

Taxon: <i>Quercus suber L.</i>	Family: Fagaceae
Common Name(s): cork oak	Synonym(s): <i>Quercus cintrana</i> Welw. ex Nyman <i>Quercus corticosa</i> Raf. <i>Quercus mitis</i> Banks ex Lowe <i>Quercus occidentalis</i> Gay

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 25 Aug 2017
WRA Score: 3.0	Designation: EVALUATE	Rating: Evaluate

Keywords: Mediterranean Tree, Naturalized, Fire-Tolerant, Mast-Seeding, Coppices

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	Intermediate
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	y
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	n
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed		
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	y
604	Self-compatible or apomictic	y=1, n=-1	n
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	>3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m ²)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence of domestication] "A typical Mediterranean species, <i>Q. suber</i> has many xerophytic adaptations, both structural and physiological, which suggest an origin going back to the Tertiary era (Oligocene-Miocene), making it one of the most ancient <i>Quercus</i> species (Vieira Natividade, 1950). It seems likely that cork oak spread out from the area now covered by the Tyrrhenian Sea (Italy), migrating westward following the Iberian-Corsican-Sardinian mountain range which in the Miocene must have linked the lands now under that sea with the Iberian Peninsula. Its entry into Africa must have been either by way of the mountain range which, until it was submerged at the end of the Pliocene, linked Sicily and Tunisia, or across the Straits of Gibraltar. At that time the Mediterranean was a series of lakes and islands, providing a link between the Andalusian Cordillera Bética with the Atlas of Morocco."
	KewScience. 2017. Plants of the World Online - <i>Quercus suber</i> . http://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:296785-1 . [Accessed 25 Aug 2017]	[No evidence of domestication] "Cork oak bark has been harvested for thousands of years, and with good reason. The Romans discovered that it would float and used it for buoys in fishing nets, as well as for making sandals. Today it is most commonly known for its use in wine bottle corks."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	Intermediate
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 24 Aug 2017]	"Native: Africa Northern Africa: Algeria; Libya; Morocco; Tunisia Asia-Temperate Western Asia: Turkey Europe Southeastern Europe: Albania; Bosnia and Herzegovina; Croatia; Greece; Italy; Malta; Montenegro; Slovenia Southwestern Europe: France; Portugal; Spain"

Qsn #	Question	Answer
202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 24 Aug 2017]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Climatic amplitude (estimates) - Altitude range: 0 - 1200 m - Mean annual rainfall: 450 - 1100 mm - Rainfall regime: bimodal - Dry season duration: 2 - 4 months - Mean annual temperature: 13 - 16°C - Mean maximum temperature of hottest month: 18 - 26°C - Mean minimum temperature of coldest month: 3 - 10°C - Absolute minimum temperature: > -12°C"

204	Native or naturalized in regions with tropical or subtropical climates	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 24 Aug 2017]	"Native: Africa Northern Africa: Algeria; Libya; Morocco; Tunisia Asia-Temperate Western Asia: Turkey Europe Southeastern Europe: Albania; Bosnia and Herzegovina; Croatia; Greece; Italy; Malta; Montenegro; Slovenia Southwestern Europe: France; Portugal; Spain"
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Q. suber is adapted to a temperate Mediterranean climate and can withstand high temperatures with a sufficient water supply. It does not thrive in cold climates and although it may survive, its yield and vigour will be below normal. The ideal mean annual temperature is 13-16°C, although it may live in climates with a mean annual temperature of up to 19°C, since cork oak is one of the most thermophilous of Mediterranean forest species. It will not withstand absolute minima of below -11 or -12°C if these occur often. The mean temperature of the coldest month should not be below 4-5°C."
	Lohr, M. T., & Keighery, G. (2016). <i>Quercus</i> (Fagaceae) in Western Australia. <i>Western Australian Naturalist</i> , 30, 172-175	"This species is native to the western Mediterranean basin, an area with similar climate to south western Western Australia."

205	Does the species have a history of repeated introductions outside its natural range?	y

Qsn #	Question	Answer
	Source(s)	Notes
	Lohr, M. T., & Keighery, G. (2016). <i>Quercus</i> (Fagaceae) in Western Australia. <i>Western Australian Naturalist</i> , 30, 172-175	"However, more recent checklists (Walsh and Stajsic 2007) list <i>Quercus robur</i> and <i>Q. suber</i> as naturalised in Victoria." ... " <i>Quercus suber</i> (Cork Oak) is occasionally grown as an ornamental tree on private land in south-western Western Australia."
	San-Miguel-Ayanz, J., de Rigo, D., Caudullo, G., Houston Durrant, T., Mauri, A. (Eds.), 2016. <i>European Atlas of Forest Tree Species</i> . Publication Office of the European Union, Luxembourg	"The species has also been introduced to other countries outside the Mediterranean region in the twentieth century, either in order to produce cork or simply as an ornamental tree, and limited numbers can be found in Bulgaria, California, Chile, New Zealand, southern Australia and Turkey."
	CAB International, 2005. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	"The value of cork and the growing number of applications for this raw material has led to its cultivation in many countries outside its present native zone. The greatest interest in introducing and reproducing <i>Q. suber</i> in new areas has been in Russia (in the 'subtropical' regions of Transcaucasia and in the Crimea), the USA (in California) and Korea."
	Skolmen, R.G. 1980. Plantings on the forest reserves of Hawaii: 1910–1960. Institute of Pacific Islands Forestry, Pacific Southwest Forest & Range Experiment Station, US Forest Service, Honolulu, HI	2,353 trees planted statewide [Kauai = 60 in 1948; Oahu = 275 between 1946-1950; Molokai = 135 between 1946-1949; Maui = 74 between 1948-1951; Hawaii = 1809 between 1942-1951]

301	Naturalized beyond native range	y
	Source(s)	Notes
	Lohr, M. T., & Keighery, G. (2016). <i>Quercus</i> (Fagaceae) in Western Australia. <i>Western Australian Naturalist</i> , 30, 172-175	"However, more recent checklists (Walsh and Stajsic 2007) list <i>Quercus robur</i> and <i>Q. suber</i> as naturalised in Victoria." ... " <i>Quercus suber</i> has seeded in St. Kilda in Victoria along a railway line, suggesting it has some potential to naturalise (Walsh and Stajsic 2007)." ... "Currently, <i>Quercus robur</i> and <i>Q. suber</i> are regarded as naturalized in Australia." ... "Three species of oaks (<i>Q. palustris</i> , <i>Q. robur</i> and <i>Q. suber</i>) have established naturalised populations in Western Australia." ... "Of the oak species currently present in Western Australia, <i>Q. suber</i> is best adapted to a Mediterranean climate, most tolerant of fires, and the only species with potential to naturalise outside the wettest areas of the State."

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Global Register of Introduced and Invasive Species. 2017. <i>Quercus suber</i> . http://griis.org/ . [Accessed 25 Aug 2017]	Reported to be introduced into 5 countries (Armenia, Australia, Croatia, South Africa, Spain). In all countries, Evidence of Impacts = No

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	Environmental weed	

Qsn #	Question	Answer
	Source(s)	Notes
	Victorian Resources Online. 2017. Cork oak (<i>Quercus suber</i>). http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/weeds_cork-oak . [Accessed 25 Aug 2017]	[Speculation. No evidence of impacts documented] "May cause major displacement of some dominant spp. within a strata/layer (or some dominant spp. within different layers."

305	Congeneric weed	Y
	Source(s)	Notes
	Svenning, J. C., & Skov, F. (2007). Could the tree diversity pattern in Europe be generated by postglacial dispersal limitation?. <i>Ecology Letters</i> , 10(6), 453-460	" <i>Quercus cerris</i> is naturalized and invasive as far north-west of its native south-eastern European range as England (Peterken 1996)."
	Danielewicz, W., Kiciński, P., & Wiatrowska, B. (2016). Symptoms of the naturalisation of the Turkey oak (<i>Quercus cerris</i> L.) in Polish forests. <i>Folia Forestalia Polonica</i> , 58(3), 147-162	" <i>Quercus cerris</i> capable of a natural renewal in a woodland environment in Poland. In the light of the various definitions concerning the synanthropisation of the plant cover, it can be problematic to regard the Turkey oak as an invasive plant in forests. While it penetrates forest communities spontaneously and has a stable position in the undergrowth or even lower tree layers in them, those phytocoenoses greatly depart from the permanent natural communities in terms of structure and floristic composition. The dispersal of <i>Q. cerris</i> in them is similar to that of other oaks species, often renewing under the canopy of pine tree stands (Mosandl and Kleinert 1998; Pigan and Pigan 1999; Gómez 2003; Sokołowski and Paluch 2003; Gniot 2007). In many cases, this reflects the regeneration of forest communities in which native plants can be accompanied by alien species. If we assume, following Sukopp's (1962) conception, that a neophyte appearing in such 'unsaturated' phytocoenoses does not push out native species, and the proportion of the Turkey oak to the already present community components, according to Faliński's (1968) criteria, can be called compensatory, at least for the time being, then classifying it as an invasive plant is disputable in terms of definitions emphasising the threat to biological diversity posed by such plants. However, if we were to use the criterion of the rate of dispersal of alien species – over a distance longer than 100 m in a period shorter than 50 years (Richardson et al. 2000), then <i>Q. cerris</i> would have the status of an invasive plant."
	National Trust. 2014. New Forest Northern Commons Invasive Species Removal. https://ehipc.files.wordpress.com/2013/02/ehi-turkey-oak-november-2014.pdf . [Accessed 25 Aug 2017]	"Turkey Oak – <i>Quercus cerris</i> <ul style="list-style-type: none"> • Introduced to Britain by Lucombe, Exeter 1735 • Aggressive coloniser of acid sandy soils • Displaces native vegetation • Harbours Knopper Gall wasp which lays eggs in English Oak acorns • Low value to nature conservation • Approx. 500 trees Rockford Common"

Qsn #	Question	Answer
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[<i>Quercus robur</i>] "Toxic - Habit: Tree Preferred Climate/s: Mediterranean, Subtropical, Tropical Origin: Africa, C Asia, E Asia, Europe, W Asia Major Pathway/s: Crop, Forestry, Herbal, Ornamental Dispersed by: Humans, Animals, Flyers, Water, Wind, Escapee Seed Longevity: Transient Weed of: Cereals"

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[No evidence] "Q. suber is a xerophytic oak species, usually growing to 15 m, but reaching 20-25 m in ideal conditions. Stems can reach 4-5 m in circumference (Bussotti, 1997). Isolated individuals usually have a short thick trunk, since, if formation pruning has not been applied, early branching is at low level and at very open angles. With time, and aided by pruning, the rounded crown of young trees spreads out, giving the tree a wide, majestic appearance."

402	Allelopathic	n
	Source(s)	Notes
	Victorian Resources Online. 2017. Cork oak (<i>Quercus suber</i>). http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/weeds_cork-oak . [Accessed 25 Aug 2017]	[Possibly] "The mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth" (PFAF 1996-2008). May seriously affect some plants. "

403	Parasitic	n
	Source(s)	Notes
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Q. suber is a xerophytic oak species, usually growing to 15 m, but reaching 20-25 m in ideal conditions." [Fagaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Protection of seedlings and saplings is advisable in areas with rabbits or hares."
	Bugalho, M. N., & Milne, J. A. (2003). The composition of the diet of red deer (<i>Cervus elaphus</i>) in a Mediterranean environment: a case of summer nutritional constraint?. <i>Forest Ecology and Management</i> , 181(1), 23-29	"The diet of red deer contained a relative constant proportion of cork oak (approximately 0.26) and gum cistus (0.20) in summer of each year."

Qsn #	Question	Answer
	Bugalho, M. N., Milne, J. A., & Racey, P. A. (2001). The foraging ecology of red deer (<i>Cervus elaphus</i>) in a Mediterranean environment: is a larger body size advantageous? <i>Journal of Zoology</i> , 255(3), 285-289	[Browsed by deer] "The proportion of cork oak <i>Quercus suber</i> in the diet was also significantly different between sexes and between years, with males having a higher proportion of cork oak in their diets in 1996 (males and females, 0.30 and 0.16 0.037, respectively) and 1997 (males and females, 0.41 and 0.23 0.064, respectively)." ... "The canopy of cork oak, the dominant tree in the study area, was generally above a height of 2 m, within the potential reach of males but beyond the reach of females. More males than females were observed successfully reaching and feeding on oak canopies during the period of study. This could be explained by the larger body size of males, which allowed them to reach the base of the tree canopy, compared to the smaller females."

405	Toxic to animals	n
	Source(s)	Notes
	KewScience. 2017. Plants of the World Online - <i>Quercus suber</i> . http://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:296785-1 . [Accessed 25 Aug 2017]	"Cork oak forest has additional economic value providing cropping, grazing, hunting, honey, mushrooms and livestock farming, which are of considerable social importance as they are associated with traditional agrosilvopastoral practices. As fodder, acorns are low in protein and rich in carbohydrates, which are easily transformed into fat. Acorns are therefore used for fattening fully-grown livestock." ... "Hazards - None known."
	Bugalho, M. N., Milne, J. A., & Racey, P. A. (2001). The foraging ecology of red deer (<i>Cervus elaphus</i>) in a Mediterranean environment: is a larger body size advantageous? <i>Journal of Zoology</i> , 255(3), 285-289	[No evidence for foliage. Browsed by deer] "The proportion of cork oak <i>Quercus suber</i> in the diet was also significantly different between sexes and between years, with males having a higher proportion of cork oak in their diets in 1996 (males and females, 0.30 and 0.16 0.037, respectively) and 1997 (males and females, 0.41 and 0.23 0.064, respectively)." ... "The canopy of cork oak, the dominant tree in the study area, was generally above a height of 2 m, within the potential reach of males but beyond the reach of females. More males than females were observed successfully reaching and feeding on oak canopies during the period of study. This could be explained by the larger body size of males, which allowed them to reach the base of the tree canopy, compared to the smaller females."
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	Notes

Qsn #	Question	Answer
	<p>CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK</p>	<p>"Diseases Biscogniauxia mediterranea is the causal agent of charcoal disease of <i>Q. suber</i>. The disease is widespread in the Mediterranean region, where it affects several species of <i>Quercus</i>, although the cork oak is the preferred species, and the disease is closely associated with cork oak stand decline (Santos, 2003). <i>Botryosphaeria stevensii</i> causes a form of canker disease of cork oak (Evidente et al., 2003). A root pathogen, <i>Cylindrocarpon destructans</i>, is newly described attacking <i>Q. suber</i> in Spain (Sanchez et al., 2002). Numerous pathogenic fungi were found in <i>Q. suber</i> by Luque et al. (2000; 2001), including <i>Cystodendron dryophilum</i>, <i>Dendrophoma myriadea</i>, <i>Elsinoe quercus-ilicis</i>, <i>Lembosia quercina</i> and <i>Phomopsis quercella</i> attacking leaves, and <i>Biscogniauxia mediterranea</i>, <i>Botryosphaeria stevensii</i>, <i>Cryphonectria gyrosa</i>, <i>Nectria haematococca</i>, <i>Graphium</i> sp., <i>Ophiostoma piceae</i>, <i>Phomopsis</i> sp., <i>Phytophthora cinnamomi</i> and <i>Sporendocladia bactrospora</i> pathogenic on the stem. Insects The annual acorn crop of <i>Q. suber</i> can be affected by insect attack. <i>Tortrix viridana</i> (Lepidoptera: Tortricidae) attacks new buds and continues its attack as the leaves and flowers develop, thus causing serious fruit loss. <i>Lymantria dispar</i> is very common in Andalucian (Spain) cork woods, where it makes concentrated attacks on stands or groups. It causes devastating leaf loss, disturbing the phenological rhythm and obliging the tree to undertake a second foliation well into the summer. This extra effort drastically reduces the following spring's blossom, thus affecting two acorn crops. <i>Malacosoma neustria</i> is another defoliator of <i>Q. suber</i> (Verdinelli and Sanna-Passino, 2003). The Coleopteran pest <i>Curculio elephas</i> lays its eggs in cork oak acorns in August or September, and early-instar larvae feed on the cotyledons, reducing their food store. When the damage is limited to only part of the cotyledons the acorn can still germinate, although the seedling that emerges from it will exhibit weaker growth. If the damage affects the embryo, the acorn naturally loses its ability to germinate. Once acorns have fallen to the ground, if they have their cases broken or there are holes made by exiting <i>C. elephas</i> larvae, they are more liable to fungal rots caused by infection with <i>Fusarium</i> or <i>Ceratocystis</i> spp. <i>Dryomyia lichtensteini</i> causes leaf galls (Villgran et al., 2002). The moth, <i>Cydia splendana</i> also damages <i>Q. suber</i> acorns. Chalaki et al. (2002) noted numerous pests of <i>Q. suber</i> in Algeria, including the defoliators <i>Lymantria dispar</i>, <i>Ephesia nymphaea</i>; <i>Euproctis chrysorrhoea</i> and <i>Teia trigotephras</i> frequently damaging cork oak foliage; the xylophagous insects <i>Cerambyx cerdo mirbecki</i> and <i>Platypus cylindrus</i>; and acorn damage by the moth <i>Cydia fagiglandana</i> and the weevil <i>Curculio elephas</i>. <i>Platypus cylindrus</i> causes damage in a number of countries. Inacio et al. (2002) reviewed the gall-forming insects associated with <i>Q. suber</i> in Portugal."</p>

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	<p>Plants for a Future. 2017. <i>Quercus suber</i>. http://pfaf.org/user/Plant.aspx?LatinName=Quercus+suber. [Accessed 25 Aug 2017]</p>	<p>"Known Hazards - None known"</p>

Qsn #	Question	Answer
	Victorian Resources Online. 2017. Cork oak (<i>Quercus suber</i>). http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/weeds_cork-oak . [Accessed 25 Aug 2017]	"Poisoning in children from chewing a few acorns need cause little worry before in the introduction the potato, acorns were a (starch-containing) food in times of emergency" (Pfander 1984). "Leaves are alternate, simple and leathery, with spiny, serrate margins" (Bodkin 1986). Not toxic to people but may cause some physiological issues from spiny, serrated leaf margins"
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Silva, J. S., & Catry, F. (2006). Forest fires in cork oak (<i>Quercus suber</i> L.) stands in Portugal. <i>International Journal of Environmental Studies</i> , 63(3), 235-257	[Cork oak survives in areas with a frequent fire regime. No evidence of increased fire risk] "There is evidence that the expansion of cork oak has been significantly driven by the occurrence of fire in the Mediterranean Region [8]. In fact, fire works as a selection factor enabling cork oak trees to prevail over other less fire-resistant species. More recently, man has probably influenced cork oak expansion in an indirect way [7] by significantly altering the natural fire regime [18]"
	Victorian Resources Online. 2017. Cork oak (<i>Quercus suber</i>). http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/weeds_cork-oak . [Accessed 25 Aug 2017]	"Very fire resistant" (Byles 1931). "Plant materials, while it may accentuate the damage caused by fire, can also be used to slow or divert the fire...Deciduous hardwoods that are suitable include oaks (<i>Quercus</i> spp.)" (Cremer 1990). Could greatly change the frequency and/ or intensity of fire. "

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	CAB International, 2005. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Establishes in shade] "Q. suber is a partly sun-demanding species, but fairly hardy in character. The adult tree needs an abundance of light, but the saplings need shelter and shade for 4-5 years on sunny slopes because of the high summer temperatures and on shaded mountain slopes because of cold winter temperatures."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	San-Miguel-Ayanz, J., de Rigo, D., Caudullo, G., Houston Durrant, T., Mauri, A. (Eds.), 2016. <i>European Atlas of Forest Tree Species</i> . Publication Office of the European Union, Luxembourg	"Apart from this it can survive in a variety of conditions and soil types, although it prefers sandy and lightly structured soils. It has a number of adaptations for growing in a warm and dry climate"
	Plant Oregon. 2017. <i>Quercus suber</i> - Cork Oak. http://www.plantoregon.com/product.asp?specific=2314 . [Accessed 25 Aug 2017]	"Plant in full sun, where they prefer moist, well drained soils but are adaptable to a variety of soil types."

Qsn #	Question	Answer
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	<p>"Q. suber prefers non-calcareous soils, preferably loose and sandy. It does not tolerate alkaline or clayey soils, clay-sand loams or muddy conditions. It is not a species which demands a highly fertile soil, but if it is to produce good yields it needs deep, fertile and well-drained soils. It does not tolerate compacted or waterlogged soils. Once established, stands of cork oak act as soil improvers.</p> <p>Soil descriptors</p> <ul style="list-style-type: none"> - Soil texture: light - Soil drainage: free - Soil reaction: acid; neutral - Soil types: acid soils; cambisols"

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Q. suber is a xerophytic oak species, usually growing to 15 m, but reaching 20-25 m in ideal conditions. Stems can reach 4-5 m in circumference (Bussotti, 1997). Isolated individuals usually have a short thick trunk, since, if formation pruning has not been applied, early branching is at low level and at very open angles. With time, and aided by pruning, the rounded crown of young trees spreads out, giving the tree a wide, majestic appearance."

412	Forms dense thickets	y
	Source(s)	Notes
	Silva, J. S., & Catry, F. (2006). Forest fires in cork oak (<i>Quercus suber</i> L.) stands in Portugal. <i>International Journal of Environmental Studies</i> , 63(3), 235-257	"According to the results of the forest inventory [3] cork oak stands (pure and cork oak-dominant) corresponded to 712,813 ha. This represents 22% of all forest surface in Portugal."
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"In dense stands, a more acute branching angle results in more pronounced height growth and the tree takes on an irregular shape, with less interior foliage." ... "The countries with the highest area of cork oak are Portugal, Algeria, Spain, Morocco and Tunisia, the densest forests being in Algeria and Tunisia."
	Costa, A., Pereira, H., & Madeira, M. (2009). Landscape dynamics in endangered cork oak woodlands in Southwestern Portugal (1958–2005). <i>Agroforestry Systems</i> , 77(2), 83–96	"The cork oak woodlands were mostly dense stands with about half of the area with a canopy cover superior to 50% both in 1958 and 2005." ... "The main characteristics of the cork oak woodlands were maintained: dominance of dense stands with an herbaceous understory. The canopy cover dynamics corresponded to an overall increase of both dense and clear woodlands and in contrast, with a decrease in open woodlands."

501	Aquatic	n
	Source(s)	Notes
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	[Terrestrial] "Vegetation types: broadleaved evergreen forests; sclerophyllous forests"

502	Grass	n
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Qsn #	Question	Answer
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 25 Aug 2017]	Family: Fagaceae Subfamily: Fagoideae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 25 Aug 2017]	Family: Fagaceae Subfamily: Fagoideae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Q. suber is a xerophytic oak species, usually growing to 15 m, but reaching 20-25 m in ideal conditions." ... "Cork oak develops a taproot which can go down several metres, and abundant rootlets near the surface which may give rise to shoots. This characteristic can be used to regenerate old trees by means of mouldboard ploughing, which by cutting the rootlets and shifting them nearer to the surface helps shoots to develop. These shoots are clearly distinguishable from plants from acorns, by the fact that they have whitish, downy, leaf undersides, and a much faster growth rate in the early years."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	San-Miguel-Ayanz, J., de Rigo, D., Caudullo, G., Houston Durrant, T., Mauri, A. (Eds.), 2016. European Atlas of Forest Tree Species. Publication Office of the European Union, Luxembourg	"Distribution Worldwide, cork oak forests cover about 2.2 million hectares, almost all of which is in the Mediterranean countries of Algeria, France, Italy, Morocco, Portugal, Spain and Tunisia ⁴ . The most extensive forests are on the Atlantic coast of the Iberian Peninsula ¹ . <i>Quercus suber</i> forests cover almost 1.5 million ha in Europe and 700 000 ha in North Africa. Its distribution is fragmented, suggesting that it is mainly relictual."

Qsn #	Question	Answer
	<p>KewScience. 2017. Plants of the World Online - <i>Quercus suber</i>. http://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:296785-1. [Accessed 25 Aug 2017]</p>	<p>[No evidence, but threatened by habitat loss] "The habitats that support cork oak are under ever increasing threat, mainly due to human activity such as the intensification of agriculture and careless causes of forest fires (too frequent fires can damage the trees, as it makes them susceptible to fungal infection). <i>Quercus suber</i> forests are protected by the European Union (Habitats Directive 92/43/EEC). Cork oaks cannot be legally cut down in Portugal, except for the purpose of forest management (felling of old unproductive trees). The Natura 2000 network, a pan-European network of classified nature conservation areas, classifies montados (habitat 6310) and cork oak forests (habitat 9330) as very important for the conservation of biodiversity. The increasing use of plastic wine stoppers and metal screw tops could reduce the value of cork oak forests, leading to their conversion or abandonment. WWF has been working to publicise the environmental and economic value of cork stoppers, in particular with the wine industry, to show what would be lost if cork forests disappeared, and has a major programme to promote products derived from sustainably managed cork oak forests. <i>Quercus suber</i> is a target species for the gene conservation network of the European Forest Genetic Resources Programme, which is co-ordinated by Bioversity International in conjunction with the FAO (Food and Agriculture Organization of the United Nations). This is a collaborative programme between European countries, which aims to ensure the effective conservation of genetic resources in Europe."</p>

602	Produces viable seed	y
	Source(s)	Notes
	<p>CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK</p>	<p>"<i>Q. suber</i> reproduces well from seed (acorns) after a suitable after-ripening period. Healthy, ripe, full-size, grey-brown and smooth acorns should be chosen. After gathering, seeds must be transported to the store as soon as possible, in netting bags which allow some ventilation, before storage on trays. If the store is temporary, it must be a well-ventilated cool place; the acorns must be kept in layers less than 10 cm deep, and stirred at least once or twice a day. If the final storage is carried out at temperatures below -1°C, fungal treatments are not necessary. For long term storage, acorns should be kept between -1 and -3°C at 40-45% relative humidity, in non-hermetic containers and with permanent ventilation systems. Mixing the seeds with hygrophilous material, such as peat, is advisable when storing for lengthy periods."</p>

603	Hybridizes naturally	y
	Source(s)	Notes

Qsn #	Question	Answer
	Belahbib, N., Pemonge, M. H., Ouassou, A., Sbay, H., Kremer, A., & Petit, R. J. (2001). Frequent cytoplasmic exchanges between oak species that are not closely related: <i>Quercus suber</i> and <i>Q. ilex</i> in Morocco. <i>Molecular Ecology</i> , 10(8), 2003-2012	"Examples of hybrids between the two species are listed in Camus (1936–39). Although usually considered to be rare, they are mentioned in Algeria, France, Italy, Portugal and Spain (Camus 1936–39; Franco 1990 in Gil Sánchez et al . 1996). Reports of other hybrids with <i>Q. suber</i> involve deciduous species such as <i>Q. afares</i> Pomel in Algeria (Camus 1936–39) and <i>Q. cerris</i> L. in Italy (Bellarosa et al . 1996) (all belonging to section <i>Cerris</i>) but also <i>Q. faginea</i> s. l. in Spain (Gil Sánchez et al . 1996), which belongs to the section <i>Quercus</i> s.s. (Manos et al . 1999)."

604	Self-compatible or apomictic	n
	Source(s)	Notes
	Soto, A., Lorenzo, Z., & Gil, L. (2007). Differences in fine-scale genetic structure and dispersal in <i>Quercus ilex</i> L. and <i>Q. suber</i> L.: consequences for regeneration of Mediterranean open woods. <i>Heredity</i> , 99(6), 601–607	" <i>Q. suber</i> reproduces almost exclusively through allogamous mating." [Allogamy ordinarily involves cross-fertilization between unrelated individuals]
	Feijó, J. A., Certal, A. C., Boavida, L., Van Nerum, I., Valdivieso, T., Oliveira, M. M., & Broothaerts, W. (1999). Advances on the study of sexual reproduction in the cork-tree (<i>Quercus suber</i> L.), chestnut (<i>Castanea sativa</i> Mill.) and in Rosaceae (apple and almond). Pp. 377-396 In <i>Fertilization in Higher Plants</i> . Springer, Berlin Heidelberg	"There is a lag period between the anthesis of the male flowers and the receptivity of female flowers in the same tree: the dehiscent anthers shed the pollen generally one week before the female spikes start to appear. This phenomenon may also play a role in the self-incompatibility known in <i>Quercus</i> (Hagman 1975)." ... "Oaks are recognised to be self-incompatible species with gametophytic control, particularly due to morphological evidence of the flower and pollen grain (Hangman 1975, Yacine and Bouras 1997). In oaks self-incompatibility occurs with inhibition inside the style, observed by the slowing or arresting of the tubes. Sometimes callose depositions on the tips were also observed"

605	Requires specialist pollinators	n
	Source(s)	Notes
	San-Miguel-Ayanz, J., de Rigo, D., Caudullo, G., Houston Durrant, T., Mauri, A. (Eds.), 2016. <i>European Atlas of Forest Tree Species</i> . Publication Office of the European Union, Luxembourg	"Cork oak is a monoecious wind-pollinated species. The flowers appear from April onwards throughout the summer, and can give rise to both annual and biennial acorns."

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	CAB International, 2005. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	"Ability to sucker; regenerate rapidly; coppice"

607	Minimum generative time (years)	>3
	Source(s)	Notes
	CAB International, 2005. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	" <i>Q. suber</i> begins to bear fruit at 10-12 years old in good seasons, and regularly after 25-30 years. It usually bears fruit every year, but only gives high yields every 2-3 years."

Qsn #	Question	Answer
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	San-Miguel-Ayanz, J., de Rigo, D., Caudullo, G., Houston Durrant, T., Mauri, A. (Eds.), 2016. European Atlas of Forest Tree Species. Publication Office of the European Union, Luxembourg	"Acorns are 2-3 cm in length in a fairly deep cup with elongated scales." [No evidence. Unlikely given relatively large acorn size and no means of external attachment]
702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Lohr, M. T., & Keighery, G. (2016). <i>Quercus</i> (Fagaceae) in Western Australia. <i>Western Australian Naturalist</i> , 30, 172-175	" <i>Quercus suber</i> (Cork Oak) is occasionally grown as an ornamental tree on private land in south-western Western Australia. This species is native to the western Mediterranean basin, an area with similar climate to south-western Western Australia."
	CAB International, 2005. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	"The value of cork and the growing number of applications for this raw material has led to its cultivation in many countries outside its present native zone. The greatest interest in introducing and reproducing <i>Q. suber</i> in new areas has been in Russia (in the 'subtropical' regions of Transcaucasia and in the Crimea), the USA (in California) and Korea."
703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	San-Miguel-Ayanz, J., de Rigo, D., Caudullo, G., Houston Durrant, T., Mauri, A. (Eds.), 2016. European Atlas of Forest Tree Species. Publication Office of the European Union, Luxembourg	"Acorns are 2-3 cm in length in a fairly deep cup with elongated scales." [No evidence. Unlikely given relatively large size of acorns]
704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	San-Miguel-Ayanz, J., de Rigo, D., Caudullo, G., Houston Durrant, T., Mauri, A. (Eds.), 2016. European Atlas of Forest Tree Species. Publication Office of the European Union, Luxembourg	"Acorns are 2-3 cm in length in a fairly deep cup with elongated scales."
705	Propagules water dispersed	n
	Source(s)	Notes
	San-Miguel-Ayanz, J., de Rigo, D., Caudullo, G., Houston Durrant, T., Mauri, A. (Eds.), 2016. European Atlas of Forest Tree Species. Publication Office of the European Union, Luxembourg	"Cork oak is normally found in forests or open woodlands as the main tree species, or together with other Mediterranean trees such as maritime pine (<i>Pinus pinaster</i>) and other deciduous oak species" [Water might move some seeds, but primarily dispersed by seed hoarding birds and rodents]
706	Propagules bird dispersed	y

Qsn #	Question	Answer
	Source(s)	Notes
	Pons, J., & Pausas, J. G. (2007). Acorn dispersal estimated by radio-tracking. <i>Oecologia</i> , 153(4), 903-911	"Bird-dispersed seeds are difficult to track, especially in the case of long-distance dispersal events. To estimate the oak dispersal distance and the seed shadow generated by the European jay (<i>Garrulus glandarius</i>), we inserted radio-transmitters in 239 acorns, placed them in bird-feeders and then located them by radio-tracking. Using this methodology we located the exact caching site of 94 <i>Quercus ilex</i> and 54 <i>Q. suber</i> acorns and determined the caching habitat characteristics (vegetation type, distance, spatial distribution). The results show that: (1) there are no differences in the dispersal distance distribution between the different acorn species or sizes, (2) dispersal distances range from approximately 3 m up to approximately 550 m (mean = 68.6 m; median = 49.2 m), (3) recently abandoned fields and forest tracks were the sites preferred by jays to cache acorns, whereas fields and shrublands were avoided and (4) seed shadows showed acorn aggregation zones (i.e. clusters of caches) close to the feeder as well as isolated caches at longer distances. The results also suggest that radio-transmitters are a cheap and reliable way to determine seed shadows and quantify both seed dispersal and postdispersal seed predation for medium to large seeds."
	Herrera, J. (1995). Acorn predation and seedling production in a low-density population of cork oak (<i>Quercus suber L.</i>). <i>Forest Ecology and Management</i> , 76(1), 197-201	"From dawn to dusk, ungulates (up to two red deer, one wild boar, and one cow at a time) were observed foraging around the tree, so that the ground was devoid of acorns in spite of the constant 'rain' of seeds. The only birds observed foraging on acorns were wood pigeons. Dispersers such as jays were never seen." ... "Known scatter-hoarders such as jays (Bossema, 1979) are common in the forests of Spain, where they collect and cache <i>Quercus</i> acorns (personal observation). Nevertheless, jays are usually absent from the scrub-dominated areas where this study was carried out (Valverde, 1960, and personal observation)."
	Pons, J., & Pausas, J. G. (2006). Oak regeneration in heterogeneous landscapes: the case of fragmented <i>Quercus suber</i> forests in the eastern Iberian Peninsula. <i>Forest Ecology and Management</i> , 231(1), 196-204	[Dispersed by jays] "Overall <i>Quercus</i> recruitment in the eastern Iberian peninsula is higher than in the western Iberian dehesas. <i>Q. suber</i> recruitment is relatively high in old fields and forest of the study area, at least in the range of distances from adult cork oak trees within the jay dispersal distances range; but recruitment is absent in shrublands. However, successful regeneration only occurs in old fields, while in forests (in both pine and oak forests), seedling development is suppressed by adult trees, and thus a seedling bank is generated in the understorey."

Qsn #	Question	Answer
707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Herrera, J. (1995). Acorn predation and seedling production in a low-density population of cork oak (<i>Quercus suber</i> L.). <i>Forest Ecology and Management</i> , 76 (1), 197-201	[In Hawaii, introduced rodents may serve as seed hoarders and potential dispersers, but the majority of seeds would likely be depredated] "Hoarding by rodents seems to be the only possible way for oaks to regenerate, but even this seems unlikely since ungulates rapidly remove most fallen acorns. Taken together, the evidence presented here suggests that prospects for natural establishment of cork oak seedlings are slim because of the low population density of trees, the lack of effective dispersers, and a superabundance of ungulates."

708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Herrera, J. (1995). Acorn predation and seedling production in a low-density population of cork oak (<i>Quercus suber</i> L.). <i>Forest Ecology and Management</i> , 76 (1), 197-201	[Seeds depredated] "Seeds placed on the ground surface were invariably eaten within a few months by a variety of vertebrate herbivores (cattle, red deer, fallow deer, wild boar and rabbits). Predation reached 100% whether acorns were placed beneath trees or more than 100 m away from trees. Seeds placed under dense heath scrub were also rapidly removed, although their final fates could not be ascertained."

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	CAB International, 2005. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	"It usually bears fruit every year, but only gives high yields every 2-3 years."
	Piotto, B. & DiNoi, A.(eds.). 2003. <i>Seed propagation of Mediterranean trees and shrubs</i> . APAT, Rome, Italy	"The longer the reproductive cycle of a species (it lasts for one year in <i>Q. ilex</i> , for two in both <i>Q. coccifera</i> and <i>Q. suber</i>), the more likely the danger of problems arising. Even fruiting is irregular in the oak species: large seed crops, exceeding 600,000 acorns/ha, occur every 2-5 years, according to the site and species, but the interval may increase owing to a number of factors, among them atmospheric pollution." ... " <i>Quercus suber</i> L. (cork oak) - (Fagaceae) Average germination: 70-90%Number of seeds per kg: 200-300"
	San-Miguel-Ayanz, J., de Rigo, D., Caudullo, G., Houston Durrant, T., Mauri, A. (Eds.), 2016. <i>European Atlas of Forest Tree Species</i> . Publication Office of the European Union, Luxembourg	"The number of acorns varies widely from year to year, with occasional very highly productive years followed by others with little or no production" [Densities unspecified]

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	Notes

Qsn #	Question	Answer
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"After gathering, seeds must be transported to the store as soon as possible, in netting bags which allow some ventilation, before storage on trays. If the store is temporary, it must be a well ventilated cool place; the acorns must be kept in layers less than 10 cm deep, and stirred at least once or twice a day. If the final storage is carried out at temperatures below -1°C, fungal treatments are not necessary. For long term storage, acorns should be kept between -1 and -3 C at 40-45% relative humidity, in non-hermetic containers and with permanent ventilation systems. Mixing the seeds with hygrophilous material, such as peat, is advisable when storing for lengthy periods." ... "- Seed storage recalcitrant"
	Plants for a Future. 2017. <i>Quercus suber</i> . http://pfaf.org/user/Plant.aspx?LatinName=Quercus+suber . [Accessed 25 Aug 2017]	"Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc."
	Royal Botanic Gardens Kew. (2017) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/ . [Accessed 25 Aug 2017]	"Storage Behaviour: Recalcitrant Storage Conditions: (Dent, 1948); no seeds survive desiccation to 23% mc, 86% germination following 8 months moist storage at 3°C with 35% mc (Harrington, 1972)"

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	San-Miguel-Ayanz, J., de Rigo, D., Caudullo, G., Houston Durrant, T., Mauri, A. (Eds.), 2016. European Atlas of Forest Tree Species. Publication Office of the European Union, Luxembourg	"Cork oak is well adapted to cope with fire, as its thick bark protects the tree enabling it to re-sprout from the stem after fire damage - the only European tree species with this capability."
	Lohr, M. T., & Keighery, G. (2016). <i>Quercus</i> (Fagaceae) in Western Australia. <i>Western Australian Naturalist</i> , 30, 172-175	"Mature trees have a thick bark which is used commercially in cork production in its native range and allows large individuals to survive crown fires (Pausas 1997). It is also unique among European trees in its ability to regenerate after fires via epicormic branching (Moreira et al. 2007)."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Naturalized in Australia
- Other *Quercus* species have become invasive
- Shade tolerant
- Tolerates many soil types
- Forms dense stands in native range
- Reproduces by seeds and root suckers
- Hybridizes with other *Quercus* species
- Seeds dispersed by seed hoarding birds, rodents & intentionally by people
- Potential for prolific seed production (mast seeder), but densities unspecified
- Able to coppice

Low Risk Traits

- No reports of detrimental impacts where naturalized
- Unarmed (no spines, thorns, or burrs)
- Palatable to browsing animals
- Non-toxic
- Ornamental
- Self-incompatible
- Reaches maturity in 10-12 years
- Recalcitrant seeds

Second Screening Results for Tree/tree-like shrubs

(A) Shade tolerant or known to form dense stands?> Yes. Saplings establish in shade and trees form dense stands within native range

(B) Bird-dispersed?> Dispersed by seed hoarding birds (may not be effectively dispersed where such birds are absent)

(C) Life cycle <4 years? No. Reaches maturity in 10-12 years

Outcome = Evaluate

