

Tree species guidance

Guidance on tree species choice

August 2015 update

Improving our knowledge to help with species selection.

In line with The Wales Strategy for Woodlands and Trees and the associated policy guidance we have started increasing the range of tree species used in Wales but as we know there is limited information on some tree species and limited or no supply of seed for some tree species. Working with forest research, nurseries and a range of other support are rapidly getting up to speed with the knowledge required support managers in their choices and with the ability to grow some of these species not recently grown in significant numbers in British tree nurseries. The purpose of this document is to update decision makers and operational staff on the latest information on tree species, provenance, seed and plant supply that will help support decisions on tree species choice and help inform your future plant supply requirements.

To support these choices we have classified the individual species into three broad groups A, B and C as to their potential value. Recommendations on future use are made for each species and the current level of knowledge on provenance choice is identified.

Category A - Major Species - These are currently widely used and there are no issues with supply of plants. Though it may be recommended to increase or decrease their use, they will continue to be a major component of the Welsh woodlands we manage.

Category B – Minor Species – There is enough information on these species to start planting or increase use of now, but there may still be issues with supply and you must check availability. A specific role for these species has been identified and we promote the increased use of these species providing they meet with your objectives.

Category C – Secondary Species – These are species where there is currently limited information on their suitability for use in Wales or categorised as a minor component in native woodland mixtures only. We need to improve our knowledge of these before significant planting is carried out as they may be species which will only have a minor role in Wales. Trials of some species need to be agreed at a national or local level. Availability of seed and trees is likely to be an issue as well if required in any significant numbers.

In our Guide for increasing tree species diversity in Wales we identified 55 species which, from the FC Ecological Site Classification, are suited to the range of Welsh site types. To this we have added a number of minor native tree species as identified in Figure 4.3 of Bulletin 112 – Creating New Native Woodlands, John Rodwell and Gordon Patterson. Note the list of natives here is not definitive but does include the majority of species likely to be chosen for planting in Wales.

We have also listed separately below the table those listed in the same booklet, Figure 4.4 as major and minor shrub species for new native woodland types. These native trees and shrubs may be used for planting as components of new or restoration of native woodlands.

This document should not be used alone, it does not contain all the information you need - it should be used in line with the original FCW Guidance on tree species diversity (Now being revised), latest FR guidance (<http://www.forestry.gov.uk/fr/treespecies>) or <http://www.silvifuture.org.uk> and any publications available (See Bibliography).

Species	Category	Native to Wales (Y/N)	Provenance information	Current recommended use in Wales	Seed/tree availability
Alder - Common (<i>Alnus glutinosa</i>)	B	Y	Little known about provenance differences so seed from good quality British standards should be preferred.	Continue to plant this species on appropriate sites. Ensure nursery stock is clear of <i>Phytophthora</i> .	Available
Alder - Grey (<i>Alnus incana</i>)	C	N	No provenance studies undertaken in Britain - seed should be obtained from good British stands or possibly from western Sweden or Norway	Minor component or on reclamation sites only. Suitable to dryer sites than other alders.	No current experience of growing this in nurseries.
Alder - Italian (<i>Alnus cordata</i>)	C	N	A few trial plantations have been established in Britain though no provenance studies undertaken; seed from good stands in the natural range should be preferred.	Possible use in limited trials in SE Wales. Also for reclamation sites.	Can be difficult to grow in nurseries.
Alder - Red (<i>Alnus rubra</i>)	C	N	Trialled on a wide range of sites in Britain & some provenance studies have been carried out. Preferred seed sources should be from good British stands or from coastal Washington or British Columbia.	Potential to start planting as a component of conifer crops. Short lived species.	Available but need to check
Ash (<i>Fraxinus excelsior</i>)	-	Y	Material from good quality British stands should be preferred with provenances in northern France as an alternative in southern Britain.	Moratorium on planting due to <i>Chalara</i> Ash Dieback.	-
Aspen (<i>Populus tremula</i>)	B	Y	Limited trials of a small number of Scottish clones have shown good survival and reasonable growth from native material but there are selected Scandinavian clones which can give faster growth rates.	Increase testing of this species on a range of sites in Wales as a component of conifer and broadleaf stands (including native mixes). Test as a species for Short Rotation Forestry.	No seed currently available; can be made available but may be expensive. Possible to store for several years so look to collect for future years – seek advice on potential for

Species	Category	Native to Wales (Y/N)	Provenance information	Current recommended use in Wales	Seed/tree availability
					improved stock for trials for SRF
Beech (<i>Fagus sylvatica</i>)	B	Y (Usually considered native in South East Wales only)	Material from good quality British stands should be preferred with registered western European seed stands as an alternative.	Predicted to become more suitable to Wales and could replace ash but grey squirrel damage remains an issue. More information will be given in Guidance on restocking on Ancient woodland sites.	No problem with supply though little current demand from Wales so consider collection of seed from Welsh stands of Beech for supply to nurseries
Birch - Downy (<i>Betula pubescens</i>)	A	Y	British seed sources of good form should be preferred. On equivalent sites tends to be slower growing and have poorer stem form than silver birch. Consider improved sourced and suits objectives. Obtaining stock from an equivalent elevation seed source is important.	Suitable for wetter sites. Ensure you source from equivalent elevation seed source. Consider for SRF – biomass production using improved stock. Current research and information available if needed.	Easily available but depending on objectives consider potential for Natural regeneration. Also consider improved stock for biomass trials - seek advice on this.
Birch - Silver (<i>Betula pendula</i>)	A	Y	British seed sources of good form or material from breeding programmes should be used. Avoid seed sources from more continental European climates. Usually first choice is naturally regenerated birch but consider option for improved birch if this suits objectives.	Ensure you chose seed source from an equivalent elevation. For dryer sites only. Also consider improved stock where production is an objective.	Need to check availability of improved stock. Be sure it is necessary to plant, what opportunities exist for natural regeneration?
Cherry - Bird (<i>Prunus padus</i>)	C	Y		Minor role in some native broadleaved mixtures	No information
Cherry - Wild (<i>Prunus avium</i>)	B	Y	There is limited knowledge of provenance variation, so seed from seed orchards or good British	Minor role in some native broadleaved mixtures	Available

Species	Category	Native to Wales (Y/N)	Provenance information	Current recommended use in Wales	Seed/tree availability
			stands should be preferred; some selected clones are available. Avoid material from eastern and southern Europe which is not adapted to British conditions. Consider improved stock and canker resistant varieties.		
Coast redwood (<i>Sequoia sempervirens</i>)	B	N	Very limited provenance testing has been carried out in Britain but more northerly provenances (North West America) are likely to be more cold hardy. There may be potential to collect locally sourced seed – some sites have been identified in Wales.	A priority species to start wider planting more, particularly in lower areas with coastal influence.	Available
Cypress - Lawson's (<i>Chamaecyparis lawsoniana</i>)	B	N	No provenance testing has been carried out; seed should be obtained from good British stands or from the natural range. Seed collected from hedges or other horticultural sources should be avoided. There are a number of sites of this in Wales some of which will be suitable for seed collection – further investigation is needed	Potentially good timber and may be of interest. However there are disease issues that may be of concern. Root rot pathogens <i>Phytophthora cinnamomi</i> and <i>P. lateralis</i> are very damaging, and potentially lethal diseases of Lawson cypress. <i>Chamaecyparis</i> is also considered to be particularly susceptible to <i>Armillaria</i> root rot (honey fungus).	No current seed available and not currently being grown in the nurseries. Wales has a number of LC stands though and we may consider collection of seed from these, note there are many poor stands of LC and ensure you locate stock from a good quality seed source.
Cypress - Leyland	C	N	There are a number of clones used in horticulture, particularly for hedging. The clone 'Leighton Green'	Potential to increase use of this species.	Limited by availability of cloned material.

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<i>(Cupressocyparis leylandii)</i>			has been the most widely used in forestry trials in Britain.		
Elm - Wych <i>(Ulmus glabra)</i> – <i>Information across columns refers to Wych elm only)</i> English Elm <i>(Ulmus procera)</i>	C	Y	No information on provenance variation in Britain so seed sources from good British stands should be preferred.	Possible use only as a minor component of native woodland	Limited availability
Eucalyptus - Cider gum <i>(Eucalyptus gunnii)</i>	C	N	Provenance trials have suggested that some material withstand up to - 20°C; seed should be selected from high elevation areas in Tasmania to obtain maximum cold hardiness.	Limit its use to testing in biomass (Short Rotation Forestry) trials. This is the most frost hardy of the eucalypts to use.	Could be grown in nurseries if required. Seed availability not known.
Eucalyptus - Shining gum <i>(Eucalyptus nitens)</i>	C	N		Plant only in limited trials. More frost susceptible than <i>gunnii</i> but more vigorous.	
Fir - Caucasian silver/ Nordmann's silver <i>(Abies nordmanniana)</i>	C	N	None – seek sources from its natural range to trial	Plant only in limited trials. More likely to plant other silver firs.	Can be made available from none FC nurseries but check provenance.
Fir - Douglas <i>(Pseudotsuga menziesii)</i>	A	N	Provenances from coastal Washington recommended for western and more oceanic parts of Britain while material from S. Washington Cascades can be used on suitable soils in drier zones of eastern Britain.	Increase use of this species.	Available

Species	Category	Native to Wales (Y/N)	Provenance information	Current recommended use in Wales	Seed/tree availability
Fir - European silver (<i>Abies alba</i>)	B	N	Limited provenance testing suggests seed sources (Czech republic and nearby areas) should be favoured.	Increase use of this species but only plant as an understory to diversify CCF stands.	A limited amount of seed is available, need to check provenance.
Fir - Grand (<i>Abies grandis</i>)	B	N	Preferred choice – Coastal Washington	Usually other firs will be preferred but some planting should be done preferably only in mixtures.	It is currently being grown in limited numbers in the nurseries. Difficult to grow bare rooted. Seed is available (Provenance - Vancouver).
Fir - Noble (<i>Abies procera</i>)	B	N	Provenances from the Washington or north Oregon Cascade mountains or from good quality British stands should be used.	Of value to diversify poorer sites of spruce in upland Wales. Will stand exposure. Possible use in mixture with SS. Issues with timber quality so more likely to be of value for biomass rather than timber. Good alternative to spruce at high elevation.	Plenty of seed is available.
Fir - Pacific silver (<i>Abies amabilis</i>)	C	N	Provenances from western Washington are preferred.	Only plant as an understory in CCF crops. More likely to use European silver fir but trial this species.	No seed currently available.
Holly (<i>Ilex aquifolium</i>)	C	Y		Minor role in some native broadleaved mixtures	
Hornbeam (<i>Carpinus betula</i>)	C	Y (Native to UK but not recognised)	No provenance trials have been undertaken in Britain so seed sources from good British stands or	Plant only as a component of native woodland. For	This is currently being grown in the nurseries in small numbers.

Species	Category	Native to Wales (Y/N)	Provenance information	Current recommended use in Wales	Seed/tree availability
		as native to Wales)	from the near continent should be preferred.	mixtures and as an understory.	Seed is available, sourced from the New Forest.
Larch - European (<i>Larix decidua</i>)	-	N	-	Moratorium on planting. This is still being grown in nurseries for the moment as a true hybrid.	-
Larch - Hybrid (<i>Larix x eurolepis</i>)	-	N	-	Moratorium on planting. This is still being grown in nurseries for the moment as a true hybrid.	-
Larch - Japanese (<i>Larix kaempferi</i>)	-	N	-	Moratorium on planting. This is still being grown in nurseries for the moment as a true hybrid.	-
Lime - Large-leaved (<i>Tilia platyphyllos</i>)	C	Y		Minor role in some native broadleaved mixtures	
Lime - Small leaved (<i>Tilia cordata</i>)	B	Y	No provenance trials have been undertaken in Britain and production of seed is intermittent in this country, so plants should either be of local origin or sourced from stands of good form in this country or in west Europe.	Good potential to increase use as a component of native woodland.	Limited availability – looking to collect seed from local sources.
Maple - Big Leaf (<i>Acer macrophyllum</i>)	C	N	Very few plots have been established in Britain and no provenance trials have been carried out; seed sources from Washington should be preferred.	This has the potential to be a very productive species but to date very little is known about it so only to be planted in limited trials	No seed currently available

Species	Category	Native to Wales (Y/N)	Provenance information	Current recommended use in Wales	Seed/tree availability
Maple - Field (<i>Acer campestre</i>)	C	Y		Minor role in some native broadleaved mixtures	
Oak - Pedunculate (<i>Quercus robur</i>)	A	Y	Excellent	Increase use for Native woodland expansion in Wales. Further advice on native species to follow.	Consider collections from appropriate local sources to supply nurseries
Oak - Red (<i>Quercus rubra</i>)	B	N	Few provenance trials in Britain and few forest plots; seed should be sourced either from S. Canada or from good stands in north western Europe. A number of stands in Wales that could provide a source of seed?	Potential for use in Eastern and Southern Wales as a replacement to Larch. Good potential.	Oak - Red (<i>Quercus rubra</i>)
Oak - Sessile (<i>Quercus petraea</i>)	A	Y	Provenances from selected British or north-west European seed stands are to be preferred – may need to consider local provenance for important AW sites.	Increase use for native woodland expansion in Wales. Further advice on native species to follow including appropriate provenance choice on AW sites.	Available. Some being collected by NRW for use on WGWE.
Pine - Corsican (<i>Pinus nigra var. maritime</i>)	-	N		Considered to have a moratorium on planting due to <i>Dothistroma</i> needle blight but it may be appropriate to plant small quantities for specific uses e.g. planting on coastal dune sites such as Newborough or Pembrey	Not currently being grown.

Species	Category	Native to Wales (Y/N)	Provenance information	Current recommended use in Wales	Seed/tree availability
Pine - Eastern White / Weymouth (<i>Pinus strobus</i>)	C	N	No provenance testing has been carried out in Britain; seed sources from the native range from New England northwards should be suitable. The species is adapted to a cool, humid climate and is of intermediate shade tolerance when young but then requires full light for good growth.	Plant only in limited trials. Some evidence of resistance to <i>Dothistroma</i> needle blight. Only likely to be of use in coastal sites in Wales. Most likely plant in mixtures with other pines or birch	Available.
Pine - Lodgepole (<i>Pinus contorta</i>)	B	N	South coastal origins should not be used, while Alaskan provenances are best suited for use in nursing mixtures. If pure stands are being planted, then Skeena or other interior provenances should be used – expert advice will be helpful	Concern as to susceptibility to <i>Dothistroma</i> needle blight. Potential for use as part of a mixture (line) in spruce areas susceptible to heather check. Do not dismiss use of this species – using the right provenance and in mixtures it will have a role to play.	Not currently being requested for growing in Wales.
Pine - Macedonian (<i>Pinus peuce</i>)	B	N	Some seed is being collected from Welsh sites, or seek sources from native range.	Commence increased use of this species but be aware of establishment issues. Susceptibility to <i>Dothistroma</i> needle blight should be checked but thought to be more resistant than most pines.	Limited seed available from local sources. Slow to grow in nursery generally taking four years. This will have cost implications. Some local seed stands have been identified.
Pine - Maritime (<i>Pinus pinaster</i>)	B	N	Very limited provenance testing has been carried out; preferred seed sources should be from the Landes	Commence limited use as component of coastal and southern forests of Wales.	Available

Species	Category	Native to Wales (Y/N)	Provenance information	Current recommended use in Wales	Seed/tree availability
			region of France ideally using improved material from French breeding programmes.	Susceptible to <i>Dothistroma</i> needle blight.	
Pine - Radiata (<i>Pinus radiata</i>)	C	N	Very limited provenance testing has been carried out in Britain; seed could be sourced from cold hardy strains identified in breeding programmes in other countries (New Zealand) or possibly from British stands of good form.	May have potential for increased use in Wales but is susceptible to a range of pests and diseases. Frost issues so mainly plant close to the coast.	No seed currently available.
Pine - Scots (<i>Pinus sylvestris</i>)	A	N (Not considered to be native to Wales)	Material from seed orchards is recommended although in western Britain seed from the western native pinewood zone should be considered.	Planting should continue both as a pure stand and in mixture but be aware of risks from <i>Dothistroma</i> needle blight. Likely to be used on a variety of site types so ensure correct use of provenances.	Available
Pine - Western white (<i>Pinus monticola</i>)	C	N	None	Plant only in limited trials. This species is vulnerable to white pine blister rust. <i>Heterobasidion</i> (Fomes root and butt rot) is also considered to be an important pathogen of western white pine. If considered plant only in mixture.	?
Poplar cultivars (<i>Populus deltoides</i> , , <i>Populus nigra</i> ,	C	N (Black poplar is the only native)	Seek advice on use appropriate clones or sourcing Black poplar for conservation of species	May have a value in providing rapid tree cover on some sites to replace larch	Check with nurseries

Species	Category	Native to Wales (Y/N)	Provenance information	Current recommended use in Wales	Seed/tree availability
<i>Populus trichocarpa</i>)		one of these species		(recreation sites, visitor centres). Otherwise limited trials only.	
Red-Cedar - Japanese (<i>Cryptomeria japonica</i>)	B	N	Very limited provenance testing has been carried out and seed production from British plots is unreliable; seed should be sourced from the northern part of the natural range. Some potential seed stands in Wales have been identified	Very good potential. Planting of this species should be considered for more widespread use. Consider using as part of a mixture.	Sourcing seed is currently very difficult and investigations are underway. Use of our own stands for seed or use of cuttings may be possible. Potential seed stands have been identified.
Red-cedar - Western (<i>Thuja placata</i>)	B	N	Limited provenance testing suggests that seed sources from western Washington or Vancouver Island should be preferred. The most appropriate provenances need to be confirmed. Some local stands have been identified as seed sources. Need to identify more from own stands. Be careful to ensure a good provenance.	Commence planting as a priority for increased use either pure or in simple (line) mixtures.	Trees are available from several provenances.
Rowan (<i>Sorbus aucuparia</i>)	A	Y	There is little knowledge of provenance variation so seed should be sourced from British stands of good form wherever possible.	Accept natural regeneration and only plant in areas with no potential for NR.	Available
Service tree – True (<i>Sorbus domestica</i>)	C	Y	There is no information on provenance variation in Britain so plants should be of local origin or from the near continent.	Plant only in limited trials as a component of stands. Component of native woodlands.	

Species	Category	Native to Wales (Y/N)	Provenance information	Current recommended use in Wales	Seed/tree availability
Service tree – Wild (<i>Sorbus torminalis</i>)	C	N	There have been no provenance trials in Britain so plants should be from sources of local origin or from the near continent.	Plant only in limited trials as a component of stands. Component of native woodlands.	?
Southern beech - Rauli <i>Nothofagus alpina</i> (Syn. <i>N. procera</i> and <i>N. nervosa</i>)	B	N	Provenances from the southern part of the natural range or from good quality British stands should be preferred.	Check latest information on susceptibility to <i>Phytophthora pseudosyringae</i> . Caution is necessary until this susceptibility is better understood but consider increased use in Western Wales as a potential replacement to Larch where frost is likely to be a lower risk.	Some good stands available for seed.
Southern beech - Roble (<i>Nothofagus obliqua</i>)	B	N	Provenances from the southern part of the natural range or from good quality British stands should be preferred.	Use Rauli in preference. But trial further stands in Western Wales as a potential replacement to Larch where frost is likely to be a lower risk. See comments on susceptibility to <i>Phytophthora</i> against Rauli above.	Not known
Spruce - Norway (<i>Picea abies</i>)	A	N	Provenances from eastern Europe (e.g. Romania, southern Poland) are generally preferable. Recent recommendation for Danish provenances but check this.	Reduce use of this species to Western and upland Wales or as a component elsewhere or as a nurse species. Not suitable for	Easily available. Consider containerised stock.

Species	Category	Native to Wales (Y/N)	Provenance information	Current recommended use in Wales	Seed/tree availability
				peaty sites or exposed sites. Caution on to extensive use of this species as it does have some site limitations and establishment issues. Consider use of other spruces such as Serbian or Oriental Spruce, both which potentially have similar growth rates.	
Spruce - Oriental (<i>Picea orientalis</i>)	C	N	No provenance testing has been carried out in Britain and there are few forest plots; seed should be sourced from the natural range	May have significant potential to replace other less drought resistant spruce. Commence active trials of this species throughout Wales.	No seed currently available.
Spruce - Serbian (<i>Picea omorika</i>)	B	N	There is little evidence of provenance variation; seed from good British stands or from the natural range should be preferred.	Commence increased use of this species as an alternative to both Norway and Sitka spruce. Most suitable for sites similar to those liked by Norway. Note planting at density of 4.0k/ha + to attain full stocking due narrow crown – planting below this density will not achieve max potential YC	Identify sites for local seed collection.
Spruce - Sitka (<i>Picea sitchensis</i>)	A	N	Excellent information available	Concern over the dominance of SS and risks associated with drought.	Available

Species	Category	Native to Wales (Y/N)	Provenance information	Current recommended use in Wales	Seed/tree availability
				Reduce use and no planting of pure SS in Eastern or southern Wales where risk of future drought is predicted to be high	
Sweet chestnut (<i>Castanea sativa</i>)	B	N	Studies of provenance variation in Britain are very recent so material should be sourced from good British stands or from selected stands in western Europe.	Commence increased use of this species particularly in Eastern and lower elevations in Wales. Possible replacement for larch on the better sites. Some caution is necessary as there are several diseases including <i>Phytophthora</i> and chestnut blight that are of concern.	Available
Sycamore (<i>Acer pseudoplatanus</i>)	B	N	Material from good quality British stands or selected stands in western Europe should be preferred.	Good as a component of mixed woodlands. Limited planting only should be considered as generally regenerates well so only plant where regeneration unlikely.	Available
Walnut (<i>Juglans regia</i>)	C	N	Limited provenance trials have been undertaken suggesting that preferred material should be late flushing varieties identified in French breeding programmes. Unless interested in growing walnuts for the nuts, avoid using material sourced	Plant only in small quantities or as small component in mixtures	Expensive and limited availability

Species	Category	Native to Wales (Y/N)	Provenance information	Current recommended use in Wales	Seed/tree availability
			from open grown trees which often have poor form.		
Western hemlock (<i>Tsuga heterophylla</i>)	B	N	Provenances from Vancouver Island are recommended, although more southerly origins could be used on sheltered sites with low frost risk	Its invasive nature will limit its use but should not be discounted in the appropriate location. Consider as part of a mixture – further advice to follow.	Not currently available.
Whitebeam (<i>Sorbus aria</i>)	C	Y		Minor role in some native broadleaved mixtures	
Willow - Crack (<i>Salix fragilis</i>)	C	Y			
Willow - Goat (<i>Salix caprea</i>)	C	Y			
Willow - White (<i>Salix alba</i>)	C	Y			
Yew (<i>Taxus baccata</i>)	C	Y			

Major and minor shrub species for new native woodland types

Blackthorn – *Prunus spinosa*

Alder buckthorn – *Frangula alnus*

Purging buckthorn – *Rhamnus cathartica*

Elder – *Sambucus nigra*

Guelder rose – *Viburnum opulus*

Common hawthorn – *Crataegus mongoyna*

Hazel – *Corylus avellana*

Wild privet – *Ligustrum vulgare*

Spindle – *Euonymus europaeus*

Wayfaring tree – *Viburnum lantana*

Juniper – *Juniperus communis*

Almond willow – *Salix triandra*

Bay willow – *Salix pentandra*

Eared willow – *Salix aurita*

Grey willow – *Salix sinerea*

Osier willow – *Salix viminalis*

Purple willow – *Salix purpurea*

Alternative sources of information on tree species choice

- **Pyatt, G, Ray, D and Fletcher, J. (2001)** FC Bulletin 124 - An Ecological Site Classification for Forestry in Britain
- **Saville, Peter S. (2013)** Silviculture of Trees used in British Forestry
- **Harmer, R, Kerr, G and Thompson, R (2010)** Forestry Commission - Managing Native Broadleaf Woodland
- **Silvifuture** <http://www.silvifuture.org.uk/>
- **Forest Research – tree species and provenance** <http://www.forestry.gov.uk/fr/treespecies>
- **Future Trees** <http://www.futuretrees.org/>