New Disease Reports

A new disease of *Nothofagus* in Britain caused by *Phytophthora pseudosyringae*

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Nothofagus is a deciduous tree native to Chile and introduced into Britain over 100 years ago. Small-scale plantations are widespread, particularly of *N. obliqua* and *N. alpina* (syn. *N. procera*), but prone to frost damage. Both species are fast growing, potentially valuable broadleaf timber species, with few pests and pathogens (Tuley, 1980). However in 2009 at a site in Cornwall, 12-18 year-old trees of *N. obliqua* were reported with extensive dieback and mortality. Located in four neighbouring 0.3-0.6 ha plots, 50-72% of trees had bleeding lesions on trunks and branches. Often these were aerial lesions 2-5 m above ground level (Fig. 1), in some cases girdling trunks or branches entirely, resulting in crown dieback and dying foliage (Fig. 2). Necrotic phloem tissue underneath the bleeds was pinkish-brown.

Culturing from margins of infected phloem onto *Phytophthora* selective medium (Denman *et al.*, 2009), *Phytophthora* was obtained from five trees showing symptoms. Based on morphology and growth rate at 20°C and 25°C on carrot agar (CA), it was identified as *P. pseudosyringae* (Jung *et al.*, 2003). DNA was extracted from three isolates and ITS regions 1 and 2 of the rDNA gene sequenced. All sequences exactly matched the *P. pseudosyringae* type isolate (GenBank AY230190) and one (for isolate P2177) was deposited in GenBank (JN542830). During 2010-11, *P. pseudosyringae* was isolated from both mature and semi-mature trees of *N. obliqua* and *N. alpina* at a further six *Nothofagus* plantations: three in England, two in Scotland and one in Wales, all showing similar symptoms.

In Europe *P. pseudosyringae* causes a root and collar rot of *Fagus sylvatica*, *Alnus glutinosa* and *Carpinus betulus* (Jung *et al.*, 2003; Denman *et al.*, 2009; Scanu *et al.*, 2010) and a foliar blight of *Vaccinium myrtillus* (Beales *et al.*, 2009). To satisfy Koch's postulates on *N. obliqua* and compare the pathogenicity of isolates from several hosts, freshly cut twigs (15 mm diameter, 250 mm long) were inoculated with small plugs of seven-day-old *P. pseudosyringae* cultures grown on CA. Inoculum was placed in small bark incisions and the wounds wrapped in damp cotton wool and Parafilm. Controls used sterile CA. Twigs were incubated in natural daylight, cut ends in water, for 14 days at 20°C. Phloem lesions were then measured (Fig. 3). *P. pseudosyringae* was re-isolated from lesions on all hosts (except controls) and, with the exception of one isolate, was most pathogenic on *N. obliqua* regardless of host origin (Table 1). *Nothofagus* appears highly susceptible to *P.*

pseudosyringae and infection is typically aerial rather than the root and collar rot observed by Jung *et al.*, (2003). A consequence of this damaging new disease is that future use of *N. obliqua* and *N. alpina* in UK forestry as suitable species for climate change adaptation strategies could be limited.

Acknowledgements

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Figure 1

Figure 2

Figure 3

Figure 4

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