

A Healthy World and Plants with *Phytophthora*? Multiple Introductions of Tree Pathogens to a Newly Established Woodland

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Established between 1996 and 2010, a site in Dorset was the largest newly-created mainly broadleaved woodland in England. It covered 202 ha (499 acres) and the planted tree species were mostly native, intermixed with small components of non-native species. Historically the site had been managed as farmland for centuries (predominantly grassland but also arable crops), divided by undisturbed hedgerow systems.

The site came to attention in 2011 when the site manager reported dieback of alder and ash (*Fraxinus excelsior*) trees. In an area of around 1 ha, more than 100 ash trees were observed with aerial stem cankers. *Phytophthora syringae* was identified as the causal agent, of which ash was a previously unknown host (Webber et al. 2014). During further site visits, grey alder (*Alnus incana*) was observed with dieback and bleeding stem cankers, and both the symptoms and on-site diagnostic tests indicated the causal agent was a root-attacking *Phytophthora* sp. In 2013, laboratory testing identified *Phytophthora siskiyouensis* from the alder stem and root cankers, and also from associated soil samples. It was estimated that 10% of ca. 1000 *A. incana* trees planted on the site were affected (Perez-Sierra et al. 2015). Follow-up investigations in 2014 which established the distribution of disease also yielded further isolations of *P. siskiyouensis*. Since then, gradual felling of *A. incana* under biosecurity restrictions has been ongoing. The most recent site investigation in 2018 recorded only a very small number of *A. incana* trees remaining, with a few of these still exhibiting symptoms. The decline of affected alder trees has been very gradual, and the site remains the only European record of *P. siskiyouensis*. Other findings from the site include the confirmation of *P. plurivora* from the rhizosphere soil of a healthy common alder (*Alnus glutinosa*), and *P. cambivora* causing bleeding stem cankers in small-leaved lime (*Tilia cordata*). Following the first UK identification of ash dieback caused by the fungus *Hymenoscyphus fraxineus* in planted ash trees in Leicestershire in 2012, the Dorset site was also found to have accepted a significant proportion of its ash planting material from the same supplier. Subsequent investigations in 2013 concluded that *H. fraxineus* was likely to have been introduced and causing symptoms on ash trees on the site as early as 2007 - 2008.

Although the site for this new woodland could not be described as pristine undisturbed land, the communities of *Phytophthora* species attacking the recently established trees were varied and even novel. There is a strong likelihood that all were introduced on infected planting stock, which clearly illustrates the importance of careful selection of species, consideration of supply origin and the need for improved biosecurity practices in nurseries supplying planting stock.

References

Perez-Sierra, A.; Kalantarzadeh, M.; Sancisi-Frey, S.; and Brasier, C.M. 2015. *Phytophthora siskiyouensis* causing stem lesions and cankers on *Alnus incana*. New Disease Reports. 31, 17. [dx.doi.org/10.5197/j.2044-0588.2015.031.017](https://doi.org/10.5197/j.2044-0588.2015.031.017).

Webber, J.; Wylder, B.; Harris, A.R.; and Brasier, C. 2014. Aerial stem cankers associated with *Phytophthora syringae* on *Fraxinus*: how and why? Page 25, in: Proceedings of the 7th meeting of the IUFRO Working Party S07.02.09: Phytophthoras in forests and natural ecosystems. http://forestphytophthoras.org/sites/default/files/proceedings/IUFRO_Proceedings_2014.pdf.