



# International Plant Sentinel Network

An early warning system for new and emerging plant pests

Ellie Barham, Suzanne Sharrock, Charles Lane, Richard Baker

*IPRRG 2016, 23-26 August, Parma, Italy*



# The Power of Plant Sentinels



Monitoring plants grown outside their native range, e.g. in botanic gardens

The main aim is to identify new pests threats

Other research opportunities to inform Plant Health include to:

- Increase understanding of known pests
- Identify new pest-host associations
- Identify potential biocontrol agents
- Support integrated management tools

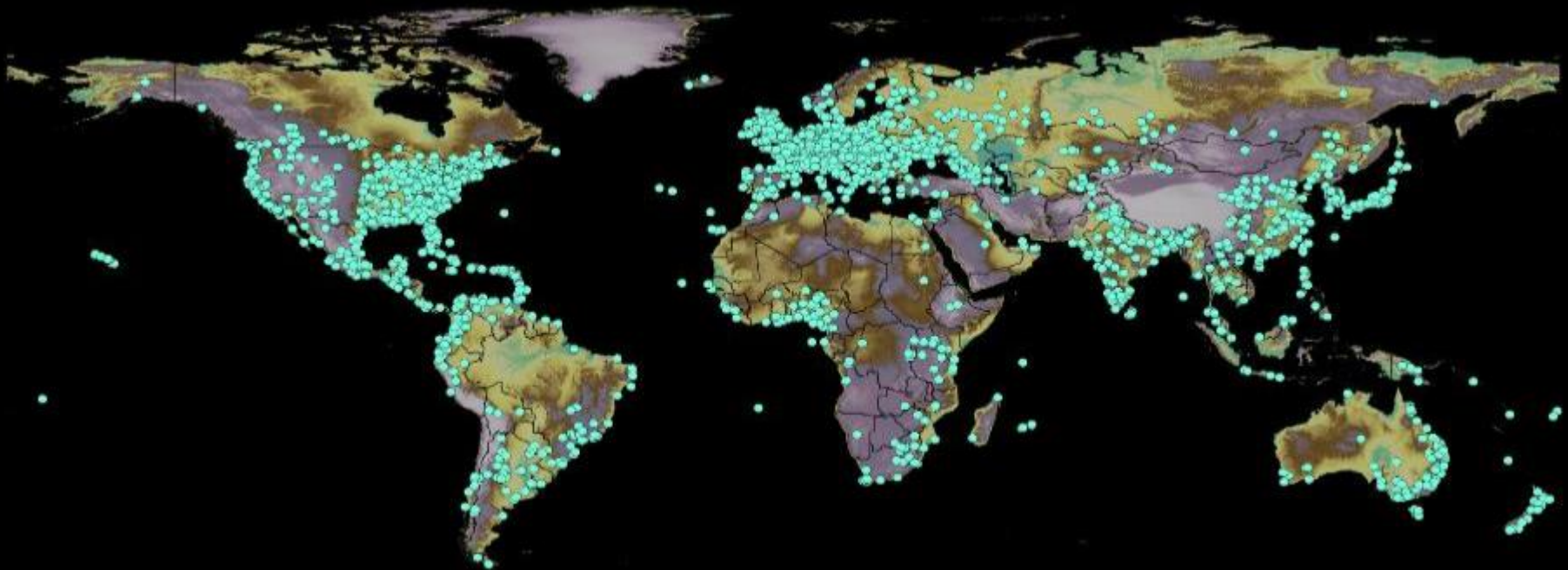
# The Road to the IPSN

- Work, principally in New Zealand, monitored expatriate endemic plant collections for pests: New Zealand Expatriate Plant Programme – Better Border Biosecurity (B3)
- EU 7<sup>th</sup> Framework Projects (ALIENS, PRATIQUE and ISEFOR) identified new pest threats by surveying European trees in eastern Asia growing in arboreta and specially planted in nurseries
- International workshop based at York in March 2012 led to the establishment of the IPSN in 2013 funded by EUPHRESKO



# Botanic Gardens, Arboreta and BGCI

- Over 2,500 botanic gardens worldwide
- Collections include 30-40% of known plant species
- Presence of non-native species in collections
- Knowledgeable staff with a relevant experience/expertise
- Botanic Gardens Conservation International (BGCI)



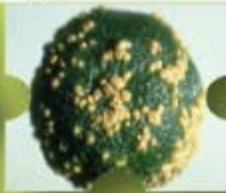
# Euphresco Project

**Phase 1 (2013-2016): Establishing the basis for an International Plant Sentinel Network as an early-warning system for future pest threats**

- Establishing international network and collaboration
- Developing and sharing best practice

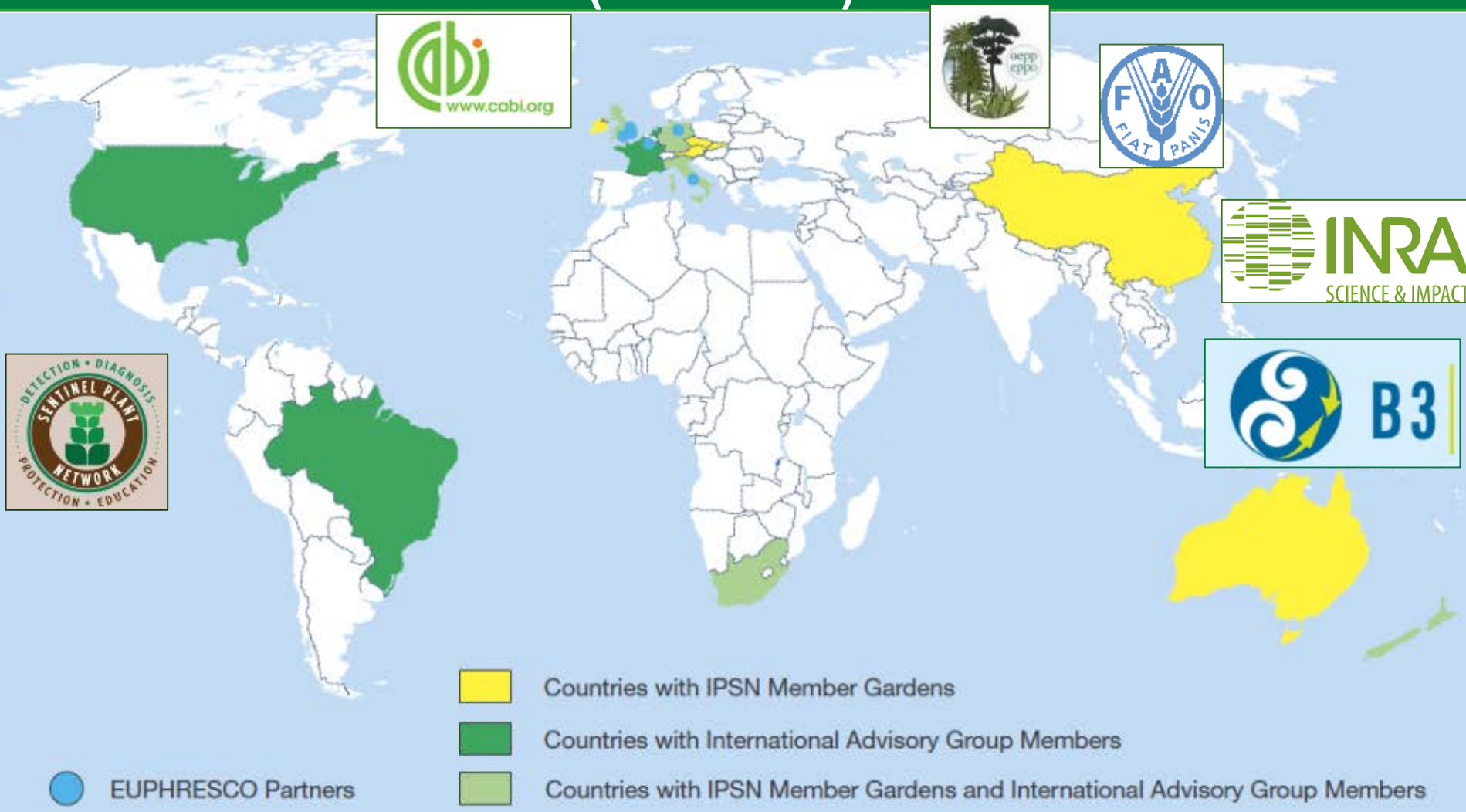


**Euphresco**  
Network



for phytosanitary research coordination and funding

# International Network and Collaboration (Phase 1)



# Developing and Sharing Best Practice: IPSN Plant Health Checker

- Plant Health checker
- IPSN Guides
- Posters
- EPPO Conference
- Meetings
- Publications
- Workshops

International Plant Sentinel Network  
**Plant Health Checker - Step 1**

Name of Botanic Garden / Arboretum: \_\_\_\_\_  
 Country: \_\_\_\_\_  
 Address: \_\_\_\_\_

Name of IPR contact: \_\_\_\_\_  
 Surname: \_\_\_\_\_  
 Date of air temp. \_\_\_\_\_  
 Date of observation: \_\_\_\_\_

**Plant details:**  
 Species: \_\_\_\_\_  
 Cultivar: \_\_\_\_\_

**General description of environment:**  
 Any management issues (e.g. irrigation, soil pH, soil watering) or any other use of pesticides/fungicides? \_\_\_\_\_

**For most species of this plant group a rating dependent on its health is appropriate:**  
 1) Green  
 2) Yellow / Foliage stress  
 3) Red / No growth

For most species of this plant group a rating dependent on its health is appropriate:  
 1) Green  
 2) Yellow / Foliage stress  
 3) Red / No growth

International Plant Sentinel Network  
**Plant Health Checker - Step 2**

Name of Botanic Garden / Arboretum: \_\_\_\_\_  
 Country: \_\_\_\_\_  
 Address: \_\_\_\_\_

Name of IPR contact: \_\_\_\_\_  
 Surname: \_\_\_\_\_  
 Date of air temp. \_\_\_\_\_  
 Date of observation: \_\_\_\_\_

**Plant details:**  
 Species: \_\_\_\_\_  
 Cultivar: \_\_\_\_\_

**General description of environment:**  
 Any management issues (e.g. irrigation, soil pH, soil watering) or any other use of pesticides/fungicides? \_\_\_\_\_

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International Plant Sentinel Network  
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 Date of observation: \_\_\_\_\_

**Plant details:**  
 Species: \_\_\_\_\_  
 Cultivar: \_\_\_\_\_

**General description of environment:**  
 Any management issues (e.g. irrigation, soil pH, soil watering) or any other use of pesticides/fungicides? \_\_\_\_\_

**For most species of this plant group a rating dependent on its health is appropriate:**  
 1) Green  
 2) Yellow / Foliage stress  
 3) Red / No growth

For most species of this plant group a rating dependent on its health is appropriate:  
 1) Green  
 2) Yellow / Foliage stress  
 3) Red / No growth



**Plant Health Checker - Step 1**

Name of Botanic Garden / Arboretum:		
Country:		
Address:		
Name of IPSN contact:		
<b>Survey details</b>		
Survey carried out by:		
Date of survey:		
Best description of season:		
Main reason for surveying this particular individual:		
<b>Plant details</b>		
Species (Cultivar):		
Accession number:		
GPS		
Country/region species is native to:		
Age/amount of time plant has been present in gardens:		
General Comments:		
<b>General description</b> (please tick)		
Generally healthy	<input checked="" type="checkbox"/>	Some damage <input checked="" type="checkbox"/>
Dying	<input checked="" type="checkbox"/>	Dead <input checked="" type="checkbox"/>
Any recent changes in health or overall look:		

**General description of environment**

Any management issues (e.g. irrigation, soil pH, sun bleaching) or any recent use of pesticides/ fungicides/ herbicides:

Description of environment (focusing on recent changes and individuals in close proximity):

For each section of the plant give it a rating dependent on how healthy it appears:

**Red (R)** = In very poor health and of imminent concern due to significant damage potentially resulting in death of individual  
**Orange (O)** = Not currently a concern but could develop; should be checked frequently to monitor progress

**Green (G)** = As would be expected on a 'healthy plant'

**Black (X)** = Absent/not applicable

Where an orange or red rating is given, ensure you give a description of why you've given it this rating in notes.

1.) Crown  
 R  O  G  X

2.) Flowers / Fruits (circle)  
 R  O  G  X

3.) New growth  
 R  O  G  X

4.) Leaves  
 R  O  G  X

5.) Trunk & branches  
 R  O  G  X

6.) Base and Roots (if exposed)  
 R  O  G  X

**Notes:**

What do you think is wrong with this plant?

(give an indication of how sure you are of this diagnosis)

Reference/file name of any photographs taken:

1.) Is a re-survey required?

2.) If yes, in what timeframe (include a suggested date)

3.) Should this be escalated to an appropriate staff member to carry out STEP 2?

4.) Name of person escalated to (if applicable):

5.) Date:





## Plant Health Checker – Step 2

Please read: This section should be completed if escalation is specified by STEP 1. It should be carried out by an appropriately trained staff member who has the relevant knowledge concerning the plant's history and/or pest and pathogen identification skills.

Tick all signs/symptoms that are at abnormal levels or are unexpected for the individual, and are thus cause for concern (e.g. are out of the ordinary/new to the plant). Give a description and an indication of severity/abundance in the notes, plus note anything else of importance or interest.

1. Crown			
Thin /sparse	<input checked="" type="checkbox"/>	<b>Notes:</b>	
Yellow leaves	<input checked="" type="checkbox"/>		
Dead wood	<input checked="" type="checkbox"/>		
2. Blossom/Flowers			
Dead	<input checked="" type="checkbox"/>	<b>Notes:</b>	
Malformed	<input checked="" type="checkbox"/>		
Swollen	<input checked="" type="checkbox"/>		
3. New Growth (Shoots and Buds)			
Dead	<input checked="" type="checkbox"/>	Dieback	<input checked="" type="checkbox"/>
Wilted	<input checked="" type="checkbox"/>	Malformed	<input checked="" type="checkbox"/>
<b>Notes:</b>			
4. Leaves			
Dead	<input checked="" type="checkbox"/>	Malformed	<input checked="" type="checkbox"/>
Smaller than expected (stunted)	<input checked="" type="checkbox"/>	Mosaics / mottled / variation in colour	<input checked="" type="checkbox"/>
Sticky	<input checked="" type="checkbox"/>	Galls	<input checked="" type="checkbox"/>
Rust	<input checked="" type="checkbox"/>	Mildew	<input checked="" type="checkbox"/>

4. Leaves continued (leaf spots)			
Single	<input checked="" type="checkbox"/>	Numerous	<input checked="" type="checkbox"/>
Present only at the edge	<input checked="" type="checkbox"/>	All over leaf	<input checked="" type="checkbox"/>
Only on old growth	<input checked="" type="checkbox"/>	Only on new growth	<input checked="" type="checkbox"/>
Yellowing (chlorotic leaves)	<input checked="" type="checkbox"/>	Brown/blackening (necrotic leaves)	<input checked="" type="checkbox"/>

**Notes:**

5. Trunk & Branches			
Canker or lesion	<input checked="" type="checkbox"/>	Approx. number	
Dry	<input checked="" type="checkbox"/>	Gummy/sticky	<input checked="" type="checkbox"/>
Approx. height of canker from ground (m)			
Galls	<input checked="" type="checkbox"/>	Approx. size (m)	
Trunk bleeding ('weeping patches')			<input checked="" type="checkbox"/>
Approx. height of bleed from ground (m)			
Approx. number of bleeds over trunk			
Vertical bleeds (in a line up the trunk)	<input checked="" type="checkbox"/>	Horizontal bleeds (around the trunk)	<input checked="" type="checkbox"/>
Loose Bark / bark flaking / comes off easily			<input checked="" type="checkbox"/>

**Notes:**

6. Base and Roots (if exposed)			
Bootlaces/black strands (1-2mm wide)			<input checked="" type="checkbox"/>
Fungal mycelium/white strands			<input checked="" type="checkbox"/>
Mushrooms/toadstools on plant			<input checked="" type="checkbox"/>
Damage by mammals	<input checked="" type="checkbox"/>	<b>Notes:</b>	
Decay / Rotting		<input checked="" type="checkbox"/>	
Wet	<input checked="" type="checkbox"/>	Dry	<input checked="" type="checkbox"/>

7. General pest damage			Location (e.g. leaf)
Insect galleries under loose bark	<input checked="" type="checkbox"/>		
Insect eggs	<input checked="" type="checkbox"/>		
Chewing damage	<input checked="" type="checkbox"/>		
Insect webbing	<input checked="" type="checkbox"/>		
Insect mines	<input checked="" type="checkbox"/>		
Frass	<input checked="" type="checkbox"/>		
Bore holes (circle below)			
<5mm	5-10mm	>15mm	<input checked="" type="checkbox"/>

**Notes:**

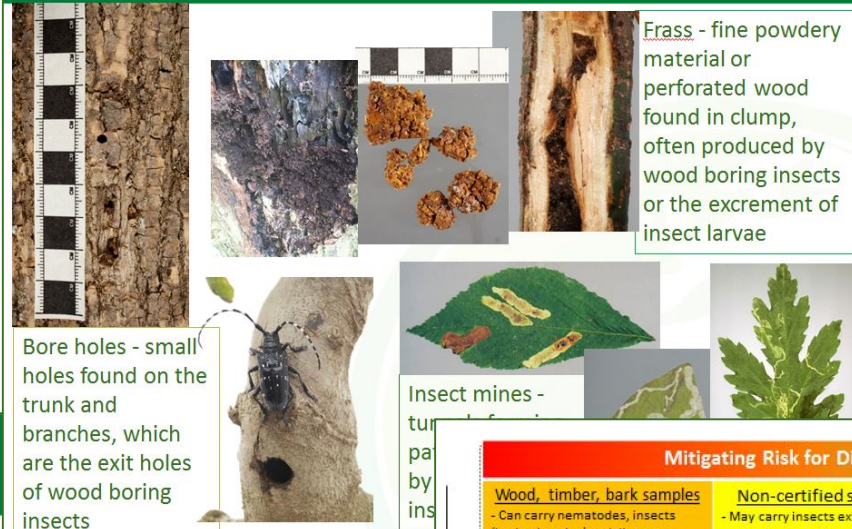
8. Pest sightings		Location (e.g. leaf)	Photo (file name)
<i>(give an indication of how sure you are of this identification)</i>			
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		

9. General Observations and Additional Notes	
<b>Reference/file name of any photographs taken:</b>	

<b>What do you think is wrong with this plant?</b> <i>(give an indication of how sure you are of this diagnosis)</i>		1.) Is a re-survey required? <input checked="" type="checkbox"/>		2.) If yes, in what timeframe <i>(include a suggested date)</i>	
3.) Should this be reported to the local diagnostic laboratory - a physical sample may be required <i>(this is only if symptoms are severe or if a pest of concern)</i>		<input checked="" type="checkbox"/>	3.) Date reported:		4.) Should this be escalated to local National Plant Protection Organisation (NPPPO)? <i>(as advised by local diagnostic laboratory)</i>
					5.) Date reported:

# Developing and Sharing Best practice: IPSN Guides

## 7. General Pest Observations



**Frass** - fine powdery material or perforated wood found in clump, often produced by wood boring insects or the excrement of insect larvae

**Bore holes** - small holes found on the trunk and branches, which are the exit holes of wood boring insects

**Insect mines** - tunnels eaten by insect larvae within the leaf tissue

## 9. Leaf curling

### Characteristic of damage

- Caused by abnormal growth of the leaf tissue
- Makes a shelter for continued eating
- Can also be caused by certain fungi and viruses



### Potential cause:

- Aphidoidea
- Larvae of some Lepidoptera
- Some mites (Acari)



Mitigating Risk for Different Types of Plant Material				Low Risk ↑
<b>Wood, timber, bark samples</b> <ul style="list-style-type: none"> <li>- Can carry nematodes, insects (boring-beetles) and diseases</li> <li>- Wood with bark attached is considered particularly high risk</li> <li>- Check under international law (ISPM 15) woody packaging should be marked to show it has been treated appropriately</li> </ul>	<b>Non-certified seed</b> <ul style="list-style-type: none"> <li>- May carry insects externally and pathogens internally</li> <li>- Inspect both seedlings and (later) young plants</li> <li>- Source carefully</li> </ul>	<b>Dried artefacts</b> <ul style="list-style-type: none"> <li>- Low risk to live plants but can cause problems for herbaria, libraries and galleries</li> <li>- Appropriately treat; e.g. fumigation, heat treatment or rapid freezing</li> </ul>	<b>Certified seed</b> <ul style="list-style-type: none"> <li>- International Seed Testing Association (ISTA) regulated</li> <li>- Unlikely to be pest free but will have very low levels of fungal and bacterial infections</li> <li>- Careful planting; away from susceptible/unhealthy specimens</li> </ul>	
<b>Plants</b> <ul style="list-style-type: none"> <li>- Pose a significant threat from any source, the wild, commercial, other organisations, in-country or further afield</li> <li>- Inspect carefully on arrival</li> <li>- Quarantine for at least 6 weeks</li> </ul>	<b>Soil and growing media</b> <ul style="list-style-type: none"> <li>- Carry nematodes, flatworms, insects and microorganisms such as fungi bacteria</li> <li>- Quarantine with any associated plant material for at least 6 weeks</li> </ul>	<b>Tissue cultures</b> <ul style="list-style-type: none"> <li>- Usually considered low risk, but depends on source</li> <li>- May carry latent infections and viruses which are very hard to detect</li> <li>- Source carefully</li> </ul>	<b>Dried flowers</b> <ul style="list-style-type: none"> <li>- Low risk to live plants but can cause problems for herbaria, libraries and galleries</li> <li>- Inspect on arrival</li> <li>- Source carefully</li> </ul>	
<b>Large specimen plants</b> <ul style="list-style-type: none"> <li>- Harbour many pests and diseases, and are hard to inspect properly</li> <li>- Plants in leaf and with large root balls are particularly high risk</li> <li>- Crucial to source carefully and know where material originated</li> <li>- Ideally a rigorous risk assessment should be carried out</li> <li>- Quarantine for at least 6 weeks</li> </ul>	<b>Wild-sourced seed</b> <ul style="list-style-type: none"> <li>- May carry insects externally and pathogens internally</li> <li>- Thoroughly inspect both seedlings and (later) young plants</li> <li>- Where suitable, soak in a surface sterilant such as dilute hydrogen peroxide</li> </ul>	<b>Reproductive material or storage organs</b> <ul style="list-style-type: none"> <li>- E.g. bulbs, fruits, etc.</li> <li>- Common pathway for non-native and quarantine pests and diseases</li> <li>- Thoroughly inspect on arrival</li> <li>- Source carefully</li> </ul>	<b>Cut flowers</b> <ul style="list-style-type: none"> <li>- Dependent on type, source and cultural conditions e.g. tropical flowers such as <i>Phalaenopsis</i> have been found to be infested with <i>Thrips palmi</i></li> <li>- Inspect on arrival</li> <li>- Source carefully</li> </ul>	

**Type of material**

- General information
- Potential mitigation actions

High risk (red) to Low risk (green)



# Developing and Sharing Best practice: Posters

International Plant Sentinel Network  
**EMERGING PEST AND DISEASE THREATS TO TREES IN THE UK**

fera Kew BGI

## Plane trees *Platanus sp.*

London plane is a deciduous tree that can grow up to 35m high and live for hundreds of years. Leaves are palmately lobed, bark is flaky grey and cream and fruits are clustered and spikey. Despite being the most common tree in London it is not a UK native, the species is thought to be an American and oriental plane hybrid which was brought from Spain around the 17<sup>th</sup> Century.

Robert Vides#23331, Doronicum HT., Bugwood.org

### Plane wilt *Ceratocystis platani*

Staining as seen on the trunk and after removing bark  
 Xylem staining: A. Vigouroux, ENGA, Bugwood.org  
 Dieback compared to a healthy tree

- A fungal pathogen which commonly causes infection through wounds and root contact.
- Causes severe wilting, xylem staining, cankers and ultimately death. A single infection can cause a canker 2-2.5m long within a year
- Present in the U.S., parts of Europe and Asia (Armenia) but, currently, absent from the UK.

### Plane lace bug *Corythucha ciliata*

Feeding: Kansas Department of Agriculture, Bugwood.org  
 Plane lace bug: C. Malumphy, Fera  
 Damage both sides of the leaf: C. Malumphy, Fera

- Highly invasive insect ~3mm length, 2mm width (pictured) which is an obligate feeder on plane. Adults and nymphs feed on leaf's underside. Heavy infestation can cause severe chlorosis, leaf fall and dieback.
- Native to North America; present in Asia, South America, Oceania and Europe.

### Polypagous shot hole borer *Euwallacea sp.* (and associated *Fusarium euwallaceae* sp. nov.)

'Shot holes' and running sap: C. Malumphy, Fera  
 Javier Mercado, Colorado state University, Bugwood.org  
 Dark staining internally and dieback: C. Malumphy, Fera

- PSHB is a very small (2.5mm) beetle, morphologically identical to tea shot hole borer, *E. fornicatus* (pictured).
- Symptoms include bleeding, staining, gumming, reddish sawdust-like frass, numerous small emergence holes (around 0.85mm in diameter.), epicormic growth and dieback. Internally the fungus causes dark staining.
- Infested trees can be killed rapidly, and the beetle is known to have an extremely large host range.
- Present in the U.S. (California) and Israel.

**REPORT ANY SUSPECTED SIGHTINGS TO \_\_\_\_\_ DATE: \_\_\_\_\_**

For more information about the IPSN go to: [www.plantsentinel.org](http://www.plantsentinel.org)  
 Useful website: <http://www.forestry.gov.uk/forestry/1beeh-9ruekf>  
<http://www.cabi.org/isc/datasheet/42237>

Reference source: UK Plant Health Risk Register Version: 1.1 02.2015

International Plant Sentinel Network  
**EMERGING PLANT PEST AND DISEASE THREATS:**

fera Kew BGI

## *Xylella fastidiosa*

*Xylella fastidiosa* is a damaging bacterium with a vast host range including both woody and herbaceous plants. Significant mortality to olive trees (*Olea spp.*) is now occurring in southern Italy and it has also been found in Corsica and southern France. Alongside Olives and those species listed below, *X. fastidiosa*'s host list includes maples (*Acer spp.*), pecans (*Carya illinoensis*), *Citrus spp.*, *Prunus spp.*, *Pyrus spp.*, plus many more. For a full list visit: <http://www.cabi.org/isc/datasheet/57195>

### Coffee *Coffea spp.*

Bruno Legendre, Anses, Plant Health Laboratory, Angers (FR)  
 Maria Bergmas-Viari, NPPO (NL)

- Main symptom is leaf scorch (images) starting from the margins OR the apex
- Premature loss of older leaves
- Overall stunting; reduction of fruit size and quantity
- Dieback of lateral shoots
- Premature loss of leaves
- Shortened internodes; on the stem between leaf bearing branches

### Oleander *Nerium oleander*

Donato Bossici, CNR - Institute for Sustainable Plant Protection, UO5, Bari (IT)

- Chlorotic mottling along leaf edges – turns to brown
- General stunting of leaves and internodes
- Defoliation after leaf scorch has killed the leaves
- New growth will also be symptomatic (similar to scorching seen in coffee)

### Oak *Quercus spp.*

John Hartman, University of Kentucky, www.Bugwood.org

- Scorch is pronounced, with a dull red or yellow halo between normal colour and scorched section (above)
- Will appear on leaves of all ages at the same time – thus a (nearly) whole branch/tree will be affected
- Leaves may curl and drop prematurely

### Grapevine *Vitis vinifera*

M. Scortichini, Istituto Sperimentale per la Frutticoltura, Roma (IT)  
 J. Clark, University of California, Berkeley (US)  
 J. Clark & A.H. Purcell, University of California, Berkeley (US)

- Green 'islands' – caused by stems maturing irregularly leading to patches of brown and green tissue (images)
- Chlorotic margins of leaves eventually becoming scorched – with a yellow halo between the scorched part of the leaf and healthy green tissue – development of leaf scorch will vary with variety (middle image)
- Development of late, stunted and chlorotic shoots after a few years - mortality usually occurs after 2-5 years

**Please note:** plants must have more than one symptom before considering *X. fastidiosa* as a cause. Symptoms alone can be caused by other factors including other pests and diseases and environmental factors (frost damage, sun bleaching etc.)

Photos: <https://doi.org/10.1111/phy.12100> Header photos: Damage to olive trees, Donato Bossici, CNR - Institute for Sustainable Plant Protection, UO5, Bari (IT) & Camille Picard - DIAL-SQUP (FR)

**REPORT ANY SUSPECTED SIGHTINGS TO \_\_\_\_\_ DATE: \_\_\_\_\_**

For more information about the IPSN go to: [www.plantsentinel.org](http://www.plantsentinel.org)  
 Useful website: <http://www.cabi.org/isc/datasheet/57195>  
[http://www.eppo.int/QUARANTINE/special\\_topics/Xylella\\_fastidiosa/Xylella\\_fastidiosa.htm](http://www.eppo.int/QUARANTINE/special_topics/Xylella_fastidiosa/Xylella_fastidiosa.htm)

Reference source: IPSN Version: 1.1 09.2015

# Developing and Sharing Best practice: Conference & Publications

- Plant Health checker
- IPSN Guides
- Posters
- EPPO Conference
- Meetings
- Publications
- Workshops





# Developing and Sharing Best practice: Workshops & training



Shenzhen Fairy Lake Botanical  
Garden (CAS), China


Huntington Library, Art Collections and  
Botanical Gardens, U.S.




Royal Botanic Gardens Kew,  
UK



# Data Collection - Targeted Surveys



Royal Horticultural Society  
Sharing the best in Gardening



International Plant Sentinel Network

## IPSN Fact Sheet for Agapanthus gall midge

**Purpose of study**

- To determine the worldwide distribution of the Agapanthus gall midge, deducing both its natural and introduced range.
- To collect information on the biology and lifecycle of the midge.

**Research question:**

- Are Agapanthus plants in your collection affected by the Agapanthus gall midge?
- How severe are the symptoms?
- During which months of the year are active larvae present?
- Which species of Agapanthus are affected?

**Brief description:**

The agapanthus gall midge is an undescribed pest affecting Agapanthus. The tiny gall midge lays eggs which develop into maggot flower head sheath. The midge can cause the bud to be deformed. The midge was first noticed in a UK private garden and reported to the Royal Horticultural Society. Subsequent reports indicate that it has been present in the UK and South Africa.

**Host range:**


Recorded on these species and cultivars thereof: *Agapanthus inopertus*, *A. praecox*.


**Images of pests, signs and symptoms:**

**Symptoms**


The agapanthus gall midge affects Agapanthus flowers in the following ways:

- Infested flower buds are deformed in shape and may abort.
- Affected buds fail to open and either dry up or rot.
- If the infestation occurs as the flower spike is developing, numerous creamy yellow or orange maggots, up to 3 mm long, are found in a watery liquid (see Figures 1b and 1c).






Royal Horticultural Society



International Plant Sentinel Network




**Figure 2.** Symptoms of agapanthus gall midge infestation. Severity from low to high (left to right). Severity in the corresponding Plant Health Checker is rated: 1 (no visible symptoms), 2(a), 3(b), 4(c), 5(d) to 6 (all buds affected/flower heads completely aborted).

Infestation has been observed at very early stages of flowering, when the flower head sheath had not yet opened. When infested at this stage the larvae develop between the stems of the developing buds inside the sheath, rather than inside buds (Figure 1c, 2c & d). Heavy infestation at this stage can cause the flower head to abort completely.


**Lifecycle**

There is limited knowledge of the lifecycle of the agapanthus gall midge, but it is understood that it is quite similar to other Cecidomyiidae flies. The eggs are laid on or in the buds of Agapanthus and the larvae develop inside before leaving to overwinter and pupate in the soil.

Observations in the UK indicate that the midge can have multiple generations during the Agapanthus season; active larvae were found from early July to early October in 2015.



**Figure 3.** Agapanthus gall midge adult (dead) and larvae with scale bar



International Plant Sentinel Network

**Agapanthus gall midge**  
Cecidomyiidae family

Survey Details	
Name of Botanic Garden / Arboretum:	
Country:	
Address:	
Survey carried out by:	
Date of survey:	
Best description of season:	

The agapanthus gall midge is an undescribed pest affecting Agapanthus that belongs to the Cecidomyiidae family of flies. The midge can cause the bud to be deformed and discoloured and often fail to open. For help completing this form please refer to the corresponding IPSN Fact Sheet for Agapanthus gall midge.

**Research questions:**

- Are Agapanthus plants in your collection affected by the agapanthus gall midge? Survey known hosts
- How severe are the symptoms? Include images
- During which months of the year are active larvae present? Complete survey details as above
- Which species of Agapanthus are affected? Start with surveys of known hosts and move to other Agapanthus spp.

*\*Please make a note if agapanthus gall midge is not found, including which species surveyed\**

**Plant Details - SURVEY 1**

Species (cultivar):	
Accession number:	
GPS (if available):	
Country/region species is native to:	
Age/amount of time plant has been present in gardens (years):	

**General Description of Health**

Generally healthy	<input type="checkbox"/>	Some damage	<input type="checkbox"/>
Dying	<input type="checkbox"/>	Dead	<input type="checkbox"/>

Any recent changes in health or overall look:

Any management issues (e.g. irrigation, soil pH, sun, bleaching) or any recent use of pesticides/fungicides/herbicides:

**Plant Details - SURVEY 2**

Species (cultivar):	
Accession number:	
GPS (if available):	
Country/region species is native to:	
Age/amount of time plant has been present in gardens (years):	

**General Description of Health**

Generally healthy	<input type="checkbox"/>	Some damage	<input type="checkbox"/>
Dying	<input type="checkbox"/>	Dead	<input type="checkbox"/>

Any recent changes in health or overall look:

Any management issues (e.g. irrigation, soil pH, sun, bleaching) or any recent use of pesticides/fungicides/herbicides:

**Symptoms Check (flowers)**

Deformed buds	<input type="checkbox"/>
Buds with brown discoloration	<input type="checkbox"/>
Buds fail to open, dry up or rot	<input type="checkbox"/>
Flower head collapsed or fails to develop	<input type="checkbox"/>
Maggots present	<input type="checkbox"/>

Do you think this plant is infested by the gall midge?

Rate the severity of the symptoms from 1-6, 1 No visible symptoms - 6 severe symptoms (all buds affected/flower heads completely aborted)

Notes:

**Symptoms Check (flowers)**

Deformed buds	<input type="checkbox"/>
Buds with brown discoloration	<input type="checkbox"/>
Buds fail to open, dry up or rot	<input type="checkbox"/>
Flower head collapsed or fails to develop	<input type="checkbox"/>
Maggots present	<input type="checkbox"/>

Do you think this plant is infested by the gall midge?

Rate the severity of the symptoms from 1-6, 1 No visible symptoms - 6 severe symptoms (all buds affected/flower heads completely aborted)

Notes:



# Data Collection – Online Reporting

- Working with CABI-UK
- Electronic version of the IPSN Plant Health Checker
- Pilot project completed April 2016
- Trialled by 2 UK gardens

The image shows two side-by-side screenshots of a mobile application interface. The left screenshot is titled 'Step 1 - Initial assessment' and contains sections for 'Survey details' (including surveyor name 'John Grimshaw', date '10 February 2016', and location 'Winter') and 'Plant details' (including tree type 'Cedar', species 'oak (Quercus)', and accession number 'YT2561'). The right screenshot is titled 'Step 2 - Follow up assessment' and contains sections for 'General pest observations' (with fields for 'Pest damage', 'Chewing damage', and 'Describe the location of the pest damage') and 'Pest sightings' (with fields for 'Have you spotted any pests?', 'Name of Pest 1 (if known)', 'Oak processionary moth', 'How confident are you that this is the name of Pest 1?', 'Very confident', 'Where on the plant was Pest 1 seen?', 'Leaves', and 'Photos of Pest 1').



# Euphresco Project

**Phase 2 (2017-2020): An International Plant Sentinel Network (IPSN) as an early-warning system; research on future pest threats**

- Targeted surveys / first detection / research
- Capacity building
- 14 European organisations



**Euphresco**  
Network



Network for phytosanitary research coordination and funding



# The Future

A self-sustaining network that is championed by NPPOs, scientists working within plant health, botanic gardens and arboreta and supported by BGCi





# International Plant Sentinel Network

## Thank you for listening

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