Since the early 1990s common ash, *Fraxinus excelsior* has been affected by a new forest health problem, known as ash dieback (Figure 1). Ash dieback was first observed in Poland and now it occurs in many European countries (Przybył 2002, Kowalski 2006, Kowalski & Holdenrieder 2008). In Austria, dieback of *F. excelsior* was first noticed between 2003 and 2005 and since 2006 it has been widespread and serious in many parts of the country (Cech & Hoyer-Tomiczek 2007, Cech, pers. comm., 2008, Kirisits et al. 2008).

**Symptoms of ash dieback**

Symptoms of this new syndrome include necrosis of leaf rachises and leaflet veins, shoot, twig and branch dieback (Figure 1) as well as necrotic lesions and cankers in the bark. Bark necrosis is often accompanied by brownish to greyish discolouration of the wood that frequently extends longitudinally beyond necrotic areas in the bark. Wilting of leaves can sometimes be seen on recently girdled shoots and twigs. Diseased trees react with prolific formation of epicormic shoots (Figure 1).

The syndrome occurs on ash trees of all ages, both on natural regeneration and on planted trees. In Austria, mortality of mature trees has thus far only been observed in exceptional cases, but it is common amongst saplings and younger trees.

**Suggested causes of ash dieback**

Ash dieback was initially thought to be primarily caused by abiotic factors (early, winter and late frosts, drought and abrupt changes of periods with warm and cold weather conditions), with secondary, weakly virulent fungal pathogens and endophytes (e.g. *Diplodia mutila*, *Phomopsis* spp.) contributing to the syndrome (Przybył 2002, Pukacki & Przybył 2005, Cech & Hoyer-Tomiczek 2007). Accumulating evidence now suggests, however, that the recently described hyphomycete *Chalara fraxinea* (Figure 2) is involved in this unprecedented dieback of common ash in Europe (Kowalski 2006, Kowalski & Holdenrieder 2008).
C. fraxinea was found at 31 Austrian localities, including 16 localities in the Province of Lower Austria and five localities each in the Provinces of Vienna, Upper Austria and Styria (Kirisits et al. 2008). In one case the fungus was detected in a forest nursery. At 29 sites C. fraxinea was isolated from young F. excelsior trees, at one site from young narrow-leaved ash (Fraxinus angustifolia subsp. danubialis) trees and, in a park in Vienna, from weeping ash (Fraxinus excelsior 'Pendula') trees (Kirisits et al. 2008). The latter are the first and thus far only records of the fungus from a host other than F. excelsior.

Isolation of C. fraxinea proved to be difficult from trees showing late symptoms of disease, especially from tissues bearing fruiting bodies of other fungi. We suppose that on such plant material the slow growing C. fraxinea is in most cases already outcompeted by fast-growing endophytic or saprotrophic fungi. However, when isolations were made from shoots, twigs and stems showing early symptoms of disease (Figure 3) C. fraxinea was the most common fungus and in most cases the only one that was recovered.

Ash dieback: A new fungal disease

Kowalski & Holdenrieder (2008) reported the proof of pathogenicity of C. fraxinea to F. excelsior. This has been confirmed in own, presently ongoing inoculation experiments (Kirisits et al. 2008). Based on studies in Poland (Kowalski 2006, Kowalski & Holdenrieder 2008) and our preliminary results from Austria (Halmenschlager & Kirisits 2008, Kirisits et al. 2008) we suppose that ash dieback is not a complex phenomenon, but an infectious disease, with C. fraxinea as primary causal agent.

Figure 1: Mature, solitary Fraxinus excelsior tree affected by ash dieback (Laussa, Upper Austria, July 2007).

Abbildung 1: Solitäres mit starkem Trieb-, Zweig- und Aststerben (Laussa, Oberösterreich, Juli 2007)

Figure 2: Phialophores and conidia (inset) of Chalara fraxinea. The arrow in the inset indicates a first-formed conidium. Bar = 4 μm.

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Figure 3: Small necrotic lesions on shoots of young *Fraxinus excelsior* trees prior to budburst (Schafberg, Vienna, mid-April 2008). *Chalara fraxinea* was the most common and in most cases the only fungus isolated from these shoots showing early symptoms of ash dieback.


Thomas Kirisits, Michaela Matlakova, Susanne Mottinger-Kroupa and Erhard Halmschlager, Institute of Forest Entomology, Forest Pathology and Forest Protection (IFFF), Department of Forest and Soil Sciences, University of Natural Resources and Applied Life Sciences, Vienna (BOKU), Hasenauerstraße 38, A-1190 Vienna, Austria, phone: +43-1-3682433, email: thomas.kirisits@boku.ac.at