Introduction

Our environment is under unprecedented threat from an increasing number of non-native tree pathogens, with many introductions via the plant trade. Successive initiatives to increase afforestation across the United Kingdom since the early 1990s, has often resulted in plant demand outstripping domestic supply from UK tree nurseries. As a consequence, landowners may often, knowingly or unknowingly, use material grown outside the UK and potentially at higher risk of contamination with novel plant pathogens. The outcome has been an increasing number of introductions of new pathogens, often not identified until many years after planting. This limited study of a single recently-established woodland site in south England is a salutary example of multiple introductions through the planting stock pathway.

Observations

Established between 1996 and 2010, the site in Dorset was the largest, newly-created mainly broad-leaved woodland in England. It covered 202 ha (499 acres) and planted tree species were mostly native, intermixed with small components of non-natives. 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 grey alder (Alnus incana) and ash (Fraxinus excelsior) trees. In an area of around 1 ha, more than 100 ash trees were observed with aerial stem cankers (Fig 1). Phytophthora syringae was identified as the causal agent, of which ash was a previously unknown host (Webber et al. 2014).

Grey alder (A. incana) was observed with stem and root cankers causing dieback (Fig 2). Both the symptoms and on-site diagnostic tests indicated the causal agent was a root-attacking Phytophthora sp, although laboratory testing was inconclusive. In 2013, further samples were tested and Phytophthora sikkimensis identified from cankers and also from associated soil. 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 established the distribution of disease and yielded further isolations of P. sikkimensis. Since then, gradual felling of A. incana under biosecurity restrictions has been ongoing. The most recent site investigation in 2018 found only a very small number of A. incana trees remained, with a few still exhibiting symptoms. The decline of affected alder trees has been very gradual, and the site remains the only European record of P. sikkimensis.

Discussion

Although the site for this new woodland could not be described as pristine undisturbed land, the community of pathogen species attacking the recently established trees was unusual and even novel. There is a strong likelihood that all pathogens detected on the site were introduced on infected planting stock. This scenario is likely to have been repeated but undocumented on multiple similar afforestation sites across the UK.

This is an example of the legacy of problems that can be caused by the introduction of contaminated/infected planting material. The findings also highlight the importance of reporting symptoms in newly established woodland plantings and the need for accurate diagnosis of the causal agent.

In order to prevent similar damage in future plantings, priority should be given to careful selection of species and provision of adequate lead-in times to allow sufficient domestic plant supply. Also, there is a need for consideration of production origin and improved biosecurity practices in the planting stock supply chain.

References
