

INVASIVE INSECT SPECIES IN EUROPE: FIRST RESULTS OF THE DAISIE PROGRAM

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ABSTRACT

Research on insect invasions in forests became a European preoccupation only recently, and there is still no global list of exotic insects and no list of forest insect invaders available for Europe. During the past 5 years, lists of alien insects have become progressively more available in some European countries, but even more major progress is likely to result from the development since 2004-2005 of two European research projects: ALARM (Assessing Large-scale Risks with tested Methods) and DAISIE (Delivering Alien Invasive Species Inventories in Europe). The major objective of DAISIE is to deliver lists of alien organisms including insects for all European countries and the major European islands. The first results revealed the presence of more than 1,200 insect species of exotic origin in Europe and of more than 500 species of Continental Europe introduced into European islands such as UK, Malta, Corsica, and the Canary Islands. Among the exotic species, 313 are related to forests and other wooded areas such as city parks and hedgerows. Homoptera followed by Coleoptera are the dominant groups of alien insects in forests. The introduction of alien insects significantly accelerated during the second half of the 20th century; 42.4% of the species have been introduced since 1950. During the same period, Asia became the dominant source (> 20%) for exotic species establishing in Europe. Less than 2% of the forest insect invaders resulted from deliberate release (e.g., Saturniidae moths, biocontrol agents); most came as plant contaminants (77%) and a few were hitchhikers (e.g., ants, *Cameraria orchidella*). Insect species related to deciduous trees are slightly dominant compared to those specialized on conifers, but an amazingly important number of species (>50) are related to tropical trees such as eucalyptus and palm trees.

Some tendencies in arrival of alien species could also be inferred from the notifications of non-compliance regularly published by the European and Mediterranean Plant Protection Organization (EPPO). We compiled and analyzed these interception lists at the European level for 1995-2004. During this period, a total of 779 exotic forest insects were intercepted, but only 281 individuals were identified at species level for a total of 42 species. These records indicated an increasing role of bonsai in providing new forest invaders, essentially from Asia. The trade of bonsai was the source of 35.3% of the interceptions; those from wood packaging represented 37.7% (mostly from Asia). Only 24.1% of the interceptions were related to fresh wood and derivatives, mostly originating from Russia. The diversity of alien insects carried by bonsai was significantly higher than that of the entomofauna carried by wood packaging material and fresh wood. Whereas some species were relatively well represented (e.g., the cerambycids *Anoplophora* spp. and *Monohammus* spp.), a number of exotic forest insects established in Europe were never intercepted at importation such as the cerambycid *Neoclytus acuminatus*, the platypodid *Platypus mutates*, or the chestnut gall-maker (*Dryocosmus kuriphilus*). We must thus consider that a number of invasive pathways remain unknown.

Final validation of DAISIE results is planned for September 2007, followed by free Internet online access in mid- 2008.