

Sentinel Plants to Prevent Biological Invasions

A.M. VETTRAINO¹ H. M. Li² R. ESCHEN³, A. ROQUES⁴ A. YART⁴ M. KENIS³ A. VANNINI¹

¹DIBAF, via S. Camillo de Lellis snc, University of Tuscia-via S. Camillo de Lellis, snc Viterbo- 01100, Italy email: vannini@unitus.it

²MoA-CABI Joint Laboratory for Biosafety, Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing 100193, PR China

³CABI, Rue des Grillons 1 CH-2800 Delémont, Switzerland

⁴INRA, UR633, Zoologie Forestière, Centre de Recherche d'Orléans, 2163 Avenue de la Pomme de Pin, CS 40001 Ardon, 45075 Orléans, Cedex 2, France

During the past century, non-indigenous plants pests have been introduced at increasing rates into Europe. A growing number of these species are becoming invasive and contribute to decline in native species diversity, cause changes in ecosystem function, and pose cumulative direct economic impacts. Most alien and invasive pests of trees were not known to be harmful prior to their establishment, making prevention of their introduction and mitigation of impacts difficult. Developing tools to identify pests before they arrive is expected to significantly advance the science and technology of ecological forecasting and risk assessment. We explored the use of 'sentinel' plants, plants surveyed for the presence of damaging pests and pathogens, in China as an early warning system for new and emerging tree pests in Europe. Depending on the native range of sentinel trees, the results provide information on the potential impact on native trees in the importing country, or the likelihood that the pest enters the pathway towards this country.

The sentinel trees strategy has been used to identify Asian fungi pathogenic to European trees, research done within the EU projects PRATIQUE, and fungi pathogenic to Asian species most frequently imported into Europe, research done within the project ISEFOR and the COST Action PERMIT. Plots with sentinel trees were established in Fujian province and close to Beijing, China, using healthy imported seedlings of European broadleaved and conifer species or using seedlings of five Asian broadleaved species that are commonly exported to Europe. The fungal assemblage associated to specific symptoms was studied using traditional methods, isolation on synthetic media, and a molecular approach, 454-NGS analysis. The results will be reported and the differences between the approaches using European and Asian trees discussed.

Keywords: alien species, bioinvasion, pathway risk assessment