



Department
for Environment
Food & Rural Affairs

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Tree Health and Plant Biosecurity

Progress Report - Research

May 2013



Forestry Commission

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Research Funding

Defra has allocated £8 million of research funding in support of tree health and plant biosecurity over the five years from 2012/13 to 2016/17, increasing its spend in response to the recommendation by the Independent Panel on Forestry to increase resourcing and pace in this area. Additional funds have also been found from existing Defra resources for new chalara ash dieback research.

Initial research was prioritised against the Tree Health and Plant Biosecurity Action Plan launched in October 2011. The programme of both applied and strategic research will be informed further by the outputs from the Independent Expert Taskforce of Tree Health and Plant Biosecurity and reflected in Defra's Evidence Plan¹ for this area.

Defra Research Calls

A significant proportion of Defra's funding for this area is being used for more applied and immediate research, complementing the increased Forestry Commission (FC) funded programme on tree health. A list of the new Defra projects is provided in Annex 1. Most of these projects have been let by competition, but some have been commissioned directly via Defra's and FC's agencies in response to new outbreaks or threats.

The Tree Health and Plant Biosecurity Initiative

Defra, in partnership with several Research Councils (the Biotechnology and Biological Research Council, the Natural Environment Research Council, and the Economic and Social Research Council), the FC and Scottish Government are also funding a strategic Tree Health and Plant Biosecurity Initiative (THAPBI). Defra is contributing £4M from its total resources for TH&PB research into this initiative, with the other funders contributing a further £5.6M.

This THAPBI initiative aims to address longer-term needs, especially improved biosecurity, mitigation, adaptation and resilience to pests and diseases. This £9.6 million initiative, under the auspices of the Living With Environmental Change (LWEC) Partnership, will draw upon the widest possible research base in the UK, thereby building our national science capability and capacity in this area. The initiative began in 2012 with a short 'capacity and consortium building' phase funded directly by Defra. The call² for research proposals (Phase-2) was made in May 2013.

¹ Defra Tree Health and Plant Biosecurity Evidence Plan:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/181846/pb13929-evidenceplan-tree-health-plant-biosecurity.pdf.pdf

² LWEC Tree Health and Plant Biosecurity Initiative (Phase-2 call):

<http://www.bbsrc.ac.uk/funding/opportunities/2013/tree-health-and-plant-biosecurity-phase2.aspx>

Annex 1 – Research Supporting Tree Health and Plant Biosecurity

Defra-funded Tree Health and Plant Biosecurity Research (from 1 April 2012)

Defra projects commissioned to date are shown in the table below. Additional project details can be found on the Government website ([Project Code](#)):

Project Code	Defra Short Project Title	Start Date	End Date	Cost	Contractors ³
TH0101	Oak Processionary Moth – Early Detection	02/04/12	31/03/14	272,061	Fera, FR, CEH, UBr, G&T, WO
TH0102	Oak Processionary Moth – Control	02/04/12	31/03/15	295,000	ADAS, RBG, UW, BTRL
TH0103	Oak Processionary Moth – Outbreak Management	02/04/12	30/06/13	111,017	ULIC, ULBC, HAUC, FR
TH0104	Analysis & Improved Understanding of Stakeholders	01/05/12	30/12/13	241,437	ULIC, FR, Fera, UWE, UCr
TH0105	Phytophthora Ramorum Genotypes	20/04/12	31/03/13	98,435	FR, Fera, AFBI
TH0106	Control Strategies – Review and Analysis	15/07/12	31/10/13	118,799	FR, ADAS
TH0107 (ST ⁴)	Asian Longhorn Beetle – Improved Detection	01/06/12	31/05/13	109,402	Fera, FR, ULIC, UY, UP, DFP
TH0108	Acute Oak Decline – Distribution, Scale & Causes	01/02/13	31/03/16	1,109,764	FR, RR, HAUC, UCm, Fera, UBa

³ **ADAS** (ADAS); **AFBI** (Agri-Food and Biosciences Institute, Northern Ireland); **BOKU** (University of Natural Resources and Life Sciences, Austria); **BTRL** (Bartlett Tree Research Laboratory, University of Reading); **CEH** (Centre for Ecology and Hydrology); **CP** (Colin Price); **DFP** (Department of Forest Protection, Austria); **EMR** (East Malling Research); **Fera** (Food and Environment Research Agency); **FR** (Forest Research); **G&T** (Gristwood and Toms); **HAUC** (Harper Adams University College); **INRA** (National Institute for Agricultural Research, France); **JIC** (John Innes Centre); **KRC** (Karen Russell Consulting); **NT** (National Trust); **PP** (Petergarth Pathways); **RBG** (Royal Botanic Gardens Kew); **RR** (Rothamsted Research); **SCION** (New Zealand Forest Research Institute); **TDG** (Technology Development Group); **TGAC** (The Genome Analysis Centre); **TSL** (The Sainsbury Laboratory); **UA** (University of Aberdeen); **UBa** (University of Bangor); **UBr** (Brunel University); **UCm** (University of Cambridge); **UCr** (University of Cardiff); **UEX** (University of Exeter); **UEGP** (GenePool, at University of Edinburgh) **UG-NRI** (University of Greenwich, Natural Resources Institute); **ULe** (University of Leeds); **ULBC** (Birkbeck College, University of London); **ULIC** (Imperial College, University of London); **UP** (University of Padova, Italy); **UW** (University of Warwick); **UWE** (University of the West of England); **UY** (University of York); **WO** (White October); **WT** (Woodland Trust)

⁴ Single Tender (ST) Action, building on existing European-level transnational projects ([ANOPLORISK](#) and [QDETECT](#))

TH0109	Oak Processionary Moth - Larval Trail Pheromone	01/07/12	31/03/14	33,519	UG-NRI, Fera
TH0111	Dothistroma Needle Blight – Socio-Economics	01/03/13	30/09/14	262,621	FR, Fera, UBr, UA, SCION, CP
TH0112 (ST)	Risk Analysis & Preparedness - Future Pest Threats	01/01/13	31/03/16	210,794	Fera, FR, ULe, INRA, BOKU, KRC
TH0115	Strategic Analysis of Capability and Capacity	01/03/13	30/06/13	39,650	PP, TDG
TH0118	Technical Review of Phytophthora Programme ⁵	01/11/12	31/03/13	25,000	Expert Advisory Group members
TH0129 (ST)	ObservaTree ⁶ – Exploring Citizen Science	01/02/13	31/03/13	250,000	FR, Fera, NT, WT
TH0132 ⁷	Chalara Resistance – Ash-Planting Trials	01/03/13	28/02/18	709,000 ⁸	FR
TH0135 (with BBSRC)	Chalara – Molecular Basis For Ash Resistance (Nornex)	2013	2015	1,103,903 ⁹ (Defra)	JIC, TSL, TGAC, UEGP, UEx, EMR, Fera, FR
TH0135 (with BBSRC)	Chalara – Modelling Supporting Management	2013	2016		UCm, RR
LWEC Tree Health and Plant Biosecurity Initiative (Phase-1) - Capacity and Consortium Building					
TH0121 TH0122 TH0123 TH0124 TH0125 TH0126 TH0127	LWEC (Phase-1) Capacity and Consortium Building (seven projects awarded)	01/01/13	31/03/13	313,803	Various

⁵ Note specific research on *Phytophthora ramorum* and *P. kernoviae* from 2009-2012/13 in support of this Phytophthora Disease Management Programme; and see also TH0105

⁶ ObservaTree consortium for a feasibility study to: test how volunteer networks can be used as an early warning system; understand the role and use of mobile apps to support this system; explore how citizen-sourced data can be fed into official systems. This brings forward some elements of an EU-LIFE+ proposal.

⁷ Other Chalara-related research is being considered (proposals under evaluation) in support of the Defra Chalara Management Plan

⁸ Additional £41k from Forestry Commission in 2012/13

⁹ BBSRC initiated projects with Defra match funding: <http://www.bbsrc.ac.uk/news/fundamental-bioscience/2013/130308-pr-bioscience-to-battle-ash-dieback.aspx>

Current Forestry Commission Research on Tree Health

Research Programme	Work Package	Review Date	Funding Source
Advice and Scientific Support for Tree Health £1.65m (2012/13)	Dothistroma Needle Blight <ul style="list-style-type: none"> • Disease monitoring, diagnostics and impact • Disease management • Disease epidemiology • Advice, technical transfer and bid preparation 	31 March 2013/2014	Forestry Commission, DEFRA Phytophthora programme, Private charities, USDA Forest Service, EU FP7 REPHRAME project, Small contracts
	Phytophthora Diseases <ul style="list-style-type: none"> • Diagnosis of symptomatic trees • Epidemiological studies • Genetic analysis of <i>Phytophthora</i> genotypes • Provision of advice and analysis 		
	Oak Declines, Acute Oak Decline <ul style="list-style-type: none"> • Identification and pathogenicity of organisms associated with declined oak trees • Distribution, surveying and monitoring of oak decline • Epidemiology and interaction of oak declines • Knowledge transfer, project management and fund raising 		
	Horse Chestnut Bleeding Canker <ul style="list-style-type: none"> • Genetic analysis and biological characterisation • Infection, survival and contamination hazard 		
	Regulated Forest Pests <ul style="list-style-type: none"> • Surveys and genetic analysis of Pine-tree Lappet Moth • Surveys including improvements of surveillance methods 		
	Advisory and Extension Service <ul style="list-style-type: none"> • Disease Diagnostic and Advisory Service • Pest Identification and Advisory Service Hylobius including advice and alternative pesticide testing • Knowledge transfer and training via Forest Health days • Squirrel research and advice 		
	Scientific Support for Phytosanitary Regulation <ul style="list-style-type: none"> • Research and monitoring • Assessment of risk 		

	<ul style="list-style-type: none"> • Phytosanitary advice • Future threats 		
	<p>Biosecurity, Climate Change and Forest Susceptibility</p> <ul style="list-style-type: none"> • Susceptibility of forests to invasion by exotic bark beetles • Temperature and water stress on disease severity • Climate change and spruce pests 		
Integrated Forest Monitoring £0.356m (2012/13)	<p>Development and management of a GB forest health surveillance system</p> <ul style="list-style-type: none"> • Developing common methodologies • Testing of system and reporting in two directions – evaluation and refinement • Extension of system beyond FC – opportunities for wider sector involvement and citizen science 	31 March 2013/2014	Forestry Commission
	<p>Remote sensing aims to increase certainty about Britain's forest resource</p> <ul style="list-style-type: none"> • Identification of Interpreted Forest Types • Monitoring changes • Estimation of stand parameters 		
	<p>Maintenance and development of the GB Research Forest network</p> <ul style="list-style-type: none"> • Identification of new network; developing management agreements and relevant protocols; installation of monitoring equipment and collection systems • Data acquisition, QA, storage and transmission • Development of special projects in Research Forests 		
Genetic conservation and species £0.065m (2012/13)	Support for forest reproductive material regulations	31 March 2013/2014	Forestry Commission
Genetic improvement £0.210m (2012/13)	EU Novel tree contract	31 May 2012	Forestry Commission, EU
	<p>Emerging species</p> <ul style="list-style-type: none"> • Research into new species • EU REINFFORCE contract • Arboreta • FC Tree Collection Project. 	31 March 2013/2014	Forestry Commission, EU

Examples of EU-funded or European Transnational Research Projects (Relevant to Tree Health)

Project	Project Title	Funding Source	UK Partners	Status
DIAROD	Determining invasiveness and risk of Dothistroma	EU (COST)	FR, Aberdeen University	On-going
PERMIT	Pathway evaluation and pest risk management in transport	EU (COST)	FR, Aberdeen University	On-going
FRAXBACK	Understanding chalara ash dieback	EU (COST)	FR	On-going
QDETECT	Developing tools for on-site phytosanitary inspection	EU (FP7)	Fera, RAL, Optisense	Completed
REPHRAME	Development of improved methods for detection, control and eradication of pine wood nematodes in support of EU Plant Health Policy	EU (FP7)	FR ¹⁰ , NRI	On-going
ISEFOR	Increasing sustainability of European forests: modelling for security against invasive pests and pathogens under climate change	EU (FP7)	Aberdeen University, FR	On-going
Palm Protect	Eradication and containment strategies and tools against the red palm weevil (<i>Rhynchophorus ferrugineus</i>) and <i>Paysandisia archon</i> (palm moth)	EU (FP7)	Fera	On-going

¹⁰ Other past EU projects involving FR can be found at: <http://www.forestry.gov.uk/fr/infid-63jghm>

NOVELTREE	Novel tree breeding strategies	EU (FP7)	FR, Edinburgh University	Completed
IMPACT	Integrated management of forest pests addressing climate trends	EU (ERDF)	FR, Swansea University	Completed
MOTIVE	Models for adaptive forest management	EU (FP7)	FR	Completion in 2013
PROCOGEN	Promoting a functional and comparative understanding of the conifer genome - implementing applied aspects for more productive and adapted forests	EU (FP7)	FR, Edinburgh University	On-going
PRATIQUE	Enhancements of pest risk management techniques	EU (FP7)	Fera, Imperial College	Completed
ANOPLORISK	Anoplophora longhorn beetle detection and risk management	EUPHRESKO	Fera, FR, York University	On-going
CEP	Current and emerging phytophthoras	EUPHRESKO	Fera, FR, SASA, AFBI	On-going

Examples of Other Research Projects Relevant to Tree Health and its Associated Plant Biosecurity

Phytophthora ramorum and Phytophthora kernoviae Projects:

- £1.5 Million Defra research programme supporting the England and Wales Phytophthora Disease Management Programme, plus other FC and Scottish Government and Welsh Government projects, from 2009-2012/13.
<http://www.fera.defra.gov.uk/plants/plantHealth/pestsDiseases/phytophthora/research.cfm>

On-going Defra-funded research projects, commissioned against a previous Plant Health evidence plan. Key projects relevant to tree health and its associated plant biosecurity include:

- Future-proofing Plant Health (Defra Project [PH0441](#)) - Started 2011; Ends 2014
- Gathering the economic evidence for the bee health, plant health, and varieties and seeds sectors and interventions ([PH0442](#)) – Started 2011, Ends 2013
- Evidence of delivering commodity pest risk analyses in support of plant health within a new EU Plant Health Regime ([PH0444](#)) – Started 2012; Ends 2014
- Improving tools and approaches for plant health inspectorate activities – detection, surveillance and monitoring ([PH0439](#)) – Started 2010, Ends 2013

Rural Economy and Land Use (Relu) Programme:

- Growing risks? The potential impact of plant disease of land use and the UK rural economy
<http://www.relu.ac.uk/research/projects/Third%20Call/Mills.htm>
- Memory and prediction in tree disease control: Lessons from Dutch elm disease in assessing the threat from sudden oak death
<http://www.relu.ac.uk/research/projects/Third%20Call/Potter.htm>