



<b>habitat</b>	
natural distribution	Serbia, Tara Mountains
in N.W. Europe since	1880, Germany
natural areas The Netherlands	not indigenous
geological landscape types The Netherlands (Hoek 1997)	coversand area, ice-pushed ridges
forested areas The Netherlands	sandy soils; former heath fields
area Netherlands	<1700 ha (2002, Probos)
% of forest trees in the Netherlands	<0,7 (2002, Probos)
soil type	natural area: limestone, rich organic
pH-KCl	5-7
soil fertility	medium to nutrient rich
light	highly shade tolerant
① shade tolerance (0=no tolerance to 5=max. tolerance)	4.7
① drought tolerance (0=no tolerance to 5=max. tolerance)	2.8
① waterlogging tolerance (0=no tolerance to 5=max. tolerance)	1.0
plant communities in the Netherlands	-
<b>management</b>	
status Europe	rare indigenous species in forests
status The Netherlands	infrequent exotic species in forests; frequent in urban environment
application	timber tree, ornamental tree
propagation	seed, cuttings
regeneration	planting
optimal gap size for regeneration	1-2x tree length
first plantation Netherlands	
resprouting after cutting	no
growth rate (M.A.I. in $m^3ha^{-1}j^{-1}$ )	
diseases	<i>Heterobasidion annosum</i> , fungus on roots (Wortelzwam) <i>Rhizina undulata</i> , fungus on roots (Koffievuurtjeszwam)
insects	
<b>wood</b>	
wood	European spruce (Vuren)
wood structures key characteristics of pores	Resin canals. Continous transition from earlywood to latewood
density heartwood ( $kg/m^3$ )	
elastic modulus ( $N/mm^2$ )	
durability heartwood	fungus 4
heartwood colour	white
sapwood colour	white
contents	resin (hars)
products	construction timber, cladding, pulpwood for paper, packing-wood
<b>non-timber products</b>	
seeds	raw edible

① Ülo Niinemets and Fernando Valladares. 2006. Tolerance to shade, drought, and waterlogging of temperate Northern Hemisphere trees and shrubs. Ecological Monographs 76:521–547



Picea omorika stand Warnsborn, Arnhem



Young tree at Wageningen-Hoog



Two old trees in a garden at Oosterbeek



twig showing leaves

photographs 5x ©L Goudzwaard, Wageningen University



the brown colour in the wood proves a fungus infection, the normal colour is white