Taxon: Callistemon pallidus (Bonpl.) DC. **Family:** Myrtaceae

Common Name(s): lemon bottlebrush
yellow bottlebrush

Synonym(s): Melaleuca pallida (Bonpl.) Craven
Metrosideros pallida Bonpl.

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 27 May 2020

WRA Score: **-3.0** **Designation:** L **Rating:** Low Risk

Keywords: Shrub, Unarmed, Ornamental, Serotinous, Resprouter

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	y
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		
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		
409	Is a shade tolerant plant at some stage of its life cycle		

Qsn #	Question	Answer Option	Answer
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	n
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		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)		
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	y
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)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
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)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	[No evidence] "This is a very variable species, usually occurring as a shrub but a tree form occurs in Tasmania. It is commonly cultivated as an ornamental garden shrub in temperate Australia but the tree form should be trialled for use in parks and larger gardens. Use of the tree form in hybridisation with red-flowered bottlebrush species, such as M. citrina, may give rise to a range of cultivars with tree form but novel flower colours."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2020). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2020). 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**
	Austraflora. (2020). Callistemon Candle Glow - Callistemon pallidus low selection. https://austraflora.com/project/callistemon-candle-glow/. [Accessed 25 May 2020]	"Cool to sub tropical climates, full sun or light shade, and good drainage will suit; frost is no problem, and it loves coastal gardens."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 25 May 2020]	"Native Australasia AUSTRALIA: Australia [Tasmania, New South Wales (s. & e.), Queensland (s.e.), Victoria]"
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	"Queensland, New South Wales, Victoria, Tasmania: from the border ranges area of Queensland and New South Wales south to eastern Victoria and Tasmania."

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	**n**
	Source(s)	**Notes**
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2015). Growing Native Plants. Callistemon pallidus. https://www.anbg.gov.au/gnp/gnp14/callistemon-pallidus.html. [Accessed 26 May 2020]	"This frost-hardy plant will grow in moist situations in full sun or part shade and will withstand moderate exposure to salt laden winds."
	Missouri Botanical Garden. (2020). Callistemon pallidus. http://www.missouribotanicalgarden.org. [Accessed 26 May 2020]	"Zone: 7 to 10"

204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	Austraflora. (2020). Callistemon Candle Glow - Callistemon pallidus low selection. https://austraflora.com/project/callistemon-candle-glow/. [Accessed]	"Cool to sub tropical climates, full sun or light shade, and good drainage will suit; frost is no problem, and it loves coastal gardens."
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	"Queensland, New South Wales, Victoria, Tasmania: from the border ranges area of Queensland and New South Wales south to eastern Victoria and Tasmania."

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2015). Growing Native Plants. Callistemon pallidus. https://www.anbg.gov.au/gnp/gnp14/callistemon-pallidus.html. [Accessed 26 May 2020]	"Callistemon pallidus, commonly called Lemon Bottlebrush, is a widely grown ornamental plant which has performed exceptionally well in cultivation and is useful as a specimen or screen plant."
	Talhouk S.N. , Fabian M., Dagher R. 2015. Landscape Plant Database. Department of Landscape Design & Ecosystem Management, American University of Beirut. http://landscapeplant.aub.edu.lb. [Accessed 26 May 2020]	Cultivated in Lebanon
	Dave's Garden. (2020). Melaleuca Species, Lemon Bottlebrush - Melaleuca pallida. https://davesgarden.com/guides/pf/go/59932/. [Accessed 26 May 2020]	Cultivated in UK and Portland, Oregon

Qsn #	Question	Answer
301	**Naturalized beyond native range**	**n**
	Source(s)	**Notes**
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

302	Garden/amenity/disturbance weed	n
	Source(s)	**Notes**
	Talhouk S.N. , Fabian M., Dagher R. 2015. Landscape Plant Database. Department of Landscape Design & Ecosystem Management, American University of Beirut. http://landscapeplant.aub.edu.lb. [Accessed 26 May 2020]	"Invasive Potential: No "
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	**Notes**
	Talhouk S.N. , Fabian M., Dagher R. 2015. Landscape Plant Database. Department of Landscape Design & Ecosystem Management, American University of Beirut. http://landscapeplant.aub.edu.lb. [Accessed 26 May 2020]	"Invasive Potential: No"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	Environmental weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

305	Congeneric weed	
	Source(s)	**Notes**
	Kaufman, S.R. & Kaufman, W. 2012. Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species. Second Edition, Revised and Updated. Stackpole Books, Mechanicsburg, PA	"The related weeping bottlebrush tree (Callistemon viminalis (Sol. x Gaertn.) Chee!) is reported as invasive in parts of California and occasionally naturalizes in Florida."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Several Callistemon species are reported to be naturalized and/or weeds. Subsequent literature searches have not confirmed negative impacts that warrant designation of any species as significant weeds.

Qsn #	Question	Answer
401	**Produces spines, thorns or burrs**	**n**
	Source(s)	**Notes**
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	[No evidence] "Shrub or tree 1–25 m tall; bark fibrous or somewhat papery, hard, yellowish-brown, light brown or dark grey. Branchlets glabrescent, sericeous to sericeouspubescent. Leaves alternate, 20–79 mm long, 4–17 mm wide, 2.3–7.5 times as long as wide, long- to short-petiolate; blade glabrescent, sericeous or sericeous-pubescent, narrowly elliptic, narrowly obovate, elliptic or obovate, in transverse section transversely linear, sublunate or broadly v-shaped, the base attenuate or very narrowly attenuate, the apex shortly acuminate or obtusely shortly acuminate, the veins pinnate, 6–16, oil glands sparse or moderately dense, distinct or obscure, scattered."

402	Allelopathic	
	Source(s)	**Notes**
	Shah, N., Ahmad, I., Imran, M., Gul, H., Babar, M. J., Shah, W. A., & Anwar, S. (2018). Allelopathic effect of Callistemon lanceolatus DC. against two cultivars of Triticum aestivum L. Pure and Applied Biology (PAB), 7(2), 783-790	[Unknown. Allelopathic properties documented in genus] "Generally, the plants have effects on the other plants growing in their vicinity. The plants may have both positive and negative effects on each other. The purposes of the current study were to assess the allelopathic capability of Callistemon lanceolatus against the two cultivars of Triticum aestivum, under laboratory condition. Allelopathic potential of the plant was determined using aqueous extracts of various parts of the plant. Aqueous extract of leaves and bark were acquired by independently soaking 5gm and 10gm powder in 100 ml distilled water for 24, 48 and 72 hours. The results revealed that allelopathic potential of the plant was both dose and soaking duration dependent. Generally, extract of higher concentration i.e. 10gm/100 ml soaked for higher duration (72 hours) were more inhibitory than lower concentrations (5gm/100 and shorter soaking duration 24 and 48 hours). Hot water extracts, Litter and mulches of the plant also significantly repressed seed germination and the general development of both the test crops. Seminal roots numbers were also suppressed by all the treatments used in the study. It was concluded that the plant has strong allelopathic potential. Further investigation is required to isolate the chemicals that triggered inhibition which may provide base to for the development of novel synthetic pesticides. The study further suggests that cultivation of the plant should be avoided in the vicinity of the crop fields."

403	Parasitic	n
	Source(s)	**Notes**
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	"Shrub or tree 1–25 m tall; bark fibrous or somewhat papery, hard, yellowish-brown, light brown or dark grey." [Myrtaceae. No evidence]

404	Unpalatable to grazing animals	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Native Garden. (2020). Lemon Bottlebrush - Callistemon pallidus. http://native-garden.blogspot.com/2014/11/lemon-bottlebrush-callistemon-pallidus.html?m=0. [Accessed 26 May 2020]	"Susceptible to browsing by possums and wallabies." [Unknown if cattle or ungulates present in the Hawaiian Islands would browse on this species]

405	Toxic to animals	n
	Source(s)	**Notes**
	HerbiGuide. (2020). Callistemon. http://www.herbiguide.net/Descriptions/hg_Callistemon.htm. [Accessed 26 May 2020]	"Toxicity: Not recorded as toxic."
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	No evidence
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Missouri Botanical Garden. (2020). Callistemon pallidus. http://www.missouribotanicalgarden.org. [Accessed 26 May 2020]	"No serious insect or disease problems."
	WRA Specialist. (2020). Personal Communication	Unknown if Callistemon pallidus could serve as a host to the fungus Austropuccinia psidii, but this pathogen is already present in the Hawaiian Islands and has been documented on a fairly wide host range of native and non-native plants. The cultivation of Callistemon pallidus is therefore unlikely to significantly affect the distribution of Austropuccinia psidii.

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	HerbiGuide. (2020). Callistemon. http://www.herbiguide.net/Descriptions/hg_Callistemon.htm. [Accessed 26 May 2020]	"Toxicity: Not recorded as toxic."
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	No evidence
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

Qsn #	Question	Answer
408	**Creates a fire hazard in natural ecosystems**	
	Source(s)	**Notes**
	Clarke, P. J., Knox, K. J., & Butler, D. (2011). Fire intensity, serotiny and seed release in 19 woody species: evidence for risk spreading among wind-dispersed and resprouting syndromes. Australian Journal of Botany, 58(8), 629-636	[Callistemon pallidus - Plant crown fire response = Resprouter] "Table 1. Woody-fruited species selected for use in experimental treatments, and their family, treatment unit, degree of serotiny observed in the field on live stems, diaspore dispersal mechanism and fire response"
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	[Unknown. Recorded as a fire resprouter in other literature, suggesting fire is common in this species natural range] "Recorded as occurring in wet sclerophyll forest along streams, dense shrubbery on river edge, Eucalyptus delegatensis forest, margin of coastal heath on upper cliff face, swamp, rocky hillside, snow gum open forest, gully areas in dry sclerophyll forest, margin of Nothofagus temperate rainforest, Eucalyptus pulchella woodland with low shrub understorey, on an exposed ridge, limestone, and dolerite."

409	**Is a shade tolerant plant at some stage of its life cycle**	
	Source(s)	**Notes**
	Missouri Botanical Garden. (2020). Callistemon pallidus. http://www.missouribotanicalgarden.org. [Accessed 26 May 2020]	"Best flowering in full sun, but will tolerate some light shade."
	Austraflora. (2020). Callistemon Candle Glow - Callistemon pallidus low selection. https://austraflora.com/project/callistemon-candle-glow/. [Accessed 25 May 2020]	"Position: Full Sun to Part Shade"
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2015). Growing Native Plants. Callistemon pallidus. https://www.anbg.gov.au/gnp/gnp14/callistemon-pallidus.html. [Accessed 26 May 2020]	"This frost-hardy plant will grow in moist situations in full sun or part shade and will withstand moderate exposure to salt laden winds."

410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**y**
	Source(s)	**Notes**
	Native Garden. (2020). Lemon Bottlebrush - Callistemon pallidus. http://native-garden.blogspot.com/2014/11/lemon-bottlebrush-callistemon-pallidus.html?m=0. [Accessed 26 May 2020]	"Does well in all soils and adapts to waterlogging"
	Missouri Botanical Garden. (2020). Callistemon pallidus. http://www.missouribotanicalgarden.org. [Accessed 26 May 2020]	"Easily grown in a wide variety of soil types, including poorly drained soils, but does best in average to moist, slightly acidic, well-draining conditions in full sun."
	Wilson, G., & Elliot, R. (1983). Small trees that will stay small. Landscape Australia, 5(3), 193-199	"It often grows in sandy soils on or near granite outcrops, but also on a range of other soils. These acid to neutral soils are usually moist for most of the year, and colonies of plants are common in soaks." … "This bottlebrush is commonly cultivated, and is reliable in all soils, except for those that are alkaline."

411	**Climbing or smothering growth habit**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	"Shrub or tree 1–25 m tall; bark fibrous or somewhat papery, hard, yellowish-brown, light brown or dark grey."

412	Forms dense thickets	n
	Source(s)	**Notes**
	Ashton, D. H., & Webb, R. N. (1977). The ecology of granite outcrops at Wilson's Promontory, Victoria. Australian Journal of Ecology, 2(3), 269-296	[Becomes dominant, but not reported to form dense thickets that exclude other vegetation] "In the rock-heath above about 300 m, Callistemon pallidus becomes dominant, and the moss mats consist chiefly of Catnpylopus bicolor and Rhacomitrium crispulum"
	Royal Botanic Gardens Victoria. (2020). VicFlora Flora of Victoria - Callistemon pallidus. https://vicflora.rbg.vic.gov.au. [Accessed 26 May 2020]	[No evidence] "Mostly in rocky, high areas of the Great Dividing Range and other rocky (often granitic) outcrops (e.g. Gembrook, Ben Cairn, Mt Oberon), also occasionally in gullies and at lower elevations."
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	[No mention of dense thickets in this publication] "Recorded as occurring in wet sclerophyll forest along streams, dense shrubbery on river edge, Eucalyptus delegatensis forest, margin of coastal heath on upper cliff face, swamp, rocky hillside, snow gum open forest, gully areas in dry sclerophyll forest, margin of Nothofagus temperate rainforest, Eucalyptus pulchella woodland with low shrub understorey, on an exposed ridge, limestone, and dolerite."

501	Aquatic	n
	Source(s)	**Notes**
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	[Terrestrial] "Recorded as occurring in wet sclerophyll forest along streams, dense shrubbery on river edge, Eucalyptus delegatensis forest, margin of coastal heath on upper cliff face, swamp, rocky hillside, snow gum open forest, gully areas in dry sclerophyll forest, margin of Nothofagus temperate rainforest, Eucalyptus pulchella woodland with low shrub understorey, on an exposed ridge, limestone, and dolerite."

502	Grass	n
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 25 May 2020]	Family: Myrtaceae Subfamily: Myrtoideae Tribe: Melaleuceae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 25 May 2020]	Family: Myrtaceae Subfamily: Myrtoideae Tribe: Melaleuceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	"Shrub or tree 1–25 m tall; bark fibrous or somewhat papery, hard, yellowish-brown, light brown or dark grey."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2015). Growing Native Plants. Callistemon pallidus. https://www.anbg.gov.au/gnp/gnp14/callistemon-pallidus.html. [Accessed 26 May 2020]	"Callistemon pallidus is common on rocky sites of the eastern ranges and occurs naturally in New South Wales, the Australian Capital Territory, Victoria and Tasmania. In the ACT it is a dominant species in heath on exposed mountain slopes."
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	[No evidence] "Natural occurrence: Queensland, New South Wales, Victoria, Tasmania: from the border ranges area of Queensland and New South Wales south to eastern Victoria and Tasmania."

602	Produces viable seed	y
	Source(s)	**Notes**
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2015). Growing Native Plants. Callistemon pallidus. https://www.anbg.gov.au/gnp/gnp14/callistemon-pallidus.html. [Accessed 26 May 2020]	"Callistemon pallidus may be propagated from seed or cuttings. When collecting seed, select old capsules and place them in a warm area until they dry out and release the fine seeds."

603	Hybridizes naturally	
	Source(s)	**Notes**
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	[Artificial hybrids used to produce cultivars. No information on natural hybridization provided] "Use of the tree form in hybridisation with red-flowered bottlebrush species, such as M. citrina, may give rise to a range of cultivars with tree form but novel flower colours."

604	Self-compatible or apomictic	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	[Unknown for Callistemon pallidus, previously treated as Melaleuca pallida] "J.C. Doran and G.F. Moran (unpublished report, 2002) reported a selfing rate of up to 28% among progeny of some trees when their flowers were bagged without emasculation. A similar result was reported by Kartikawati (2005) for M. cajuputi subsp. cajuputi in a seed orchard in Yogyakarta, Indonesia, where a few individual trees in the orchard proved to be self-compatible, although most were found to be self-incompatible. Baskorowati et al. (2010a, b), reported that a self-incompatibility system operates in the style and is complemented by late-acting, self incompatibility mechanisms discriminating against self-pollen tubes when they descend to the ovary, based on microscopic observation of pollen-tube development in M. alternifolia (Figure 8). Barlow and Forrester (1984) also studied self-incompatibility in various Melaleuca species, although not in M. alternifolia, and found that self-pollen tubes do not penetrate past the base of the style."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	"Melaleucas are mostly insect-pollinated." … "Inflorescences spicate, pseudoterminal and sometimes also upper axillary or interstitial, with 15–50 monads, 20–45 mm wide. Hypanthium hairy to glabrous, 3.1–4.2 mm long. Calyx lobes abaxially hairy or glabrescent, 1–2.2 mm long, herbaceous to the margin. Petals deciduous, 2.9–6 mm long. Stamens 34–70 per flower; filaments pale yellow, yellow, lemor or rarely pink or pinkish-red, 8–16 mm long; anthers yellow. Style 12–21 mm long. Ovules c. 70–150 per locule."
	Wilson, G., & Elliot, R. (1983). Small trees that will stay small. Landscape Australia, 5(3), 193-199	"Native honey-eating birds are regular visitors to flowering plants."
	Kingston, A. B., & McQuillan, P. B. (2000). Are pollination syndromes useful predictors of floral visitors in Tasmania?. Austral Ecology, 25(6), 600-609	[Visited by insects] "Table 2. Flowering plants, their floral characteristics, and the numbers of anthophile species which they supported" [Callistemon pallidus - Bee = 4; Wasp = 1; Beetle = 3]

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2015). Growing Native Plants. Callistemon pallidus. https://www.anbg.gov.au/gnp/gnp14/callistemon-pallidus.html. [Accessed 26 May 2020]	[Reproduces by seeds, and can be propagated by cuttings] "Callistemon pallidus may be propagated from seed or cuttings. When collecting seed, select old capsules and place them in a warm area until they dry out and release the fine seeds. New growth which has hardened is suitable cutting material and should be taken in February/March. Cuttings should be treated with a rooting hormone."

607	Minimum generative time (years)	
	Source(s)	**Notes**
	Benson, D. & McDougall, L. (1998). Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. Cunninghamia 5(4): 808-987	"Primary juvenile period:" [No information provided on entry for Callistemon pallidus]

Qsn #	Question	Answer
	Clarke, P. J., Knox, K. J., Campbell, M. L., & Copeland, L. M. (2009). Post-fire recovery of woody plants in the New England Tableland Bioregion. Cunninghamia, 11, 221-239	"primary juvenile period' (PJP) which refer to the time taken for seedlings to flower and produce viable seed." … "Appendix 3. List of taxa and their habitats, fire response, primary juvenile period, secondary juvenile period and growth form." [Unknown. PJP recorded for a number of species, but left blank for Melaleuca pallida]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	**Notes**
	Benson, D. & McDougall, L. (1998). Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. Cunninghamia 5(4): 808-987	"Fruit/seed: Woody capsule 4–6 mm, with very small seed." [Seeds are small but lack means of external attachment. They could hypothetically be transported in soil attached to vehicles, footwear or equipment, but evidence is lacking at this time]

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2015). Growing Native Plants. Callistemon pallidus. https://www.anbg.gov.au/gnp/gnp14/callistemon-pallidus.html. [Accessed 26 May 2020]	"Callistemon pallidus, commonly called Lemon Bottlebrush, is a widely grown ornamental plant which has performed exceptionally well in cultivation and is useful as a specimen or screen plant."
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	"It is commonly cultivated as an ornamental garden shrub in temperate Australia but the tree form should be trialled for use in parks and larger gardens."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	Wilson, G., & Elliot, R. (1983). Small trees that will stay small. Landscape Australia, 5(3), 193-199	[Seeds retained in capsules. Unlikely to be come produce contaminants unless used in flora arrangements] "fruits are woody globular capsules, about 0. 7 cm diameter, seed is retained."
	WRA Specialist. (2020). Personal Communication	No evidence found. Small seeds could potentially become a contaminant if grown in proximity to other plants or crops, but this is probably an unlikely dispersal vector

704	Propagules adapted to wind dispersal	
	Source(s)	**Notes**
	Clarke, P. J., Knox, K. J., & Butler, D. (2011). Fire intensity, serotiny and seed release in 19 woody species: evidence for risk spreading among wind-dispersed and resprouting syndromes. Australian Journal of Botany, 58(8), 629-636	"Table 1. Woody-fruited species selected for use in experimental treatments, and their family, treatment unit, degree of serotiny observed in the field on live stems, diaspore dispersal mechanism and fire response" [Callistemon pallidus - Dispersal mechanism = Unassisted. In contrast to other taxa in the table identified as wind-dispersed, C. pallidus has an unassisted dispersal mechanism, although the small seeds may be dispersed short distances by wind]

Qsn #	Question	Answer
705	**Propagules water dispersed**	**y**
	Source(s)	**Notes**
	Benson, D. & McDougall, L. (1998). Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. Cunninghamia 5(4): 808-987	"Habitat: Beside streams and in wet rocky places." [Habitat suggests water may facilitate dispersal of seeds]
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	"Recorded as occurring in wet sclerophyll forest along streams, dense shrubbery on river edge" [Riparian habitat suggests water presumably facilitates some dispersal of seeds]

706	**Propagules bird dispersed**	**n**
	Source(s)	**Notes**
	Clarke, P. J., Knox, K. J., & Butler, D. (2011). Fire intensity, serotiny and seed release in 19 woody species: evidence for risk spreading among wind-dispersed and resprouting syndromes. Australian Journal of Botany, 58(8), 629-636	"Table 1. Woody-fruited species selected for use in experimental treatments, and their family, treatment unit, degree of serotiny observed in the field on live stems, diaspore dispersal mechanism and fire response" [Callistemon pallidus - Dispersal mechanism = Unassisted]
	Benson, D. & McDougall, L. (1998). Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. Cunninghamia 5(4): 808-987	[Not fleshy fruited] "Fruit/seed: Woody capsule 4–6 mm, with very small seed."

707	**Propagules dispersed by other animals (externally)**	**n**
	Source(s)	**Notes**
	Benson, D. & McDougall, L. (1998). Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. Cunninghamia 5(4): 808-987	"Fruit/seed: Woody capsule 4–6 mm, with very small seed." [Seeds are small but lack means of external attachment. They could hypothetically be transported in soil attached to animals, but evidence is lacking at this time]

708	**Propagules survive passage through the gut**	**n**
	Source(s)	**Notes**
	Benson, D. & McDougall, L. (1998). Ecology of Sydney plant species. Part 6. Dicotyledon family Myrtaceae. Cunninghamia 5(4): 808-987	"Fruit/seed: Woody capsule 4–6 mm, with very small seed." [Fruiting capsules unlikely to be consumed, or seeds to survive gut passage]

801	**Prolific seed production (>1000/m2)**	
	Source(s)	**Notes**
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2015). Growing Native Plants. Callistemon pallidus. https://www.anbg.gov.au/gnp/gnp14/callistemon-pallidus.html. [Accessed 26 May 2020]	"The cup-shaped fruit capsules are woody and contain numerous fine seeds." [Densities unspecified]

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Royal Botanic Gardens Kew. (2020) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/. [Accessed 27 May 2020]	"Storage Behaviour: Orthodox Storage Conditions: Long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collection18 years; germination change 75 to 100%, 18 years, 1 collection"
	Clarke, P. J., Knox, K. J., & Butler, D. (2011). Fire intensity, serotiny and seed release in 19 woody species: evidence for risk spreading among wind-dispersed and resprouting syndromes. Australian Journal of Botany, 58(8), 629-636	[Seeds may be retained in capsules until fire or heat triggers release. Weak serotiny suggests fire may not be necessary for seed release] "Table 1. … Callistemon pallidus - Degree of serotiny = Weak" … "Even though heat did not directly influence fruit/cone opening in most species, heating had a subsequent positive effect on seed release from fruits/cones under windless conditions in several species. This phenomenon reinforces the importance of distinguishing serotiny (on-plant seed storage) from the release of seeds over time following fruit opening (bradychory) and shows that the two traits are not necessarily directly related. For example, Allocasuarina spp., Callistemon pallidus, Callitris monticola, Hakea eriantha and Isopogon petiolaris all had open fruits at ambient temperature; however, the number of seeds released from the fruits increased in response to higher temperature (Table 2). This suggests that seed dispersal may be spread in time under low-intensity fires, as is the case with the strongly serotinous Banksia species (Fig. 3), whereas it would be more rapid under high-intensity fires."

803	**Well controlled by herbicides**	**y**
	Source(s)	**Notes**
	HerbiGuide. (2020). Callistemon. http://www.herbiguide.net/Descriptions/hg_Callistemon.htm. [Accessed 27 May 2020]	"Individual trees can be sawn off close to ground level and the stump painted immediately with Access. Basal bark spraying with Access® in diesel is effective. Saplings can be sprayed overall with Garlon, Grazon or glyphosate. Herbicide resistance: None reported."
	Munger, G. T. (2005). Melaleuca quinquenervia. In: Fire Effects Information System, [Online]. USDA, Forest Service. https://www.fs.fed.us/database/feis/plants/tree/maggra/all.html. [Accessed]	[Melaleuca quinquenervia effectively controlled by herbicides] "Chemical: Herbicides are among the most effective and widely used tools for controlling melaleuca in peninsular Florida [40]. Herbicides are most effective when integrated within a suite of control measures and strategies."
	WRA Specialist. (2020). Personal Communication	No information on herbicide efficacy and chemical control of this species. However, methods to control the invasive Melaleuca quinquenervia would presumably be effective for controlling Callistemon pallidus if required

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**
	Missouri Botanical Garden. (2020). Callistemon pallidus. http://www.missouribotanicalgarden.org. [Accessed 26 May 2020]	"Once flowering is complete, prune to maintain shape and create a bushier, denser habit."
	HerbiGuide. (2020). Callistemon. http://www.herbiguide.net/Descriptions/hg_Callistemon.htm. [Accessed 27 May 2020]	"Stem will coppice when damaged."

Qsn #	Question	Answer
	Australian National Botanic Gardens and Centre for Australian National Biodiversity Research. (2015). Growing Native Plants. Callistemon pallidus. https://www.anbg.gov.au/gnp/gnp14/callistemon-pallidus.html. [Accessed 26 May 2020]	"This plant responds well to periodic pruning to encourage a bushier growth habit."
	Clarke, P. J., Knox, K. J., & Butler, D. (2011). Fire intensity, serotiny and seed release in 19 woody species: evidence for risk spreading among wind-dispersed and resprouting syndromes. Australian Journal of Botany, 58(8), 629-636	[Callistemon pallidus - Plant crown fire response = Resprouter] "Table 1. Woody-fruited species selected for use in experimental treatments, and their family, treatment unit, degree of serotiny observed in the field on live stems, diaspore dispersal mechanism and fire response"

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	Brophy J.J., Craven L.A. and Doran J.C. (2013). Melaleucas: their botany, essential oils and uses. ACIAR Monograph No. 156. Australian Centre for International Agricultural Research, Canberra	"A threat to the future health and genetic diversity of a substantial number of Melaleuca species in eastern Australia is from Puccinia psidii sensu lato (synonym Uredo rangelii). This exotic pathogen has the common name of myrtle rust in Australia but it is known as guava or eucalyptus rust elsewhere, with origins in Brazil. Myrtle rust targets species of the family Myrtaceae, including Melaleuca. First observed in Australia on the central coast of New South Wales in 2010, it has now spread from Victoria to northern Queensland. In susceptible plants, young spore-covered leaves and shoots become curled and distorted and severe infection can cause shoots to die, causing these plants to become stunted after repeated infections. In the worst cases, death of the whole plant can occur after repeated destruction of new growth. As this book goes to press, this disease is of concern to all with an interest in the conservation and sustainable use of Australian plants of the family Myrtaceae."
	WRA Specialist. (2020). Personal Communication	Unknown. Austropuccinia psidii is present in the Hawaiian Islands, and may affect Callistemon pallidus, as it does many genera in the family Myrtaceae

Summary of Risk Traits:

High Risk / Undesirable Traits
• Able to grow, and potentially spread, in regions with subtropical climates
• Other Callistemon species reported to be naturalized
• Tolerates many soil types
• Reproduces by numerous, tiny seeds
• Seeds may be dispersed for short distances by wind and water
• Serotinous seeds retained on plants, may form a persistent “canopy seed bank”
• Able to resprout after cutting and fires

Low Risk Traits
• No reports of invasiveness or naturalization
• Unarmed (no spines, thorns, or burrs)
• Non-toxic
• Serotinous seeds unlikely to be accidentally dispersed