

Letters to the Editor

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The Editor, *Irish Forestry*

Re. Options to protect forest and plant health in Ireland

Dear Sir,

Some of the readers of *Irish Forestry* may have noticed Ben Haugh's piece on "The scourge of conker canker" in the *Irish Mail* on Sunday, 20th September 2015. In short, the article dealt with the increasing threat to Irish trees from non-native pest and pathogens, and featured an interview with the author Thomas Pakenham. While I was very glad to see plant health issues getting such popular coverage, I do have some reservations over the tone and one of the conclusions of the piece. The aim of this letter is not to critique the newspaper article; rather I feel it offers a good opportunity to provide an alternative opinion to that of the article. In my opinion the conclusion of the article was rather defeatist in tone, conceding that the place of native Irish trees in Irish forestry may be finished. The article encouraged importing and planting non-native tree species to counteract the effects of the non-native pests and pathogens. This conclusion is based on the premise that these non-native trees have co-evolved with the non-native pest or pathogen in the region of origin, and so have a higher degree of resistance to the pest or pathogen than our native tree species. This is certainly true in some cases, as experiments and field observations have shown that ash species (e.g. *Fraxinus manshurica*) from the region of origin of the ash dieback pathogen (*Hymenoscyphus fraxineus*) show little or no disease symptoms when "infected" with the fungus¹. Using a co-evolved ash species (e.g. *F. manshurica*) instead of our native European ash (*Fraxinus excelsior*) in future plantings may ensure most of the trees will not succumb to ash dieback, however there is also the possibility that resistance to the pathogen already exists in our native ash population, as has been shown in Denmark². Indeed, preliminary results of the multi-institute UK funded research project NORNEX have shown high frequency of resistance genes in the UK *F. excelsior* population³.

¹ McKinney, L.V., Nielsen, L.R., Collinge, D.B., Thomsen, I.M., Hansen, J.K. and Kjær, E.D. 2014. The ash dieback crisis: genetic variation in resistance can prove a long-term solution. *Plant Pathology* 63:485-499.

² Lobo, A., Hansen, J.K., McKinney, L.V., Nielsen, L.R. and Kjaer, E.D. 2014. Genetic variation in dieback resistance: growth and survival of *Fraxinus excelsior* under the influence of *Hymenoscyphus pseudoalbidus*. *Scandinavian Journal of Forest Research* 29: 519-526.

³ Anon. 2016. An open consortium (NORNEX) for molecular understanding of ash dieback disease. Online: http://oadb.tsl.ac.uk/wp-content/uploads/2016/04/Nornex_Final_Report_April_2016.pdf

While I do not disagree in principal with the planting of non-native trees as a response to increasing pest and disease damage in Irish forests; I suggest that great caution be exercised in the implementation of such a step. Firstly, there are regulations in place to control the importation of plants and seeds into Ireland (see the Horticulture and Plant Health Division section on the Department of Agriculture, Food and the Marine website), or Northern Ireland (see the Plant and tree health section on the Department of Agriculture, Environment and Rural Affairs website), and these are designed to prevent the spread of non-native pests and pathogens. Despite these rules, it is known that some pests and pathogens do slip through the inspection net, and could go on to cause significant plant health problems. Importing any plant or plant reproductive material from another region brings with it the inherent risk that new pests and pathogens are present with the plant. A further problem with replacing native with non-native tree species is that we do not know the effect that our native flora and fauna (e.g. insects, fungi) will have on these non-native tree species once they are planted. Again using the ash dieback pathogen as an example, the pathogen was known as a benign fungus in Japanese forests, only exhibiting pathogenic behaviour when it encountered European *Fraxinus* species in the European environment. Who knows what effect any one of the 1,000's of seemingly harmless native Irish fungal, bacterial or insect species could have on these imported non-native tree species?

A better solution to the threat from current and future pests and pathogens on our forests is to increase the resilience of our forest estate by increasing forest tree diversity. This diversity includes several levels of diversity, such as species diversity (i.e. mixed species), genetic diversity (i.e. multiple provenances), and structural diversity (e.g. multiple age). This could provide a built-in buffering capacity within the forest, helping prevent major pest or disease epidemics⁴. Increasing the diversity would also provide increased resilience to climate change in the forest stand; and is also generally accepted to benefit native biodiversity. However, as always with forest planning, other factors need also be considered (e.g. soils, geography) in the choice of species, provenances and forest management strategies.

With a view to proactively preventing and mitigating against future pest and pathogen outbreaks in forestry, Ireland also needs to develop an indigenous capacity in the scientific disciplines of forest pathology and entomology. According to Dr Leslie Dowley (ex-Teagasc) there were 32 practicing plant pathologists in the research performing institutions on the island of Ireland in 1970, today there are only around 5. At present, I am the only full time specialist hired as a Forest pathologist on the island of Ireland. This decrease in expertise is happening at the same time as increases in the numbers of new pests and pathogens entering Ireland. Globally much of the work

⁴ Ennos, R.A. 2015. Resilience of forests to pathogens: an evolutionary ecology perspective. *Forestry* 88:41–52.

previously carried out by plant pathologists is being transferred to molecular biologists; however, many of the skills involved in traditional plant pathology are still vital to our understanding of pathogen biology and epidemiology. Plant pathologists also have key responsibilities in public education and in contribution to national phytosanitary and biosecurity policy. The research performing institutes need to broaden their searches for future staff hires - if not hiring a dedicated plant pathologist then perhaps a microbiologist, environmental scientist or plant biologist with experience in plant/forest pathology. With many national and international funding bodies signalling an increase in the importance of plant pathology topics in their research policies (e.g. Department of Agriculture, Food and the Marine Ireland; Department of Agriculture, Environment, and Rural Affairs Northern Ireland; Biotechnology and Biological Sciences Research Council UK), the institutes need to respond to these policy drivers by hiring suitable staff to lead the work.

As an island off the west coast of Europe, Ireland has a significant natural defence against pest and pathogen invasions. However, we need to build upon this natural defence by investing in our scientific capacity in the fields of plant pathology and entomology. Institutes should be proactive and invest in this capacity now, rather than acting in response to future outbreaks. Plant pathogens are almost impossible to eradicate once introduced into a new region, therefore the national focus should be on proactive scientifically informed activities such as horizon scanning, pest risk analysis and contingency planning in an effort to safeguard Ireland's plant health for future generations.

Yours sincerely,

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