

Family: *Pinaceae*

Taxon: *Pinus thunbergii*

Synonym: *Pinus thunbergiana* Franco

Common Name: black pine
Japanese black pine

Questionnaire : current 20090513 **Assessor:** Patti Clifford **Designation:** H(HPWRA)
Status: Assessor Approved **Data Entry Person:** Patti Clifford **WRA Score** 8

101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?	y=1, n=-1	
103	Does the species have weedy races?	y=1, n=-1	
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)	Low
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	Low
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)	y
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
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	y=1, n=0	
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	
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	
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	n
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	
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	
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
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	
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	y
705	Propagules water dispersed	y=1, n=-1	
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m2)	y=1, n=-1	y
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	
803	Well controlled by herbicides	y=-1, n=1	
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)	y=-1, n=1	

Designation: H(HPWRA)

WRA Score 8

Supporting Data:

101	2012. WRA Specialist. Personal Communication.	[Is the species highly domesticated? No] No evidence of domestication that reduces invasive traits.
102	2012. WRA Specialist. Personal Communication.	[Has the species become naturalized where grown? NA]
103	2012. WRA Specialist. Personal Communication.	[Does the species have weedy races? NA]
201	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"? 0- low] Native distribution: Japan - Honshu, Kyushu, Shikoku; South Korea.
202	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Quality of climate match data? 0 - low] Native distribution: Japan - Honshu, Kyushu, Shikoku; South Korea.
203	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Broad climate suitability (environmental versatility)?] "Pinus thunbergii grows predominantly along the coasts of Honshu, Shikoku and Kyushu islands in Japan. It also occurs along the coast of southern Korea Republic. Its northern limit is at about 41°34'N, the southern limit is Takara island, south of Kyushu, at 29°N. It is the dominant pine species of the coastal lowland area, to about altitude 1,000 m." Climatic amplitude (estimates) - Altitude range: 0 - 500 m - Mean annual rainfall: 1030 - 1540 mm - Rainfall regime: summer - Mean annual temperature: 13 - 16°C - Mean maximum temperature of hottest month: 32 - 35°C - Mean minimum temperature of coldest month: -12 - -3°C - Absolute minimum temperature: > -15°C
203	2012. Dave's Garden. PlantFiles: Japanese black pine, black pine - Pinus thunbergii. Dave's Garden, http://davesgarden.com/guides/pf/go/60103/	[Broad climate suitability (environmental versatility)? Yes] USDA Zone 5a: to -28.8 °C (-20 °F) USDA Zone 5b: to -26.1 °C (-15 °F) USDA Zone 6a: to -23.3 °C (-10 °F) USDA Zone 6b: to -20.5 °C (-5 °F) USDA Zone 7a: to -17.7 °C (0 °F) USDA Zone 7b: to -14.9 °C (5 °F) USDA Zone 8a: to -12.2 °C (10 °F) USDA Zone 8b: to -9.4 °C (15 °F) USDA Zone 9a: to -6.6 °C (20 °F) USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F)
203	2012. Fu, L./Li, N./Elias, T.S./Mill, R.R.. Flora of China Vol. 4 Pinaceae. www.efloras.org , http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200005368	[Broad climate suitability (environmental versatility)? Yes] Cultivated in cities, used for afforestation on mountain slopes; to 1400 m
204	2007. Randall, R.. Global Compendium of Weeds - Pinus thunbergii. http://www.hear.org/gcw/species/pinus_thunbergii/	[Native or naturalized in regions with tropical or subtropical climates? No] No evidence.
205	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Does the species have a history of repeated introductions outside its natural range? Yes] Planted in: United Kingdom; China; Japan; Korea; Canada; United States.
301	2003. Haysom, K.A./Murphy, S.T.. The status of invasiveness of forest tree species outside their natural habitat: a global review and discussion paper. Forest Health and Biosecurity Working Paper FBS/3E. Forestry Department. FAO, Rome ftp://ftp.fao.org/doc	[Naturalized beyond native range? Yes] Naturalized in the United States in Virginia and Oregon.
302	2012. National Park Service. Nonnative species. http://www.nps.gov/fiis/naturescience/nonnativespecies.htm	[Garden/amenity/disturbance weed? Yes] Pinus thunbergii is considered to be one of the most prominent invasive species on Fire Island National Seashore, New York. [no mention of control or impacts]
302	2012. USDA Forest Service. Weed of the Week - Pinus thunbergii. http://www.na.fs.fed.us/fhp/invasive_plants/weeds/japanese-black-pine.pdf	[Garden/amenity/disturbance weed? Yes] Reported invasive in New York.

303	2007. Randall, R.. Global Compendium of Weeds - <i>Pinus thunbergii</i> . http://www.hear.org/gcw/species/pinus_thunbergii/	[Agricultural/forestry/horticultural weed? No] No evidence.
304	2007. Randall, R.. Global Compendium of Weeds - <i>Pinus thunbergii</i> . http://www.hear.org/gcw/species/pinus_thunbergii/	[Environmental weed? No] No evidence of control or impacts in natural systems.
305	1994. Richardson, D.M./Williams, P.A./Hobbs, R.J.. Pine Invasions in the Southern Hemisphere: Determinants of Spread and Invasibility. <i>Journal of Biogeography</i> . 21(5): 511-527.	[Congeneric weed? Yes] <i>Pinus banksiana</i> is invasive in New Zealand in scrub and open places on and near forest margins, shrublands, tussock grassland. At least 16 <i>Pinus</i> species are invasive in the Southern hemisphere: <i>P. banksia</i> , <i>P. canariensis</i> , <i>P. contorta</i> , <i>P. elliotii</i> , <i>P. halepensis</i> , <i>P. muricata</i> , <i>P. nigra</i> , <i>P. patula</i> , <i>P. pinaster</i> , <i>P. pinea</i> , <i>P. ponderosa</i> , <i>P. radiata</i> , <i>P. roxburghii</i> , <i>P. strobus</i> , <i>P. sylvestris</i> , <i>P. taeda</i> .
401	2012. Fu, L./Li, N./Elias, T.S./Mill, R.R.. Flora of China Vol. 4 Pinaceae. www.efloras.org , http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200005368	[Produces spines, thorns or burrs? No] "Trees to 30 m tall; trunk to 2 m d.b.h. in native range; bark dull gray when young, aging gray-black, rough and thick, scaly and deciduous; crown broadly conical or umbrellalike; 1st-year branchlets pale brown-yellow, glabrous; winter buds silvery white, cylindrical-ellipsoid or cylindrical, scales fringed at margin. Needles 2 per bundle, dull green, shiny, 6-12 cm x 0.5-2 mm, rigid, stomatal lines present on all surfaces, resin canals 6-11, median, base with persistent sheath, margin serrulate. Seed cones solitary or 2 or 3 together, shortly pedunculate, brown, conical-ovoid or ovoid, 4-6 x 3-4 cm, deciduous."
402	2012. WRA Specialist. Personal Communication.	[Allelopathic? Unknown]
403	2012. Fu, L./Li, N./Elias, T.S./Mill, R.R.. Flora of China Vol. 4 Pinaceae. www.efloras.org , http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200005368	[Parasitic? No] Pinaceae.
404	2012. WRA Specialist. Personal Communication.	[Unpalatable to grazing animals? Unknown]
405	2012. National Center for Biotechnology Information. PubMed. http://www.ncbi.nlm.nih.gov/sites/entrez	[Toxic to animals? No] No evidence of toxicity.
405	2012. Specialized Information Services, U.S. National Library of Medicine. TOXNET toxicology data network [online database]. National Institutes of Health, http://toxnet.nlm.nih.gov/	[Toxic to animals? No] No evidence of toxicity.
406	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Host for recognized pests and pathogens?] Pests recorded Insects: Ceroplastes rubens (red wax scale) Dendroctonus terebrans (beetle, black turpentine) Dendrolimus punctatus (Masson pine caterpillar) Dendrolimus tabulaeformis (Chinese pine caterpillar) Matsucoccus resinosa (red pine scale) Matsucoccus thunbergiana Monochamus alternatus (Japanese pine sawyer) Monochamus saltuarius (Japanese pine sawyer) Neodiprion sertifer (European pine sawfly) Pineus pini (pine woolly aphid) Thecodiplosis japonensis (pine needle gall midge) Tomicus minor (lesser pine shoot beetle) Tomicus piniperda (common pine shoot beetle) Nematodes: Bursaphelenchus xylophilus (pine wilt nematode) Trichodorus (stubby root nematodes) Fungus diseases: Armillaria mellea (armillaria root rot) Cronartium quercuum (pine-oak rust) Gibberella circinata (pitch canker) Gremmeniella abietina (Brunchorstia disease) Leptographium procerum (white pine root decline) Mycosphaerella dearnessii (brown spot needle blight) Mycosphaerella gibsonii (needle blight of pine) Mycosphaerella pini (Dothistroma blight) Sirococcus conigenus (sirococcus blight of conifers) Sphaeropsis sapinea (Sphaeropsis blight)

407	2012. National Center for Biotechnology Information. PubMed. http://www.ncbi.nlm.nih.gov/sites/entrez	[Causes allergies or is otherwise toxic to humans? No] No evidence of allergies or toxicity.
407	2012. Specialized Information Services, U.S. National Library of Medicine. TOXNET toxicology data network [online database]. National Institutes of Health, http://toxnet.nlm.nih.gov/	[Causes allergies or is otherwise toxic to humans? No] No evidence of allergies or toxicity.
408	2012. WRA Specialist. Personal Communication.	[Creates a fire hazard in natural ecosystems? Unknown]
409	2004. Kasel, S.. Restoration of former pine plantations in Australia: a review of critical ecosystem processes. School of Forest and Ecosystem Science, University of Melbourne, Creswick, Victoria http://www.forestsience.unimelb.edu.au/people/staff/sabine	[Is a shade tolerant plant at some stage of its life cycle?] "Germination of self sown <i>Pinus thunbergii</i> in coastal forest of Japan was independent of canopy openness, however seedlings older than one year were absent from unthinned stands suggesting seedlings subsequently died without additional light. There were significant increases in seedling establishment and growth with increasing canopy openness. Seedlings required a minimum canopy openness of >30% in order to survive and develop into seedlings with >40% canopy openness required to develop into saplings."
409	2012. Dave's Garden. PlantFiles: Japanese black pine, black pine - <i>Pinus thunbergii</i> . Dave's Garden, http://davesgarden.com/guides/pf/go/60103/	[Is a shade tolerant plant at some stage of its life cycle? No] Full sun.
409	2012. USDA National Resources Conservation Service. Plant fact sheet - Japanese black pine <i>Pinus thunbergii</i> Parl.. United States Department of Agriculture, http://plants.usda.gov/factsheet/pdf/fs_pith2.pdf	[Is a shade tolerant plant at some stage of its life cycle? No] Poor shade tolerance.
410	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)? Yes] " <i>Pinus thunbergii</i> grows on a wide variety of soils, generally under adverse conditions. In Japan and Korea, it typically occurs in slightly acid, loamy to sandy soils. It tolerates moderately well-drained soils."
410	2012. USDA National Resources Conservation Service. Plant fact sheet - Japanese black pine <i>Pinus thunbergii</i> Parl.. United States Department of Agriculture, http://plants.usda.gov/factsheet/pdf/fs_pith2.pdf	[Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)? Yes] <i>Pinus thunbergii</i> will grow on a wide variety of soils under adverse conditions. Medium fertility, slightly acid, loamy to sandy soils.
411	2012. Fu, L./Li,N./Elias, T.S./Mill, R.R.. Flora of China Vol. 4 Pinaceae. www.efloras.org , http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200005368	[Climbing or smothering growth habit? No] Trees to 30 m tall.
412	2012. WRA Specialist. Personal Communication.	[Forms dense thickets? Unknown]
501	2012. Fu, L./Li,N./Elias, T.S./Mill, R.R.. Flora of China Vol. 4 Pinaceae. www.efloras.org , http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200005368	[Aquatic? No] Terrestrial; tree.
502	2012. Fu, L./Li,N./Elias, T.S./Mill, R.R.. Flora of China Vol. 4 Pinaceae. www.efloras.org , http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200005368	[Grass? No] Pinaceae.
503	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Nitrogen fixing woody plant? No] Pinaceae.
504	2012. Fu, L./Li,N./Elias, T.S./Mill, R.R.. Flora of China Vol. 4 Pinaceae. www.efloras.org , http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200005368	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] Tree; woody.
601	2012. WRA Specialist. Personal Communication.	[Evidence of substantial reproductive failure in native habitat? No]
602	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Produces viable seed? Yes] "This species is easily grown from seed and transplants well. Fresh seeds require no pre-sowing stratification."
602	2012. USDA National Resources Conservation Service. Plant fact sheet - Japanese black pine <i>Pinus thunbergii</i> Parl.. United States Department of Agriculture, http://plants.usda.gov/factsheet/pdf/fs_pith2.pdf	[Produces viable seed? Yes] Grown in nurseries from seed.

603	1985. Kondo, K./Segawa, M./Yata, T.. Hybridization of <i>Pinus densiflora</i> and <i>Pinus thunbergii</i> accelerated by human interference in natural pine forest vegetation in Hiroshima Japan. <i>Phyton</i> . 45: 45-54.	[Hybridizes naturally? Yes] "The natural occurrence of hybridization between <i>Pinus densiflora</i> and <i>P. thunbergii</i> was investigated in 64 samples sites in pine forests in the environs of Hiroshima City, Japan. The appearance frequencies of <i>P. densiflora</i> , <i>P. thunbergii</i> and their hybrids were 64.4, 8.6 and 27.0%, respectively. Hybrid frequencies of more than 50% were shown in seven sites and were always(a) in formerly fire-destroyed areas or(b) close to residential areas developed in the last 30 yr and reclaimed lands of the former <i>P. thunbergii</i> habitats near the coastline as far back as the 1600s."
604	2012. WRA Specialist. Personal Communication.	[Self-compatible or apomictic? Unknown]
605	2009. Williams, C.G.. <i>Conifer reproductive biology</i> . Springer, New York	[Requires specialist pollinators? No] Wind pollinated.
606	2005. CAB International. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Reproduction by vegetative fragmentation? No] Propagate by seed.
606	2012. USDA National Resources Conservation Service. Plant fact sheet - Japanese black pine <i>Pinus thunbergii</i> Parl.. United States Department of Agriculture, http://plants.usda.gov/factsheet/pdf/fs_pith2.pdf	[Reproduction by vegetative fragmentation? No] Propagate by seed.
607	1948. Forest Service - U.S. Department of Agriculture. <i>Woody-plant seed manual No.654</i> . United States Government Printing Office, Washington D.C. http://books.google.com/books?id=kdfwAAAAMA AJ&pg=PA9&dq=Pinus+thunbergii+%2B+%22seed+dispersal%22&source=gbs_t	[Minimum generative time (years)? 3+] Commercial seed-bearing age 6 years.
607	2012. USDA National Resources Conservation Service. Plant fact sheet - Japanese black pine <i>Pinus thunbergii</i> Parl.. United States Department of Agriculture, http://plants.usda.gov/factsheet/pdf/fs_pith2.pdf	[Minimum generative time (years)? >3] After 4 or 5 years cones are produced.
701	2012. WRA Specialist. Personal Communication.	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Unknown]
702	2005. CAB International. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Propagules dispersed intentionally by people? Yes] Planted in: United Kingdom; China; Japan; Korea; Canada; United States.
702	2012. USDA National Resources Conservation Service. Plant fact sheet - Japanese black pine <i>Pinus thunbergii</i> Parl.. United States Department of Agriculture, http://plants.usda.gov/factsheet/pdf/fs_pith2.pdf	[Propagules dispersed intentionally by people? Yes] Planted along the Northeast shores of the United States.
703	2012. WRA Specialist. Personal Communication.	[Propagules likely to disperse as a produce contaminant? No] No evidence.
704	2012. Fu, L./Li,N./Elias, T.S./Mill, R.R.. <i>Flora of China Vol. 4 Pinaceae</i> . www.efloras.org , http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200005368	[Propagules adapted to wind dispersal? Yes] Winged seeds.
706	2012. Fu, L./Li,N./Elias, T.S./Mill, R.R.. <i>Flora of China Vol. 4 Pinaceae</i> . www.efloras.org , http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200005368	[Propagules bird dispersed? No] "Seed cones solitary or 2 or 3 together, shortly pedunculate, brown, conical-ovoid or ovoid, 4-6 x 3-4 cm, deciduous. Seed scales ovate-elliptic; apophyses slightly swollen, obviously cross keeled; umbo slightly concave, apex blunt. Seeds obovoid-ellipsoid, 5-7 x 2-3.5 mm; wing gray-brown, 1-1.1 cm."
707	2012. Fu, L./Li,N./Elias, T.S./Mill, R.R.. <i>Flora of China Vol. 4 Pinaceae</i> . www.efloras.org , http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200005368	[Propagules dispersed by other animals (externally)? No] "Seed cones solitary or 2 or 3 together, shortly pedunculate, brown, conical-ovoid or ovoid, 4-6 x 3-4 cm, deciduous. Seed scales ovate-elliptic; apophyses slightly swollen, obviously cross keeled; umbo slightly concave, apex blunt. Seeds obovoid-ellipsoid, 5-7 x 2-3.5 mm; wing gray-brown, 1-1.1 cm." [no means of external attachment]
708	2012. Fu, L./Li,N./Elias, T.S./Mill, R.R.. <i>Flora of China Vol. 4 Pinaceae</i> . www.efloras.org , http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=200005368	[Propagules survive passage through the gut? No] "Seed cones solitary or 2 or 3 together, shortly pedunculate, brown, conical-ovoid or ovoid, 4-6 x 3-4 cm, deciduous. Seed scales ovate-elliptic; apophyses slightly swollen, obviously cross keeled; umbo slightly concave, apex blunt. Seeds obovoid-ellipsoid, 5-7 x 2-3.5 mm; wing gray-brown, 1-1.1 cm." [unlikely to be eaten]

801	2012. USDA National Resources Conservation Service. Plant fact sheet - Japanese black pine <i>Pinus thunbergii</i> Parl.. United States Department of Agriculture, http://plants.usda.gov/factsheet/pdf/fs_pith2.pdf	[Prolific seed production (>1000/m2)? Yes] Fruiting and seed production are usually prolific. There are 34,000 seeds per pound.
802	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Evidence that a persistent propagule bank is formed (>1 yr)?] "Fresh seeds require no pre-sowing stratification. No loss of viability occurs in seeds when stored in sealed containers at room temperature for 2 years; however, storage for longer periods (seed moisture content about 5%) was detrimental to seed viability. Stratification for a short period (6 weeks) at 4°C improves germination rate of stored seed." Seed storage orthodox.
802	2012. WRA Specialist. Personal Communication.	[Evidence that a persistent propagule bank is formed (>1 yr)?] Unknown]
803	2012. WRA Specialist. Personal Communication.	[Well controlled by herbicides? Unknown]
804	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] Ability to coppice; pollard.
805	2012. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown]

Summary of Risk Traits

High Risk

- Broad environmental tolerance
- Naturalized in Oregon and Virginia
- Invasive in New York
- Numerous species in the Pinus genus are invasive
- Grows in a wide range of soil types
- Can hybridize naturally with other Pinus species
- Wind dispersed seed
- Prolific seed producer
- Able to coppice after pruning

Low Risk

- Temperate zone species
- Doesn't have spines
- Is not a parasitic plant
- Not toxic to humans or animals
- Is not shade tolerant
- Does not fix nitrogen