WIDESPREAD *PHYTOPHTHORA* INFESTATIONS OF NURSERIES IN GERMANY AND AUSTRIA AND THEIR ROLE AS PRIMARY PATHWAY OF *PHYTOPHTHORA* DISEASES OF TREES

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Between 2001 and 2007 extensive nursery surveys were carried out across Germany and Austria. In Northern Germany beech, oak and maple fields of 14 nurseries were investigated and 54% were found infested by *P. cactorum* (23%), *P. syringae* (23%) and *P. cambivora* (15%). Other *Phytophthora* spp. were isolated infrequently. In Lower Saxony, Northwestern Germany beech fields were surveyed in 6 nurseries and 5 were found infested by *P. cactorum*, *P. cambivora*, *P. citricola*, *P. gonapodyides* (each 2 nurseries) and *P. pseudosyringae* (1 nursery). In Bavaria, Southern Germany the beech fields of all 9 nurseries tested were infested by a range of 8 *Phytophthora* species with *P. citricola*, *P. cactorum* (each 7 nurseries) and *P. cambivora* (5 nurseries) being most widespread. In Southern and Western Germany all oak fields (*Q. robur*, *Q. rubra*, *Q. petraea*) of the 8 tested nurseries were infested by *Phytophthora* spp. *P. quercina*, *P. citricola* (each 5 nurseries) and *P. cactorum* (4 nurseries) were most common.

Alder fields were investigated in Bavaria, Southern Germany, in Brandenburg, Eastern Germany and in Austria with the specific purpose of detecting *P. alni* which is responsible for the epidemic alder mortality across Europe. In Bavaria *P. alni* was recovered from rootstocks of alders from 3 out of 4 nurseries which regularly bought in alder plants for resale, but not in rootstocks from four nurseries that grew their own alders from seed. In addition, *P. cambivora*, *P. cactorum*, *P. gonapodyides* and *P.* taxon 'Pgchlamydo'(each 37.5%), *P. megasperma* (50%) and *P. citricola* (62.5%) were isolated. In Brandenburg *P. alni* was found in 5 out of 10 nurseries. In addition, *P. cambivora*, *P. cactorum* and *P. syringae* were recovered with annually changing isolation frequencies. In both countries the infested nurseries used water from infested water courses for irrigation. In Austria *P. alni* was found in 1 of the 4 nurseries studied. As a result alders in Bavaria and Brandenburg were produced according to a code of good practice. Control isolations showed that *P. alni* but not the other *Phytophthora* spp. could be eliminated.

Extensive field studies in young forest and amenity plantations in Southern and Northwestern Germany, and in more than 3000 alder and more than 200 mature beech and oak stands across Germany demonstrate the ubiquitous involvement of *Phytophthora* species in the devastating broadleaf tree declines, and the role of infested nursery stock as a primary pathway of Phytophthora diseases of trees. The implications of our results for the nursery and the forest industries are discussed.