New Pest Response Guidelines;

Ash Dieback (Teleomorph: *Hymenoscyphus pseudoalbidus;* Anamorph: *Chalara fraxinea*)

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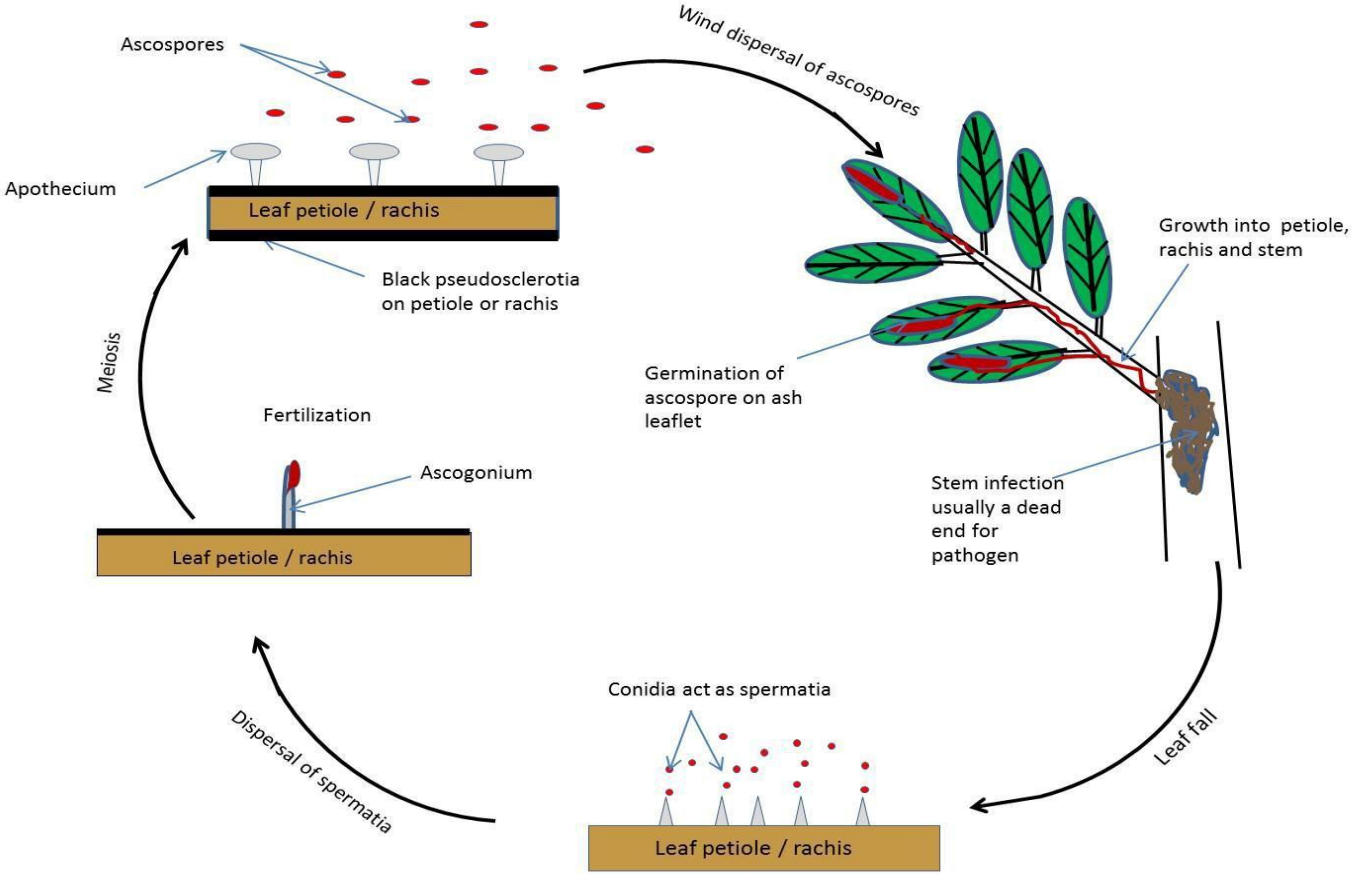
Ash dieback

- The disease was first observed in Poland and Lithuania in 1992
- Causal organism (Anamorph: *Chalara fraxinea*)
- Teleomorph **not** *Hymenoscyphus albida* ***but*** *H. pseudoalbidus*
- The disease has spread and is now present in a large part of Europe

- The pathogen is present in Japan but was wrongly identified as *Lambertella albida* (Gillet) Korf

Hymenocyphus pseudoalbidus World distribution

Biology



Lifecycle of *Hymenoscyphus pseudoalbidus* (adapted from Gross *et al.* (2012a))

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Economic Impact

- *Fraxinus* spp. are important hardwood resources in the United States
- They makeup 5.5% of all tree species, throughout the north eastern US and eastern Canada
- $140 million worth of *Fraxinus* spp. Is produced by the US nursery industry annually
- Exports of *Fraxinus* spp. lumber from the US exceeded $132 million in 2011.
- The loss of *Fraxinus* spp. in the national urban landscape could lead to a financial loss of between $20 to 60 billion

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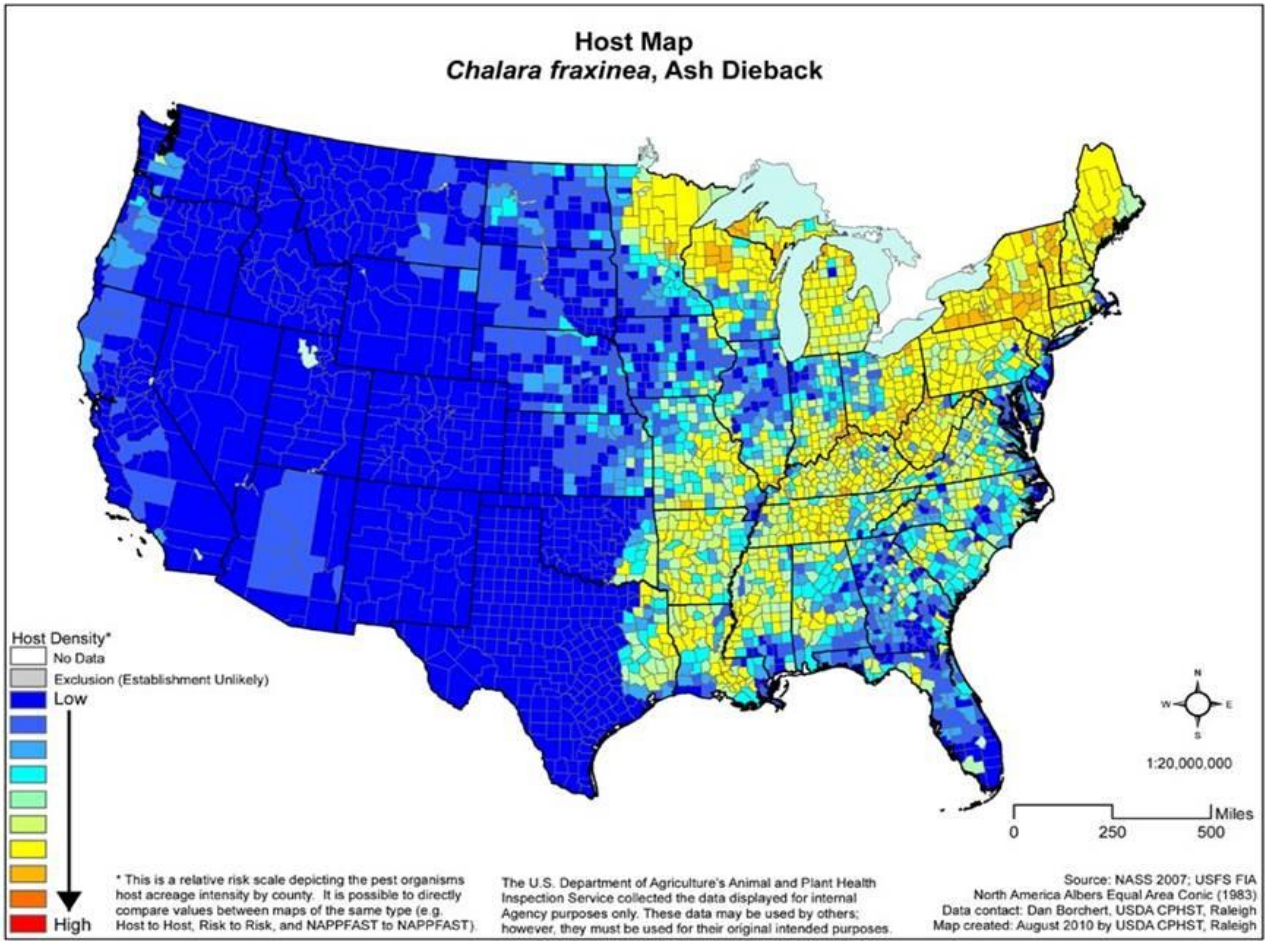
Hosts

- Full host range currently unknown

Scientific name	Common name
Fraxinus excelsior L.	European ash
Fraxinus excelsior subsp. excelsior	
Fraxinus angustifolia subsp danubialis	
Fraxinus ornus L.	Flowering ash
Fraxinus angustifolia Vahl	Narrow-leafed ash
Fraxinus nigra Marsh.	Black ash
Fraxinus pennsylvanica Marsh.	Green ash
Fraxinus americana L.	White ash
Fraxinus mandshurica Rupr.	Manchurian ash

Potential distribution in US



Distribution of *Fraxinus* species that are potential hosts of *Hymenoscyphus pseudoalbidus* (http://www.nappfast.org/)

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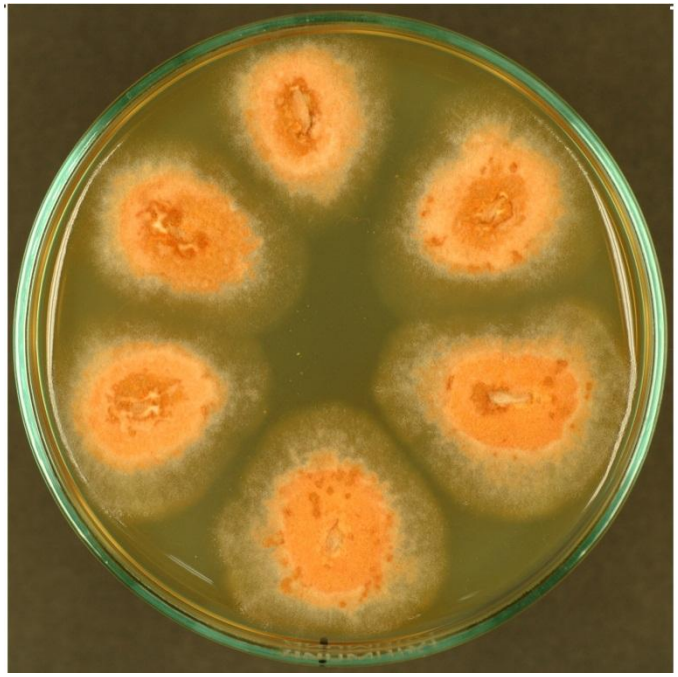
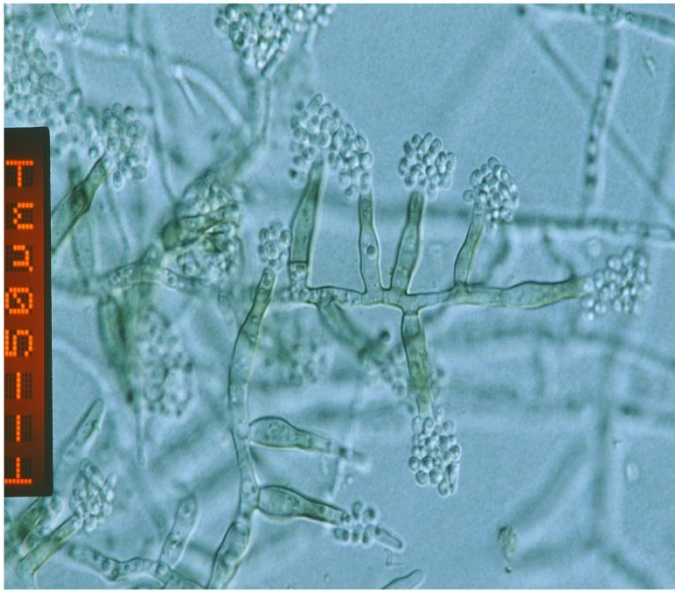
Identification

- The CAPS (2010) approved method involves morphological identification
- Sometimes overgrown in culture by saprotrophic fungi
- Molecular methods based on PCR, RT-PCR RFLP and T-RFLP.





Tadeusz Kowalski, Department of Forest Pathology, Agricultural University of Cracow, Poland)

- Apothecia on leaf litter and rachis first appear at the end of May, June or early July in the year following infection

- Not easily distinguishable from *H. albidus*

(© Thomas Kirisits, IFFF-Boku Vienna, Austria)

Symptoms

Infection of *Fraxinus spp.* by *H. pseudoalbidus* results in;

- Necrotic spots on leaves as well as wilting and premature leaf fall
- Necrotic lesions and cankers
- Wood discoloration
- Prevention of nutrients from being effectively transported around the plant
- Tree mortality due *to H. pseudoalbidus* damage is greatest in saplings and young trees as well as natural regeneration

Leaf symptoms: necrotic areas, abnormal colors, wilting and premature leaf fall

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Stem symptoms: canker on woody stem, internal discoloration, necrosis leading to dieback

Tadeusz Kowalski, Department of Forest Pathology, Agricultural University of Cracow, Poland)

Growing points and Whole plant: wilting, shoot dieback and tree death

Tadeusz Kowalski, Department of Forest Pathology, Agricultural University of Cracow, Poland)

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Pathways

- **Natural**

- Wind-borne spores can move up to 30 km/year (very unlikely)

- No known insect vector

- **Human assisted**

- Plants for planting or wood and seed (?) are possible pathways for long distance spread

Ban on importation of planting material excluding seed from all foreign countries (except portions of Canada)

Control Procedures

There is currently no information on an effective control method for *H. pseudoalbidus,* however;

- Eradication
- Cultural control
- Fungicide efficacy under test in UK
- Potential for the fungus, *Pacilomyces marquandii* and fungus gnats in bio-control
- Use of potentially resistant clones in breeding programs for resistance

Research Needs

- Determine the host range and environmental requirements
- Research into the potential for seed transmission
- Assess potential sources of resistance in the currently known host plants within the United States
- Assessments of potential biological control agents such as *Pacilomyces marquandii* and fungus gnats
- Development of rapid diagnostic methods

Thank you