DAFM Plant Pest Factsheet

Phytophthora alni species complex
Root disease of alder

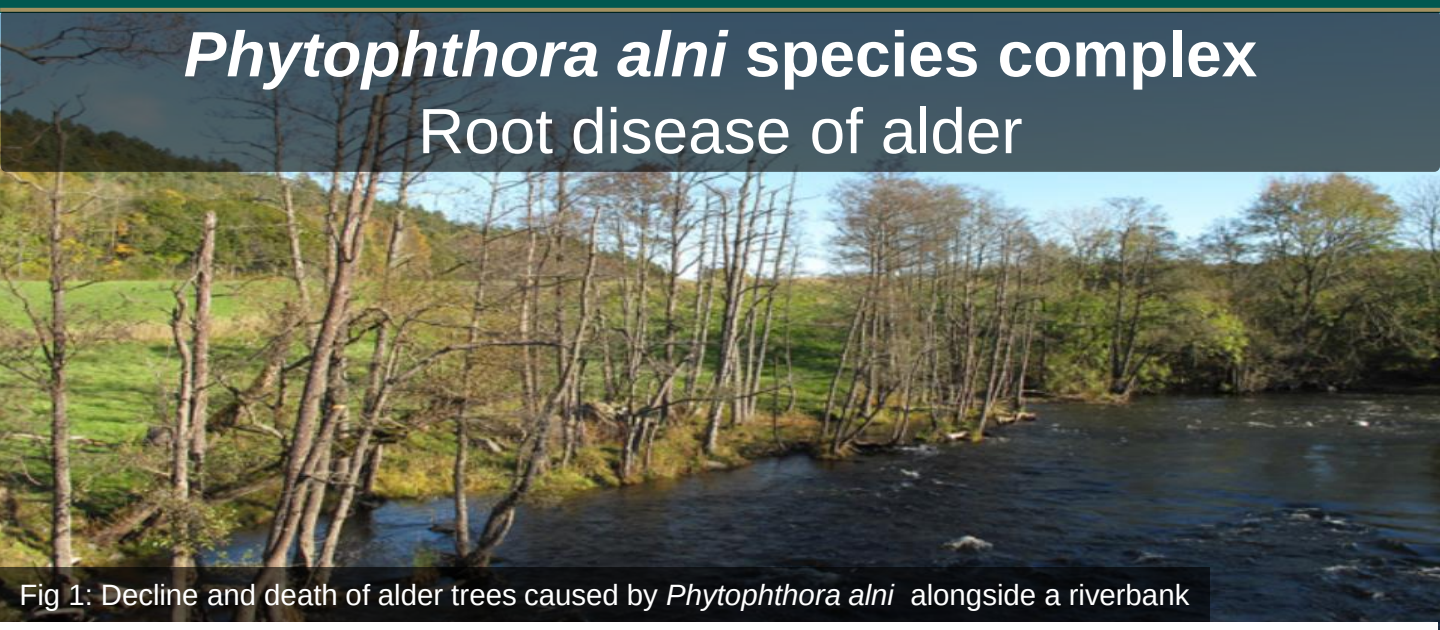

Fig 1: Decline and death of alder trees caused by *Phytophthora alni* alongside a riverbank

Pest Characteristics

- **Pest:** *Phytophthora x alni; P. x multiformis and P. uniformis*
- **Common name(s):** Root disease of alder
- **Host(s):** Alder (*Alnus*) tree species: Italian (*A. cordata*), black/common (*A. glutinosa*), grey/white (*A. incana*) and green/mountain (*A. viridis*).
- **Invasive Risk:** A decline in alder tree health was noticed across Europe in the early 1990s. The causative agent of this disease was first reported in 1993 (in the UK) as the *Phytophthora alni* species complex. The *Phytophthora alni* species complex actually consists of 3 separate species (*P. x alni, P. uniformis* and *P. x multiformis*). The 3 species have been found to be distributed across Europe, including Ireland. *Phytophthora x alni* appears to have originated in Europe as a hybrid between *P. uniformis* and *P. x multiformis*. The origin of *P. x multiformis* is currently unknown, however, *P. uniformis* appears to be native to North America where it has been found in Oregon and Alaska.
- **Entry Pathways:** How the two parental species were introduced into Europe is unknown. It is possible that the parental species were introduced on infected host material. The pest has been commonly found in nursery trees and its spread has likely been facilitated by the trade in alder trees.
- **Visual Symptoms:** Tarry/rusty spots and bleeding cankers on lower tree stem (Fig 2). Infested trees can display reduced leaf vigour (fewer, smaller, yellow) and thinner crowns. Prolonged infestation leads to dieback: twig and tree death. Infested trees appear to produce more cones.

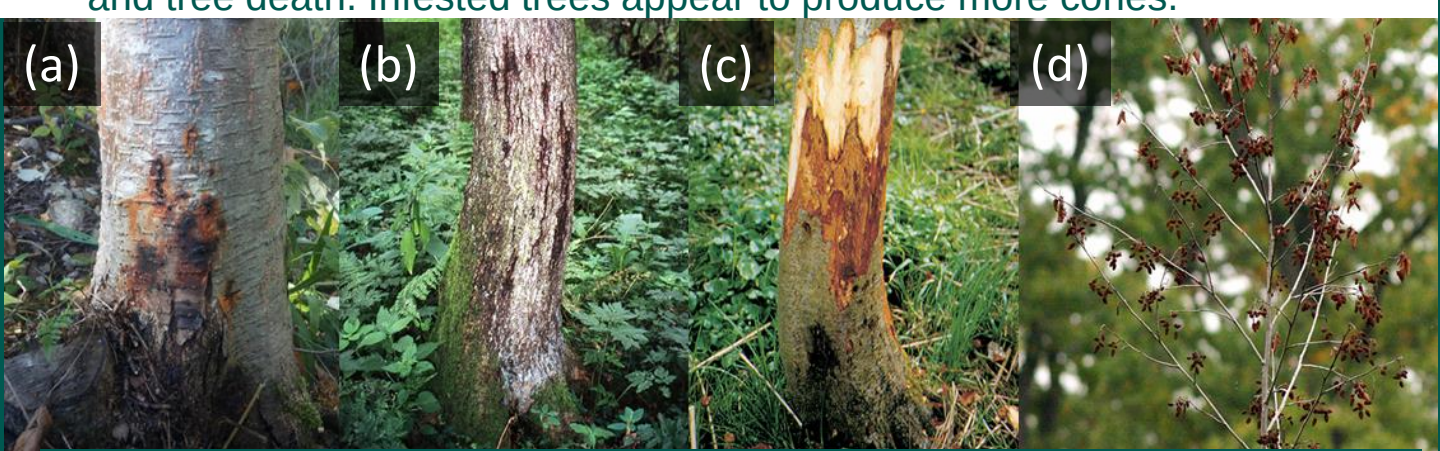

Fig 2: Visual symptoms of *P. alni* species complex infestations on alder: rusty/tarry spots (a), bleeding cankers (b), necrosis under bark (c), tree dieback with heavy cone production (d)

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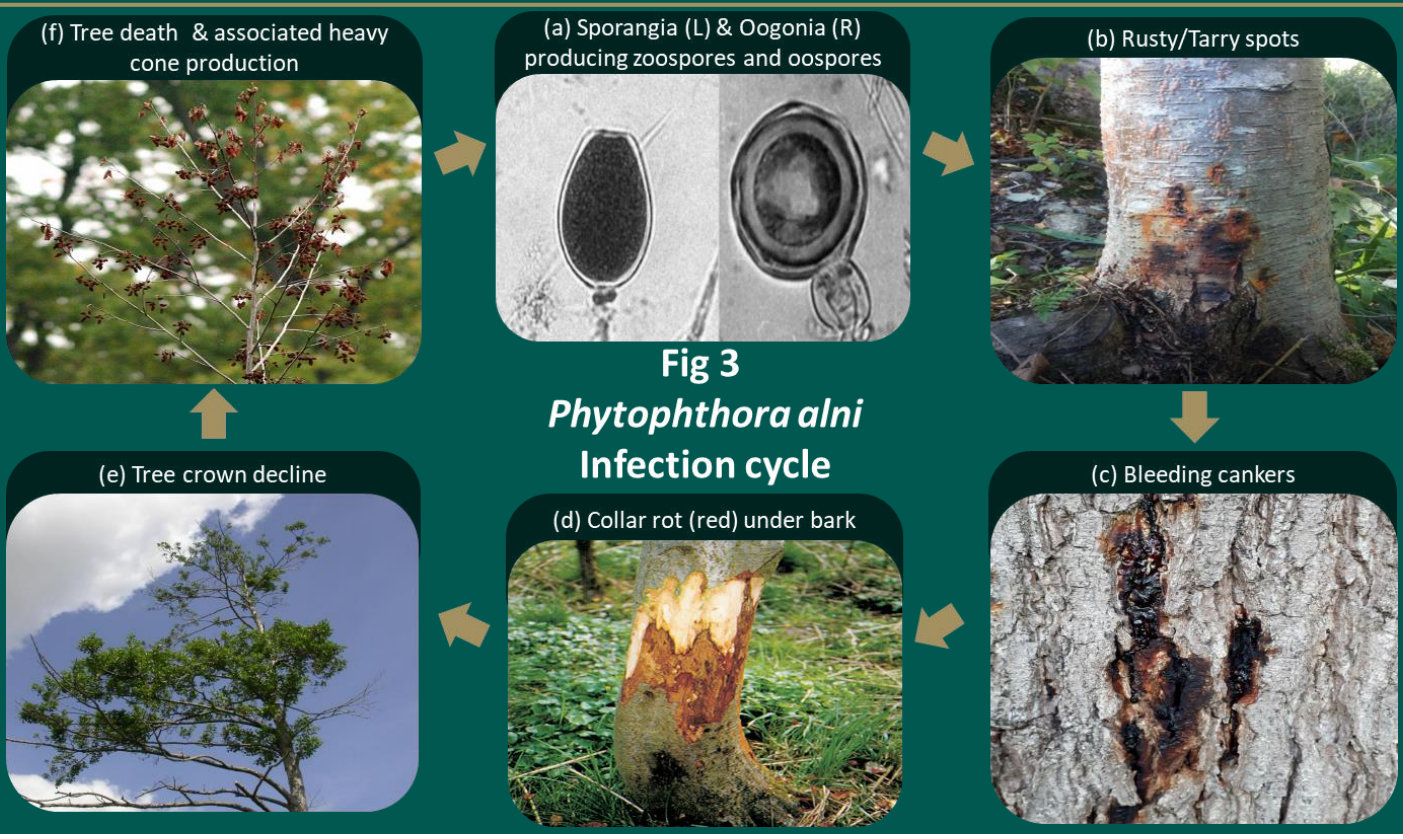

Fig 3
Phytophthora alni
Infection cycle

- **Adaptability:** This pest appears to be well suited to climates in Europe. However, *P. x alni* appears to less cold tolerant than the parental species.
- **Impact:** In Europe the pest has caused significant decline in native alder trees, particularly along streams and riverbanks. Tree death can take up to 10 years, however, in some cases trees can recover, typically if cold conditions (severe frosts) occur as these stunt disease progression.
- **Distribution:** The 3 species are distributed across Europe (Fig 3). Only *P. uniformis* has been found outside of Europe, in Alaska and Oregon (USA).
- **Dispersal:** *Phytophthora alni* spreads to new hosts by producing zoospores and oospores which spread in watercourses (e.g. streams and rivers) to reach new host trees.
- **Lifecycle:** The pest produces zoospores and oospores from structures called sporangia and oogonia. These spores are spread in watercourses and soil. When they make contact with a host tree they germinate and infection takes place through roots or the lower stem. The pest spreads under the bark by attacking the phloem tissue leading to tree decline/death.

Photo credits: Fig 1, Fig 2(a-b), Fig 3 (b), Bjelke *et al* 2016 (doi:10.1111/fwb.12729); Fig 3 (a) Brasier *et al*. 2004 (DOI: 10.1017/S0953756204001005); Fig 3 (c&e) EPPO (https://gd.eppo.int/taxon/PHYTAL/photos); Fig 2 (C). Fig 3 (d) T. Jung, Bugwood.org - CC BY-NC 3.0 US; Fig 2 (d), Fig 3 (f) A. Kunca/National Forest Centre, Bugwood.org - CC BY-NC 3.0 US;

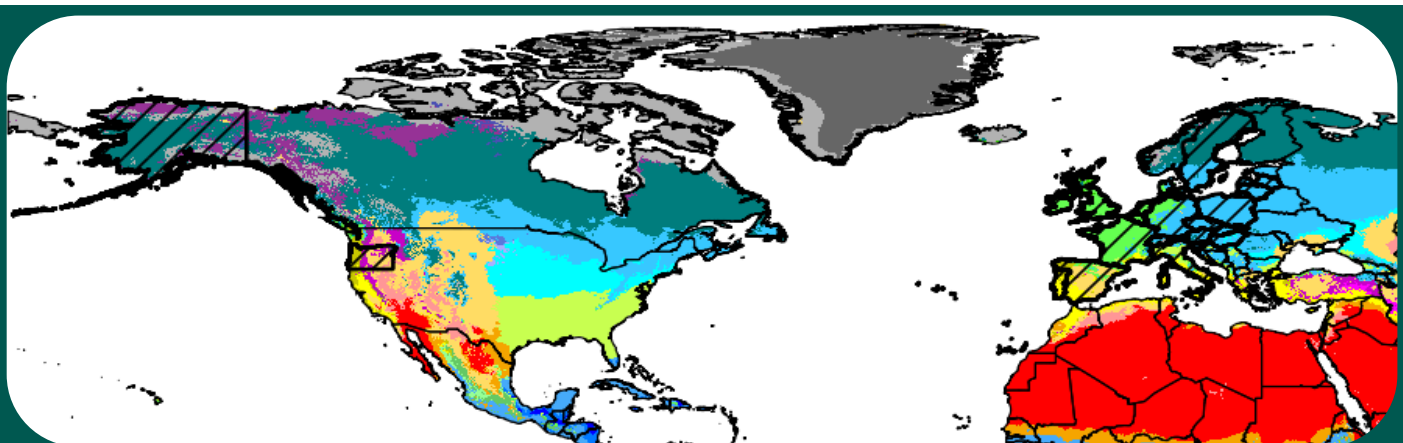

Fig 3: Known global distribution of *Phytophthora alni* complex overlaid on climate classifications of regions

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