Pests & Pathogens of London's Trees:

Pest / Pathogen and Species Affected					Diagnosis	Management			Prognosis	Information Links
Location and extent of occurence	**Pest / Pathogen (common name, scientific name)**	**Typical symptoms and effect on host**	**Species most affected (common name, scientific name)**	**Means of spread**	**Detection/ Diagnosis**	**Legal obligation if observed**	**Management and control measures : Immediate**	**Management and control measures: Long term**	**Scale of damage / loss (die back, reduced vigour, tree mortality)**	**Further information available: http://www.forestry.gov.uk/pdf/Pests_established_in_UK.pdf/$file/Pests_established_in_UK.pdf**
Established In London	**Acute Oak Decline (AOD) (possible association of bacteria and insect pathogens)**	Extensive stem bleeding or oozing of a dark fluid from small lesions or splits in the bark. The rapid decline of the tree is a common factor. Eventual death. Also occasional D shaped exit holes in bark associated with Agrilus biguttatus beetle	50+ year old Sessile Oak (*Quercus petraea*) ; Pedunculate Oak (*Quercus robur*); Turkey Oak (Q. cerris) and Bali Oak (Q. Fabri)	Associated with *Agrilus biguttatus* beetle (which create characteristic D shaped exit holes in bark); human transmission implicated; possibly also insects/ birds; bacteria activity	visual tree assessment & subsequent DNA molecular diagnostic tests	None; enhanced risk managem-ent may be appropriate	Basic phytosanitary measures; eg sterilization of tools; Avoid pruning if possible. Consider cordoning off affected areas. Remove bark if timber to leave site	Good husbandry. Beneficial soil modification may improve prognosis.	Dieback and/or rapid mortality of infected native oaks. On average 25% of trees on an affected site symptomatic, over one year of monitoring 1% of trees died. Currently limited distribution GB wide. (Midlands, SE) Decline and death (perhaps within 5 years of colonisation).	http://www.forestry.gov.uk/acuteoakdecline#advice http://www.forestry.gov.uk/fr/INFD-7UL9NQ http://www.forestry.gov.uk/fr/infd-7ula6w
	Oak Processionary Moth (OPM) (*Thaumetopoea processionea*)	Clusters of hairy caterpillars. **The hairs are irritating and pose a health risk.** The caterpillars leave silk trails and clusters of pupa . Defoliation if colonisation heavy	Oak species *(Quercus spp.)*	Adult moths fly. Caterpillars may also fall on to vehicles and be transported. Removal of arisings	Visual tree assessment	Notifiable disease: Notify FC immediately if identified	Insecticide use: (Deltamethrin (Bandu, Decis ect.) (broad spectrum pyrethroid insecticide). BT (Dipel) (narrow spectrum biological agent) Diflubenzuron (Dimilin Flo). (Growth regulator) Physical nest removal. Eradication	Containment / eradication dependent on location. Development of biological control through bacterial, viral or nematode 'bio-pestcides' and importation/enhance ment of predators and parasitoids.	Threat to public health more significant than loss of foliage, unless tree very heavily colonised	http://www.forestry.gov.uk/opm http://www.ltoa.org.uk/resources/oak-processionary-moth http://www.bartlett.com/resources/Oak-Processionary-Moth.pdf
	Bleeding Canker of Horse Chestnut (*Pseudomonas syringae* pv aesculi (bacterium))	Orange to black exudates from bark, bark lifting and cracking, bark failure, branch and stem girdling and eventual tree death.	Horse Chestnut, *(Aesculus hippocastanum)* Red Horse Chestnut *(Aesculus x carnea)*	Bacteria is water borne; Linked to rain and snow.	Visual tree assessment, DNA & seriological tests avalable	None; enhanced risk managem-ent may be appropriate	Reduction pruning of branches or trees affected where structural integrity compromised	Good husbandry. Beneficial soil modification may improve prognosis. Identification of resistance mechanisms and specimens	Young trees may die through girdling of cambium, decline of older trees may be accelerated . Exposed heartwood of chestnut vulnerable to fungal decay; Loss of amenity. Can lead to tree death.	http://www.forestry.gov.uk/fr/INFD-6KYBGV
	Horse Chestnut Leaf Miner (*Cameraria ohridella*)	Severe damage to the foliage of susceptible specimens.	*Aesculus hippocastanum* some resistant specimens reported (including red flowering horse chestnut *Aesculus x carnea*).	Insect flight and pupae overwintering in fallen leaves	Visual tree assessment	None	Removal of fallen leaves and their destruction. Insecticide sprays can offer season long control.	Good husbandry. Beneficial soil modification may improve prognosis. Identification of resistance mechanisms and specimens	Loss of foliage function compounds vulnerability to other pathogens (e.g. *Pseudomonas*). Degraded visual amenity	http://www.forestry.gov.uk/fr/infd-68jjrc
	Massaria Disease of Plane (*Splanchnonema platani)*	Infected branches initially have a distinctive lesion on the upperside, leading to complete bark loss, and exposed orangey heartwood. Foliar symptoms include wilting and necrosis. Loss of individual limbs, often in lower crown.	London plane (*Platanus acerifolia*)	Wind distributed fungal spores	Visual tree assessment & subsequent DNA molecular diagnostic techniques	None; enhanced risk managem-ent may be appropriate	Enhanced inspection regime of London planes may be appropriate. Monitor, reduce or prune affected branches.Basic phytosanitary measures are also important. eg sterilization of tools; Avoid pruning if possible.	Good husbandry eg mitigation of potential drought stress through mulching; Beneficial soil modification / Reduction pruning	A weak pathogen with moderate effect on overall tree viatlity and little effect on amenity. Enhanced risk management may be appropriate	http://www.ltoa.org.uk/resources/massaria-disease-of-plane-mdp http://www.forestry.gov.uk/fr/massaria
	Phytophthera alni	Disruption of vascular systems, exudate from bark,decline, death.	Alder (Alnus spp) - *A. glutinosa* most susceptable.	Long-distance: Planting material, soil. Locally: Rain, Soil on footwear etc.	Visual tree assessment & subsequent seriological and DNA molecular diagnostic techniques	None; enhanced risk managem-ent may be appropriate	No cure has been found . There are fungicides which can suppress the symptoms, but few will kill the pathogen. Cultural practices such as mulching has been shown to have some supressive effects.	Identification of resistant specimens	Dieback and death	http://www.forestry.gov.uk/palni

Location and extent of occurence	Pest / Pathogen (common name, scientific name)	Typical symptoms and effect on host	Species most affected (common name, scientific name)	Means of spread	Detection/ Diagnosis	Legal obligation if observed	Management and control measures : Immediate	Management and control measures: Long term	Scale of damage / loss (die back, reduced vigour, tree mortality)	Further information available: http://www.forestry.gov.uk/pdf/Pests_established_in_UK.pdf/$file/Pests_established_in_UK.pdf
Not recorded West of Dgenham or North of Croydon at 1/1/15	**Ash Dieback (*Chalara fraxinea*)**	Foliage die back, bark die back, decline and death. (Mature trees may live with infection for many years)	Ash (*Fraxinus spp* .)	Infected nursery stock and wind distributed fungal spores from leaf litter	Visual tree assessment & subsequent DNA molecular diagnostic techniques	Notifiable disease: contact FC immediately	Monitoring of current population. Removal of leaf litter. Felling of trees where infected. Restrictions on planting of Ash. Import and movement of trees and seeds restricted.	Identification of resistance mechanisms and species For amenity trees, conventional fungicide treatments show potential (however no fungicides are currently licenced)	Nationally between 70% and 90% of Ash trees may be affected, resulting in dieback and eventual death. Urban specimens may be less vulnerable to infection.	Forestry Commission (Plant Health) www.forestry.gov.uk/pestsanddiseases Map: http://chalaramap.fera.defra.gov.uk/ Forest Research (Disease Diagnostic Advisory Service) www.forestry.gov.uk/fr/ddas Fera (Tree Health and Plant Biosecurity Action Plan) www.fera.defra.gov.uk/treehealth http://www.forestry.gov.uk/forestry/infd-8udm6s
Localised outbreaks in Warwickshire and Sussex	**Sweet Chestnut Blight (*Cryphonectria parasitica*)**	Infects through bark; canker may develop quickly, girdling of trunk causes death	Beech (*Fagus sylvatica*), English and Pedunculate Oak (*Q. robur, petraea*) Oak (*Quercus s* pp.) Sweet Chestnut (*Castanea sativa*), Holm Oak (*Q. ilex*) Red Oak (*Q. rubra, Q. palustris* etc.)	Long Distance: infected plant material. Local: Insects inc. *Agrilus spp.* beetles, birds, wind and rain splash	Visual tree assessment & subsequent DNA molecular diagnostic techniques	Notifiable disease: contact FC immediately	UK plant health order;EU quarantine organism; FC attempting eradication	The application of hypovirulent strains of *C. parasitica* to trees affected with virulent, growing cankers-treatment converts the virulent pathogen to a less aggressive form through the action of CHV1, and this allows the trees to recover from infection.	Serious but restricted to 2 orchards. Eradicated. Unlike the US, European strains apparently show lower virulence and cankers may heal.	http://www.forestry.gov.uk/forestry/infd-8s5qbf
Paddock Wood area near Maidstone in Kent.	**Asian Longhorn Beetle (*Anoplophora glabripennis*)**	Dieback of foliage; resin bleeds, ; exudates from bark; vascular failure; tree death.	Most broadleaf species	Long distance: Eggs, larvae and pupae on packing material. Locally: Adult flight of 2km.	Active in tree canopy. Resin bleeds and exudates; masses of wood shavings at base of trees.	Notifiable disease: contact FC immediately	EU quarantine organism. Outbreak in Kent being closely studied by FC. Eradication by destruction of infected trees. Containment used in US, insecticides used in China.	Containment used in US, insecticides used in China. Preemptive treatment of uninfected host species with Imidacloprid has shown promise in the US.	Limited to a small outbreak in Kent, which has been contained; surveying of the site continues	http://www.forestry.gov.uk/forestry/HCOU-4U4J45 http://cityroom.blogs.nytimes.com/2013/05/14/if-youre-a-tree-hungry-beetle-run/?src=recg http://asianlonghornedbeetle.com/ http://www.aphis.usda.gov/plant_health/plant_pest_info/asian_lhb/
Cornwall and South-West	**Kernoviae Disease (*Phytophthora kernoviae)***	Disruption of vascular systems, exudate from bark,decline, death	Beech (*Fagus sylvatica*), English Pedunculate and Holm Oak (*Q. robur, Q. petraea, and Q. ilex*), Tulip Tree (*Liriodendron tulipfera*), Bilberry (*Vaccinum spp.*), *Rhododendron ponticum*	Long-distance: Planting material; soil. Locally: Rain, windblown mists, soil on footwear etc.	Visual tree assessment, DNA and seriological diagnostic techniques	Notifiable disease: contact FC immediately (Tree A!ert is designed for this purpose)	Plant Health Order. Limited outbreaks in Cornwall, South Wales eradicated. Basic phytosanitary measures are also important. eg sterilization of tools	Breeding / host resistance. Removal of vectors. Basic phytosanitary measures are also important. eg sterilization of tools. A number of treatments for other Phytophthora diseases are already in use.	Fagaceae: minor; death and dieback	http://www.forestry.gov.uk/pkernoviae
Larch: in the South-West, Wales. Oak: No occurence on UK Oaks	**Sudden Oak Death (SOD) (*Phytophthora ramorum)***	Lesions, disruption of vascular systems, exudate from bark,decline, death.	In UK Larch (*Larix* sp.) American Oaks (*Q. rubra, Q. palustris* etc.) *Q. cerris* (Turkey oak), *Q. ilex* (holm oak); *Fagus sylvatica* (beech), *Castanea sativa* (sweet chestnut), *Aesculus hippocastanum* (horse chestnut) *Rhododendron* spp., *Viburnum* spp. and *Pieris.*	Long-distance: Planting material; soil. Locally: Rain, windblown mists, soil on footwear etc.	Visual tree assessment & subsequent seriological and DNA molecular diagnostic techniques	Notifiable disease: use Tree A!ert to notify FC. Plant Health Notices may be served on owners of outbreak sites (Larch) requiring felling	No cure has been found. There are fungicides which can suppress the symptoms, but few will kill the pathogen. Mulching has been shown to have some supressive effects.	Breeding / host resistance. Continued removal of *R.ponticum* and other sporulating hosts	Larix; foliage loss and tree death. Fagaceae: dieback and death	http://www.forestry.gov.uk/pramorum http://www.forestry.gov.uk/fr/oakstembleeding
Currently sporadic towards in the west of the UK, increase expected to follow temp increase	**Ink Stain Disease (*Phytophthora cinnamomi*)**	Root Rot. Bleeding cankers on trunks and/ or crown. Bark discolouration, tree decline, death	Sweet Chestnut (*Castanea sativa*), American Chestnut (*Castanea dentata*), Holm Oak (*Q. ilex*) Red Oak (*Q. rubra, Q. palustris* etc.) and many other species (>1000)	Long-distance: Planting material; soil. Locally: Rain, windblown mists, soil on footwear etc.	Visual tree assessment & subsequent seriological and DNA molecular diagnostic techniques	Requirement to report to Forestry Commission (Tree A!ert is designed for this purpose)	No cure has been found. There are fungicides which can suppress the symptoms, but few will kill the pathogen. Mulching has been shown to have some supressive effects.	Breeding / host resistance. Continued removal of *R.ponticum* and other sporulating hosts	Widespread mortality of *C. sativa, Q. Ilex*	http://www.forestry.gov.uk/pdf/fcin30.pdf/$file/fcin30.pdf http://www.forestry.gov.uk/treealert

Location and extent of occurence	Pest / Pathogen (common name, scientific name)	Typical symptoms and effect on host	Species most affected (common name, scientific name)	Means of spread	Detection/ Diagnosis	Legal obligation if observed	Management and control measures : Immediate	Management and control measures: Long term	Scale of damage / loss (die back, reduced vigour, tree mortality)	Further information available: http://www.forestry.gov.uk/pdf/Pests_established_in_UK.pdf/$file/Pests_established_in_UK.pdf
No Current Occurrence in British Isles; Potential Threat	**Citrus Longhorn Beetle (CLB) (*Anoplophora chinensis*)**	The tunnels created by feeding larvae leave trees susceptible to diseases and wind damage. Stem girdling can occur causing rapid death of the tree.	Many deciduous species inc. Maples, (Acer spp.) Horse Chestnut (Aesculus hippocastanum) Hazels (Corylus spp) Planes (Platanus spp.), Poplars (Populus spp.) Willows (Salix. spp.)	On ornamemental plants from China, Japan, Asia (inc Bonsai)	Small exit holes, small indentations	Notifiable disease: contact FC immediately; EU quarantine organism	Many interceptions since 2005 and outbreaks in Europe demonstrate that there is a significant threat to the UK	Vigilance	Stem girdling can occur causing rapid death of the tree. Trees are also susceptible to diseases and wind damage following feeding damage.	http://www.fera.defra.gov.uk/plants/plantHealth/pestsDiseases/clb/ http://www.invasivespeciesinfo.gov/animals/citrusbeetle.shtml
	Oak Wilt (*Ceratocystis fagacearum*)	Disruption of vascular systems, exudate from bark, decline, death	Red Oaks (*Q. rubra, palustris*) Oak (*Quercus robur, petraea Q. spp.*)	Long distance: Spread via movement of infected logs and lumber; Locally: insect spread, infested soil, via natural root grafts	Visual tree assessment, Laboritory DNA methods and trap techniques also possible	Requirement to report to Forestry Commission (Tree A!ert is designed for this purpose)	Present N America. Prevention of entry in to EU, UK: import controls and inspection; treatment of oak logs/lumber from North America. In US: felling of infected trees and severing of root grafts	Plant movement restrictions.	Potentually rapid dieback and death	http://www.extension.umn.edu/environment/trees-woodlands/oak-wilt-in-minnesota/ http://en.wikipedia.org/wiki/Oak_wilt Juzwik J. et al. 2008. The origin of Ceratocystis fagacearum, the oak wilt fungus. Annu Rev Phytopathol. 46:13-26.
	Plane Wilt (*Ceratocystis fimbriata* f. *platani*)	Chlorotic foliage, stem bleeding, bark girdling and death,	London Plane (*Platanus acerifolia*), American planetree (*P. occidentalis*) and oriental plane (*P. orientalis*)	Long distance: Spread via movement of infected plants. Locally: infested soil, via natural root grafts; infected tools. Slow.	Visual tree assessment, DNA diagnostics	Requirement to report to Forestry Commission (Tree A!ert is designed for this purpose)	Present in S. Europe; N America felling of infected trees and severing of root grafts; UK applying for protected status on basis of obesrved absence	Identification of resistant specimens, Basic phytosanitary measures are also important. eg sterilization of tools	Potentually rapid dieback and death	http://www.forestry.gov.uk/pdf/pathology_note07.pdf/$file/pathology_note07.pdf http://www.cabi.org/isc/datasheet/12144#toBigImage55996
	Emerald Ash Borer (EAB) (*Agrilus planipennis*)	Vascular disruption and subsequent death from larvae feeding inside trunk.	EAB has only been found on North American ash species so far. No information is available regarding EAB on Common Ash (Fraxinus Excelsior) and narrow leaved Ash (Fraxinus angustifolia).	Adults fly up to 0.5 miles.	Visual tree assessment for larvae and galleries under bark. Leave D-shaped emergence holes. Adults present. Crown dieback.	Notifiable disease: contact FC immediately; EU quarantine organism. (Tree A!ert is designed for this purpose)	Controlled in US using emamectin benzoate injection (TREE-AGE), soil injection of imidacloprid and bark sprays of dinotefuran. Treatment often preventative.	Vigilance	Infestation generally recognized to cause whole tree death in the long term.	http://www.forestry.gov.uk/pestsanddiseases http://www.fera.defra.gov.uk/plants/plantHealth/documents/additionalDeclarations0513.pdf