

## REPORT OF THE TREE HEALTH EXPERT MEETING, 1 JULY 2011

*This summary note includes points noted from the meeting which was based upon the outputs of the 'Tree Health and Plant Biosecurity Workshop' held on 16 February 2011 and the 'Securing Tree Health in a Changing Environment' workshop held on 6 May 2011. It is intended as an informal aide memoire rather than a comprehensive record. It does not attempt to capture the detail of the wide-ranging debate, to reconcile views or to comment on the validity of the comments made by participants.*

### 1. Welcome and Aims (Sue Popple)

Sue Popple, Defra's Deputy Director for Farming and Food Science welcomed participants to the meeting and thanked them for their attendance. (The list of participants for this meeting is at Annex A.)

Defra's Secretary of State considers Tree Health and Plant Biosecurity an important and urgent issue. She has therefore commissioned the development of an Action Plan, which focuses on four areas: practical actions, import controls, public engagement and research.

The purpose of the meeting was to bring together a small group of experts to consider and prioritise the evidence needs and opportunities identified in previous workshops (the '[Tree Health and Plant Biosecurity Workshop](#)' held on 16 February 2011 and the '[Securing Tree Health in a Changing Environment](#)' workshop held on 6 May 2011) as part of the Action Plan.

These previous stakeholder and Living With Environmental Change (LWEC) workshops looked at evidence needs and opportunities in: pest and disease biology, epidemiology, host interactions, modelling and risk; generic evidence needs; detection and identification of pests and diseases; prevention and control (including novel solutions); and governance, awareness and behaviours.

Subsequently it was decided to identify research needs on the basis of current and future risks, taking account of the output from earlier workshops, in the following categories:

- Established within the UK
- New to the UK
- Potential Threats in EU (not in the UK)
- Other Threats Globally (not in the UK).

In addition to specific pest and disease problems, a number of broader research questions on tree health were identified. These are summarised below and presented in a tabular form in Annex B.

#### 1. Pests and Diseases established within the UK

The pests and diseases listed in Annex C were discussed.

It was agreed that current control policies for large pine weevil (based upon protection of conifer transplants with insecticides and biological control agents) and great spruce bark beetle (using classical biological control through the imported specific predatory beetle *Rhizophagus grandis*) were successful and that further research on control measures was not a high priority. There is scope to review these control policies/measures to inform control strategies and contingency plans for other pests.

Bleeding canker in horse chestnut is widespread (70% trees affected by symptoms in parts of England, 36% in Wales and 42% in Scotland in 2007) with few potential practical options for control of existing infections. Any further research should focus on longer term strategic research into breeding resistant selections— see generic needs section below.

Dothistroma needle blight has been present in the UK since the 1950s. There is information available in the UK and overseas on aspects of control and this should be brought together to identify a control strategy with guidance for foresters. This should be reviewed in the future in the light of outputs from ongoing research. Such a strategy should consider if spread between locations is related to regional planting stock and control on nurseries to ensure new stock is disease free, or changing management practices mindful of experiences from other countries. It was recommended that an expert Action Team should be established to pull relevant information together and produce guidance. If successful, a similar approach could be rolled out to other pests and diseases.

## 2. Pests and diseases newly arrived in the UK

Over the past 3-4 years a new form of oak decline - acute oak decline - has been characterised, although current evidence does not suggest it is due to a recently introduced pest/pathogen. Research is required to understand the factors that are involved in the change in the disease complex, together with aspects of pathogenicity such as differential susceptibility, relationship with age and potential for recovery. Outputs from such fundamental research would inform genetic improvement programmes as well as future management strategies, including benefits of improved phytosanitary measures and biosecurity protocols.

Improved basic biological understanding for both *Phytophthoras* in general and *Phytophthora ramorum*, in particular including host specificity, lineages, hybridisation and cryptic infection is needed as well as more information about heath land ecosystems. This would establish whether there have been changes in *Phytophthora ramorum* which has enabled the fungi to change hosts and move onto larch. In particular it would be helpful to understand why foliar *Phytophthoras* on woody plants have become more prominent in the last 10 years. Aspects of these more

fundamental research questions, if they can be expressed as competitive research, are most appropriate for Research Council funding. Other issues (not just specific to *Phytophthora*) were also discussed, such as improvements to monitoring, modelling and data collection; these have been presented below under the generic evidence needs section below.

There was no consensus on whether there should be an eradication strategy for oak processionary moth or whether it should be considered an established pest with a need for improved control options. A more detailed cost benefit analysis would be helpful. In either case, research is required to improve pheromone trapping and spray application (provision of more innovative spraying techniques which could enable treatment of large trees with small volumes of insecticide that would be suitable in the urban environment). Improvements should also be made in respect to timing of control activities to link to moth traps (amateur network is established and has experience running traps) and timings of egg hatch e.g. phenology models to predict egg hatch and larval development rates.

There was a similar discussion on pine tree lappet moth. There is one outbreak in the UK and the strategy for eradication is being developed and appears successful so far. Its impact in Europe suggests that it could be very damaging if it became established and spread within the UK, it was agreed that the current focus should be on monitoring, rather than research.

### 3. Potential threats to the UK, present in the EU (not present in the UK)

The group decided that the best course of action for these threats would be to set up an expert Action Team to review and update current risk assessment and contingency plans, including urgency for action if found in UK, scope for contingency pesticide approvals, advice on handling affected wood/plants, and established links with experts in countries where the problem is already established. This team should identify if further research is required to improve level of preparedness.

Pine processionary moth should be added to the list of pests and diseases as it is now present in Paris and continues to expand its range northwards, linked to climate change.

### 4. Potential Threats to the UK, present globally (not present in the UK)

A similar approach to that for pests and diseases which are already present in the EU (but not yet in the UK), was recommended. It was thought the best course of action is for an expert Action Team to review these risk assessments and contingency plans for these threats alongside pests and diseases in Europe (as above).

Emerald ash borer was seen as a key threat, given its impact in other countries (foreign *Agilus* species seem very aggressive) and that European ash in the UK would be susceptible if the beetle was introduced here (based on evidence from the outbreak in Russia (Moscow). Joint research/partnership arrangements with other countries to share knowledge would be helpful.

Risks associated with wood chips and wood arriving into the UK as pallets or for biomass were also raised. There was debate over whether wood chips are small enough as evidence has suggested that ash borer could survive chipping. Asian and citrus longhorn beetles can also be imported in pallets, wood packaging or live plants. These are regulated pathways, but not all measures to ensure absence of the pests are effective, as evidenced by establishment of the two species in some EU Member States and continued interceptions in the UK. In relation to possible use of fumigation, and the banning of methyl bromide by the EU, there has been a long standing EU programme to find alternative treatments. So far this programme has been unsuccessful although the use of microwaves for treatment is now included in ISPM15 (the International Standard for wood packaging material).

## 5. Generic Evidence Needs

“What is a healthy tree?” was raised as a key science question so that we can be proactive about identifying areas of concern. This could include a review of what investigations have been carried out in the past, understanding how stakeholders (including woodland owners) perceive health in tree and woodland health. Specifically, to assess the use of sniffer and remote sensing technologies and citizen science to provide indications of the health of trees and risk areas (e.g. this could be based on detection of colour/stress changes in trees).

Understanding the implications for tree health of leaving dead trees and branches in a plantation for biodiversity benefits. There could be benefits from providing advice to landowners/managers on treatment and removal of dead material (specifically related to species or infection/infestation). There is conflict here with conservation interests and further research is required on the relative costs and benefits of protection for tree health versus enhancement of biodiversity and other ecosystem services.

We need to understand the implications of establishing corridors for wildlife on tree health. Such corridors may help promote biodiversity but could increase the spread of pathogens and insect pests.

Improvements to speed of detection of new infestations/outbreaks was recommended. This could include improvements to monitoring/sampling, such as: better co-ordination/establishment of a network for monitoring; use of ‘smart’ (multiple) pheromone traps or spore traps which could test for multiple pests and

pathogens; use of 'citizen' science such as using home test kits (e.g. for *Phytophthora*); extending monitoring for disease to other areas not just plants (e.g. water and soil); review of current monitoring regimes to improve timing of treatment and surveys and deal with latent and cryptic infections; better models to underpin and interpret monitoring outputs to provide a better tool to predict likely spread and effectiveness of control using current knowledge and control measures; provision of better input data to models (e.g. bring together existing knowledge on host and disease temporal geographic mapping, greater understanding of spread of infection/infestation and include positive and negative monitoring results); and better quality models which can estimate parameters from incomplete information. In addition, traceability of infestation/infection and more systematic collection of information on successes and failures from previous outbreaks and learning from them would be helpful.

A better understanding of the socio-economics and public engagement aspects of tree diseases and their management is needed. It was noted that the socio-economic evidence base for tree health is generally much less well developed than biological and epidemiological aspects and that more research is needed to identify current levels of awareness among stakeholders, to provide more accurate estimates of disease control costs and benefits and to assess the willingness and ability of woodland owners, gardeners and others to implement control measures.

The development of robust cost-benefit assessments of alternative control and alleviation strategies is required based on improved estimates of the direct and indirect costs of intervention at different scales and the imputed public and industry willingness to pay for such measures.

A general conclusion was that there is a need for a strategic review of the evidence base to establish if there is a sufficient critical mass of natural and social science expertise and to assess if there would be the ability to quickly convene an expert group when new a threat is detected and to assess if working mechanisms are/can be put in place to bring together global expertise.

An improved understanding of public perceptions, awareness and engagement was thought critical for effective policy implementation. A full stakeholder mapping exercise was recommended (including environment Non-Governmental Organisations, trade groups, landscape architects, Local Authorities and others) to explore levels of awareness, perception of risk, awareness of responsibility and in order to best influence the behaviours of gardeners, foresters etc). Convening an 'awareness group' would be effective as a first step to raise attention.

Other issues were raised at the meeting. For example consideration of whether current forestry policy is sustainable and if forestry practices should be changed (e.g. use of mixtures, distance between trees, establishment of a maximum age of stock, use of mixed age stands, rotation time for species of trees, if continuous cover or

clear fell should be used and if we can learn from other countries (e.g. NZ) and adopt some of their practices) should be topics for further discussion.

## ANNEX A

### TREE HEALTH EXPERT GROUP MEETING: LIST OF PARTICIPANTS

Organisation	Name	Comments
Defra	Sue Popple	Chair
	David Cooper	
	Justine Bejta / Cathy Garretty	Secretariat
Fera	Rick Mumford	
Forest Research	Peter Freer-Smith	
	Hugh Evans	
Royal Botanical Gardens, Kew	Tony Kirkham	
University of Cambridge	Chris Gilligan	
Imperial College London	Mike Jeger	
Imperial College London	Clive Potter	
University of St Andrews	Tom Meagher	
	Richard Shattock	
University of Exeter	Murray Grant	
University of Oxford	Charles Godfray	Did not attend meeting – provided some written comments
Living With Environmental Change	Brian Harris	

## ANNEX B

### RESEARCH OPPORTUNITIES AND PRIORITIES - TABLE

This theme has been categorised into the following areas, dependent on whether pests/diseases are threats:

1. Established within the UK
2. Newly Arrived to the UK
3. Potential Threats to the UK, present in the EU or globally (not present in the UK)
4. Generic Evidence Needs

There is a need to combine an immediate applied research and development support to contingency planning and disease control with a long-term programme of strategic research and horizon scanning. It will be vital to take an interdisciplinary approach to research, integrating natural sciences, social and economic evidence. We will also improve co-ordination of plant and tree health research in order to get the best value from resources and avoid duplication. While we will continue to increase our understanding of the biology of pests and pathogens and the socio-economics of control and management, we will also address resilience in terms of environmental management and breeding.

<b>Action</b>	<b>Owner</b>	
<b>1 – Pests and diseases established within the UK</b>		
<b>Immediate implementation (1-12 months)</b>		
1.1	Establish a prioritised list of pests and diseases for action.	Defra
1.2	Review the successful control policies for large pine weevil and great spruce bark beetle to inform control strategies and contingency plans for other pests.	TBC
1.3	Set up an Action Team, comprising expertise in the UK and overseas, to bring together current knowledge and produce a UK control strategy on Dothistroma needle blight.	TBC
<b>Longer Term (12 months-plus)</b>		

1.4	If the Action Team in 1.3 is successful use this as a model to prepare control strategies for other pests and diseases.	TBC
<b>2 - Pests and diseases newly arrived to the UK</b>		
<b>Immediate implementation (1-12 months)</b>		
2.1	Commission short-term research on oak processionary moth to improve pheromone trapping and spray application.	TBC
2.2	Improve basic biological understanding and fundamental work for specific diseases. For example, host specificity, lineages, hybridisations for <i>Phytophthora</i> and commissioning of fundamental science for acute oak decline to better understand the shift from the chronic to the acute form.	Potentially suitable for joint funding initiative with Research Councils
<b>3 - Potential threats to the UK, present in the EU or globally (not present in the UK)</b>		
<b>Immediate implementation (1-12 months)</b>		
3.1	Set up an expert Action Team to review and update current risk assessments and contingency plans, including urgency for action if pest or disease found in UK, scope for contingency pesticide approvals, advice on handling infested pathways (e.g. wood, wood packaging, live plants, etc.), and established links with experts in countries where problem already present. Identify if further research is required to improve level of preparedness and explore the use of models to integrate information on pest and disease spread in order to gauge effectiveness of control strategies, taking account of uncertainties in the current status of knowledge.	TBC
3.2	Prioritise emerald ash borer and add pine processionary moth to the list of pests and diseases	TBC
<b>4 - Generic evidence needs</b>		

<b>Immediate implementation (1-12 months)</b>		
4.1	Commission an analysis of the full range of stakeholders and their interests to understand who they are, what motivates them and how best to influence them. This work to include a stakeholder mapping exercise and a social survey of a cross section of woodland owners and users as well as other key actors.	TBC
4.2	Commission research on public and stakeholder attitudes and behaviours in relation to tree health and plant biosecurity.	TBC
<b>Longer Term (12 months-plus)</b>		
4.3	<p>Develop a co-ordinated and interdisciplinary funding approach to research on tree health and biosecurity (linked to wider plant health research), involving Forest Research and Fera, and engaging the wider science community and the forestry sector, potentially within an LWEC-type programme that draws on a widest possible funding base. Possible initiatives with Research Councils could include:</p> <ul style="list-style-type: none"> <li>• Fundamental science work on <i>Phytophthora</i> and acute oak decline (set out in 2.2)</li> <li>• Understanding why <i>Phytophthora</i> infections have become so troublesome in the last 10 years in terms of underlying drivers and the challenges of containment and control</li> <li>• Understanding what is a healthy tree</li> <li>• Determination of which pests and diseases cause a tree to die but in other causes the tree will recover</li> <li>• What are implications for tree health of leaving dead trees and branches in a plantation?</li> <li>• Redesigning woodlands/forests with increased resilience to pest and diseases. What would they look like?</li> <li>• How could corridors for biodiversity be designed whilst minimising the spread of pest and diseases?</li> <li>• How can new outbreaks be detected earlier?</li> </ul>	Defra and Forestry Commission in partnership with Fera, LWEC and Research Councils

4.4	Develop robust cost-benefit analyses for control strategies	TBC
4.5	Undertake a strategic capacity and capability analysis of scientific capacity to undertake forest research in the UK	Defra and Forestry Commission

## **ANNEX C**

### **PRIORITY LISTS OF PESTS AND DISEASES**

[Please note Annex C is a spreadsheet in a separate document]