

Family: *Pittosporaceae*

Taxon: *Pittosporum undulatum*

Synonym: NA

Common Name: Australian cheesewood
Victorian box
sweet pittosporum

Questionnaire :	current 20090513	Assessor:	Chuck Chimera	Designation: H(HPWRA)
Status:	Assessor Approved	Data Entry Person:	HPWRA OrgData	WRA Score 10
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)	High
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	y
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)	
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)	y
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	n
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		y=1, n=0	y
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	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	
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	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)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)	y=1, n=-1	
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
803	Well controlled by herbicides	y=-1, n=1	y
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 10

Supporting Data:

101	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Is the species highly domesticated? No] No evidence
102	2011. WRA Specialist. Personal Communication.	NA
103	2011. WRA Specialist. Personal Communication.	NA
201	1981. Gleadow, R.M./Ashton, D.H. . Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. I. Invasion Patterns and Plant Morphology. Australian Journal of Botany. 29(6): 705-720.	[Species suited to tropical or subtropical climate(s) 2-high] "... <i>P. undulatum</i> can exist in a wide range of habitats of the mild, humid and subhumid climatic zones."
201	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Species suited to tropical or subtropical climate(s) 2-high] "native range [Australia] New South Wales, Queensland, Tasmania, Victoria"
202	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Quality of climate match data? 2-high] "native range [Australia] New South Wales, Queensland, Tasmania, Victoria"
203	1996. Mullett, T.L... Ecological Aspects of Sweet <i>Pittosporum</i> (<i>Pittosporum undulatum</i> Vent.): Implications for Control & Management. Pp. 489-492 in Shepherd, R.C.H. (ed.). 11th Australian Weeds Conference Proceedings. Weed Science Society of Victoria Inc.,	[Broad climate suitability (environmental versatility)? Yes] "Sweet <i>pittosporum</i> (<i>Pittosporum undulatum</i> Vent.) is one of an increasing number of native species acting as an environmental weed in habitats outside its natural ecological range (Mullett and Simmons 1995). Prior to European settlement, the distribution of <i>P. undulatum</i> was believed to encompass a range of habitat types including wet and dry forest environments, riparian and coastal communities and dry rainforests occurring along the eastern seaboard of south-east Australia (Gleadow and Ashton 1981, Short 1987). This <input type="checkbox"/> pre adaption <input type="checkbox"/> to a range of habitat types is likely to be an important component of the species success in invaded habitats west of its natural range in Australia, and also in many locations overseas where the species functions as a serious environmental weed."
203	1999. Mullett, T.L... Some characteristics of a native environmental weed: <i>Pittosporum undulatum</i> : Pp. 592-595 in Bishop, A.C. et al. (eds.). 12th Australian Weeds Conference Proceedings. Tasmanian Weed Society,	[Broad climate suitability (environmental versatility)? Yes] "Invading populations of <i>Pittosporum undulatum</i> Vent. (Sweet <i>Pittosporum</i>) impact on the floristic and structural composition of invaded plant communities. This plastic, adaptable species is able to colonise a range of environments and is arguably the most successful native weed in south east Australia...Early botanists (Maiden 1889) and gardening experts (Oakman 1964) enthusiastically advocated planting of <i>P. undulatum</i> for its ornamental qualities and its adaptability to a range of climatic and edaphic conditions. Ironically, the same adaptive and hardy features that so enthused early proponents of this species are now regarded by conservation managers as the very features that make invasive populations of <i>P. undulatum</i> so difficult to manage in invaded remnant vegetation... <i>P. undulatum</i> is able to adapt its phenotypic expression to a range of environments and environmental conditions. For a species thought to have evolved in or near wet forests it adapts extremely well to invaded coastal and dry forest environments. The successful invasion of a diverse range of vegetation complexes on other continents and islands throughout the temperate, sub-tropical and tropical zones (Cooper 1956; Goodland and Healey 1996) is further evidence of the species adaptability and broad ecological amplitude."
204	1981. Gleadow, R.M./Ashton, D.H. . Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. I. Invasion Patterns and Plant Morphology. Australian Journal of Botany. 29(6): 705-720.	[Native or naturalized in regions with tropical or subtropical climates? Yes] " <i>Pittosporum undulatum</i> Vent. (sweet <i>pittosporum</i>) has become a notorious invader of forests in the montane tropics, subtropics and warm temperate areas of the northern hemisphere. It is well known in Jamaica (P. J. Grubb, personal communication), Hawaii, Bermuda (Cooper 1956) and the Canary Islands (C. Humphries, personal communication)."
205	1996. Goodland, T./Healey, J.R.. The invasion of Jamaican montane rainforests by the Australian tree <i>Pittosporum undulatum</i> . School of Agricultural and Forest Sciences, University of Wales, Bangor, UK http://pages.bangor.ac.uk/~afs101/iwpt/pittorep.pdf	[Does the species have a history of repeated introductions outside its natural range? Yes] "We have found reports of <i>Pittosporum undulatum</i> spreading through forest and scrub in fourteen countries, in montane areas of the tropics, sub-tropics and warm temperate areas. Additionally, it is or has been cultivated in Chile, Columbia, Bolivia, France, Israel, China, India (Cooper 1956), California (P.J. Bellingham, pers. comm., 1994) as well as milder parts of the British Isles (Bean 1976). <i>P. undulatum</i> is probably the most widely cultivated <i>Pittosporum</i> species (Cooper 1956). There has been quite recent interest in the use of <i>P. undulatum</i> as a plantation tree in Columbia (Montero & Estevez 1983)."

301	1981. Gleadow, R.M./Ashton, D.H. . Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. I. Invasion Patterns and Plant Morphology. Australian Journal of Botany. 29(6): 705-720.	[Naturalized beyond native range? Yes] " <i>Pittosporum undulatum</i> Vent. (sweet pittosporum) has become a notorious invader of forests in the montane tropics, subtropics and warm temperate areas of the northern hemisphere. It is well known in Jamaica (P. J. Grubb, personal communication), Hawaii, Bermuda (Cooper 1956) and the Canary Islands (C. Humphries, personal communication). It is also spreading in New Zealand (W. R. Sykes, personal communication) and on Lord Howe and Norfolk Islands (Turner et al. 1968). In Australia it has spread beyond its 'native' habitat (Fig. 1) and is now well established in the Melbourne area, on the Otway Coast and in Portland in western Victoria (Fig. 1). It has recently appeared in forest on the outskirts of Albany in Western Australia and on King Island in Bass Strait (Winifred M. Curtis, personal communication)."
301	1992. Manders, P.T./Richardson, D.M.,. Colonization of Cape fynbos communities by forest species. Forest Ecology and Management. 48: 277–293.	[Naturalized beyond native range? Yes] South Africa
301	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Naturalized beyond native range? Yes] "cultivated and now naturalized in disturbed mesic forest, 500-1,200 m" [Hawaiian Islands]
301	2003. Howell, J.. <i>Pittosporum undulatum</i> as a case study for native species that change range – how to avoid inappropriate responses?. Cunninghamia. 8(1): 153-155.	[Naturalized beyond native range? Yes] " <i>Pittosporum undulatum</i> Vent. (family Pittosporaceae), known as Sweet Pittosporum or simply Pittosporum, is a small tree native to certain moist forests and woodlands on fertile soils on the coast and nearby ranges in southeastern Australia. Its natural range extends from southern Queensland (Bailey 1899) to eastern Victoria. At the western end of its range it was recorded 'in rocky places about Western Port' by Mueller in 1860 (Bentham & Mueller 1863). In recent years, concern about its spread particularly in Victoria (e.g. Gleadow & Ashton 1981) has seen it branded as an 'environmental weed' for the whole of southeastern Australia (e.g. Blood 2001, Mullett 2000). It is also now reported as a weed in South Australia, Tasmania and Western Australia, presumably as a consequence of horticultural plantings (Blood 2001). However, in the Sydney region, calling it a weed has put at risk scarce remnants of vegetation where it is native."
301	2005. Bellingham, P.J., Tanner, E.V.J./Healey, J.R.. Hurricane disturbance accelerates invasion by the alien tree <i>Pittosporum undulatum</i> in Jamaican montane rain forests. Journal of Vegetation Science. 16: 675-684.	[Naturalized beyond native range? Yes] " <i>Pittosporum undulatum</i> has become an important invasive tree in Jamaican montane rain forests during the last 30 years. Although introduced near the forest in the late 1800s, it was not reported in the forests in the early 20th century (Shreve 1914). Its presence within the native forests was first noted in 1973, where it had colonized alongside man-made trails (Grubb & Tanner 1976). By 2004 it had become a widespread invader in the forests, found up to 5.9 km from its point of introduction and > 2 km from the nearest trails. Seedlings noted in the early 1970s are now established trees and it is now locally a substantial component of stand basal area (Fig. 1b). Its increasing dominance of stands is apparent in its rapid increase in basal area over 14 years in widespread plots (Fig. 2b; Lundholm & Larson 2004)."
301	2007. Guix, J.C.. The role of alien plants in the composition of fruit-eating bird assemblages in Brazilian urban ecosystems. Orsis. 22: 87-104.	[Naturalized beyond native range? Yes] "Between 1985 and 2004, 91 wild fruit eating bird species were studied in 11 urban areas of Brazil...The alien fleshy fruiting plant species that most successfully colonized urban environments were: <i>Ficus microcarpa</i> , <i>Morus nigra</i> (Moraceae), <i>Eriobotrya japonica</i> (Rosaceae) and <i>Pittosporum undulatum</i> (Pittosporaceae)."
301	2010. Hortal, J./Borges, P.A.V. et al.. Assessing the areas under risk of invasion within islands through potential distribution modelling: The case of <i>Pittosporum undulatum</i> in São Miguel, Azores. Journal for Nature Conservation. 18(4): 247-257.	[Naturalized beyond native range? Yes] "Non-indigenous plant species have been frequently reported as successful invaders in island environments, changing plant community composition and structure. This is the case of the sweet pittosporum (<i>Pittosporum undulatum</i>), native from Australia, which is one of the most successful plant invaders in the Azores archipelago."
301	2011. Lourenc, P./Medeiros, V./Gil, A./Silva, L.. Distribution, habitat and biomass of <i>Pittosporum undulatum</i> , the most important woody plant invader in the Azores Archipelago. Forest Ecology and Management. 262: 178–187.	[Naturalized beyond native range? Yes] " <i>Pittosporum undulatum</i> Ventenat (Pittosporaceae) is a tree or shrub native to Australia introduced in the Azores Islands in the 19th century, presently naturalized in the nine islands."
302	2005. Bellingham, P.J., Tanner, E.V.J./Healey, J.R.. Hurricane disturbance accelerates invasion by the alien tree <i>Pittosporum undulatum</i> in Jamaican montane rain forests. Journal of Vegetation Science. 16: 675-684.	[Garden/amenity/disturbance weed? A disturbance adapted plant with ecological impacts. See 3.04] "Questions: Do past disturbance, soil nutrients, or species diversity predict the invasion success of the alien tree <i>Pittosporum undulatum</i> in an island montane rain forest? What are the consequences of its invasion for forest composition and species diversity? ... Conclusions: There are no obvious functional attributes of <i>Pittosporum</i> unrepresented in the native tree flora although it has high photosynthetic efficiency compared with native trees. More widespread invasion of these forests by <i>Pittosporum</i> seems inevitable since hurricanes, which accelerated the invasion, affect these forests frequently."

303	2011. WRA Specialist. Personal Communication. [Agricultural/forestry/horticultural weed? No] An environmental weed. See 3.04	
304	1981. Gleadow, R.M./Ashton, D.H. . Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. I. Invasion Patterns and Plant Morphology. Australian Journal of Botany. 29(6): 705-720.	[Environmental weed? Yes] " <i>Pittosporum undulatum</i> is invading eucalypt open forests in south-central Victoria, 200 km west of its native habitat in eastern Australia. This is due to horticultural plantings of <i>P. undulatum</i> and to the suppression of wildfires: it has thin bark and is killed by fires which most eucalypts can survive. Near Melbourne, <i>P. undulatum</i> preferentially establishes around the butts of eucalypts and other established trees although in denser forests this clumping is not so obvious. Seedlings of other weed species such as <i>Ilex aquifolium</i> and <i>Cotoneaster pannosa</i> similarly aggregate around established shrubs and trees. Classification of quadrats by monothetic division showed <i>P. undulatum</i> to be the most important species in the community. The weedy nature of <i>P. undulatum</i> is clear from its rapid dispersal, early seed production and fast growth. The dense canopy dramatically reduces the light intensity and completely suppresses the original sclerophyllous understorey: only <i>Gahnia radula</i> remains. Soil beneath the canopy is fertile and the litter is high in nutrients but bioassays indicate that inhibitors may be present. The root system is variable, depending on soil texture and compaction. The invasion of forest remnants by <i>P. undulatum</i> and other weeds is threatening the survival of the eucalypt forests in urban areas."
304	1982. Gleadow, R.M. . Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. II. Dispersal, Germination and Establishment. Australian Journal of Botany. 30(2): 185-198.	[Environmental weed? Yes] " <i>P. undulatum</i> is an aggressive invader of eucalypt forests despite the poor survival of the initial colonizers. The formation of a regeneration niche ensures the survival of succeeding generations. Consequently, <i>P. undulatum</i> is a permanent threat to the Victorian vegetation."
304	1996. Goodland, T./Healey, J.R.. The invasion of Jamaican montane rainforests by the Australian tree <i>Pittosporum undulatum</i> . School of Agricultural and Forest Sciences, University of Wales, Bangor, UK http://pages.bangor.ac.uk/~afs101/iwpt/pittorep.pdf	[Environmental weed? Yes] " <i>P. undulatum</i> on the floor of the gully may live for decades as even severe fires usually jump these areas. In the past it was only a minor component of open, grassy, tall forests but is now common and shades out almost everything underneath. It is the most abundant of the several rainforest species invading bushland on shales and sandstones."
304	1996. Ramos, J.E.. Introduction of exotic tree species as a threat to the Azores bullfinch population. Journal of Applied Ecology. 33: 710-722.	[Environmental weed? Yes] " <i>The Azores bullfinch's</i> monthly density was much higher in laurel forest than in exotic forests (<i>Cryptomeria japonica</i> and <i>Pittosporum undulatum</i>)."
304	1997. Rose, S./Fairweather, P.G.. Changes in Floristic Composition of Urban Bushland Invaded by <i>Pittosporum undulatum</i> in Northern Sydney, Australia. Australian Journal of Botany. 45(1): 123-149.	[Environmental weed? Yes] " <i>Overall community pattern was correlated with abundance of P. undulatum, fire and human disturbance. Relative cover of P. undulatum was found to be significantly correlated with increased proportions of exotic species and reduced native species richness and diversity. While most exotic species were concentrated within 30 m of the suburban edge, it is suggested that most management effort should be directed at those exotic species that commonly establish throughout bushland remnants. The study also provided an opportunity to test the application of the multivariate software package PRIMER in assessing environmental impact on vegetation communities.</i> "
304	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Environmental weed? Yes] " <i>This tree is a successful gap colonizer and eliminates native vegetation by the low and dense canopies, shading out almost all other species.</i> "
304	2010. Hortal, J./Borges, P.A.V. et al.. Assessing the areas under risk of invasion within islands through potential distribution modelling: The case of <i>Pittosporum undulatum</i> in São Miguel, Azores. Journal for Nature Conservation. 18(4): 247-257.	[Environmental weed? Yes] " <i>its extreme ability to outcompete the Azorean native forest species makes it also one of the most important (if not the most important) threat for the species inhabiting the very last remnants of the original low-altitude native forests that are now under protection. A dramatic example of this process is Graciosa Island (also in the Azores), where sweet pittosporum is taking over the very last remains of Morella faya-dominated forest. The extent of the threats imposed by such dramatic replacement of the native forest is evidenced by the role played by this invader in the decline of the populations of the only Azorean endemic bird species, the Azorean bullfinch (Priolo, Phyrula murina Godman) (Ramos 1996). This species is not able to feed on P. undulatum forests because their high density and dense cover limit the growth of the ground and herbaceous plants the bullfinch feeds from (Ramos 1995)...According to a recent evaluation of the Top 100 invasive species in Macaronesia, sweet pittosporum is considered invasive also in Madeira and the Canary islands, and ranked 8th in a total of 195 evaluated species (Silva et al.2008). In the Azores, M. faya has been largely replaced by P. undulatum (Palhinha et al. 1942; Palhinha 1944; Machado 1946; Ricardo et al.1977; Schaefer 2003), altering the natural transition between the native plant communities common between 300 and 600 m of altitude (Sjoˆgren 1973).</i> "

305	2004. USDA Forest Service. State and Private Forestry - Pacific Southwest Region: Forest Health Conditions in Hawaii – 2004. http://www.fs.fed.us/r5/spf/publications/foresthealth/hawaii_2004.pdf	[Congeneric weed? Yes] "Table 2. Top Invasive Plant Species Controlled by Island Invasive Species Committees in Hawaii in 2004" [Pittosporum viridiflorum targeted for eradication due to potential for becoming an environmental weed]
401	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Produces spines, thorns or burrs? No] "A glabrous bushy tree of 4-14 m height, with a grey bark and a dense pyramidal crown. Leaves are radiating at the ends of branches, are elliptic-oblong, 6-14 cm long and 3-5 cm wide, dark green above and paler beneath."
402	1981. Gleadow, R.M./Ashton, D.H .. Invasion by Pittosporum undulatum of the Forests of Central Victoria. I. Invasion Patterns and Plant Morphology. Australian Journal of Botany. 29(6): 705-720.	[Allelopathic? No] "The foliage contains many oils, resins and saponins which may be allelopathic (Power and Tutin 1906; Cornforth and Earl 1938; Cole et al. 1955; Beckworth et al. 1956; Rice 1974); therefore, we tested the litter and leachates from the foliage of Pittosporum undulatum for allelopathy. Leaf litter placed under filter papers in petri dishes significantly inhibited the germination (expressed as percentage of control) of several eucalypt species; e.g, germination of E. obliqua, E. melliodora and E. goniocalyx was 47.1.g.l and 48.3%. Wheat embryo bioassays (Milborrow 1967) of methanolic leaf extracts, developed on paper chromatograms in iso-propanolammonia- water (10/1/1, v/v/v), also showed that an inhibitor was present (Fig. 11); however, no demonstrable inhibitory effects, other than that expected from deep shade, have been shown under canopies in the field."
402	2000. Tunbridge, A./Simmons, D./Adams, R.. Allelopathic effects of Sweet Pittosporum undulatum Vent. on the germination of selected native plant species. Victorian Naturalist. 117(2): 44-50.	[Allelopathic? No] "The successful invasion of Pittosporum undulatum, and displacement of native understorey plant species has been partially attributed to allelopathic effects. This study examined the effects of Pittosporum leaf extract on the germination of Acacia spp., Eucalyptus viminalis subsp. pryoriana, Leptospermum continentale, Kunzea ericoides, Poa morrisii, Triticum sp., Ozothamnus ferrugineus, and Pittosporum undulatum. No germination was recorded for the latter two species for either treated or untreated seeds. Only Poa morrisii showed suppression of germination, while treatment with leaf extract increased germination in Eucalyptus. The allelopathic effects recorded for the other species examined are insufficient to explain the decline in native species cover and diversity under Pittosporum canopies. The most likely explanation for the successful invasion of Pittosporum is the species' competitive ability rather than any allelopathic effect."
403	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Parasitic? No] "A glabrous bushy tree of 4-14 m height, with a grey bark and a dense pyramidal crown."
404	1996. Goodland, T./Healey, J.R.. The invasion of Jamaican montane rainforests by the Australian tree Pittosporum undulatum. School of Agricultural and Forest Sciences, University of Wales, Bangor, UK http://pages.bangor.ac.uk/~afs101/iwpt/pittorep.pdf	[Unpalatable to grazing animals? No] "P. undulatum has a wide distribution on St Helena where it has had considerable value as a source of fodder...Fodder. In St Helena, P. undulatum is pollarded and fed to penned goats and cattle. It is said to make good fodder (Q. Cronk, pers. comm., 1986), which is rather surprising considering its rather coriaceous leaves, with high levels of secondary compounds, including sapogenins (Higuchi et al. 1983)."
405	1996. Goodland, T./Healey, J.R.. The invasion of Jamaican montane rainforests by the Australian tree Pittosporum undulatum. School of Agricultural and Forest Sciences, University of Wales, Bangor, UK http://pages.bangor.ac.uk/~afs101/iwpt/pittorep.pdf	[Toxic to animals? No] "P. undulatum has a wide distribution on St Helena where it has had considerable value as a source of fodder...Fodder. In St Helena, P. undulatum is pollarded and fed to penned goats and cattle. It is said to make good fodder (Q. Cronk, pers. comm., 1986), which is rather surprising considering its rather coriaceous leaves, with high levels of secondary compounds, including sapogenins (Higuchi et al. 1983)."
405	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Toxic to animals? No] No evidence
406	2006. Hüberli, D./Wilkinson, C./Smith, M.A./Meshriy, M./Harnik, T.Y./Garbelotto, M.. Pittosporum undulatum is a potential Australian host of Phytophthora ramorum. Australasian Plant Disease Notes. 1(1): 19-21.	[Host for recognized pests and pathogens? Yes] "Abstract. Pittosporum undulatum is a potential Australian host of Phytophthora ramorum, the causal agent of sudden oak death in California. It was susceptible and supported sporulation in zoospore inoculations of detached leaves. Susceptibility and sporulation potential were low when compared to Umbellularia californica. Two independent positives were obtained from symptomatic trees in a PCR-based technique using species-specific primers. Foliar symptoms observed on the trees were replicated in the inoculations."

406	2010. Ireland, K./Hüberli, D./Dell, B./Smith, I./Rizzo, D./Hardy, G. Susceptibility of Australian Plant Species to <i>Phytophthora ramorum</i> . Pp. 202-206 in Proc. of the Sudden Oak Death 4th Science Symposium. Gen. Tech. Rep. PSW-GTR-229. USDA Forest Service,	[Host for recognized pests and pathogens? Yes] "Two Australian host species, <i>Eucalyptus haemastoma</i> (scribbly gum) and <i>Pittosporum undulatum</i> (sweet pittosporum) have been listed as natural hosts of <i>P. ramorum</i> based on field observations and pathogenicity tests in the U.S. and Europe (Hüberli and others 2006, RAPRA 2007a, USDA APHIS 2007)."
407	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Causes allergies or is otherwise toxic to humans? No] No evidence
407	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Causes allergies or is otherwise toxic to humans? No] No evidence
408	1996. Goodland, T./Healey, J.R.. The invasion of Jamaican montane rainforests by the Australian tree <i>Pittosporum undulatum</i> . School of Agricultural and Forest Sciences, University of Wales, Bangor, UK http://pages.bangor.ac.uk/~afs101/iwpt/pittorep.pdf	[Creates a fire hazard in natural ecosystems? Possibly] "The undisturbed forests of the Blue Mountains are relatively resistant to burning, although forest that has been disturbed or is scrubby can burn (as for example in the summer of 1991). We do not know whether living <i>P. undulatum</i> trees are more flammable than native trees; the bark is resinous, the leaves seem quite volatile rich (in comparison with most Blue Mountain species) and the wood is dense and so would probably burn at a high temperature. There may be the possibility that areas with serious blowdown of <i>P. undulatum</i> could be vulnerable to fire. However, of the hundred or so <i>P. undulatum</i> trees seen after being blown down by H. Gilbert, only two had died, suggesting that the amount of dead and therefore flammable wood following a major blowdown of <i>P. undulatum</i> would be small. A more serious threat perhaps is a pest or disease that kills <i>P. undulatum</i> plants of all sizes quickly. This would leave large amounts of dead wood in a few hundred hectares of forest which may leave this forest susceptible to fire for several years."
409	1982. Gleadow, R.M./Rowan, K.S.. Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. III. Effects of Temperature and Light on Growth and Drought Resistance. Australian Journal of Botany. 30(3): 347-357.	[Is a shade tolerant plant at some stage of its life cycle? Yes] " <i>P. undulatum</i> seedlings are less drought resistant when grown under less dense shade and moderately high temperatures, but if well watered would grow faster under these conditions."
409	1983. Gleadow, R.M./Rowan, K.S./Ashton, D.H.. Invasion by <i>Pittosporum undulatum</i> of the forests of central Victoria. IV. Shade tolerance. Australian Journal of Botany. 31(2): 151-160.	[Is a shade tolerant plant at some stage of its life cycle? Yes] "Seedlings of <i>Pittosporum undulatum</i> were grown under shade screens for 16 days at four flux densities: 97.8, 18.2, 3.4 and 0.4% full daylight, i.e. c. 420, 78, 14 and 2 W m ² . Seedlings showed moderate tolerance of shade: the growth compensation point for light was 1.6% daylight, the leaf area ratio in full daylight was low (48.96 cm ² g ⁻¹) and when plants grown at 0.4% were compared with those grown at 97.8% full daylight and there was a fourfold increase in chlorophyll concentration. Leaves were thinner at the lowest flux density because the cells were deflated and there appeared to be only one row of palisade mesophyll cells. On the other hand, there was no large increase in leaf area ratio with shading, no alteration in the chlorophyll a/b ratio and no depression of net assimilation rate in full daylight. <i>P. undulatum</i> can endure shade but has a higher growth rate when grown at higher photon flux densities. <i>P. undulatum</i> is found predominantly in shade owing to the uneven dispersal of seed and the site-dependent survival of seedlings and not because shade is required for maximum growth."
409	1996. Goodland, T./Healey, J.R.. The invasion of Jamaican montane rainforests by the Australian tree <i>Pittosporum undulatum</i> . School of Agricultural and Forest Sciences, University of Wales, Bangor, UK http://pages.bangor.ac.uk/~afs101/iwpt/pittorep.pdf	[Is a shade tolerant plant at some stage of its life cycle? Yes] "In summary, in its native range, <i>P. undulatum</i> is characteristically a species of forest margins, open forest and scrub and is less common in forest understorey; is moderately shade tolerant; casts a dense shade, dense enough to shade out most understorey species; is moderately susceptible to fires; and has recently increased in abundance and range where the soil fertility and moisture is high enough and the fire frequency low enough."
410	2005. Burke, D.. The complete Burke's backyard: the ultimate book of fact sheets. Murdoch Books, Millers Point, Australia	[Tolerates a wide range of soil conditions? Yes] "It is adaptable to a range of acid soils, and is hardy to frost and drought."
410	2010. Hortal, J./Borges, P.A.V. et al.. Assessing the areas under risk of invasion within islands through potential distribution modelling: The case of <i>Pittosporum undulatum</i> in São Miguel, Azores. Journal for Nature Conservation. 18(4): 247-257.	[Tolerates a wide range of soil conditions? Yes] "It should also be stressed that sweet pittosporum occurs in a wide variety of habitats, and soil properties do not seem to be a limiting factor for its establishment, at least at the Azores."
411	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Climbing or smothering growth habit? No] "A glabrous bushy tree of 4-14 m height, with a grey bark and a dense pyramidal crown."

412	1981. Gleadow, R.M./Ashton, D.H .. Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. I. Invasion Patterns and Plant Morphology. Australian Journal of Botany. 29(6): 705-720.	[Forms dense thickets? Yes] "Classification of quadrats by monothetic division showed <i>P. undulatum</i> to be the most important species in the community. The weedy nature of <i>P. undulatum</i> is clear from its rapid dispersal, early seed production and fast growth. The dense canopy dramatically reduces the light intensity and completely suppresses the original sclerophyllous understorey: only <i>Gahnia radula</i> remains."
412	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Forms dense thickets? Yes] "Gaps are quickly colonized and seedlings form a dense ground cover. The nutrient rich litter leads to an increase of soil fertility levels. The tree displaces native laurel forests on the Azores with monospecific shrubland."
501	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Aquatic? No] "A glabrous bushy tree of 4-14 m height, with a grey bark and a dense pyramidal crown." [Terrestrial]
502	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Grass? No] Pittosporaceae
503	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Nitrogen fixing woody plant? No] Pittosporaceae
504	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "A glabrous bushy tree of 4-14 m height, with a grey bark and a dense pyramidal crown. Leaves are radiating at the ends of branches, are elliptic-oblong, 6-14 cm long and 3-5 cm wide, dark green above and paler beneath."
601	2007. Gleadow, R.M./Narayan, I.. Temperature thresholds for germination and survival of <i>Pittosporum undulatum</i> : implications for management by fire. Acta Oecologica. 31: 151-157.	[Evidence of substantial reproductive failure in native habitat? No] "Interestingly, it is also increasing in density in areas where it is undoubtedly indigenous, such as forest remnants in suburban Sydney (Rose and Fairweather, 1997) and where it should not necessarily be regarded as a problem (Howell, 2003)."
602	1982. Gleadow, R.M .. Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. II. Dispersal, Germination and Establishment. Australian Journal of Botany. 30(2): 185-198.	[Produces viable seed? Yes] "Seeds may germinate after seed fall in spring but most seeds germinate in autumn. No seeds germinate during summer because of the low rainfall and high temperatures, the optimum germination temperature being 18-21°C ."
603	1981. Gleadow, R.M./Ashton, D.H .. Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. I. Invasion Patterns and Plant Morphology. Australian Journal of Botany. 29(6): 705-720.	[Hybridizes naturally? Yes] "In the Dandenong Ranges, Vic., <i>P. undulatum</i> is now hybridizing with the native <i>Pittosporum bicolor</i> , as also observed in the 'native' habitat of <i>P. undulatum</i> in South Gippsland."
603	1996. Goodland, T./Healey, J.R.. The invasion of Jamaican montane rainforests by the Australian tree <i>Pittosporum undulatum</i> . School of Agricultural and Forest Sciences, University of Wales, Bangor, UK http://pages.bangor.ac.uk/~afs101/iwpt/pittorep.pdf	[Hybridizes naturally? Yes] "It is a fairly well-defined species, though it hybridises with <i>P. bicolor</i> in Victoria, Australia to a limited degree, and may also do so with <i>P. revolutum</i> further north in Australia (Cooper 1956). Vigorous growth of the <i>P. undulatum</i> × <i>P. bicolor</i> hybrid in Victoria is resulting in "serious swamping" of <i>P. bicolor</i> (Carr et al. 1992). Weedy species usually have a depauperate genetic structure (Burdon & Marshall 1981) and this can be particularly pronounced when introduced to a new location in small numbers because of a "bottleneck effect" (Harper 1977)."
604	1996. Goodland, T./Healey, J.R.. The invasion of Jamaican montane rainforests by the Australian tree <i>Pittosporum undulatum</i> . School of Agricultural and Forest Sciences, University of Wales, Bangor, UK http://pages.bangor.ac.uk/~afs101/iwpt/pittorep.pdf	[Self-compatible or apomictic? Possibly] "The reproductive characteristics of a single <i>P. undulatum</i> plant was monitored in Auckland, New Zealand by Cooper (1956). The flowers had plump ovaries and apparently aborted anthers; the fruits were fully developed and the seeds were viable; there was no male plant in the neighbourhood and the source of the pollen was not known, but presumably come from the same plant."
604	1996. Mullett, T.L.. Ecological Aspects of Sweet <i>Pittosporum</i> (<i>Pittosporum undulatum</i> Vent.): Implications for Control & Management. Pp. 489-492 in Shepherd, R.C.H. (ed.). 11th Australian Weeds Conference Proceedings. Weed Science Society of Victoria Inc.,	[Self-compatible or apomictic? Possibly] "Reproductive biology Although <i>P. undulatum</i> is dioecious, minor occurrences of functionally female flowers have been observed on otherwise predominantly male flowering individuals. At Woods Reserve on the Mornington Peninsula, Victoria, nearly 9% of predominantly male flowering plants recorded in five 10 × 30 m grids were observed bearing fruit remnants from the previous fruiting period (Mullett unpublished data 1995). This incidence in fruit production in some predominantly male plants may represent increased recruitment opportunities for invading populations as anecdotal evidence suggests germination in seed from predominantly male flowering plants is equal to that of seed from female plants. Additionally, predominantly male flowering plants in cultivated settings have been observed producing considerable quantities of fruit. These findings conflict with management advice to concentrate control efforts on female plants although obviously these pose a greater recruitment threat."

605	1996. Goodland, T./Healey, J.R.. The invasion of Jamaican montane rainforests by the Australian tree <i>Pittosporum undulatum</i> . School of Agricultural and Forest Sciences, University of Wales, Bangor, UK http://pages.bangor.ac.uk/~afs101/iwpt/pittorep.pdf	[Requires specialist pollinators? No] "The flowers are insect pollinated, bees being important pollinators in the Blue Mountains (Tanner 1982)."
606	2011. Australian Native Plant Society. <i>Pittosporum undulatum</i> . http://anpsa.org.au/p-und.html	[Reproduction by vegetative fragmentation? No] "Propagation can be carried out from seed which germinates readily without treatment. Cuttings are also successful." [No evidence]
607	1981. Gleadow, R.M./Ashton, D.H .. Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. I. Invasion Patterns and Plant Morphology. Australian Journal of Botany. 29(6): 705-720.	[Minimum generative time (years)? 4+] "Plants flower when only 4 or 5 years old, in early spring and, less vigorously, in autumn."
607	1996. Goodland, T./Healey, J.R.. The invasion of Jamaican montane rainforests by the Australian tree <i>Pittosporum undulatum</i> . School of Agricultural and Forest Sciences, University of Wales, Bangor, UK http://pages.bangor.ac.uk/~afs101/iwpt/pittorep.pdf	[Minimum generative time (years)? 4+] " <i>Pittosporum undulatum</i> first flowered at the Cinchona Botanic Gardens in 1887, approximately four years after its introduction (Anon 1887)."
701	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Propagules likely to be dispersed unintentionally? No evidence] "Seeds ca. 25, dark brown, angled and compressed, ca. 3 mm long." [No evidence, and seeds adapted for bird dispersal]
702	1981. Gleadow, R.M./Ashton, D.H .. Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. I. Invasion Patterns and Plant Morphology. Australian Journal of Botany. 29(6): 705-720.	[Propagules dispersed intentionally by people? Yes] "Gardens have undoubtedly been initial focal points of dispersal. For many decades <i>Pittosporum undulatum</i> has been prized for its perfumed cream flowers, orange berries and fast-growing leafy canopies (Elliot 1897:p. 160; Maiden 1889, p. 160)."
703	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Propagules likely to disperse as a produce contaminant? No] "Seeds ca. 25, dark brown, angled and compressed, ca. 3 mm long." [No evidence, and seeds adapted for bird dispersal]
704	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Propagules adapted to wind dispersal? No] "Capsules depressed-subglobose, slightly compressed, ca. 10-14 mm long, the persistent style ca. 2-3 mm long, the valves with coriaceous exocarp ca. 1-2 mm thick, the surface roughened-rugulose. Seeds ca. 25, dark brown, angled and compressed, ca. 3 mm long." [No adaptations for wind dispersal]
705	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Propagules water dispersed? No] No evidence
706	1981. Gleadow, R.M./Ashton, D.H .. Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. I. Invasion Patterns and Plant Morphology. Australian Journal of Botany. 29(6): 705-720.	[Propagules bird dispersed? Yes] "The other more shade-tolerant invaders such as <i>P. undulatum</i> , <i>Cotoneaster pannosa</i> , <i>Prunus</i> spp., <i>Arbutus unedo</i> , <i>Hedera helix</i> and particularly <i>Ilex aquifolium</i> , all of which produce fruits attractive to birds, are creating a new understorey stratum...The spread of this native plant 200 km beyond its original range within the last few decades correlates with the increase in the number of focal points of dispersal, created by enthusiastic gardeners, the suppression of wildfires and with the introduction of the European blackbird (<i>Turdus merula</i>). The role of blackbirds in the dispersal of <i>P. undulatum</i> will be discussed in a later paper."
706	1982. Gleadow, R.M .. Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. II. Dispersal, Germination and Establishment. Australian Journal of Botany. 30(2): 185-198.	[Propagules bird dispersed? Yes] "Invading <i>Pittosporum undulatum</i> tends to be clumped around the butts of established trees. This is due to the preferential deposition of seeds in these sites by the European blackbird (<i>Turdus merula</i>) which is believed to be the main vector of dispersal. Native silvereyes (<i>Zosterops lateralis</i>) eat some seed but are not considered important in dispersal."
706	1996. Goodland, T./Healey, J.R.. The invasion of Jamaican montane rainforests by the Australian tree <i>Pittosporum undulatum</i> . School of Agricultural and Forest Sciences, University of Wales, Bangor, UK http://pages.bangor.ac.uk/~afs101/iwpt/pittorep.pdf	[Propagules bird dispersed? Yes] "There are no alien bird species in the montane rainforests of the Blue Mountains, often a factor in the invasion of alien plants. The following birds, all native, were seen by Lack (1976) to take <i>P. undulatum</i> seeds: Jamaican oriole (<i>Icterus leucopteryx</i>); Greater Antillean elaenia (<i>Elaenia fallax</i>); Rufous-throated solitaire (<i>Myadestes genibarbis</i>); White-eyed thrush (<i>Turdus jamaicensis</i>); Greater Antillean bullfinch (<i>Loxigilla violacea</i>). Flocks of Cedar waxwings (migrants) also feed on <i>P. undulatum</i> seeds (J.W. Dalling, pers. comm., 1991)."

706	1996. Mullett, T.L.. Ecological Aspects of Sweet Pittosporum (<i>Pittosporum undulatum</i> Vent.): Implications for Control & Management. Pp. 489-492 in Shepherd, R.C.H. (ed.). 11th Australian Weeds Conference Proceedings. Weed Science Society of Victoria Inc.,	[Propagules bird dispersed? Yes] "Geldenhuys et al. (1986) suggested that the time lag between the introduction of <i>P. undulatum</i> to South Africa and its recognition as a serious environmental weed was largely due to an adaption period by frugivorous species. In south-east Australia, an increasing number of native and introduced birds, including pied currawong (<i>Strepera graculina</i> Shaw), silveryeye (<i>Zosterops lateralis</i> Latham) and satin bowerbird (<i>Ptilinopus violaceus</i> Vieillot) are recognised as utilizing the now abundant food resource provided by populations of <i>P. undulatum</i> (Cooper 1959, Gleadow 1982, Mulvaney 1986, Buchanan 1989, Brown et al. 1991)."
706	1997. Rose, S.. Influence of suburban edges on invasion of <i>Pittosporum undulatum</i> into the bushland of northern Sydney, Australia. <i>Australian Journal of Ecology</i> . 22: 89-99.	[Propagules bird dispersed? Yes] "In Sydney the main vector for dispersal of seeds in <i>P. undulatum</i> fruits appears to be the native pied currawong (<i>Strepera graculina</i>). There is evidence that its abundance has increased around suburban areas compared to bushland interior areas (Buchanan 1989b). It is one of the few species of native fauna that has successfully exploited the suburban environment. Spatial differences in the relative activity of currawongs could partially account for concentration of seedlings near edges of young sites, compared with more even densities throughout older remnants. In the narrower remnants of older suburbs, currawong activity is likely to be similar throughout the reserve, providing even distribution of <i>P. undulatum</i> seed. Because of the much greater width of reserves adjacent to younger suburbs, currawong activity and therefore seed dispersal probably decrease rapidly away from the edge."
706	2003. Weber, E.. <i>Invasive Plant Species of the World. A Reference Guide to Environmental Weeds</i> . CABI Publishing, Wallingford, UK	[Propagules bird dispersed? Yes] "The tree produces large quantities of sticky seeds that are dispersed by birds and mammals."
707	1996. Goodland, T./Healey, J.R.. The invasion of Jamaican montane rainforests by the Australian tree <i>Pittosporum undulatum</i> . School of Agricultural and Forest Sciences, University of Wales, Bangor, UK http://pages.bangor.ac.uk/~afs101/iwpt/pittorep.pdf	[Propagules dispersed by other animals (externally)? No evidence. Unlikely] "The role of pigs in dispersing <i>P. undulatum</i> capsules or seeds is probably not significant as they are only infrequent visitors to the more accessible forest that tends to be more heavily invaded by <i>P. undulatum</i> . Piles of up to several thousand <i>P. undulatum</i> seeds and gnawed capsules occur near parent trees during the time of seed fall (T. Goodland, pers. obs., 1993). These hoards are probably amassed by rats, but they are unlikely to be major factors in dispersal, as rats are not likely to travel far."
708	1982. Gleadow, R.M .. Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. II. Dispersal, Germination and Establishment. <i>Australian Journal of Botany</i> . 30(2): 185-198.	[Propagules survive passage through the gut? Yes] "The germination of <i>P. undulatum</i> seed was unaffected after passing through the digestive tract of a silveryeye or a blackbird..."
708	1996. Goodland, T./Healey, J.R.. The invasion of Jamaican montane rainforests by the Australian tree <i>Pittosporum undulatum</i> . School of Agricultural and Forest Sciences, University of Wales, Bangor, UK http://pages.bangor.ac.uk/~afs101/iwpt/pittorep.pdf	[Propagules survive passage through the gut? Yes] "The germinability of two hundred <i>P. undulatum</i> seeds collected from bird droppings and two hundred collected from trees in the Cinchona area did not differ significantly (T. Goodland, unpublished data). Three separate tests in Australia found no effect of passage through European blackbirds, <i>Turdus merula</i> , a close relative of the two <i>Turdus</i> species thought to be major dispersers in the Blue Mountains (Cooper 1959; Gleadow & Ashton 1981)."
801	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. <i>Manual of the flowering plants of Hawaii</i> . Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Prolific seed production (>1000/m ²)? Unknown] "Trees 5-14 m tall...Seeds ca. 25" [Fruit & seed densities unknown]
802	1982. Gleadow, R.M .. Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. II. Dispersal, Germination and Establishment. <i>Australian Journal of Botany</i> . 30(2): 185-198.	[Evidence that a persistent propagule bank is formed (>1 yr)? Yes] "After 16 months' storage, at moderate humidities and two temperatures, 80% of the seed was still viable. This suggests that seed falling in spring in the field could germinate the following year, given suitable conditions. On the other hand, dried seed does not keep well (Ewart 1930). The viability of seed stored for 18 months at 0.8% R.H. dropped by two-thirds (Fig. 3). If seed were deposited in sites lacking a canopy in the field, the hot sun probably would significantly reduce its viability and consequently reinforce the pattern of invasion initially dictated by seed dispersal."
802	2007. Gleadow, R.M./Narayan, I.. Temperature thresholds for germination and survival of <i>Pittosporum undulatum</i> : implications for management by fire. <i>Acta Oecologica</i> . 31: 151-157.	[Evidence that a persistent propagule bank is formed (>1 yr)? No] " <i>P. undulatum</i> is unusual in that it does not store seed in the soil from year to year (Gleadow and Ashton, 1981; Gleadow, 1982)."

803	1996. Mullett, T.L.. Ecological Aspects of Sweet Pittosporum (<i>Pittosporum undulatum</i> Vent.): Implications for Control & Management. Pp. 489-492 in Shepherd, R.C.H. (ed.). 11th Australian Weeds Conference Proceedings. Weed Science Society of Victoria Inc.,	[Well controlled by herbicides? Yes] "A common control measure undertaken at invaded sites near Melbourne is to fell mature <i>P. undulatum</i> individuals and paint the stump with herbicides (usually glyphosate). This method provides instant results, but the consequent increase in light infiltration might in itself, impose such a disturbance to the site that opportunistic weed species may be able to exploit the altered conditions, particularly in the absence of follow up control measures. Felled individuals are also generally left on-site which raises further concerns about the potential influence of allelopathic properties present in decaying leaf matter. A more appropriate control method for <i>P. undulatum</i> is the <input type="checkbox"/> drill and fill <input type="checkbox"/> technique where herbicides are injected into the trunk and individuals senesce over time. This reduces the disturbance associated with instant control techniques but is more labour intensive and as such, is not often implemented in weed control programs due to severe resource restraints."
803	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Well controlled by herbicides? Yes] "Seedlings are easy to hand pull. Small trees are cut, larger trees cut or girdles, often in combination with herbicide treatment. Effective herbicides are 2,4,5-T, picloram plus 2,4-D, or glyphosate. Follow-up programmes are necessary to treat regrowth and emerging seedling."
804	1981. Gleadow, R.M./Ashton, D.H .. Invasion by <i>Pittosporum undulatum</i> of the Forests of Central Victoria. I. Invasion Patterns and Plant Morphology. Australian Journal of Botany. 29(6): 705-720.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Does not tolerate fire] " <i>Pittosporum undulatum</i> is invading eucalypt open forests in south-central Victoria, 200 km west of its native habitat in eastern Australia. This is due to horticultural plantings of <i>P. undulatum</i> and to the suppression of wildfires: it has thin bark and is killed by fires which most eucalypts can survive... The capacity of <i>P. undulatum</i> to withstand fire is not great; its bark is thin and resinous, reaching 6 . 5 mm on a trunk 100 cm in girth (Fig. 14). Provided the fire burns right to the mineral soil, basal buds in the trunk will be killed. Light fires do little permanent damage and the saplings (> 2 m high) will coppice vigorously."
804	1997. Rose, S.. Influence of suburban edges on invasion of <i>Pittosporum undulatum</i> into the bushland of northern Sydney, Australia. Australian Journal of Ecology. 22: 89-99.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] " <i>Pittosporum undulatum</i> is also better adapted to recover from gross physical damage, such as mowing, than other native species James 1994)."
804	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] "The tree resprouts vigorously after damage."
804	2007. Gleadow, R.M./Narayan, I.. Temperature thresholds for germination and survival of <i>Pittosporum undulatum</i> : implications for management by fire. Acta Oecologica. 31: 151-157.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] "Of the adult trees, 20% resprouted within 6 months of the fire. We conclude that the temperatures associated with wildfires are sufficient to act as a circuit breaker on the invasion cycle allowing other control measures, such as poisoning and weeding to be employed to greater effect." [Seeds & seedlings destroyed, but adults may tolerate fires]
805	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Effective natural enemies present locally? Unknown] "cultivated and now naturalized in disturbed mesic forest, 500-1,200 m" [Unknown, but no evidence in the Hawaiian Islands]