ISEFOR

Increasing Sustainability of European Forests:

Modeling for security against invasive pests and pathogens under climate change

Partners

Institute of Biological and Environmental Sciences, University of Aberdeen http://www.abdn.ac.uk/ibes/index.php

Swedish University of Agricultural Sciences http://www.slu.se/en

The Laboratory of Soil Biology, University of Neuchatel http://www2.unine.ch/biolsol/page30989.html

Università degli Studi della Tuscia Facolta di Agraria www.agraria.unitus.it

Istituto per la Protezione delle Piante www.ipp.cnr.it

Forest Research Institute http://www.ibles.pl

The Biological Control and Spatial Ecology Lab, Université Libre de Bruxelles lubies.ulb.ac.be

University of Eastern Finland www.uef.fi/uef/english

Institut National de la Research Agronomique www.inra.fr

The Centre for Agricultural Bioscience International www.cabi.org

St Petersburg Forest Technology Academy http://www.ftacademy.ru

University of Natural Resources and Life Sciences, Vienna www.boku.ac.at

European State Forest Association www.eustafor.eu/?lang=eng

Confederation of European Forest Owners www.cepf-eu.org

Programme for the Endorsement of Forest Certification schemes http://www.pefc.org

Institute of Zoology, Chinese Academy of Sciences http://www.brim.ac.cn

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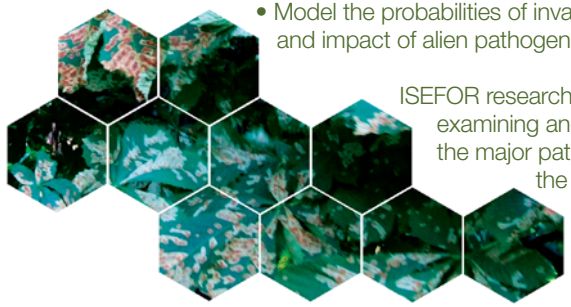
SEVENTH FRAMEWORK PROGRAMME

ISEFOR Research

European forests not only provide us with a wealth of biodiversity, but give us invaluable products such as medicines and timber, and essential protection against avalanches, flooding and landslides. However, rapid climate change threatens well established trees species, making our forest ecosystems vulnerable to disease. This is exacerbated by increasing numbers of alien pests and pathogens which arrive at European ports of entry and escape into natural and plantation forests from an ever increasing global trade, population mobility, and tourism. Furthermore, the combination of climate change and alien pests could increase the susceptibility of our forest trees to disease, resulting in novel forest health problems.

ISEFOR Research will:

- Define the pest and disease threats to European forest ecosystems
- Develop molecular techniques for detection and diagnosis
- Analyse trade and develop a quantified approach to pest risk assessment
- Model the probabilities of invasion, spread and impact of alien pathogens



ISEFOR research is examining and quantifying the major pathways for the dispersal of forest pests and diseases, including: wood as a commodity, wood packaging materials, plants for planting, standard or larger trees, hardy ornamental nursery stock and seeds of a wide range of tree species, tourist souvenirs, flying pests of eastern Eurasian origin, organisms incompletely established in the EU, and even goods from other countries bought over the Internet by the public.

ISEFOR Results will provide:

- Diagnostic tools for the plant health surveillance community
- Information on the potential of current quarantine organisms to cause damage in European forest ecosystems under climate change scenarios
- Assistance to quarantine authorities tackling risks from alien pests and pathogens
- Details of invasive pests currently unknown as threats to European forest ecosystems

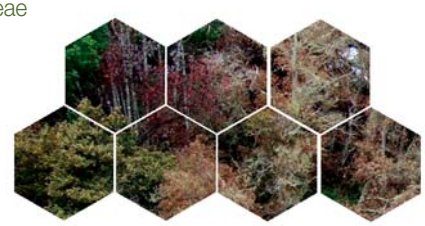
Some of the target quarantine organisms used as models in **ISEFOR:**

Bacteria

Xylella fastidiosa many hosts
Pseudomonas syringae pv. aesculi host *Prunus persicae Erwinia amylovora* host Woody Rosaceae

Oomycota

Phytophthora spp. extremely wide host range e.g.
P. ramorum, P. kernoviae, P. lateralis, P. cinnamomi



Insects

Anoplophora glabripennis wide host range on angiosperm trees
Anoplophora chinensis wide host range on angiosperm trees, incl. Citrus
Agrilus planipennis host Fraxinus spp.
Emerald ash borer
Dendrolimus spp. many coniferous species e.g.
D. superans, D. sibiricus
Dryocosmus kuriphilus host
Castanea gall insects
Megaplatypus mutates host

Nematodes

Bursaphelenchus xylophilus host *Pinus* spp.

Fungi

Ceratocystis spp. both broadleaved host species and conifers: *C. fagacearum, C. fimbriata, C. coerulescens, C. polonica, C.larici cola, C. rufipenni, C.fujiensis, C. platani*
Ophiostoma, Grosmannia and Leptographium spp. host *Ulmus* sp. *Zelkova* sp., *Picea* spp., *Pinus* spp., *Larix* spp. e.g. *Ophiostoma novo-ulmi* subspecies and subspecies hybrids, species causing bluestain on conifers
Mycosphaerella pini / Dothistroma septosporum Mycosphaerella dearnessii/Lecanosticta acicola host *Pinus* spp.
Gremmeniella abietina host *Pinaceae*
Chalara fraxinea host *Fraxinus* spp.
Eutypela parasitica host *Acer* spp.
Fusarium circinatum host *Pinus* spp.
Cryphonectria spp. host *Castanea (Quercus) C. parasitica*