

# Plant Health for Plant Nurseries

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## Agenda morning session

- 10.00: Welcome and Slido
- 10.10: Plant Health Management Standard
- 10.25: Link between emerging diseases and trade, research evidence
- 10.45: Recognising and acting on symptoms of ill health
- 11.05: Diagnostics demo/discussion/refreshments
- 11.30: Water management
- 11.50: Waste management
- 12.05: Research evidence on peat free growing media
- 12.20: Wrap up discussion for indoor session

## Agenda afternoon session

- 12.30: Lunch
- 13.00: Walk to RBGE nursery
- 13.20: Nursery walk and talk covering morning themes
- 15.00: Walk back to auditorium area for refreshments
- 15.45: Round up/ final Slido/ depart

## Why worry about plant health?

- Overall value to UK of plants and trees is ~£15.7 billion pa
- Value of agricultural and horticultural crops is ~£4.1 bn pa
- Forest industries are worth £0.7 bn
- Plants have ecosystem and societal value
- Your reputation has a value!



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Policy paper

# Plant biosecurity strategy for Great Britain (2023 to 2028)

Published 9 January 2023

**Applies to England, Scotland and Wales**

## Four desirable outcomes of the new GB Plant Biosecurity Strategy:

- A world class biosecurity scheme
- A society that values healthy plants
- An enhanced technical capability
- A biosecure plant supply chain - Plant Healthy/ raise biosecurity standards and showcase best practice

# Link between emerging diseases and the plant trade

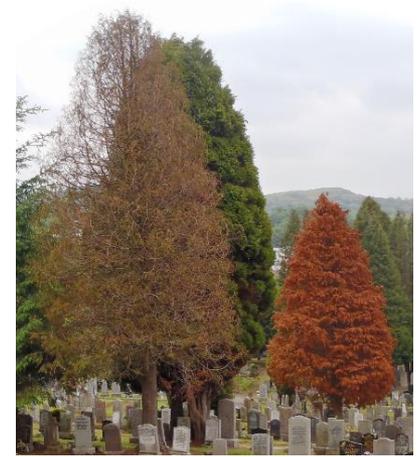
(Sarah Green, Forest Research)



*P. ramorum*



*P. austrocedri*

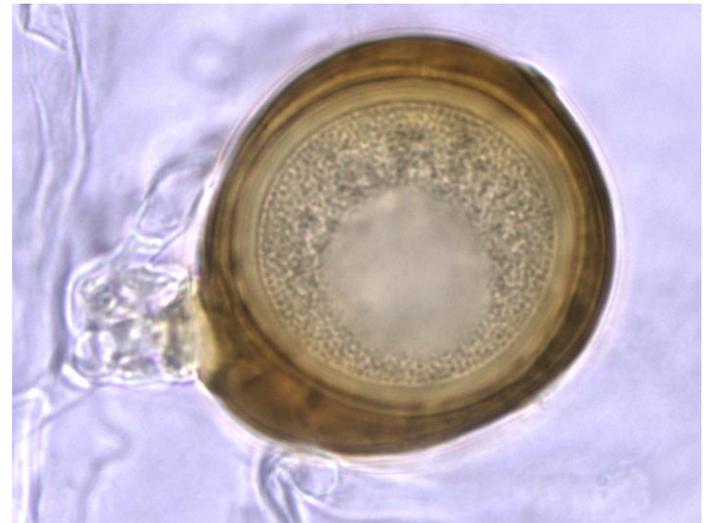
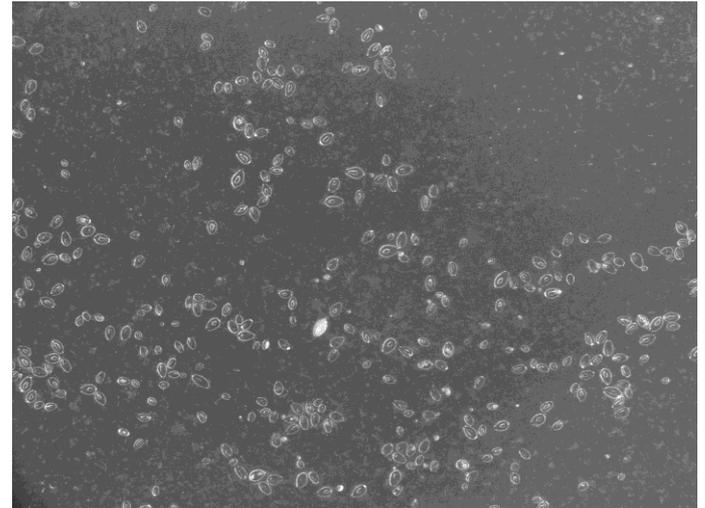


*P. lateralis*



Impact of *P. austrocedri*

- *Phytophthora* means ‘plant destroyer’
- > 190 species described worldwide on broad range of hosts
- Oomycetes – ‘water molds’ spread via free swimming zoospores
- Mainly infect plants through roots but some species also infect stems and foliage
- Borne in water and soil – can persist in soil
- These pathogens love plant nurseries!

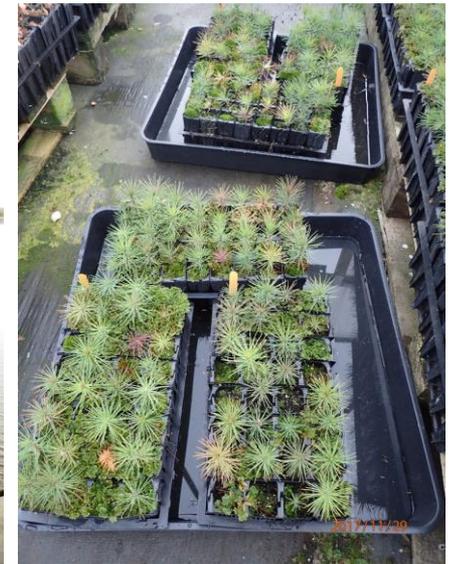


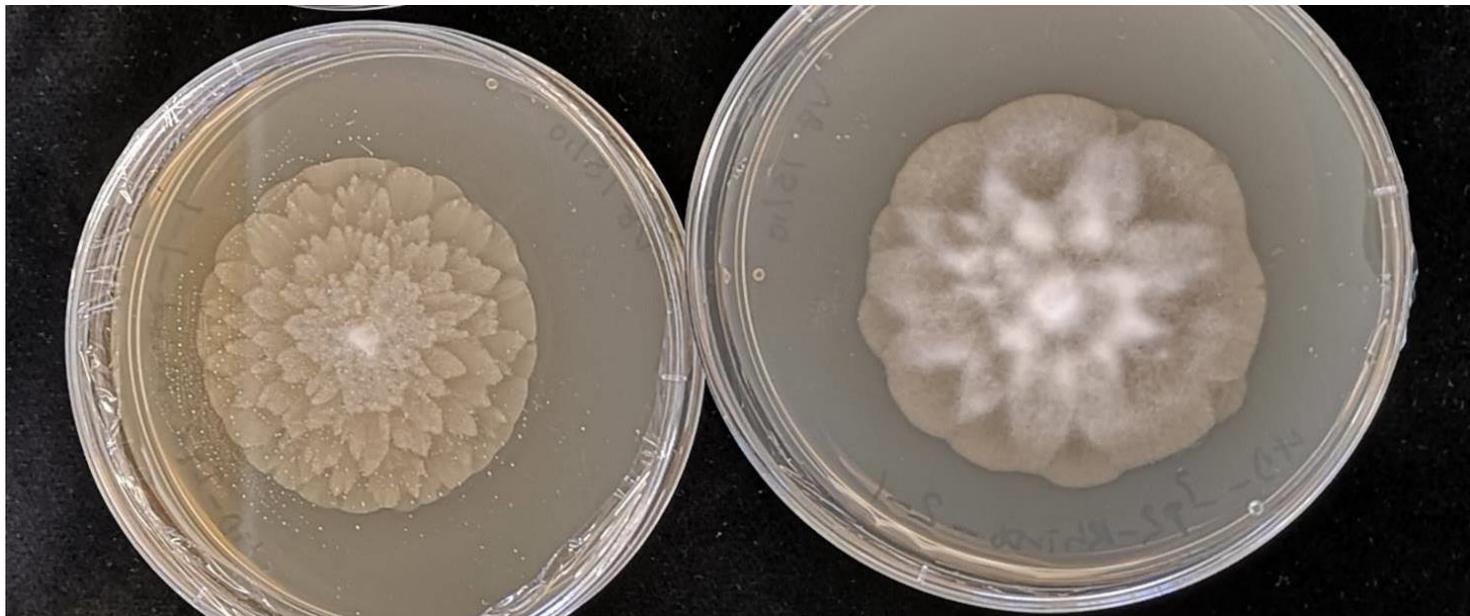


- Sampled 17 UK nurseries 2016-2022
- Identify *Phytophthora* pathogens using DNA and baiting
- Linked findings to management practices



- 2-5 visits per nursery over 2-3 yrs
- Sampled water and roots
- >3000 samples collected from ~150 host plant species
- 50% *Phytophthora* positive





- *Phytophthora* abundant in UK nurseries
- Over 65 *Phytophthora* species
- All 17 nurseries had *Phytophthora* – more some than others!
- Damaging pathogens, quarantine pathogens, rare pathogens and new UK records



Nurseries with higher levels of biosecurity which;

- Do not import live plants
- Have quarantine holding areas
- Use disinfestation mats

Have significantly fewer;

- Common *Phytophthora* species
- Invasive species
- Species rare in the wider UK environment



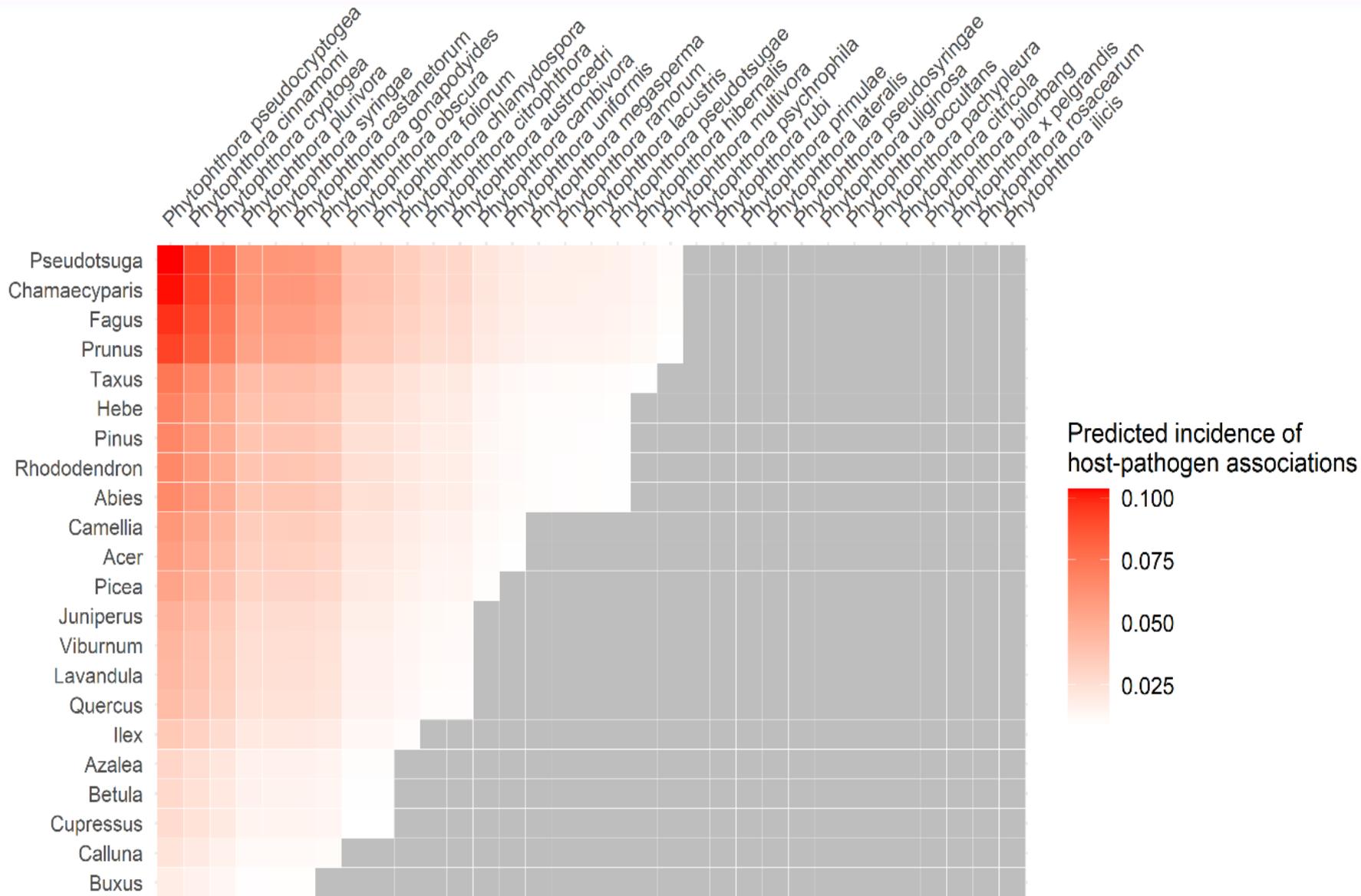
Of highest risk:

- Smaller, lower turnover ornamental nurseries that;
- Use open/untreated water supplies
- Import live plants

These nurseries had more;

- Diverse *Phytophthora* communities
- Recent invasive species (ie *P. austrocedri*)
- Rare species not yet widespread in the UK environment





- Management practice is effective in limiting or even eliminating pests and pathogens



Four priority nursery practices that can be improved:

- Not seeing signs/symptoms of ill health in plants
- Irrigating plants with pathogens and allowing water to spread pathogens around plant stock
- Pathogens proliferating in waste piles
- Putting plants into contaminated growing media

# Recognising and acting on symptoms of ill health

(Sarah Green, Forest Research)



Pale or chlorotic foliage



Brown patches



Desiccation











[https://cdn.forestresearch.gov.uk/2022/02/xylella\\_factsheet\\_defra.pdf](https://cdn.forestresearch.gov.uk/2022/02/xylella_factsheet_defra.pdf)





- Galls
- Exit holes
- Frass
- Leaves with holes!



- *Phytophthora* root infections in newly arrived imports from continental Europe
- Waterlogging leads to infection
- Raise plants off the ground







- Be observant and monitor stock regularly
- Know what a healthy plant should look like!
- Remove any sick plants from main stock
- Waste should be located on hard standing away from growing stock, hedgerows, woodlands or water courses
- Know your supplier
- Check newly arrived stock thoroughly, quarantine holding area
- Talk to all staff about plant health and biosecurity

## Quarantine concerns

SASA is the competent Plant Health Authority for Scotland

## Non-quarantine concerns

- For trees in forest and horticultural nurseries – Forest Research <https://treealert.forestresearch.gov.uk/>
- [Water Bait Test \(Phytophthora and Pythium\) \(fera.co.uk\)](https://www.fera.co.uk/)
- RHS offers diagnostic services to members

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- LFD tests for *Phytophthora* and fireblight [Pocket Diagnostic | Sorbus International Ltd. \(sorbus-intl.co.uk\)](https://www.sorbus-intl.co.uk) (DEMO)

Sort by: Default ▾



Erwinia Amylovora Lateral Flow Test (Box of 4)  
£22.86 (excl. VAT) £27.43 (incl. VAT)



Phytophthora Lateral Flow Test  
From: £9.50

# Water management

(Debbie Frederickson-Matika, Forest Research)

- Watch out for sources of contamination!
- Mains or borehole water = low risk
- Open reservoir, river or recycled water all contained multiple *Phytophthora* pathogens
- Water treatment required



River sample used to irrigate stock had 8 *Phytophthora* species:

*Phytophthora chlamydospora*

*Phytophthora gallica*

*Phytophthora gonapodyides*

*Phytophthora lacustris*

*Phytophthora pseudosyringae*

*Phytophthora riparia*

*Phytophthora rubi*

*Phytophthora syringae*



- Sourced water from small reservoir fed by stream
- Irrigation water contained 11 different *Phytophthora* species
- Installed borehole following project engagement



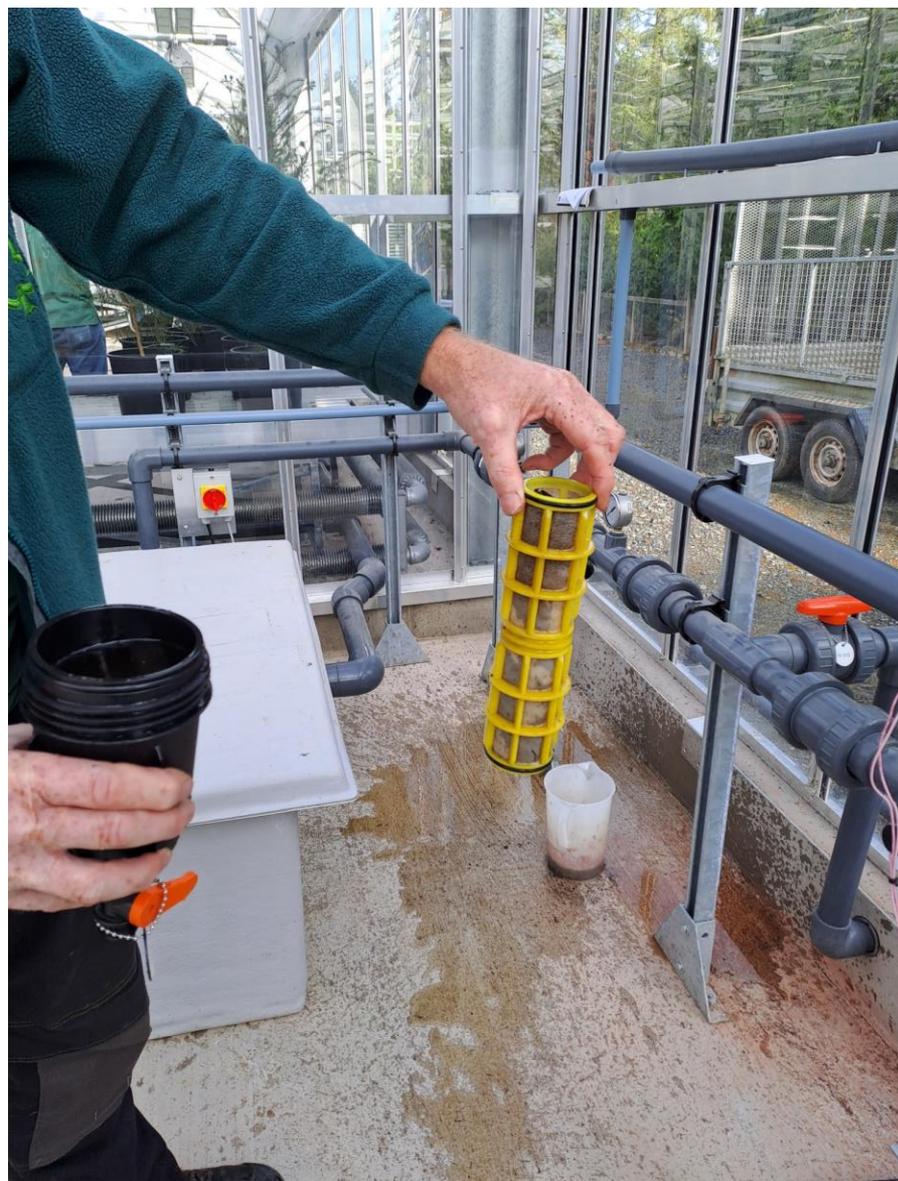
















- Do not overwater-  
stop run-off!
- Place containerised plants  
on free-draining surface,  
ideally raised above the  
ground
- Improve drainage to  
prevent puddles forming



A single puddle sample had 12 *Phytophthora* species:

*Phytophthora austrocedri*

*Phytophthora bilorbang*

*Phytophthora chlamydospora*

*Phytophthora cryptogea*

*Phytophthora gallica*

*Phytophthora gonapodyides*

*Phytophthora hibernalis*

*Phytophthora inundata*

*Phytophthora megasperma*

*Phytophthora plurivora*

*Phytophthora pseudosyringae*

*Phytophthora syringae*



- Cover your clean water!
- Hang hoses/nozzles above ground
- Keep your irrigation system clean



- Clean and disinfect pots, trays and tools
- Clean and disinfect Mypex surfaces between batches
- Reduces potential for water contamination



# Waste management

(Sarah Green, Forest Research)



- 18 different *Phytophthora* species detected in waste piles
- 8 species baited into live culture including *P. ramorum* from 2/3 nurseries tested
- These sampled piles are located next to hedgerow trees and streams
- Dumping presents very high risk of disease spread into wider landscapes



- One nursery had NO *Phytophthora* in their waste piles
- Operates to very high biosecurity standard
- Low risk of infected waste plants
- Has an effective on-site composting system for waste



- Minimise waste and risk of infected waste material by growing healthy plants
- If a notifiable pest/pathogen seek advice from SASA
- If non-notifiable waste then there are four main options:
  - On site composting
  - Incineration
  - Disposal to landfill
  - Removal to commercial composting facility



- For legislation around on-site composting contact SEPA
- Unless the composting system is accredited (UK Compost Certification Scheme) to PAS100 level it remains a 'waste'
- 'Waste' can only be used again on the same premises
- EPPO recommend at least 40% water content and continuous 55C for 2 wks with minimum number of turns



## **Incineration with licence**

- Good for small quantities of relatively dry diseased material
- Contact SEPA for exemptions

## **Disposal to landfill**

- Expensive and may be banned in future

## **Removal to commercial certified (BSI PAS100) composting system**

- Effective and environmentally sustainable
- Subject to gate fees (£30-£60 per tonne) plus haulage costs

# Our research into some plant health risks from peat-free growing media and recommendations

(Debbie Frederickson-Matika, Forest Research)



**Composted bark**



**Coir**



**Composted wood fibre**

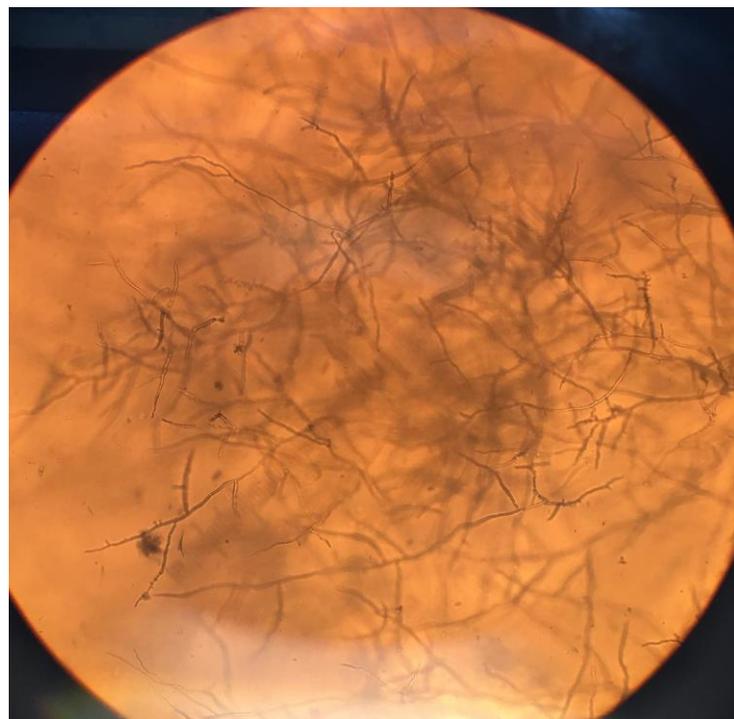


**Composted green waste**

- Peat-based growing media being phased out
- ‘Rush’ for alternatives to peat
- Tested 36 samples of peat free growing media for *Phytophthora*
- Included commercial products and key individual constituents (chopped bark, coir, recycled coir, composted green waste, industry mixes)



- No living *Phytophthora* was isolated by baiting, but DNA from 11 species detected in samples of peat-free growing media
- Included *Phytophthora bisheria* in recycled coir from NL
- Seven species of *Pythium*, *Phytopythium* and *Elongisporangium*, including four species not previously reported in the UK, were baited into live culture



- Ask your supplier what's in it? and how is it processed?
- Can they guarantee it is pest and pathogen free?
- Avoid any product containing recycled material
- Store growing media in a clean, dry, covered space

