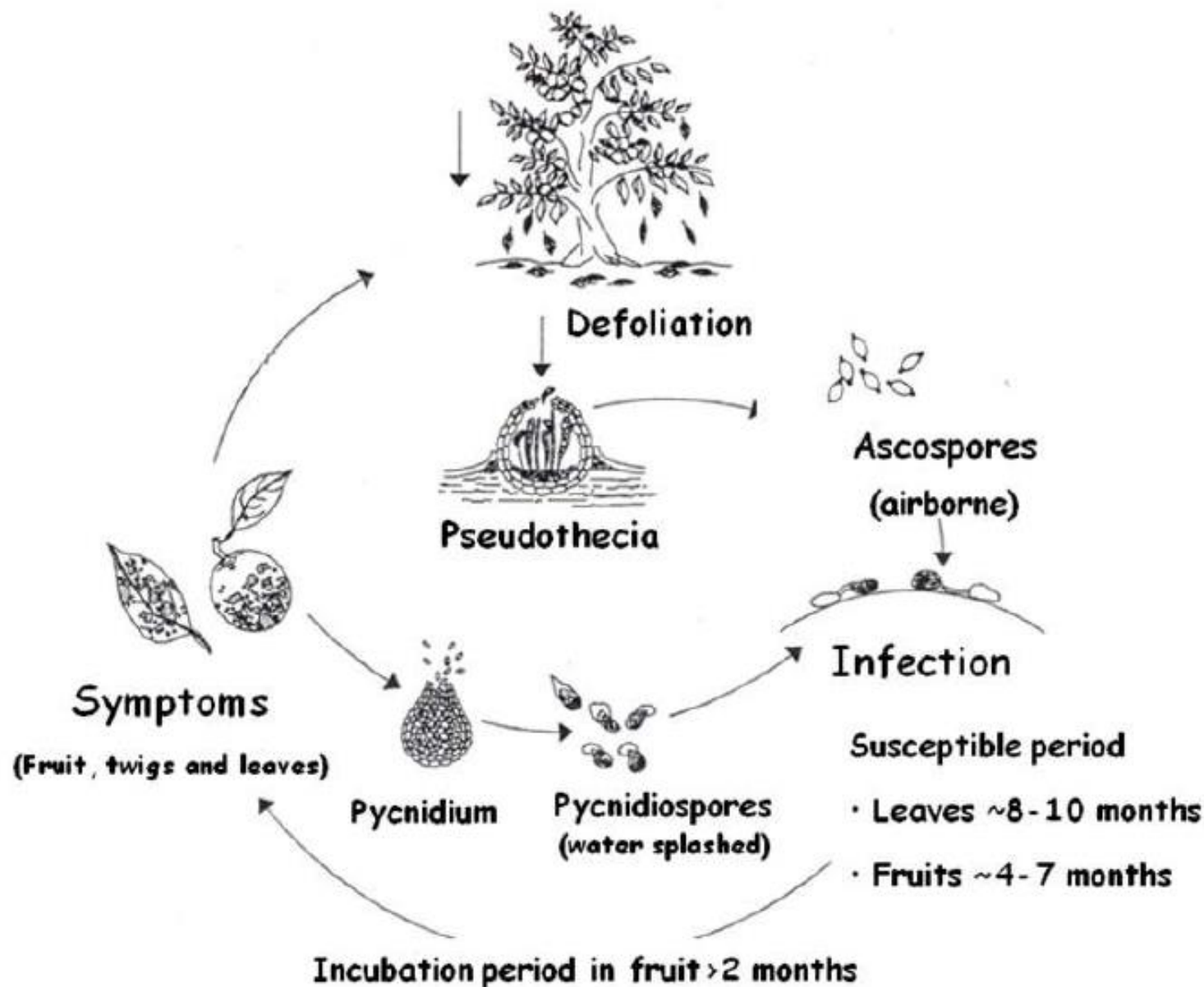
Crater like lesions on fruit

Food safety

***Citrus black spot***  
***Phyllosticta citricarpa***  
***(Guignardia citricarpa)***

- Absent in the Euro-Mediterranean region
- Occurs in Asia, Africa, Oceania. Recently recorded in Central and North America.
- Spread by plants for planting, fruit.  
Frequently intercepted on fruit, transfer possible



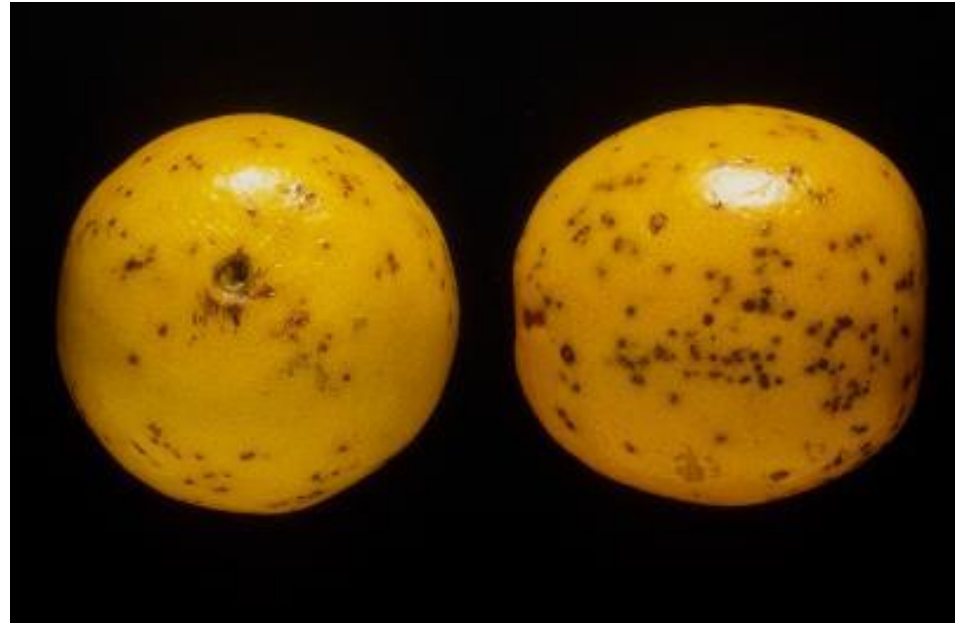


**Figure 1:** Life cycle of *Phyllosticta citricarpa* (adapted from a drawing by D. Drouillard in Timmer (1999) © American Phytopathological Society and modified according to Aguiar et al. (2012), Brentu et al. (2012), Reis et al. (2003) and Truter (2010))



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# Symptoms





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# ***Aromia bungii***

***Aromia bungii***  
***Red-necked longhorn beetle***



# *Aromia bungii*



- *Coleoptera: Cerambycidae*

## **Geographical Distribution**

- *Native in China, North Korea, South Korea, Mongolia, Vietnam.*
- *2008 – findings associated with wood packaging in UK and USA*
- *Outbreak in Germany – (single plum tree)*
- *Large damaging outbreak in Naples 2012 onwards*
- *Outbreak Milan area in 2013 (single peach tree)*

## **Host plants**

- *Prunus spp. (peach, apricot, plum, cherry and ornamentals)*
- *Other host records need verification (olive, poplar, pomegranate)*

## **Economic impact**

- *Pose a serious threat to Prunus in the UK*



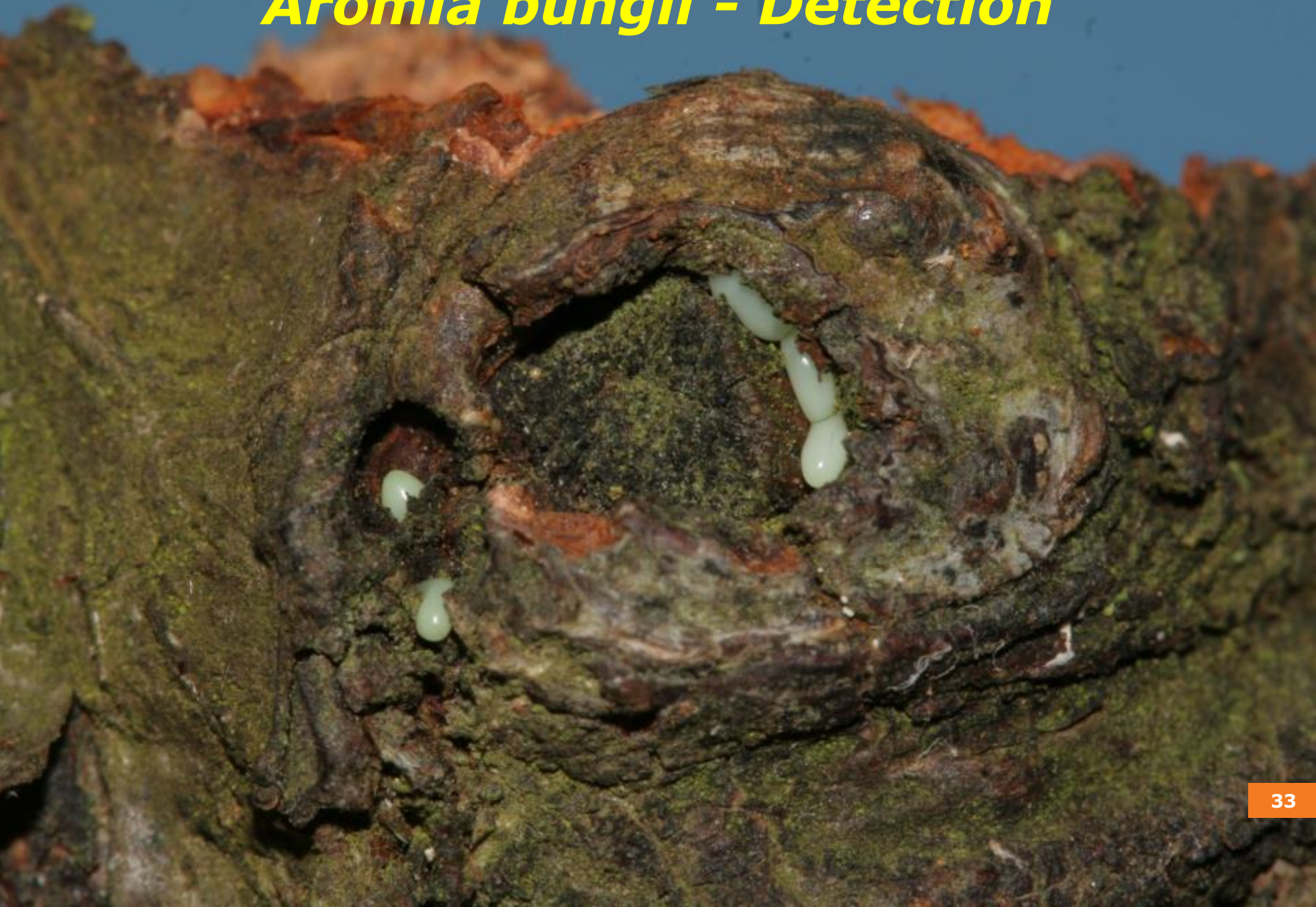
## ***Aromia bungii* - biology**

*Lifecycle typical for a longhorn beetle (e.g. Anoplophora spp.)*

- *Larvae tunnel into the main trunk and branches but not the roots*
- *Life cycle varies from 2-4 years (recently found to take 1 year in Italy when in culture)*
- *Adults emerge in spring to summer*



# *Aromia bungii* - Detection



# *Aromia bungii* - Detection



# *Aromia bungii* - Detection



# *Aromia bungii* - Detection



# *Aromia bungii* - Detection



# *Aromia bungii* - Detection



# *Diagnostic red pronotum, but ...*



Podany, 1971



# ***Aromia bungii – In Italy***

- *Discovered July 2012*
- *Over 40 private orchards affected*
- *Outbreak 10km wide with 1 outlier (5km)*
- *Apricot and peach mainly but also plum and cherry*
- *More than 600 trees infested*
- *Lots of Prunus in private gardens*
- *Wood packaging from China suspected as source*



# Aromia bungii – In Italy



Legenda

41

🌳 Monitoraggi negativi

🔥 Monitoraggi positivi



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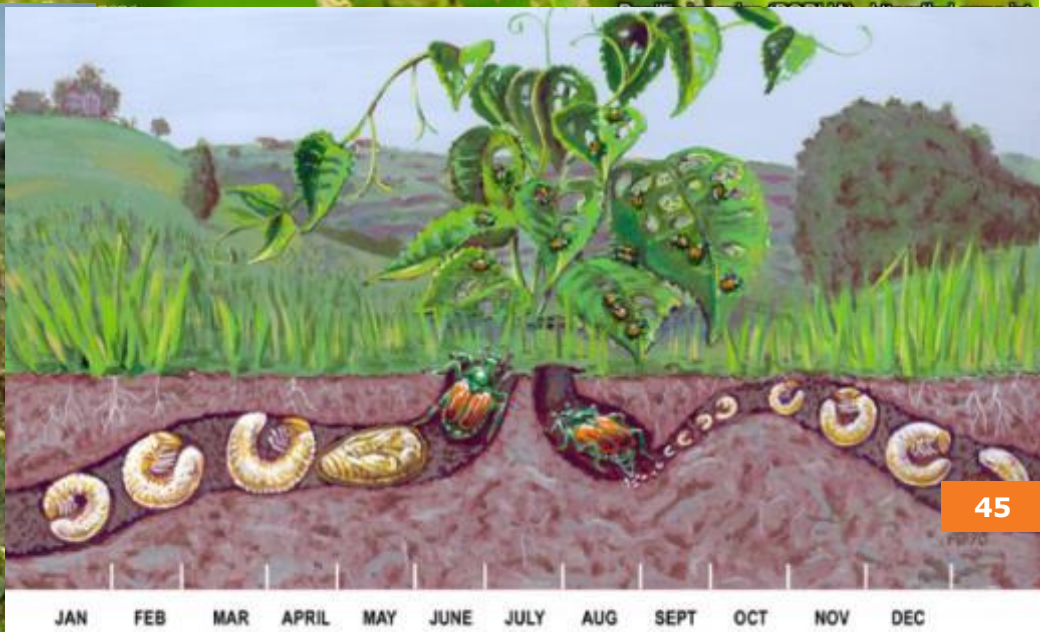
# *Popillia japonica*

# ***Popillia japonica***

- *Japanese beetle*
- *Major pest in the USA for over 100 years*
- *Findings in Piemonte & Lombardia in 2014*
- *One contiguous outbreak*
- *Massive numbers*
- *Polyphagous*
- *Larvae eat roots*
- *Adults attack leaves, flowers and fruits*
- *Adults and larvae can be moved in traded plants*







*Popillia japonica* (POPIJA) - <https://is>



# Soil sampling in Lombardy





# Thank you!

**Don Walker**

## **Better Training for Safer Food BTSF**

• *European Commission  
Consumers, Health and Food Executive Agency  
DRB A3/042  
L-2920 Luxembourg*