

Phytophthora Disease of Alder in the UK

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Alder (*Alnus*) is found throughout the Northern Hemisphere in woodland and riparian habitats. Four species are native to Europe - common alder (*Alnus glutinosa*), grey alder (*A. incana*), Italian alder (*A. cordata*) and green alder (*A. viridis*). In 1993 a lethal stem disease of alder was discovered in the UK (Fig. 1) and the disease has since been found in at least ten other European countries (Gibbs et al, 2003).

The cause of this new disease is a *Phytophthora* which has been shown to be a species hybrid. It exists as a hybrid swarm. The standard type has recently been named as *Phytophthora alni* subspecies *alni*, with the other hybrid types named subspecies *uniformis* and subspecies *multiformis* (Brasier et al, 2004).

Recent work on *Phytophthora* disease of alder at Forest Research has included an annual survey of the disease incidence, tests on the relative susceptibility of the European alder species, and a study on the potential for disease management through coppicing affected trees. Results are presented below.

Disease impact

An annual survey of alders in fixed plots alongside rivers over 8m wide has been carried out since 1994. The survey plots are mainly in southern England and east Wales, where the disease is most prevalent. Over the ten years of the survey there has been a steady increase in the incidence of disease (Table 1), from 4.3% of stems assessed in 1994 showing signs of disease through to 2003 when more than 15% of the total were diseased or dead.



Fig. 1 Diseased *A. glutinosa* (inserts show alder cones and bleeding lesion)

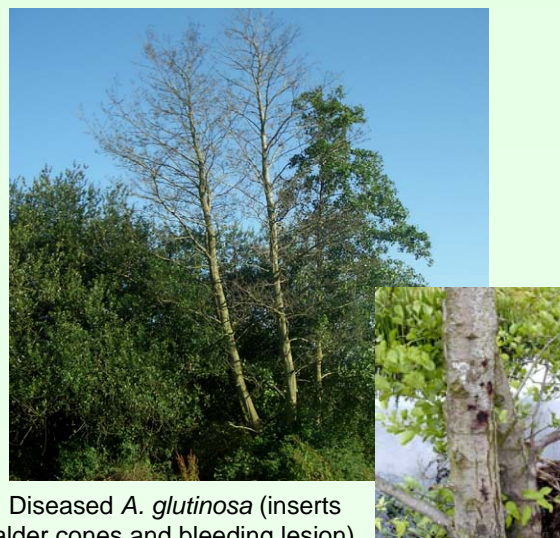


Table 1 Summary of data from riparian alder plots surveyed each year from 1994 –2003

| Year | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|-----------------------|------|------|------|------|------|------|------|------|------|------|
| No. of trees assessed | 1681 | 1718 | 1719 | 1721 | 1716 | 1734 | 1763 | 1773 | 1792 | 1752 |
| No. of diseased trees | 51 | 62 | 86 | 101 | 112 | 138 | 164 | 179 | 193 | 189 |
| No. of dead trees | 22 | 28 | 40 | 44 | 54 | 59 | 61 | 66 | 74 | 78 |
| % diseased or dead | 4.3 | 5.2 | 7.3 | 8.4 | 9.7 | 11.4 | 12.8 | 13.8 | 14.9 | 15.3 |

Susceptibility of alder species

Stem inoculation of 2.5m tall saplings of *A. glutinosa*, *A. incana* and *A. cordata* indicated marked differences in the relative susceptibility of three European alder species to *Phytophthora alni*. The results also confirmed the differences in pathogenicity between the three different subspecies (Fig. 2).

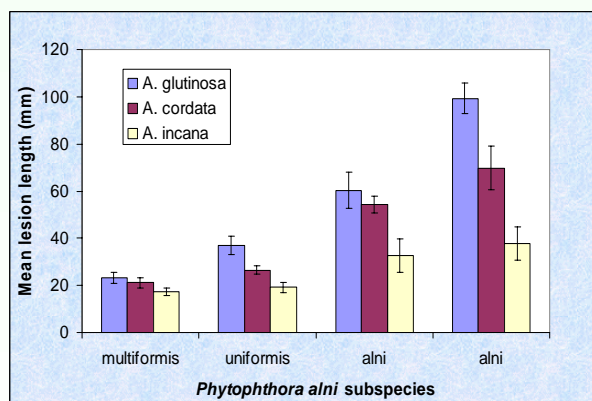


Fig. 2 Disease development on three species of alder inoculated with *Phytophthora alni* subspecies

A. glutinosa was the most susceptible, and the lesions produced by *P. alni* subspecies *alni* on this species often girdled the entire stem. In contrast, grey alder (*A. incana*) was the most resistant and the lesions on this species were always small, regardless of the *P. alni* subspecies involved.

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Disease management

Studies on the potential for disease management through coppicing affected trees were initiated in 1996. Fifty alders ranging from healthy to those with completely dead crowns were felled leaving a 20-25cm high stump. The health and vigour of the growth from the stumps has now been assessed over several years (Fig. 3).

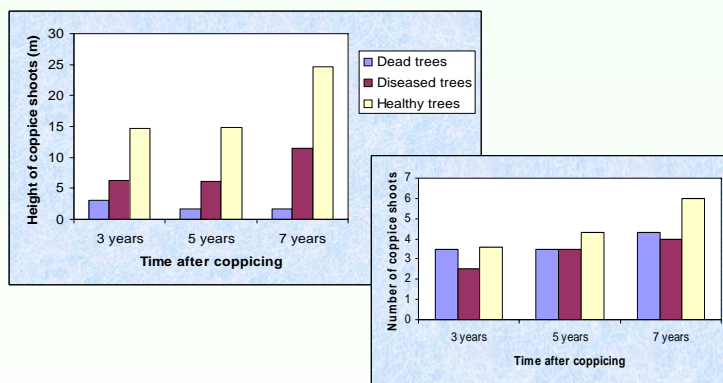


Fig. 3 Mean number & height of coppice shoots on the stumps of dead, diseased and healthy alder trees seven years after felling

Much of it remains healthy although far fewer shoots regenerate from stumps of diseased trees compared with healthy. Sometimes even the stumps of trees with completely dead crowns regenerated successfully, although the number and size of the shoots was always less than on healthy stumps.

References

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Gibbs, JN, van Dijk, C and Webber, JF (2003). *Phytophthora* Disease of Alder in Europe. Forestry Commission Bulletin **126**. Forestry Commission, Edinburgh.