

P39

### **Using genetic markers to study the naturalization of cultivated tree species – the case of *Eucalyptus globulus* Labill.**

Joaquim Silva<sup>1,2</sup>, Joana Costa<sup>3</sup>, Ernesto Deus<sup>1,2</sup>, Simão Pinho<sup>1,2</sup>, Joaquim Pinto<sup>1,3</sup>, Nuno Borralho<sup>3</sup>

<sup>1</sup>College of Agriculture, Polytechnic of Coimbra, Coimbra, Portugal. <sup>2</sup>Centre for Functional Ecology, University of Coimbra, Coimbra, Portugal. <sup>3</sup>RAIZ Forest and Paper Research Institute, Eixo, Portugal

#### **Abstract**

Genetic markers can provide valuable insights into the regeneration and dispersal of plants. This approach can be particularly useful to study exotic cultivated species that are undergoing a process of naturalization. Here we present an overview of the use of genetic markers in invasion ecology, with a particular focus on *Eucalyptus globulus*, a fast-growth tree species native to Australasia. Plantations of *E. globulus* expanded exponentially in different world regions due to economic reasons, but there are increasing reports of plant escape and invasion, especially after wildfires. The ongoing WildGum II project is aimed at investigating the spatiotemporal dynamics of wild eucalypt populations (WEP) in Portugal, using genetic markers and remote sensing. Data and tissue samples for genetic analyses were collected from nearly 3,000 eucalypts distributed across 10 WEPs. Genetic markers were used to estimate genetic diversity, the mating patterns and the gene flow. Parentage analysis was used to assess offspring abundance, dispersal direction and distances, and the role of the parent-trees on the recruitment process. A study case of a massive post-fire plant recruitment that occurred in Central Portugal is presented. Genetic diversity of the post-fire cohort was much lower than in the seed-trees. One single seed-tree originated 52% of the offspring. Post-fire dispersal occurred southward in accordance with local post-fire winds. Maximum dispersal distance was 101 m and external pollen has travelled a minimum distance of 700 m. These results presented as an example, strongly support the multiple advantages in using genetic markers for studying the naturalization of cultivated tree species.

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P40

### **Developing a prioritization framework for the management of invasive species under climate change for the Flemish Waterways: drafting the priority species list**

Frédérique Steen, Bram D'hondt, Tim Adriaens

INBO, Research Institute for Nature and Forest, Brussels, Belgium

#### **Abstract**

Site managers need clear guidance to develop an efficient policy for the management of invasive species. However, financial resources are scarce, as well as the knowledge on which species present a priority. Hence, it is necessary to develop a clear framework tailored to the needs of the individual manager, in this case the Flemish Waterways.

The first step towards this management framework is the design of a list of priority species. The list needs to encompass both the currently present invasive species, but also species that might present a future risk. To this end, a compilation was made of all non-indigenous plants on Belgian territory, including all traded plant species and invasive species present in neighbouring countries. Each of the species was subject to a climate matching under different climate scenarios, to evaluate whether they could establish within Flanders under the concurrently present Köppen-Geiger climate zones. Resulting species were subsequently evaluated for both invasiveness and manageability. Relevant and available plant traits were noted from the plant trait database TRY and used as base for discussion in the final step, where relevance of each species was evaluated by an expert panel based on a predetermined set of possible impacts.

The resulting shortlist was used to draft a management guide, compiling general management guidelines but with emphasis on the specificities of each individual plant. The species list will also be implemented in an early warning system (EWS) built on existing data infrastructure (i.e. citizen science platform 'waarnemingen.be' or LIFE Riparias EWS). This will aid the Flemish Waterways to tackle new introductions as well as to allocate available resources efficiently.