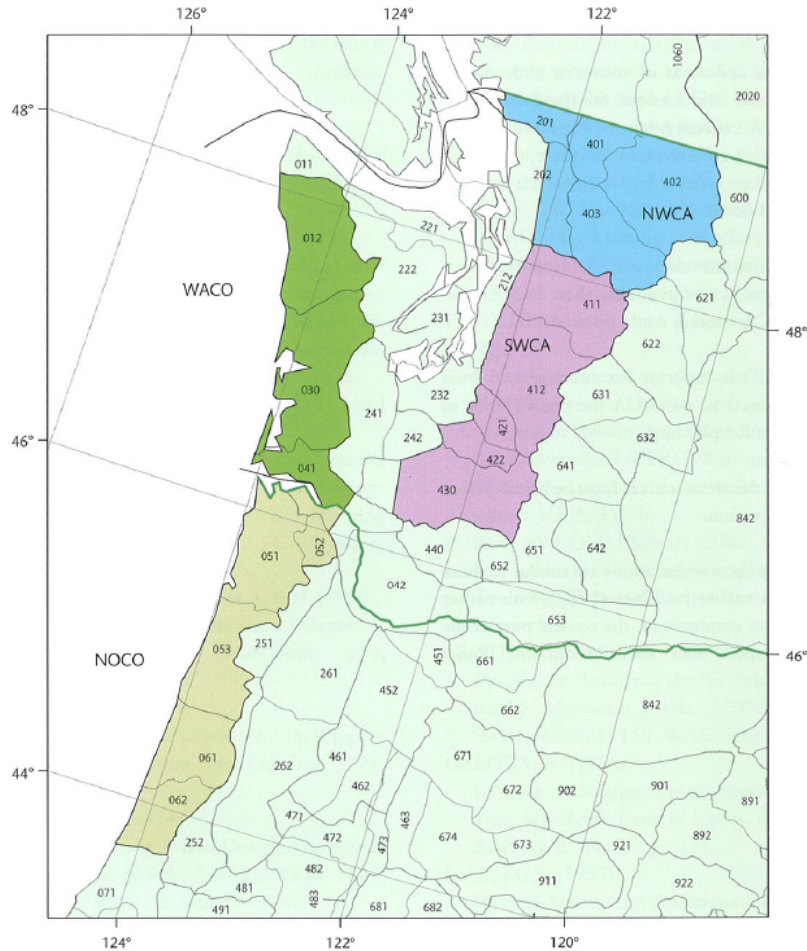
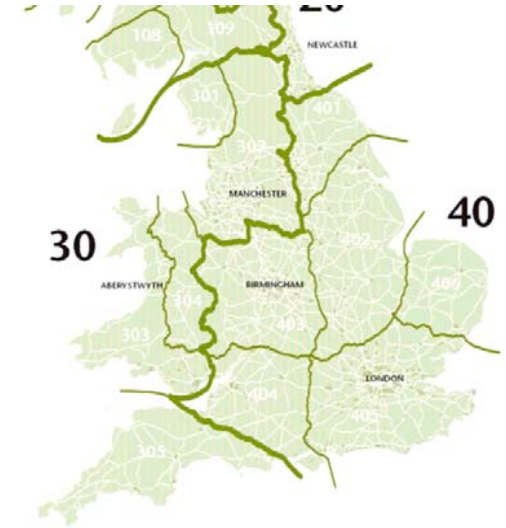


# FEE Firs



## UK Regions of Provenance

- 109 Kielder
- 204 North East
- 301 Lowland
- 302 Lake district
- 305 North West
- 305 Peninsular
- Yorkshire
- 401 Moors
- 402 East Midlands
- 403 West Midlands
- 404 West England
- 405 South East
- 406 East Anglia



	<b>Use as normal where appropriate</b>
	<b>Use, monitor and review</b>
	<b>Do not use</b>

- Douglas fir
- Grand fir
- Noble fir
- Pacific silver fir
- European silver fir
- Nordmann fir
- Pseudotsuga menziesii
- Abies grandis
- Abies procera
- Abies amabilis
- Abies alba
- Abies nordmanniana

USA seed zones  
 UK provenance zones to determine origin/provenance of seed used



# Douglas Fir Category A

## Native range

Native to the western parts of North America with a wide natural range. Only the 'green' Douglas fir from the coastal part of the range is suitable in Britain.

## Site requirements

This is a high yielding early successional species of intermediate shade tolerance which produces a high quality timber. It is best suited to areas of high humidity with 750-2000 mm of rainfall but it can also cope with summer droughts. It is cold hardy but suffers from exposure and therefore is suited to more sheltered areas such as lower to middle valley sides. It is damaged by late spring frosts and young trees can be prone to toppling. It grows well on mineral soils of poor to medium fertility but requires adequate moisture and good soil aeration. It will not grow well on waterlogged or calcareous sites, or in competition with heather. It can be grown in mixture with larch or with Sitka spruce.

## Pests and pathogens

Douglas fir is usually considered moderately resistant to *Heterobasidion* (Fomes root and butt rot) as it suffers from little decay, but it is susceptible to root rot and therefore may become unstable as a result of attack by *Heterobasidion*. It is also affected by the fungal disease Swiss needle cast, *Phaeocryptopus gaeumannii*, which is widespread but relatively insignificant although climate change predictions (warmer, wetter springs) may increase the incidence. Both mature and young trees can also be susceptible to infection by *Phytophthora ramorum*, although only when grown in close proximity to other infected plants which are a major source of spores.

## Use

A warming climate is likely to result in greater use of Douglas fir, provided that the sites are not too exposed and have adequate soil moisture.



Douglas fir

109	Kielder
204	North East Lowland
301	Lake district
302	North West
305	Peninsular
401	Yorkshire Moors
402	East Midlands
403	West Midlands
404	West England
405	South East
406	East Anglia

1st choice

pmeOR4QU
pmeOR4QU
pmeOR4QU
pmeOR4QU
PME-VG-00? Washington
pmeOR4QU
PME-VG-00? Washington
PME-VG-00? Washington
PME-VG-00? Washington
PME-VG-00? Washington
PME-VG-00? Washington

Wild collected

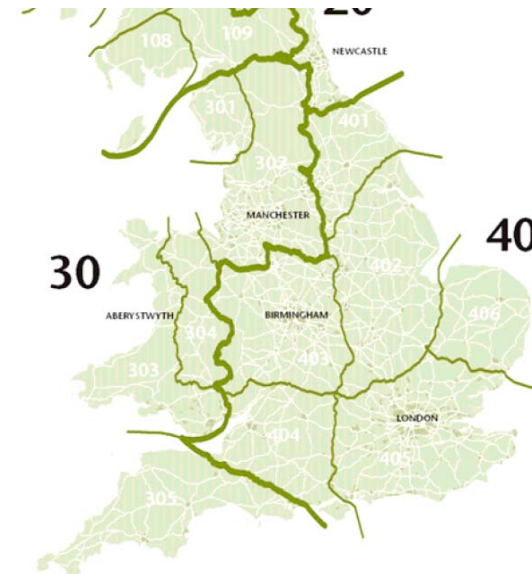
WACO
NWCA
WACO
WACO
NOCO
NWCA
SWCA
NWCA
NOCO
SWCA
SWCA

FC orchard  
French orchard  
Wild USA

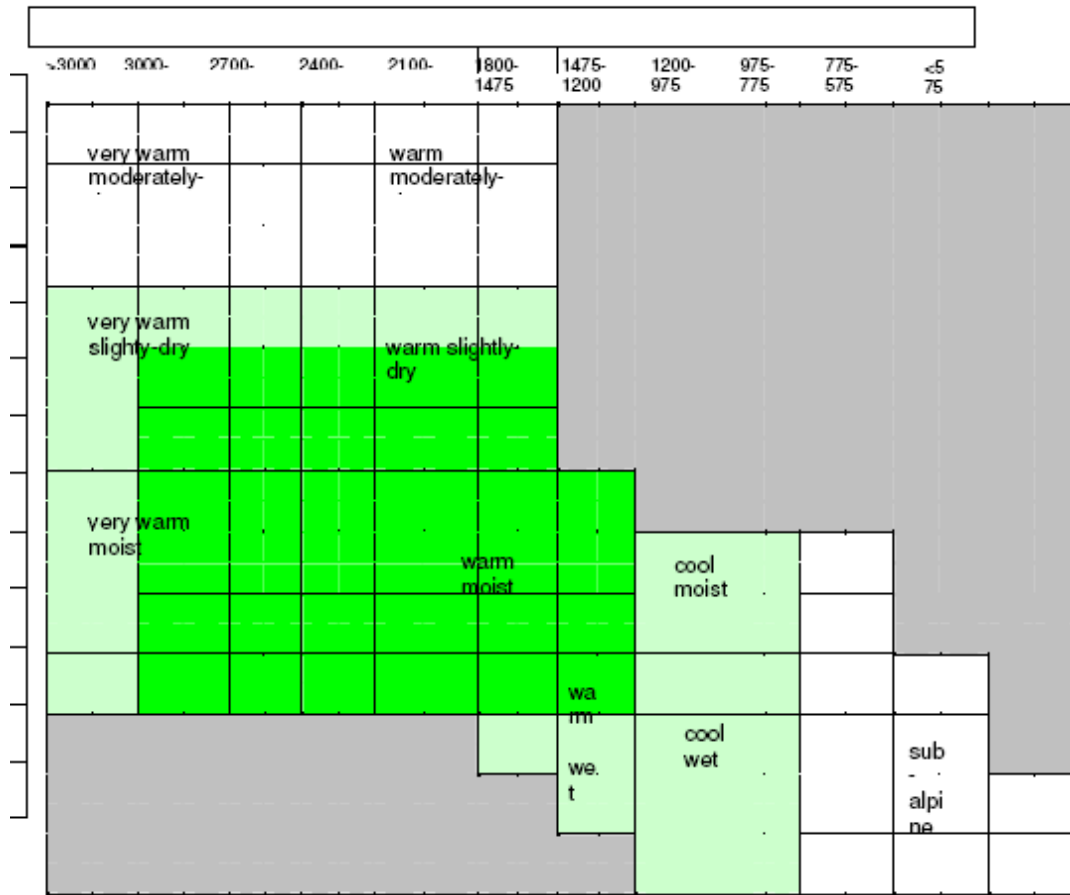
Orchard
Stand
Stand
Stand

pmeOR4QU
pmeST30-05SE
pmeST40-10SE
pmeST40-11SE

Forest of Dean FC  
Private Tavistock  
Private Gloucestershire  
Private Gloucestershire



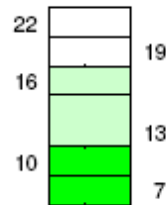
# Douglas fir - *Pseudotsuga menziesii*



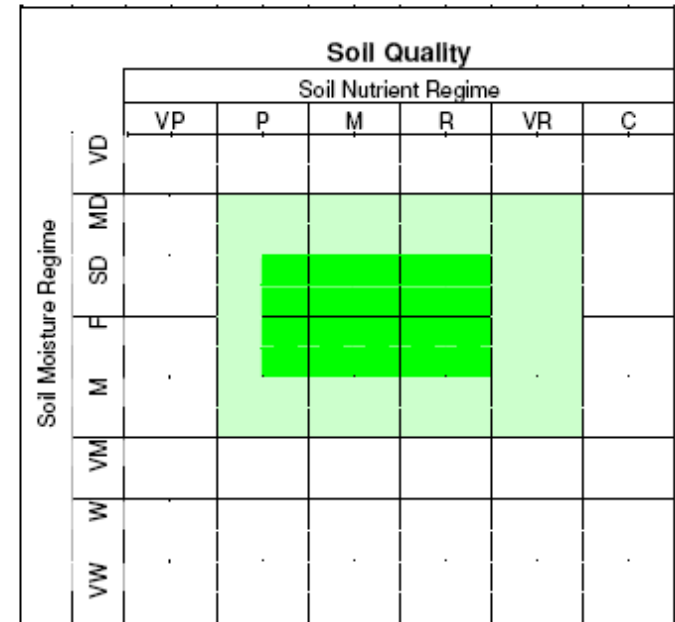
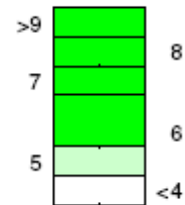
## KEY



## Windiness



## Continentality



# Grand Fir Category B



## Native range

Native to north-west USA and south-west Canada.

## Site requirements

A shade tolerant species which shows high growth rates and yields on suitable sites, but whose timber quality has a poor reputation. Best growth will be found in regions with more than 1000 mm rainfall, but will grow in drier regions provided there is adequate soil moisture. However, drought crack is common in stands in drier areas. Susceptible to spring frost and sensitive to exposure and pollution. Prefers well-drained and deep mineral soils of poor to medium fertility, but sensitive to heather check on sites of very poor nutrient status. Does not tolerate waterlogged or calcareous soils.

## Pests and pathogens

Generally shows appreciable resistance to decay by *Heterobasidion* (Fomes root and butt rot), although this may reflect the absence of *H. abietinum* (the fir form of the pathogen) from Britain. More recently, grand fir has proved susceptible to infection by *Phytophthora ramorum*, although only when grown in close proximity to other infected plants which are a major source of spores.

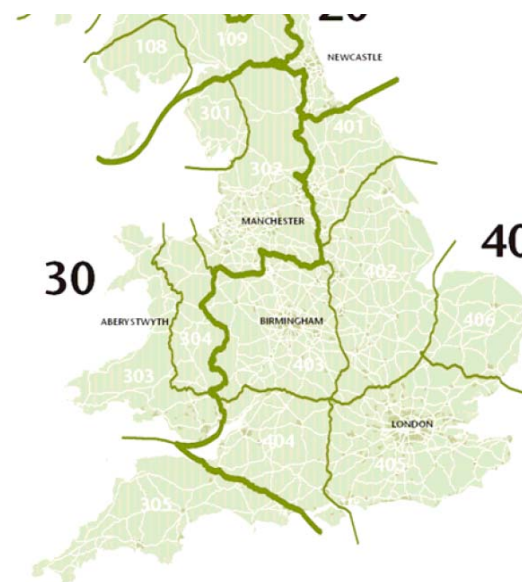
Occasional reports of infestation by balsam wooly aphid, and some trees may become severely infested and suffer dieback.

## Use

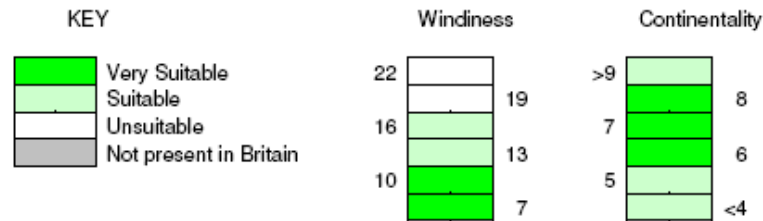
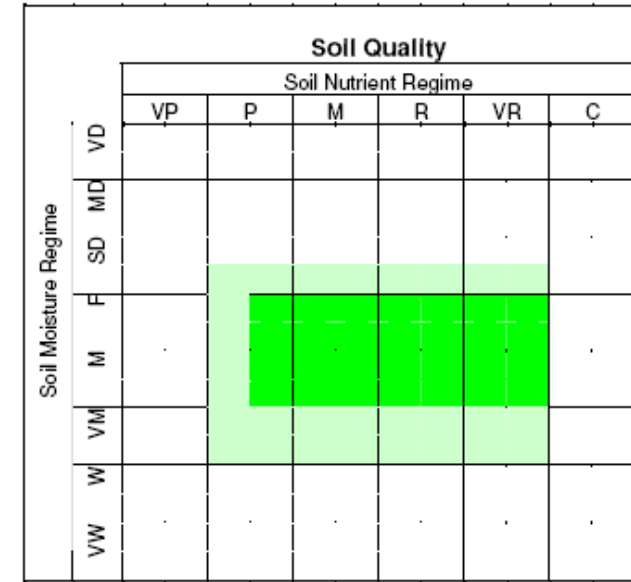
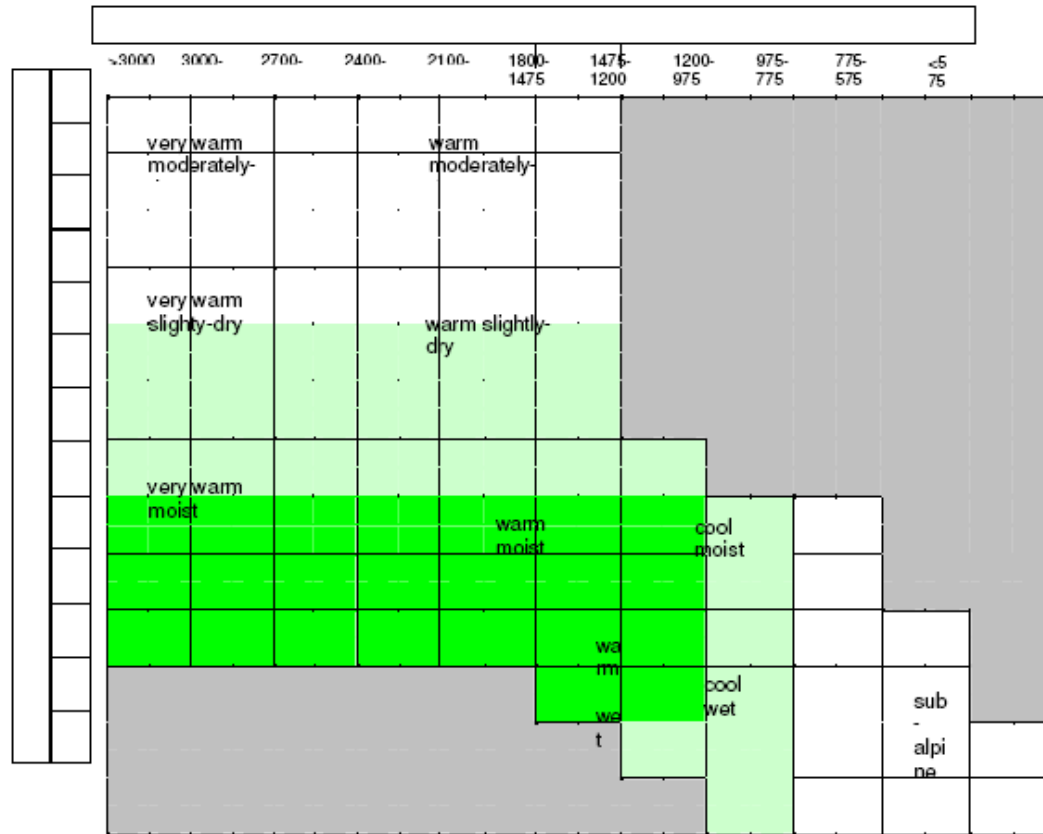
This is a minor species which may find a niche as a component of stands managed for Continuous Cover Forestry, but which is unlikely to benefit greatly from climate change

109	Kielder	WACO
204	North East Lowland	SWCA
301	Lake district	WACO
302	North West	WACO
305	Peninsular	NOCO
401	Yorkshire Moors	SWCA
402	East Midlands	SWCA
403	West Midlands	WACO
404	West England	NOCO
405	South East	SWCA
406	East Anglia	SWCA

No English seed stands  
Seed can be obtained of French provenance



# Grand fir - *Abies grandis*



## Noble fir Category B

### Native range

Native to the mountain ranges of the Pacific coast of North America.

### Site requirements

Prefers a cool and moist (i.e. >1000 mm rainfall) climate; can cope with exposure and is more frost resistant than other firs, therefore most suited to upland Britain including higher elevations. A species of intermediate shade tolerance which is reported to have stronger timber than most other silver firs. Grows best on fresh to moist mineral soils of poor nutrient status, but suffers severely from heather competition. It is a high volume producer under the right conditions, but suffers from drought crack on drier soils.

### Pests and pathogens

Noble fir is largely free of major pathogens although reported to be susceptible to the root and butt rot pathogen *Phaeolus schweinitzii*. It is subject to numerous foliage diseases (needle cast and rusts fungi) in its native range, but none are considered significant except on Christmas trees.

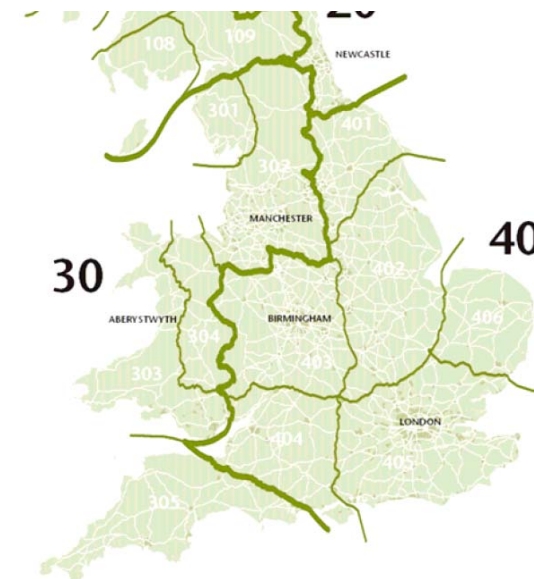
Occasional reports of infestation by balsam woolly aphid, and some trees may become severely infested and suffer dieback.

### Use

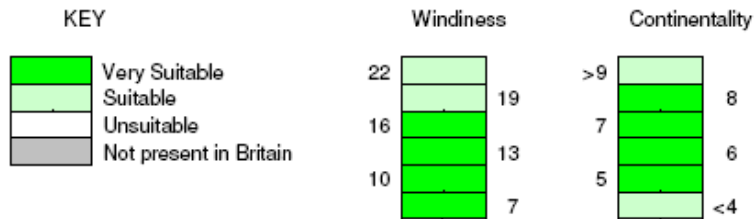
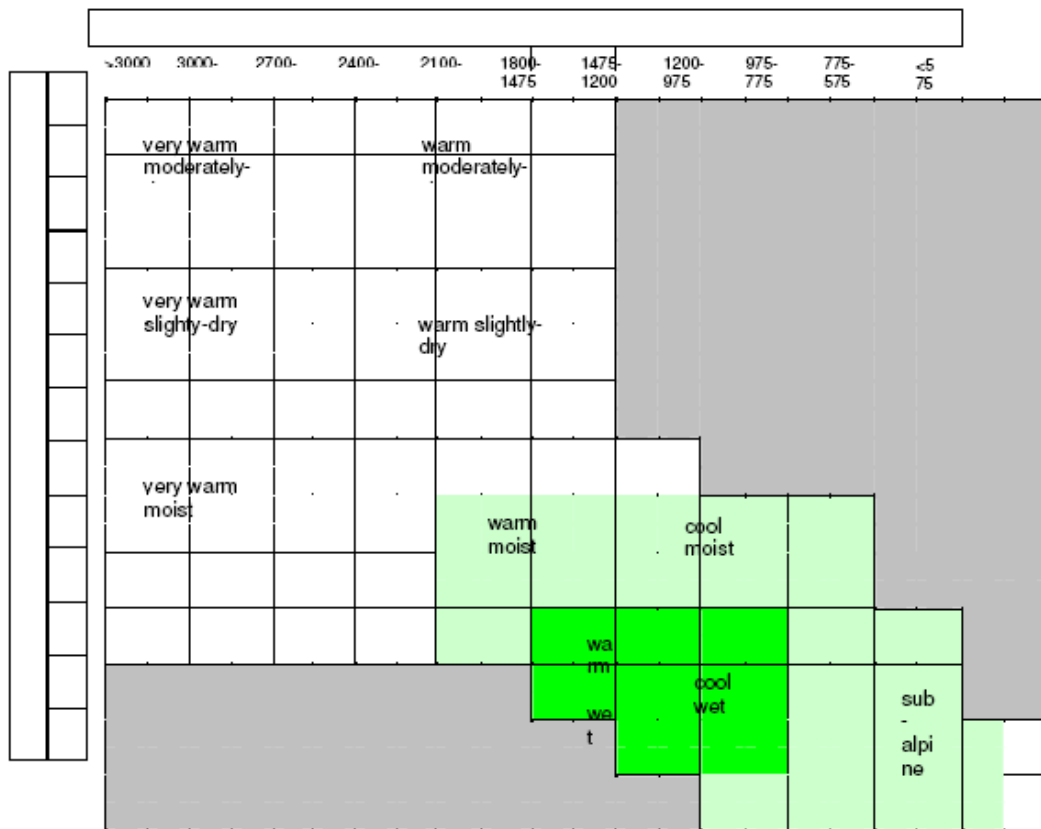
A minor species which is valued for its foliage and as a Christmas tree. It may have an increased role for diversifying spruce forests in western Britain.

109	Kielder	Welsh	Oregon 451	SWCA
204	North East Lowland			
301	Lake district	Welsh	Oregon 451	SWCA
302	North West	Welsh	Oregon 451	SWCA
305	Peninsular	Welsh	Oregon 451	SWCA
401	Yorkshire Moors			
402	East Midlands			
403	West Midlands	Welsh	Oregon 451	SWCA
404	West England	Welsh	Oregon 451	SWCA
405	South East			
406	East Anglia			

Stand Identity: aprST30-04SE	Llanafan
Stand Identity: aprST30-09SE	Brecon
Stand Identity: aprST30-11SE	Hafod
Stand Identity: aprST30-12SE	Bala



### Noble fir - *Abies procera*



		Soil Quality					
		Soil Nutrient Regime					
Soil Moisture Regime	VD						
	MD						
	SD						
	F						
	M						
	VM						
	W						
VW							



# Pacific silver fir Category C

## Native range

Native to the maritime zones of the Pacific north-west of America.

## Site requirements

It is suited to a cool maritime climate with rainfall of > 1250 mm well distributed across the year. A shade tolerant species which grows slowly for a number of years but can then out grow associated species such as western hemlock or Sitka spruce. Cold hardy in Britain but can be vulnerable to late frosts and does not withstand exposure or drought. Grows on soils of poor to rich nutrient status provided these have fresh to moist soil moisture. Does not tolerate very poor soils or heather competition and should not be planted on peats or very dry soils.

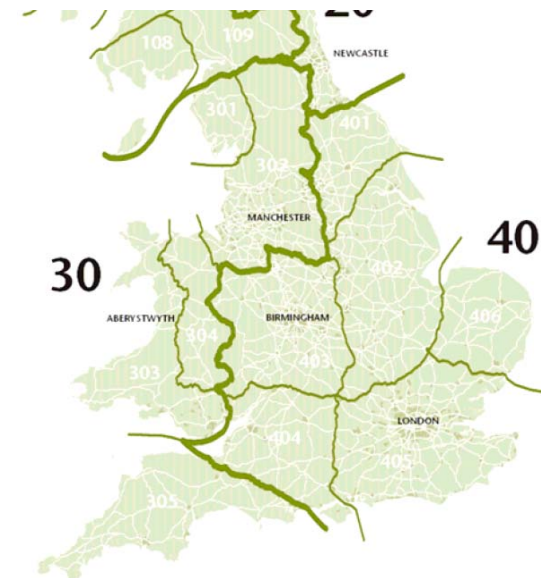
## Pests and pathogens

Unlike most of the others firs, Pacific silver fir has been found to be extremely susceptible to *Heterobasidion* (Fomes root and butt rot).

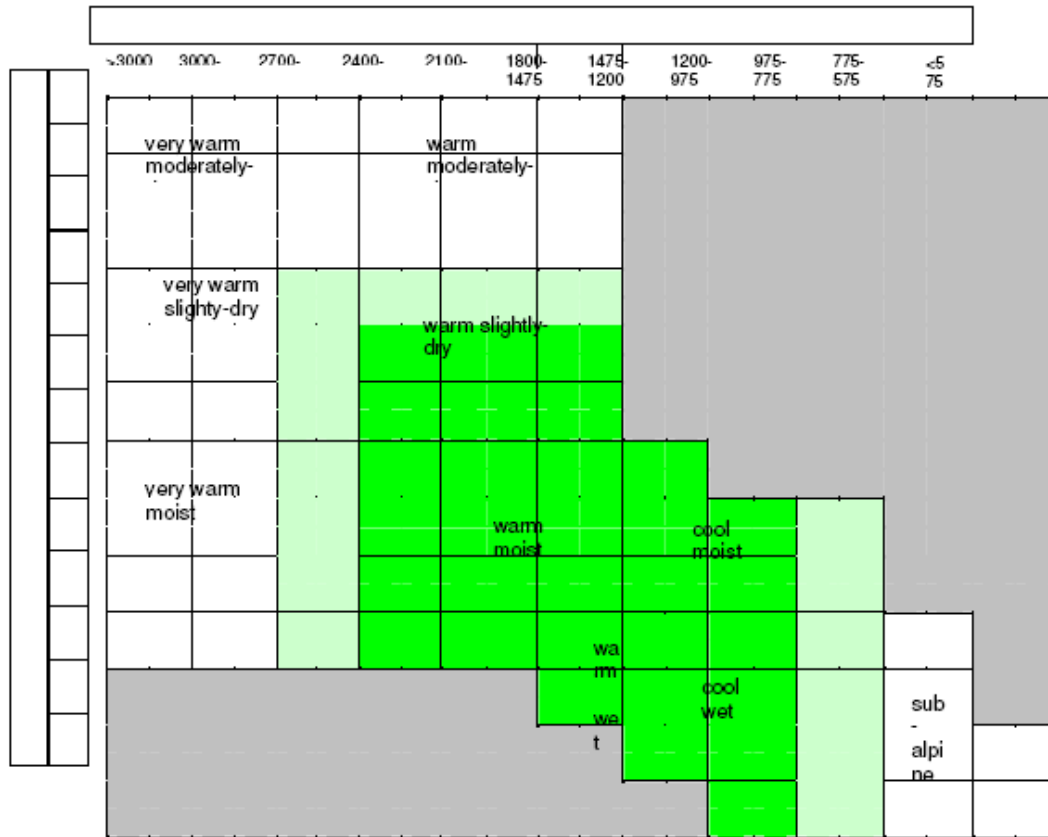
## Use

Although likely to be restricted to the western and upland forest zones in Britain, it could find an increasing role as a shade tolerant component of Continuous Cover Forestry stands

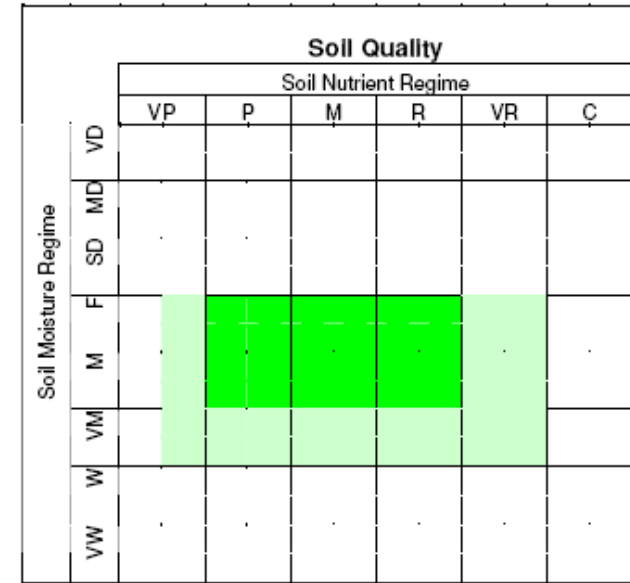
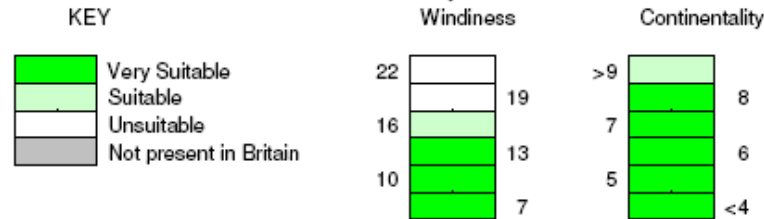
109	Kielder	WACO	SWCA
204	North East Lowland		
301	Lake district	WACO	
302	North West	WACO	
305	Peninsular	WACO	
401	Yorkshire Moors		
402	East Midlands		
403	West Midlands		
404	West England		
405	South East		
406	East Anglia		



### Pacific fir - *Abies amabilis*



AT=2734 in Medford Oregon - so considered very suitable south to this point at 600m (Rogue River)  
 AT = 965 in Juneau Alaska - so this considered to be the northern very suitable limit



## European silver fir Category B

### Native range

Native to the mountains of central and southern Europe.

### Site requirements

A shade tolerant species which grows slowly for a number of years. Suited to the uplands and other cooler areas of Britain receiving over 1000 mm rainfall evenly distributed across the year. Cold hardy throughout Britain, but vulnerable to frost unless planted under shelter, is sensitive to exposure and is not drought tolerant. Suited to soils of poor to medium nutrient status with fresh to moist soil moisture. Can grow on deep soils over limestone and other calcareous substrates. Does not tolerate very poor soils or heather competition and should not be planted on peats or very dry soils.

### Pests and pathogens

Silver fir tends to be infected by a wide variety of rust fungi in its native range, although few of them are of any practical importance. It is vulnerable to *Heterobasidion* (Fomes root and butt rot), although it is likely to be most damaged by *H. abietinum* (the fir form of the pathogen) which is absent from Britain. Occasionally Phytophthora root infections are reported, particularly in nursery trees.

Silver fir may also suffer from aphid infestations such as *Dreyfusi* (*Adelges*) *nusslini*, which causes shoot distortion, and balsam wooly aphid, which can cause dieback with severe infestations.

### Use

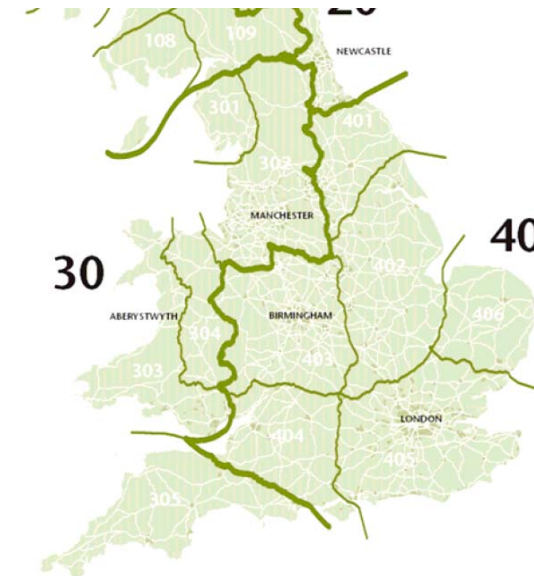
A species which could find an increasing role as a shade tolerant component of Continuous Cover Forestry stands.

109 Kielder  
204 North East Lowland  
301 Lake district  
302 North West  
305 Peninsular  
401 Yorkshire Moors  
402 East Midlands  
403 West Midlands  
404 West England  
405 South East  
406 East Anglia

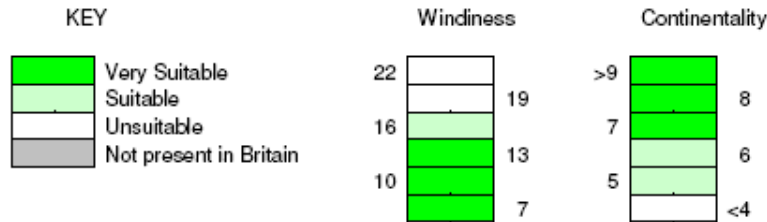
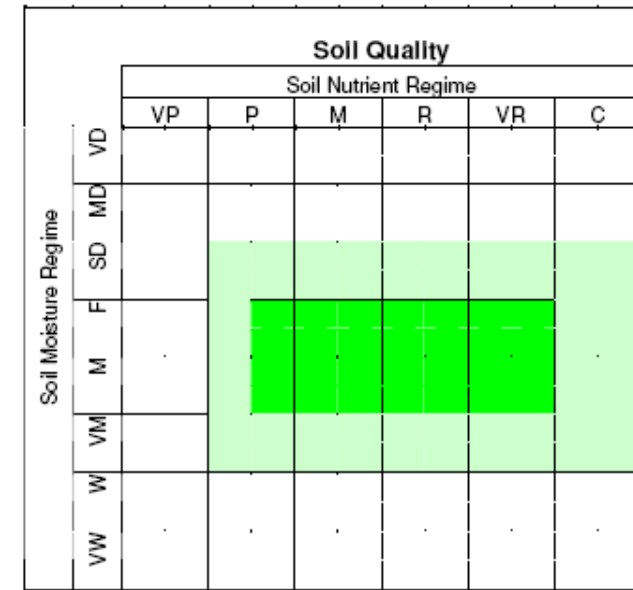
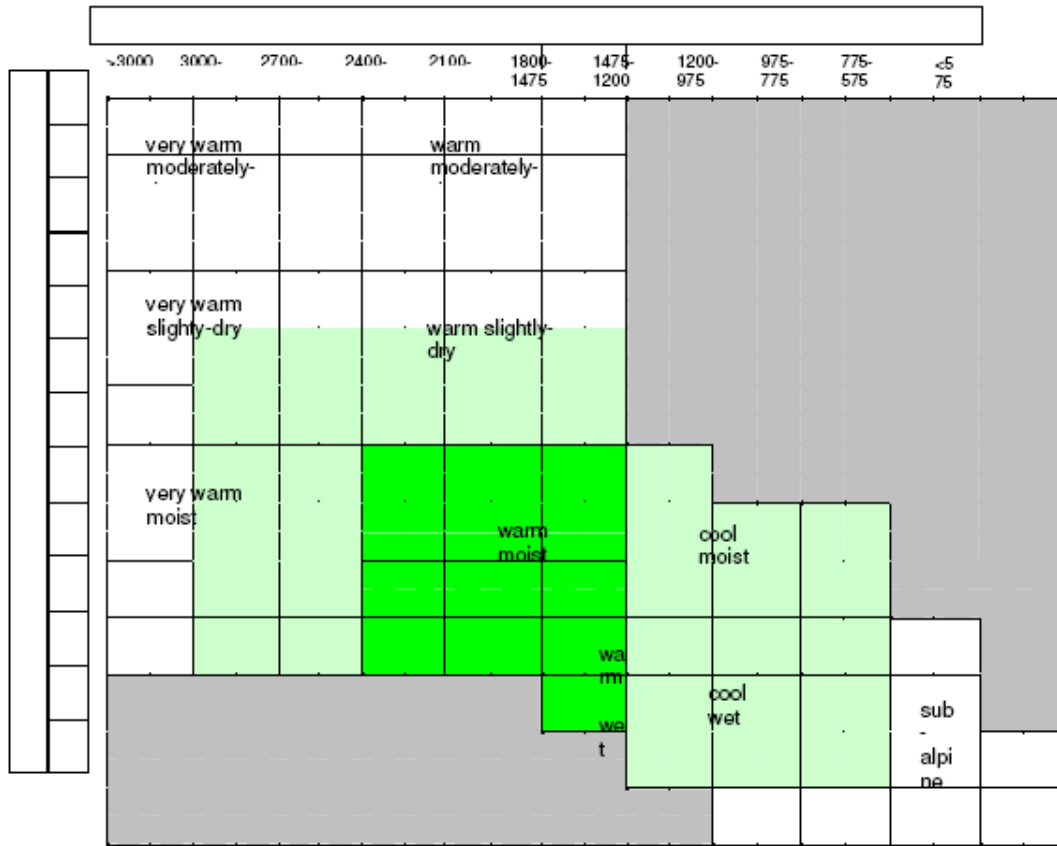
No UK

Plenty of French stands

AAL101



# European silver fir - *Abies alba*



# Nordmann fir Category C

## Native range

Native to the Caucasus mountains and areas of north-eastern Turkey.

## Provenance choice

No provenance testing other than for suitability for Christmas trees; there are few forest plots in Britain so seed should be sourced from the natural range.

## Site requirements

Although large trees can be found in eastern Britain, it is probably best suited to areas of >900 mm rainfall in western Britain. It is cold hardy throughout Britain. Does not tolerate exposure so best suited to freely draining soils on valley sides. Best suited to medium to rich soils of fresh or moist soil moisture. It does not tolerate peats or nutritionally very poor soils, but it is reported to make reasonable growth on alkaline soils.

## Pests and pathogens

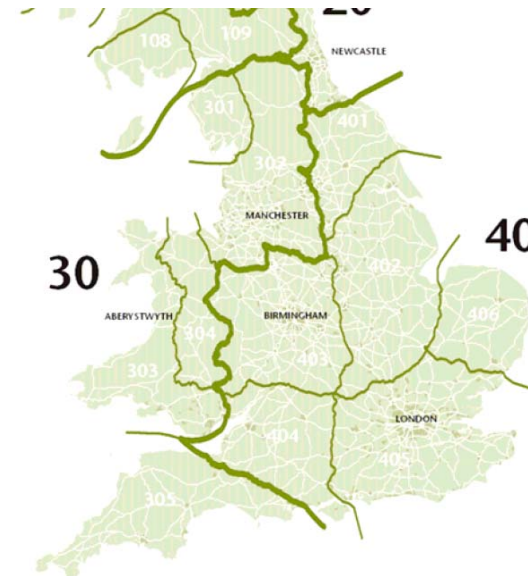
Can suffer from aphid infestations by *Dreyfusi (Adelges) nusslini*, which causes shoot distortion, and balsam wooly aphid, which can cause dieback with severe infestations. *Heterobasidion (Fomes root rot)* caused by *H. abietinum* and *H. annosum* has been recorded on this species in some European countries.

## Use

Seems unlikely to outperform other silver firs (e.g. *A. grandis*, *A. amabilis*) on suitable sites, so will probably only have a minor role in British forests, at least until there is more information on its potential.



- 109 Kielder
- 204 North East Lowland
- 301 Lake district
- 302 North West
- 305 Peninsular
- 401 Yorkshire Moors
- 402 East Midlands
- 403 West Midlands
- 404 West England
- 405 South East
- 406 East Anglia



Nordmann's silver fir - Caucasian fir - *Abies nordmanniana*

