Taxon: Dacrycarpus dacrydioides

Family: Podocarpaceae

Common Name(s): kahikatea
New Zealand dacryberry
white pine

Synonym(s): Dacrydium excelsum D. Don
Nageia dacrydioides (A. Rich.) F. M...
Nageia excelsa (D. Don) Kuntze
Podocarpus dacrydioides A. Rich.

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 19 Dec 2014

WRA Score: 0.0 **Designation:** L **Rating:** Low Risk

Keywords: Dioecious, Tree, Slow-Growing, Wind-Pollinated, Bird-dispersed

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	n
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	n
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	n
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	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed		
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		

Qsn #	Question	Answer Option	Answer
409	Is a shade tolerant plant at some stage of its life cycle		
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		
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	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	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		
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)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
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**
	Thomas, P. 2013. Dacrycarpus dacrydioides. The IUCN Red List of Threatened Species. Version 2014.3. www.iucnredlist.org	[No evidence] "As a native tree this species is now protected from logging under the laws of New Zealand. Several populations occur within protected areas, others are on private land. The distribution of protected forest areas more or less covers the extent of occurrence as formerly occupied by this species. Natural regeneration is good where mature trees occur and is also complemented by revegetation initiatives: these measures will lead in future to an increase in area of occupancy and/or abundance."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. 2014. Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. 2014. 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**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Latitude: between 34°S and 37°S List of countries: Oceania -New Zealand - natural and planted" [Marginally subtropical]

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	**n**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"- Altitude range: 0 - 700 m - Mean annual rainfall: 700 - 3000 mm - Rainfall regime: uniform - Mean annual temperature: 9 - 16ºC - Mean maximum temperature of hottest month: 15 - 25ºC - Mean minimum temperature of coldest month: 0 - 10ºC - Absolute minimum temperature: -9 - 0ºC"
	Plants for a Future. 2014. Dacrycarpus dacrydioides. http://www.pfaf.org/user/Plant.aspx?LatinName=Dacrycarpus+dacrydioides. [Accessed 16 Dec 2014]	"USDA hardiness zone : 8-11"

204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Latitude: between 34°S and 37°S List of countries: Oceania -New Zealand - natural and planted" [Marginally subtropical. The subtropics are geographic and climate zones located roughly between the tropic circle of latitude (the Tropic of Cancer and Tropic of Capricorn) and the 38th parallel in each hemisphere.]

205	**Does the species have a history of repeated introductions outside its natural range?**	**n**
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Latitude - between 34°S and 37°S List of countries Oceania - New Zealand natural and planted"

301	**Naturalized beyond native range**	**n**
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2014. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm. [Accessed 18 Dec 2014]	No evidence

Qsn #	Question	Answer
302	Garden/amenity/disturbance weed	n
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

304	Environmental weed	n
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

305	Congeneric weed	
	Source(s)	**Notes**
	Daehler, C. C. & Baker, R. F. 2006. New Records of Naturalized and Naturalizing Plants Around Lyon Arboretum, Mānoa Valley, Oʻahu. Bishop Museum Occasional Papers 87: 3-18	[Naturalized] "This tree, native to Java, was first planted in the Arboretum in 1921 as Podocarpus cupressina and volunteers were first documented in the Lyon Arboretum 1934 annual report. It is characterized by flat, linear, dimorphic leaves0.8–1.3 cm long or ca. 0.2 cm long, the latter appressed along young, green branches (Brandis 1906: 696). The leaf size, shape, and arrangement superficially resembles some Cupressus species. The seeds are attached to red, fleshy receptacles and are presumably dispersed by birds. Naturalized plants of all life stages are found widely scattered throughout unmanaged parts of the Arboretum, but they were not observed at high densities anywhere."

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	"Tree up to 50 m. or more, trunk up to 1·5 m. diam., often fluted and buttressed at base, bark grey. Branchlets slender, drooping. Lvs of juveniles subdistichous, subpatent, narrow-linear, subfalcate, acuminate, decurrent, 3-7 × 0·5-1 mm.; of semi-adults (often with cones and seeds) seldom > 4 mm. long; of adults 1-2 mm. long, imbricating, more appressed, keeled, subtrigonous, lanceolate subulate to acuminate, with broader base."

402	Allelopathic	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Perry, N. B., Foster, L., & Jameson, P. E. 1995. Effects of podocarp extracts on lettuce seed germination and seedling growth. New Zealand Journal of Botany, 33(4): 565-568	"Table 1 Germination and hypocotyl elongation effects of podocarp extracts. Results for undiluted extracts; diluted extracts were not significantly active unless otherwise noted. * Significantly different from EtOH control, P < 0.05. ** Significantly different from EtOH control, P < 0.01. %He = %Hypocotyl elongation." [Dacrycarpus dacrydioides extracts have inhibitory properties, but the effects are not statistically significant in this study]
	Molloy, B. P. J.; Ferguson, J. D.; Fletcher, P. J. 1978: The allelopathic potential of kahikatea. A progress report. New Zealand Journal of Ecology 1:183-184	[Concentrated extracts are allelopathic. Unknown under field conditions] "To test the presence of toxic substances, watersoluble extracts were made of the fresh green leaves, bark, roots, litter, and soil associated with mature kahikatea trees. These were obtained by soaking 300 g of material overnight in 600 ml of distilled water. The effect of the supernatant of each extract and of the combined extracts was compared with that of distilled water and a nutrient solution on first-year kahikatea seedlings growing in natural daylength and at room temperature. Almost 50% of the seedlings died in the litter and combined extracts, and 100 % died in the fresh green leaf extract. This experiment was repeated and similar results were obtained. The green leaf extract in particular proved to be very toxic; in this extract seedling leaves turned brown, roots failed to grow, and death occurred within 30 days."

403	Parasitic	n
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	"Tree up to 50 m. or more, trunk up to 1·5 m. diam., often fluted and buttressed at base, bark grey."

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	Marden, M. & Phillips, C. 2010. Kahikatea - Dacrycarpus dacrydioides. icm.landcareresearch.co.nz	"Is palatable to browsing animals." ... "Damage can be caused by defoliating caterpillars, stick insects and browsing animals."

405	Toxic to animals	n
	Source(s)	**Notes**
	Plants for a Future. 2014. Dacrycarpus dacrydioides. http://www.pfaf.org/user/Plant.aspx?LatinName=Dacrycarpus+dacrydioides. [Accessed 19 Dec 2014]	"Known Hazards: None known"
	Southern Woods Nursery. 2014. Dacrycarpus dacrydioides - White Pine - Kahikatea. http://www.southernwoods.co.nz/shop/dacrycarpus-dacrydioides/. [Accessed 19 Dec 2014]	"Non-poisonous to Animals Non-poisonous to Humans"
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

Qsn #	Question	Answer
406	**Host for recognized pests and pathogens**	
	Source(s)	**Notes**
	Hüberli, D., Lutzy, B., Voss, B., Calver, M., Ormsby, M., & Garbelotto, M. 2008. Susceptibility of New Zealand flora to Phytophthora ramorum and pathogen sporulation potential: an approach based on the precautionary principle. Australasian Plant Pathology, 37(6): 615-625	"Phytophthora ramorum, the cause of sudden oak death in the westernUSAand a damaging pathogen in Europe, is a biosecurity threat of unknown magnitude to New Zealand and Australasia because of its presence in traded ornamental plants. Knowledge of potential hosts acting as carriers and of symptoms caused by the pathogen on such hosts will strengthen precautionary quarantine regulations to prevent inadvertent introductions of P. ramorum into the region." ... "Phytophthora ramorum was recovered not only from all species with visible lesions, but also from nine New Zealand spp. that were asymptomatic (Brachyglottis repanda, Corynocarpus laevigatus, Leptospermum scoparium, N. fusca, N. menziesii, Dacrycarpus dacrydioides, P. spicata, Pomaderris prunifolia, Melicytus ramiflorus)."

407	**Causes allergies or is otherwise toxic to humans**	**n**
	Source(s)	**Notes**
	Plants for a Future. 2014. Dacrycarpus dacrydioides. http://www.pfaf.org/user/Plant.aspx?LatinName=Dacrycarpus+dacrydioides. [Accessed 16 Dec 2014]	[No evidence] "Known Hazards: None known" ... "Fruit - raw. A sweet taste[128, 153], it is palatable but with a slightly oily taste [173]. Also used as a masticatory[183] (this last report probably refers to the use of the resin). A resin is obtained from the tree[153], it is used as a chewing gum[173]."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence in genus or family

408	**Creates a fire hazard in natural ecosystems**	
	Source(s)	**Notes**
	Fogarty, L.G. 2001. A flammability guide for some common New Zealand native tree and shrub species. Forest Research Bulletin No. 197, Forest and Rural Fire Scientific and Technical Series, Report No. 6. New Zealand Fire Service Commission and National Rural Fire Authority, Wellington.	[Could possibly increase fire hazard] "Podocarpus dacrydioides" ... "Flammability class: Moderate" ... "Comments: Flammability may decrease with age. Mature trees often have dead branches that ignite easily and provide embers for spot fires."
	New Zealand Plant Conservation Network. 2014. Flora Details - Dacrycarpus dacrydioides. http://www.nzpcn.org.nz/flora_details.aspx?ID=2099. [Accessed 16 Dec 2014]	[Occurs in swamp forest. Less prone to fire] "Habitat: Lowland forest, formerly dominant on frequently flooded, and/or poorly drained alluvial soils. Occasionally extends into lower montane forest. Once the dominant tree of a distinct swamp forest type all but extinct in the North Island - the best examples remain on the West Coast of the South Island."

409	**Is a shade tolerant plant at some stage of its life cycle**	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Smale, M. C., Ross, C. W., & Arnold, G. C. 2005. Vegetation recovery in rural kahikatea (Dacrycarpus dacrydioides) forest fragments in the Waikato region, New Zealand, following retirement from grazing. New Zealand Journal of Ecology, 29(2): 261-269	"Major canopy and subcanopy species in these fragments comprise a mixture of relatively shadeintolerant (Dacrycarpus, Laurelia, Alectryon) and tolerant (Beilschmiedia, Melicytus, Hedycarya) species."
	Smale, M. C. 1984. White Pine Bush & an alluvial kahikatea (Dacrycarpus dacrydioides) forest remnant, eastern Bay of Plenty, New Zealand. New Zealand Journal of Botany, 22(2): 201-206	"Regeneration, although occurring, is largely ineffective, with relatively shade-intolerant seedlings generally succumbing to vigorous angiosperm competition."
	Ebbett, R. L., & Ogden, J. 1998. Comparative seedling growth of five endemic New Zealand podocarp species under different light regimes. New Zealand Journal of Botany, 36(2): 189-201	[Light demanding] "Totara and kahikatea are considered to be light demanding and have the ability to respond to increased light levels " ... "Bartlett (1984) suggested that kahikatea may establish and grow under a canopy but not at heavily shaded sites, with the highest height growth response observed when there was more than 40% unobstructed sky."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Marden, M. & Phillips, C. 2010. Kahikatea - Dacrycarpus dacrydioides. icm.landcareresearch.co.nz	"Preferred soils - Wide range of soils from heavy clays to well drained pumice and alluvial soil"
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Soil descriptors - Soil texture: light; medium; heavy - Soil drainage: free; impeded; seasonally waterlogged - Soil reaction: acid"

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	"Tree up to 50 m. or more, trunk up to 1·5 m. diam., often fluted and buttressed at base, bark grey."

412	Forms dense thickets	y
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	" D. dacrydioides once formed pure dense stands in swamp forests and on alluvial soils..."
	Wilcox, F. J. 2010. Vegetation recovery and management of kahikatea (Dacrycarpus dacrydioides)-dominated forest remnants in the Waikato Region. MSc Thesis. University of Waikato, Hamilton, New Zealand	"On alluvial plains and lowland areas, kahikatea trees may initially form dense mono-specific stands where forest has been subjected to large-scale disturbance by way of flooding and/or wind throw (Smale, 1984; Whaley et al., 1997)..."

Qsn #	Question	Answer
501	**Aquatic**	**n**
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	[Terrestrial Tree] "DIST.: N., S., St. Lowland forest, often dominant in swamp forest."

502	**Grass**	**n**
	Source(s)	**Notes**
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 16 Dec 2014]	Podocarpaceae

503	**Nitrogen fixing woody plant**	**n**
	Source(s)	**Notes**
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 16 Dec 2014]	Podocarpaceae

504	**Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)**	**n**
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	"Tree up to 50 m. or more, trunk up to 1·5 m. diam., often fluted and buttressed at base, bark grey."

601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**
	Thomas, P. 2013. Dacrycarpus dacrydioides. The IUCN Red List of Threatened Species. Version 2014.3. www.iucnredlist.org	"This species, and its main forest type, has undergone a significant decline over the last several centuries. However, the majority of this decline pre-dates the period of this assessment. In the absence of any current or ongoing decline an assessment of Least Concern is the most appropriate. "

602	**Produces viable seed**	**y**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Williams, P. A., & Karl, B. J. 1996. Fleshy fruits of indigenous and adventive plants in the diet of birds in forest remnants, Nelson, New Zealand. New Zealand Journal of Ecology, 20(2): 127-145	"A requirement for a cold period (stratification) to ensure germination is a characteristic of many temperate species. A list from an unpublished Conservation New Zealand pamphlet (Anon. N.D. refers to the following as belonging to this group-" [Includes Dacrycarpus dacrydioides]
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"In common with New Zealand's other podocarp species, D. dacrydioides is dioecious, with periodic mass fruiting (at intervals of 2-4 years) and prolific germination of ephemeral seedlings subject to summer desiccation. Seedlings are easy to raise in the nursery and persistent when planted out, either on sheltered sites for restorative interplanting in logged forest and scrub, or in full light on warm, moist, fertile lowland sites."

603	Hybridizes naturally	
	Source(s)	**Notes**
	Farjon, A. 2010. A Handbook of the World's Conifers. Volume 2. Koninklijke Brill NV, Leiden, The Netherlands	[Unknown. No hybrids documented] "9 species"

604	Self-compatible or apomictic	n
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"In common with New Zealand's other podocarp species, D. dacrydioides is dioecious, with periodic mass fruiting (at intervals of 2-4 years) and prolific germination of ephemeral seedlings subject to summer desiccation"
	Plants for a Future. 2014. Dacrycarpus dacrydioides. http://www.pfaf.org/user/Plant.aspx?LatinName=Dacrycarpus+dacrydioides. [Accessed 16 Dec 2014]	"The flowers are dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required) and are pollinated by Wind.The plant is not self-fertile. "

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Tomlinson, P. B., Braggins, J. E., & Rattenbury, J. A. 1991. Pollination drop in relation to cone morphology in Podocarpaceae: a novel reproductive mechanism. American Journal of Botany, 78(9): 1289-1303	"Pollen transfer in conifers is by wind but is evidently inefficient because it requires large amounts of pollen to be dispersed randomly to a very small target."
	Plants for a Future. 2014. Dacrycarpus dacrydioides. http://www.pfaf.org/user/Plant.aspx?LatinName=Dacrycarpus+dacrydioides. [Accessed 16 Dec 2014]	"The flowers are dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required) and are pollinated by Wind."

Qsn #	Question	Answer
606	**Reproduction by vegetative fragmentation**	**n**
	Source(s)	**Notes**
	New Zealand Plant Conservation Network. 2014. Flora Details - Dacrycarpus dacrydioides. http://www.nzpcn.org.nz/flora_details.aspx?ID=2099. [Accessed 16 Dec 2014]	[No evidence] "Easily grown from fresh seed. Can be grown from hard-wood cuttings but rather slow to strike."

607	**Minimum generative time (years)**	**>3**
	Source(s)	**Notes**
	Taylor, A. 2011. Small Scale Propagation of Native Trees. A Simple Guide and Examples. 3rd Edition. Surveying The Bay Limited, Hastings, New Zealand	"Height at maturity up to 60 metres" ... "Kahikatea are reasonably slow growing and will take at least two years before they can be planted out – preferably under an established canopy."
	Bergin, D. and Kimberley, M. 2011. Performance of Planted Native Conifer Trees. Technical Article No. 10.2. Tãne's Tree Trust. Hamilton, NZ	"Mean annual height increment for the faster growing conifers kauri and kahikatea exceeds 30 cm for kauri and kahikatea, 20 cm for totara, and around 15 cm for the slowest growing conifers miro and matai." ... "Table 3: Predicted height (m) and DBH (cm) for eight native conifer species from the growth models developed for each species based on the assessment of native plantations in the nationwide survey." [Kahikatea = 3.9 m height at 10 years age]

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	[Zoochorous. No means of external attachment] "Seeds solitary, terminal on short branchlets, upper 2-3 lvs distinct from lower, forming a receptacle, red, swollen and succulent in fr. Seeds 4-5 mm. long, broadly ovoid, hardly apiculate, black, nutlike. "

702	**Propagules dispersed intentionally by people**	**y**
	Source(s)	**Notes**
	New Zealand Plant Conservation Network. 2014. Flora Details - Dacrycarpus dacrydioides. http://www.nzpcn.org.nz/flora_details.aspx?ID=2099. [Accessed 16 Dec 2014]	"Commonly cultivated and frequently sold by most commercial nurseries and outlets. A very popular garden tree. A form with distinctly glaucous foliage is occasionally on offer." [Commonly cultivated in New Zealand. Less common elsewhere]

703	**Propagules likely to disperse as a produce contaminant**	**n**
	Source(s)	**Notes**
	Farjon, A. 2010. A Handbook of the World's Conifers. Volume 2. Koninklijke Brill NV, Leiden, The Netherlands	[Unlikely. Dioecious species with zoochorous seeds] "Seeds solitary, terminal on short branchlets, upper 2-3 lvs distinct from lower, forming a receptacle, red, swollen and succulent in fr. Seeds 4-5 mm. long, broadly ovoid, hardly apiculate, black, nutlike. "

704	**Propagules adapted to wind dispersal**	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Stella, L. 2002. Site Suitability of Harts Creek Wildlife Reserve, Te Waihora/Lake Ellesmere, New Zealand, for Restoration of Kahikatea (Dacrycarpus dacrydioides) Forest. PhD Dissertation. University of Canterbury., Christchurch, NZ	[Possibly dispersed short distances by wind] "Dispersal of seed by wind is mostly within 10 m, with a maximum of 40 m (Beveridge 1964 in Norton, 1991 p.465). The main mode of kahikatea seed dispersal is by frugiverous birds such as kereru, bellbirds, starlings, blackbirds and song thrushes (Burrows, 1994; Pratt, 1999; D. Barwick, pers. comm.)."
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	[Zoochorous] "Seeds solitary, terminal on short branchlets, upper 2-3 lvs distinct from lower, forming a receptacle, red, swollen and succulent in fr. Seeds 4-5 mm. long, broadly ovoid, hardly apiculate, black, nutlike. "

705	Propagules water dispersed	n
	Source(s)	**Notes**
	Stella, L. 2002. Site Suitability of Harts Creek Wildlife Reserve, Te Waihora/Lake Ellesmere, New Zealand, for Restoration of Kahikatea (Dacrycarpus dacrydioides) Forest. PhD Dissertation. University of Canterbury., Christchurch, NZ	"Dispersal of seed by wind is mostly within 10 m, with a maximum of 40 m (Beveridge 1964 in Norton, 1991 p.465). The main mode of kahikatea seed dispersal is by frugiverous birds such as kereru, bellbirds, starlings, blackbirds and song thrushes (Burrows, 1994; Pratt, 1999; D. Barwick, pers. comm.)."

706	Propagules bird dispersed	y
	Source(s)	**Notes**
	McEwen, W.M. 1978. The food of the New Zealand pigeon. New Zealand Journal of Ecology, 1: 99-108	"As well as miro, pigeons eat the fruit of other podocarps such as kahikatea (Dacrycarpus dacrydioides), matai (Podocarpus spicatus) and rimu (Dacrydium cupressinum)."
	Williams, P. A., & Karl, B. J. 1996. Fleshy fruits of indigenous and adventive plants in the diet of birds in forest remnants, Nelson, New Zealand. New Zealand Journal of Ecology, 20(2): 127-145	"Field observations at Eves and Faulkners indicate that their fruit diets were dominated by D. dacrydioides, P. hallii, and Prumnopitys taxifolia."
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"Landowners, however, are often appreciative of the amenity and heritage value of forest with D. dacrydioides, which is an important food source for native birds in seasons of mass fruiting."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Stella, L. 2002. Site Suitability of Harts Creek Wildlife Reserve, Te Waihora/Lake Ellesmere, New Zealand, for Restoration of Kahikatea (Dacrycarpus dacrydioides) Forest. PhD Dissertation. University of Canterbury., Christchurch, NZ	[Adapted for consumption and internal dispersal] "The main mode of kahikatea seed dispersal is by frugiverous birds such as kereru, bellbirds, starlings, blackbirds and song thrushes (Burrows, 1994; Pratt, 1999; D. Barwick, pers. comm.)."

708	Propagules survive passage through the gut	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Stella, L. 2002. Site Suitability of Harts Creek Wildlife Reserve, Te Waihora/Lake Ellesmere, New Zealand, for Restoration of Kahikatea (Dacrycarpus dacrydioides) Forest. PhD Dissertation. University of Canterbury., Christchurch, NZ	"The main mode of kahikatea seed dispersal is by frugiverous birds such as kereru, bellbirds, starlings, blackbirds and song thrushes (Burrows, 1994; Pratt, 1999; D. Barwick, pers. comm.). Seeds have a relatively short residence time in the gut of birds (Burrows, 1994) and are usually excreted under food-providing trees or under favourite perches, such as open-branched big trees (Norton, 1991)."

801	Prolific seed production (>1000/m2)	
	Source(s)	**Notes**
	Stella, L. 2002. Site Suitability of Harts Creek Wildlife Reserve, Te Waihora/Lake Ellesmere, New Zealand, for Restoration of Kahikatea (Dacrycarpus dacrydioides) Forest. PhD Dissertation. University of Canterbury., Christchurch, NZ	[Numbers per square meter unknown] "Periodic mass seeding of kahikatea maximizes the chance of colonising large canopy gaps exposed by stochastic disturbance events."

802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	**Notes**
	Moles, A. T., Hodson, D. W. & Webb, C. J. 2000, Seed size and shape and persistence in the soil in the New Zealand flora. Oikos, 89: 541–545	"Table 1. Seed mass and variance of diaspore dimensions (transformed so that length is unity) for all species used in this study, showing persistence category (persistentseeds persist in the soil for at least 2 yr" [Dacrycarpus dacrydioides = Species with persistent seeds]
	Fountain, D. W., & Outred, H. A. 1991. Germination requirements of New Zealand native plants: a review. New Zealand Journal of Botany, 29(3): 311-316	"Thus, while seeds of Dacrycarpus dacrydioides have been shown to be recalcitrant, the long lag time before seedling emergence of about 110 days suggests further embryo development after seed fall."
	Stella, L. 2002. Site Suitability of Harts Creek Wildlife Reserve, Te Waihora/Lake Ellesmere, New Zealand, for Restoration of Kahikatea (Dacrycarpus dacrydioides) Forest. PhD Dissertation. University of Canterbury., Christchurch, NZ	[Buried seeds may be able to persist for 2 years] "Burrows (1999, p.18) found drying of kahikatea seed for 7 months reduced their viability and that seed buried at 2 cm depth could remain dormant for 2 winters."

803	Well controlled by herbicides	
	Source(s)	**Notes**
	WRA Specialist. 2014. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species. No evidence that herbicides have been used on this species.

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	**Notes**
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	Unknown

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	

Qsn #	Question	Answer
	Source(s)	**Notes**
	WRA Specialist. 2014. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Can grow in temperate to subtropical climates
• Possibly allelopathic
• Moderately flammable
• Tolerates many soil types
• Forms dense stands in native range
• Seeds dispersed by birds & intentionally by people
• Seeds may persist in the soil for 2 years

Low Risk Traits
• No reports of invasiveness or naturalization, but no evidence of widespread introduction outside native range
• Unarmed (no spines, thorns or burrs)
• Palatable to browsing animals
• Non-toxic
• Ornamental
• Dioecious
• Not reported to spread vegetatively
• Long time to reproductive maturity