

		Organism(s)	Means of spread	Control measures	Control approaches being used in other countries	Detection/ diagnostics	Scale of damage commercial loss amenity, landscape (die back, reduced vigour, tree mortality)	Knowledge gaps	Research in progress	Opportunities to work with others? Who?	Impact of research on control	Likelihood of developing practical control options	Longer term options
		<b>Newly arrived</b>											
				Eradicate, control measures, live with it				Do we know likelihood of success of eradication, when to change policy to other control measures, or when we should just live with a new problem?					
6	Oak processionary moth	<i>Thaumetopoea processionea</i> (moth)	<b>Long-distance:</b> on live plants-for-planting. <b>Locally:</b> natural dispersal by adult flight (<2 km); transport on arboricultural arisings.	<b>Emergency measures</b> under PH (Forestry) Order to prevent further importation on live plants and transport within UK. Application to EU for <b>Protected Zone</b> pending. <b>Current:</b> insecticide application from ground against young larvae (limited application against older larvae); manual removal of older larvae and larval nests by hand or vacuum equipment.	EU as in UK, but also insecticide application from the air (France, Germany). Trials with entomopathogenic nematodes currently being carried out in The Netherlands.	Pheromone trapping for adult moths, but traps inefficient. Visual surveys for eggs, larvae and nests.	Affects oaks in urban areas, woodlands and forests. Currently limited to urban areas in west London and a smaller outbreak in Berkshire. Capable of defoliating native oaks over several seasons, leading to dieback, long-term decline and mortality. Larval hairs cause severe health problems for people and animals (skin rash, eye & throat irritation, allergic reactions).	Life-cycle and biology under UK conditions, e.g. timing of egg hatch, oviposition and larval distribution in the canopy, dispersal distances. Climate relations: rate of development and population increase in relation to environmental temperatures. Natural controls: parasites, predators & pathogens. Monitoring & surveillance methods, especially factors limiting the effectiveness of pheromone traps. Interaction with other defoliators, pests & pathogens and impact on oak.	FR: monitoring spread; experimental trials on efficiency of pheromone traps. <b>Netherlands:</b> trials on application of entomopathogenic nematodes for control.	Informal EU network set up following Expert meeting in June 2010. Opportunities to collaborate with commercial arboricultural companies to develop surveillance & control methods.	MEDIUM in short term, to develop better surveillance & spray application technology. HIGH in long-term if we can understand population behaviour and where, when and for how long OPM might be a problem.	MEDIUM - HIGH: improvements in pheromone trapping and potential for novel surveillance methods (e.g. detection by monitoring for presence of larval hairs); improvements in spray application, especially development of ULV technology; development of IPM / decision support system.	Understanding climate relations and impact of natural enemies would allow better prediction of likely outbreaks and duration. Development of biological control through bacterial, viral or nematode 'bio-pesticides' and importation/enhancement of predators and parasitoids.
7	Ramorum disease (canker, dieback, leafblight)	<i>Phytophthora ramorum</i> (Oomycete)	<b>Long-distance:</b> Planting material; soil. <b>Locally:</b> Rain, wind-blown mists, soil on footwear etc.	<b>Current Phytophthora Disease Management Programme (PDMP) &amp; EC measures (incl. plant passporting).</b> E&C and management methods well developed (in heathland less so). Plant destruction. Fungicides well researched and slow-sand filtration. Disinfectants. Modelling in support of E&C.	EU: As in UK. USA: similar to UK/EU.	<b>Well developed</b> (LFD; in-field and lab-based PCR; baits). Genotyping methods.	<b>Larch: massive</b> (landscape-level death). Fagaceae: minor (death/dieback). <b>Heathland: major</b> (death/dieback). Gardens: major (dieback/leafblight). <b>HONS: moderate</b> (dieback/leafblight)	<b>PDMP having success, but step-change in disease on larch (PDMP ends 2014).</b> Research gaps: Epidemiology on larch. Potential impact of other forestry species. Remote sensing. Understanding & Influencing behaviours. Host resistance (forestry species)	Significant research from 2001-present (diagnostics, epidemiology, management). Current projects: heathland epidemiology and management; epidemiology in the wider environment, including larch; modelling; clearance and disposal methods; management in gardens; economics (valuing heathland, gardens, woodlands)	USA; EU MS; DAS	HIGH	HIGH	Breeding / host resistance. Continued removal of <i>R.ponticum</i> and other sporulating hosts
8	Kernoviae disease (canker, dieback, leafblight)	<i>Phytophthora kernoviae</i> (Oomycete)	<b>Long-distance:</b> Planting material; soil. <b>Locally:</b> Rain, wind-blown mists, soil on footwear etc.	<b>Current PDMP.</b> E&C and management methods well developed (in heathland less so). Plant destruction. Fungicides well researched and slow-sand filtration. Disinfectants.	EU: as in UK	<b>Well developed</b> (LFD; in-field and lab-based PCR; baits). Limited genotyping methods.	Heathland: major (death/dieback). Trees: minor (some death/dieback). Gardens: major (dieback/leafblight). HONS: minor (dieback/leafblight)	<b>PDMP having success (ends 2014).</b> Research gaps: Remote sensing. Understanding & Influencing behaviours. Host resistance (vaccinium)	Significant research from 2001-present (diagnostics, epidemiology, management). Current projects: heathland epidemiology and management; general epidemiology; clearance and disposal methods; management in gardens; economics (valuing heathland, gardens, woodlands)	NZ, Ireland	HIGH	HIGH	Breeding / host resistance. Continued removal of <i>R.ponticum</i> and other sporulating hosts
9	Lateralis root rot	<i>Phytophthora lateralis</i> (Oomycete)	<b>Long-distance:</b> Planting material; soil. <b>Locally:</b> via water courses, soil on machinery, footwear, possibly rain, wind-blown mists if aerial infection common	<b>Current:</b> destruction of infected plant material; nursery inspections; import controls	Controls in place in USA to minimise movement in forests; also development of resistant LC genotypes	<b>Well developed</b> (LFD; in-field and lab-based PCR; baits). Microsat genotyping methods.	Evidence suggests disease limited to Lawsons cypress, so impact major on ornamental plantings, nurseries; minor for forestry	Host range; pathway analysis; pathogen variation; risk mapping; epidemiology (particularly in relation to aerial infection); potential for hybridisation with <i>P. ramorum</i> (closest relative)	Pathway analysis; pathogen variation; epidemiology (particularly in relation to aerial infection); potential for hybridisation with <i>P. ramorum</i> (closest relative)	USA; EU MS (F, NL); Taiwan	HIGH	MODERATE	Breeding / host resistance.
10	Pine tree lappet moth	<i>Dendrolimus pini</i> (moth)	<b>Long distance:</b> planting material, forestry machinery from abroad, or with wood products or wood packaging. <b>Locally:</b> Natural spread by adult flight; eggs and larvae could also be spread on harvested logs being transported on lorries, or on plants or foliage	<b>Current:</b> destruction of infected plant material (plants/foliage/ logs).	Considered a native elsewhere in Europe.	Developing: PCR based identification. Also, visual surveys for for larvae, light trapping for adult moths.	Can cause extensive damage and tree death over large areas of forest and this frequently requires aerial insecticide application to control the outbreaks	Standardise survey techniques to monitor pine-tree lappet moth; monitor the extent and size of population over time; phenology; DNA studies to clarify the origin of the Scottish moth (native or introduced); growth, consumption, and development rates of the caterpillars and adult fecundity.	Look for predators and parasites of PiLM and the potential of a range of control agents; climate modelling to determine the risk of outbreaks now and in the future; relationships between caterpillar populations and foliage damage	Pine-tree lappet moth ( <i>Dendrolimus pini</i> ) is native to, and widely distributed within Europe, and its range even extends into parts of Western Asia so plenty of opportunities for collaborative work.	HIGH	MODERATE	