Predicting Pests & Disease in European Forests

Original Sokos Hotel Kimmel Itäranta 1, 80100 Joensuu, Finland
http://www.sokoshotels.fi/hotellit/joensuu/kimmel/

Wednesday 19th to Thursday 20th February 2014

- Do you need to predict tree pests & diseases for planning, investment, monitoring?
- Do you need reliable models with assumptions and outputs that you recognize?
- Do you need information on invasive forest pests & pathogens under climate change?

This workshop introduces models to predict the spread of invasive pests and diseases that have been developed and tested over three years through the collaboration of pathologists, entomologists and mathematical modellers in ISEFOR*. Model developers will demonstrate and explain the structure of the models: inputs, outputs and rules. You will have time for discussion about assumptions and describe your first impressions of the predictive facility of the models. You will work with the models, get to know them and derive your own output. The 8-hour workshop is programmed over two days to allow informal time for you to discuss model predictions and your needs with ISEFOR researchers and colleagues.

Disease models include:

1. Pinewood nematode *Bursaphelenchus xylophilus*
2. Ash dieback, *Chalara fraxinea*
3. Pine pitch canker, *Fusarium circinatum*
4. Dothistroma needle blight, *Dothistroma septosporum*
5. Siberian moth *Dendrolimus sibiricus*
6. Emerald ash borer, *Agrilus planipennis*
7. Alder phytophtora

Contact Colette Jones to book your place at the workshop c.d.jones@abdn.ac.uk

This is the final workshop from the ISEFOR research project 2010-2014. ISEFOR researchers have worked together over three years analysing threats to European forests from invasive pests and pathogens, including alien organisms, vulnerable hosts, trade pathways for disease spread and the use of sentinel tree nurseries in China. More information is available at http://www.isefor.com/

ISEFOR

SEVENTH FRAMEWORK PROGRAMME

*ISEFOR is a consortium of researchers funded by European Union Seventh Framework Programme FP7 2007-2013 KBBE 2009-3 under grant agreement 245268; project coordinator Professor Stephen Woodward; administrator Dr Colette Jones c.d.jones@abdn.ac.uk

Cellular automaton (CA) modelling

The workshop presents models developed by Prof Timo Pukkala and Timo Möykkynen at the University of Eastern Finland. These are cellular automata models (CA), used commonly to simulate the spread of forest fires and city expansion. CA models are cell-based with temporal and spatial aspects. Every cell has a discrete state that depends on the states of neighbouring cells. States are updated in discrete time steps according to fixed rules.

Selection of pests and diseases in ISEFOR

The disease-causing species that are modelled in ISEFOR were selected because: they are invasive; cause serious damage; environmental requirements are known; occurrence maps of host species are available; show a range of spread mechanisms; they permit different CA model variants and each can be used for other species with similar spread mechanisms. Models completed include: Pinewood nematode *Bursaphelenchus xylophilus;* Ash dieback, *Chalara fraxinea;* Pine pitch canker, *Fusarium circinatum;* Dothistroma needle blight, *Dothistroma septosporum;* Siberian moth *Dendrolimus sibiricus;* Emerald ash borer, *Agrilus planipennis;* Alder phytophtora

The biology

Modellers work closely in ISEFOR with experts on the biology of the pest or pathogen: Christelle Robinet INRA; Thomas Kirisits BOKU; Jan Stenlid SLU; Andrea Vannini and AnnaMaria Vettraino UNITUS; Alberto Santini IPP-CNR; Stephen Woodward UOAberdeen; Paolo Capretti UoFirenze.

Model inputs, rules and parameters

Knowledge of pest and pathogen spread, host species cover, entry points and climatic variables are incorporated in the models via inputs and rules and determine cell states and transitions.

Model outputs

Model outputs include raster maps of forests, infected trees per cell, years of infection, probability of infection; area and percentage of infected cells; temporal development of infection.

Workshop Schedule

Day 1 Wednesday 19th February

Register	from 11:15am onwards
1pm	Welcome and buffet lunch
2pm	Explanation of the models (7 models) How they work and results from each model
3:30pm	Break
4pm	Working with the models. In working groups, each group uses one model
5:30pm	Question and answers from Day 1
7pm	Dinner

Day 2 Thursday 20th February

8:30am	Concluding sessions: Groups present their results
9:15am	The models and the results are discussed
10:30am	Break
11am	Overall discussion on modelling invasive pests and pathogens
1pm	workshop end delegates prepare to depart