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Chestnut Blight (*Cryphonectria parasitica*)

- Detected in Australia for the first time in Spring 2010.
- Initially found on a number of properties in NE Victoria.




- *Cryphonectria parasitica* (Murrill) Barr
- Taxonomic position: Fungi: Ascomycetes: Diaporthales
- Disease common names: Chestnut blight or canker

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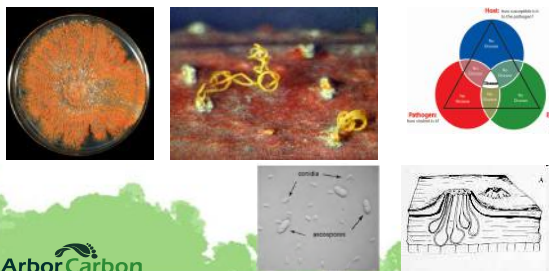

Biology

- Sexual and asexual reproduction through 2 spore types. Orange or reddish stromata on cankers on or through the bark.
- Conidia and ascospores can spread by:
 - Wind and rain
 - Insects and birds
 - Human assisted
- Wounds (mechanical, biological, environmental) allow entry.
- Pale-brown coloured mycelium fans form in inner bark and cambium.
- Pathogen can be viable for at least 12 months on cut logs.

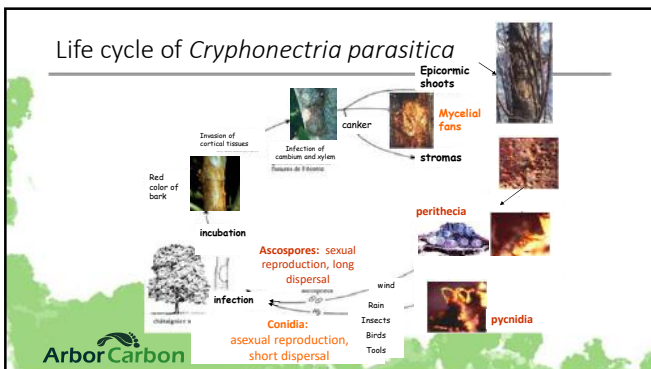


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The pathogen


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Epidemiology

- Air temperature and humidity are the drivers for disease development.
 - Average daily temperatures of 20°C, cankers expand by 1 mm per day
 - Optimum range is 20- 27°C with canker growth maximised as 27°C.
 - Increased humidity, rain or dew with warm temperatures are important for the survival, development and spread of the pathogen.
 - Ascospores are released during warm rains from Spring to Autumn but the peak is in later summer.
 - Spores can be spread a few hundred metres. With large numbers as far as 90-120m from the source and are expelled every day for 168 days.



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Symptoms

- Masses of yellow-orange to reddish-brown pustules on infected bark, tendrils of spores in humid weather.
- Cankers found on stems and branches can be:
 - Diffuse, rapid girdling of stem.
 - Sunken cankers on stem and branches where wood material has died.
 - Bright brown to red patches on young branches and epicormics.
 - Swelling and bark cracking around branch unions.
- Under the bark pale-brown fans of mycelium can be observed.
- Death above the canker – blighted leaves.
- Can be confused with *Phytophthora* damage, where dead tissue occurs from ground level, where as blight has healthy tissue below cankers.

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Chestnut Blight



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Mycelial fans under bark



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Orange stroma visible on the bark of stems and branches.



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Discolouration on the bark caused by cankers.



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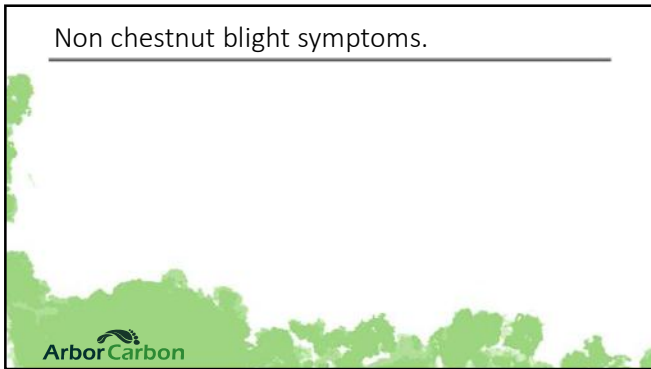
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Cut chestnut branches

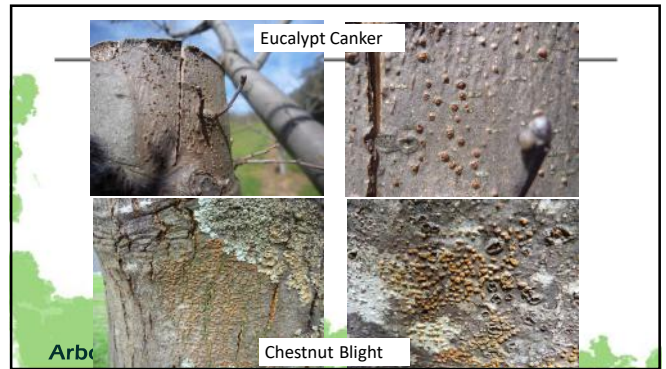
- If infected, can:
 - Support growth of the fungus for at least 2 years
 - Produce new spores for up to one year
 - Be a constant source of new infections
 - Cut chestnut branches, stumps etc. should be burnt as soon as possible
 - Infected trees should be destroyed by fire
 - The fungus on branches buried in soil will survive a fire above it.

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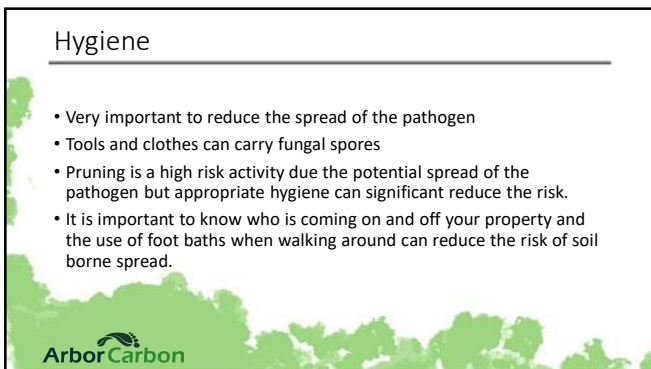
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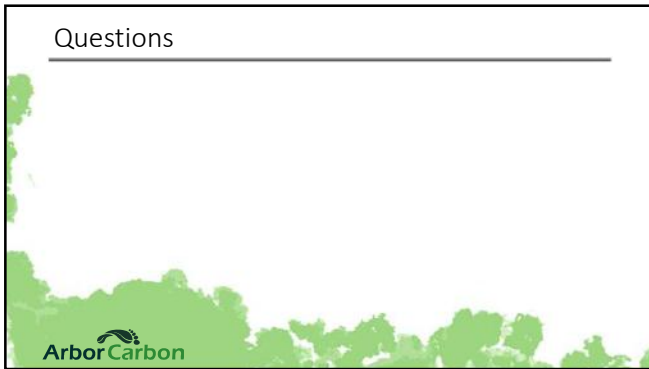
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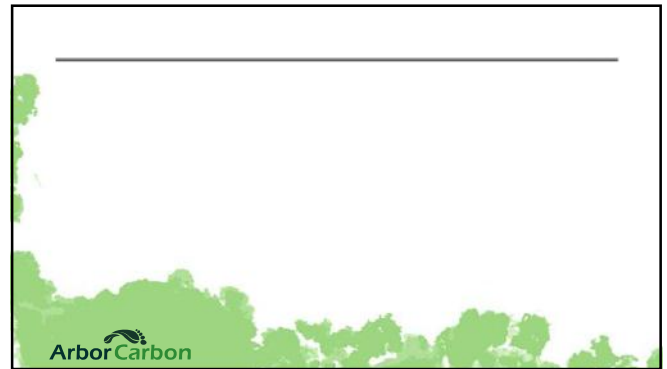
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Introduction to ArborCarbon

- More than 95 yrs combined expertise in remote sensing and plantation and forest health management
- More than 30 supervised PhD students including topics such as abiotic and biotic disorders of plantation and forest trees, mycorrhizal fungi, nursery management and remote sensing.
- Diverse range of clients and projects across most continents
- Work across all platforms including UAV/drones, crewed aircraft and satellites, and a wide range of hyperspectral and multispectral sensors, some of these proprietary and others unique to us within Oceania.
- Developed and customised a wide range of our own software for the planning, acquisition, analysis, delivery and management of geospatial datasets for office and field. Do not rely upon cumbersome 3rd party commercial software
- Track record of under-promising and over-delivering, unlike many remote sensing and tech companies
- First company in Australia to use UAV and multispectral imagery for vegetation health monitoring in WA (2010).
- We are focused on commercial delivery backed by our own R&D, not focused on R&D for publication of papers etc.

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ArborCam™

- Proprietary technology developed by ArborCarbon for remote sensing of vegetation
- Conceptualised approx. 5 yrs ago
- Commenced operations over 4 years ago (1st client City of Melbourne) capturing complex urban forests
- 11 customisable narrow and broad bands of data (VIS-NIR-LWIR) at very high-resolution (e.g. 1cm Ground Sample Distance) 3D imagery
- Data can be captured at 1000ft to 16,000ft agl from manned aircraft providing landscape scale acquisition.
- All flight planning, acquisition, processing, analysis and reporting undertaken by ArborCarbon internally with exception of engagement of pilots and aircraft
- Providing very detailed information on vertical and horizontal structure, spectral and thermal information for object identification and measurement
- Many advantages over UAV, LIDAR, aerial and satellite imagery

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Benchmarking tree condition using ArborCam™ data

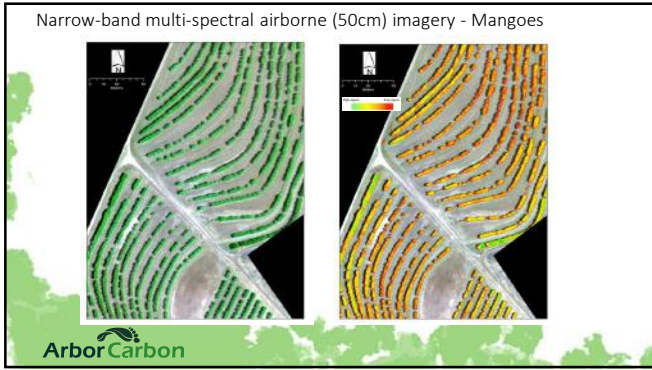
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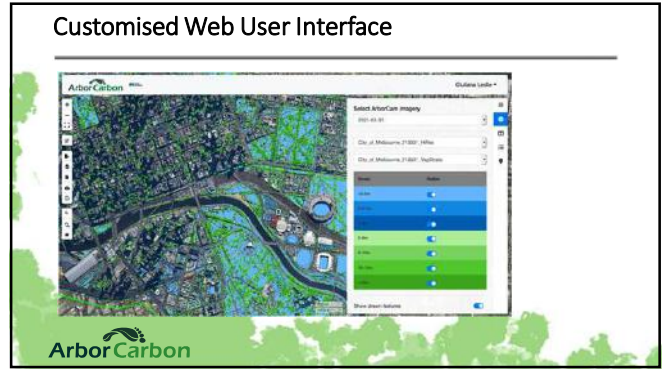
Benchmarking Tree Condition using ArborCam™ data

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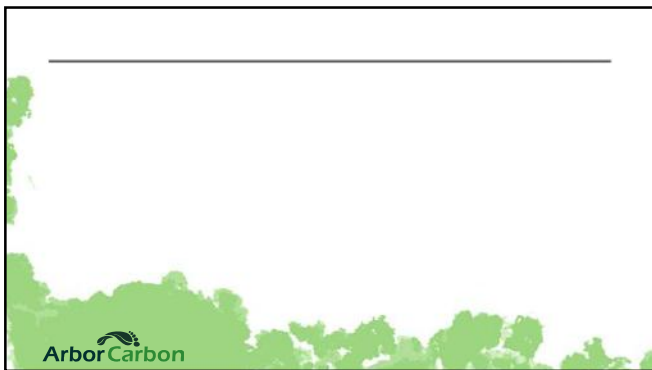
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