The weakest link: new insights on forest pathogens invading Europe

Ascomycetes and oomycetes top the list of invasive forest pathogens (IFPs) arriving in Europe in the last 30 years through increased trade of living plants from North America and Asia. Researchers investigating the threats to Europe's forests from foreign pathogens have revealed dramatic increases in IFPs since the 1990s; the majority of them attacking broadleaved trees in forest and ornamental plantations. Living plants transported in soil are now a major pathway for the introduction of new diseases to Europe's forest trees.
Arriving in a new environment offers evolutionary opportunities for pathogens. Cross breeding between closely related but previously geographically isolated pathogens could trigger the rapid emergence of modified pathogens. This phenomenon of interspecific hybridization, particularly frequent in the 90s, generates pathogens with greater fitness that can live on different hosts.

The team of researchers brought together in ISEFOR[1] painstakingly assembled historical and biogeographic patterns of invasion by 124 alien forest pathogens using comprehensive records from 20 European countries. Countries in a southern central belt of the European territory recorded the greatest numbers of IFPs with increased entrance and establishment of invasive species. Statistical analysis of the data indicated that invasion was associated with: a wider range of environments; higher population size and density; and higher international volume of commercial exchange. Land area, the amount of biomass and rainfall also influenced the rate of spread of IFPs. ISEFOR researchers predict that countries with large environmental diversity, commercially isolated in the recent past and nowadays are densely populated might be at higher risk for further spread of IFPs. "*Such countries are possibly the weakest links in attempts to prevent new introductions*" said Alberto Santini who led the research team. "*Protection will require tight coordination of actions by phytosanitary authorities and industry with special attention to the risk inherent in the trade of ornamental plants for planting."*

Emerging infectious diseases (EIDs) of forest plants damage forests both economically and ecologically. They decrease yield and quality of timber and reduce both species and ecosystem biodiversity. Plant EIDs are tightly linked to biological invasion. ISEFOR thoroughly examined determinants of invasiveness (the ability of a disease-producing species to invade a new territory) and of invasibility (the susceptibility of a territory to invasion). The new list of European Forest Pathogens is available on the ISEFOR website http://www.isefor.com/

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