

Taxon: Photinia davidiana	Family: Rosaceae
Common Name(s): Chinese photinia Chinese stranvaesia hong guo shu matchweed	Synonym(s): S. davidiana var. davidiana S. davidiana var. undulata (Decne.) Stranvaesia davidiana Decne Stranvaesia undulata Decne.

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 3 Sep 2018
WRA Score: 8.0	Designation: H(Hawai'i)	Rating: High Risk

Keywords: Ornamental Shrub, Naturalized, Environmental Weed, Self-Compatible, Bird-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	Low
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	Intermediate
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		
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		
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	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		

Qsn #	Question	Answer Option	Answer
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic	y=1, n=-1	y
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	y=1, n=-1	n
705	Propagules water dispersed		
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/m ²)	y=1, n=-1	n
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
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	No evidence of domestication

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2018. 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"	Low
	Source(s)	Notes
	Plants for a Future. 2018. <i>Photinia davidiana</i> . https://pfaf.org . [Accessed 31 Aug 2018]	"Seed - best sown in a cold frame as soon as it is ripe in the autumn. Stored seed will probably require stratification and should be sown as early in the year as possible[78]." [For the special cases of a temperate species whose seeds have been reported to require cold-stratification for germination, the answer to this question is 0(low) and the answer to question 2.02 is 1 (intermediate) regardless of knowledge of the species native range.. C Daehler pers. comm]

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

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Slopes, mountain summits, roadsides, thickets, river valleys, damp gullies; 900-3000 m." [Elevation range exceeds 1000 m; environmental versatility]

204	Native or naturalized in regions with tropical or subtropical climates	y
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Qsn #	Question	Answer
	Source(s)	Notes
	CAB International, 2005. Forestry Compendium. CAB International, Wallingford, UK	"China, [Indonesia], Sumatra, [Malaysia], Sabah, Vietnam"
	Kalkman, C. 1993. Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 11, part. 2. Rosaceae. Rijksherbarium / Hortus Botanicus, Leiden, The Netherlands	[High elevations in tropics] Habitat - In Malesia in subalpine shrubland, at 2600-3900 m altitude, on the continent lower."
	Kalkman, G. 1973. Malesian Maloideae. Blumea 21(2): 427-428	[Yes. Higher elevation tropics] "On Mt. Kinabalu [Borneo] the species has been collected at altitudes from 3050 up to more than 3900 m, on almost bare granitic rock and in subalpine shrubbery. On the continent it is known from lower altitudes. The Sumatran specimens are from subalpine scrub at altitudes of 2600 to more than 3000 metres"

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Stace, C. 2010. New Flora of the British Isles. Third Edition. Cambridge University Press, Cambridge, UK	"Intrd-natd; grown in gardens, bird-sown in rough ground in S, planted in forestry plantations in N; scattered in En, Man and Sc; China."
	Wagner, W.L. & Herbst, D.R. Supplement to the Manual of the flowering plants of Hawaii. Smithsonian Institution, Washington, D.C.	"Photinia davidiana (Decne.) Cardot" ... "newly naturalized (East Maui, Hawai'i)"
	Webb, C.J., Sykes, W.R., Garnock-Jones, P.J., Given, D.R., & Brownsey, P.J. (1989). Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised in New Zealand: Additional records and corrections. New Zealand Journal of Botany 27(2): 139-162	[Does the species have a history of repeated introductions outside its natural range? New Zealand] "Stranvaesia davidiana" ... "Christchurch; occasional escape from cultivation."

301	Naturalized beyond native range	y
	Source(s)	Notes
	Stace, C. 2010. New Flora of the British Isles. Third Edition. Cambridge University Press, Cambridge, UK	"Intrd-natd; grown in gardens, bird-sown in rough ground in S, planted in forestry plantations in N; scattered in En, Man and Sc; China."
	Wagner, W.L. & Herbst, D.R. Supplement to the Manual of the flowering plants of Hawaii. Smithsonian Institution, Washington, D.C.	"Photinia davidiana (Decne.) Cardot" ... "newly naturalized (East Maui, Hawai'i)"

Qsn #	Question	Answer
	Herbarium Pacificum Staff. 1996. New Hawaiian pest plant records for 1995. Bishop Museum Occasional Papers. 46: 3-8	"Significance. Long known in Hawaii as "Cotoneaster frigida" (Neal 1965: 386, St. John 1973: 172), a misidentification, this taxon has recently been correctly identified as a tropical species of Photinia native to southern China and northern Vietnam. First collected in 1940 around Nauhi at an elevation of ± 6000 ft, there is now a population "one half mile or more around Nauhi Camp, Nauhi Gulch, and upper Piha area" [from label A. Kikuta s.n.]. A collection from Maui is included here because P. davidiana is very likely naturalized there as well, and field collections are needed to establish its status in and near the Kula Forest Reserve. Material examined. MAUI: E Maui, Kula Forest Reserve, Polipoli Park, 1830 m, Oct 1986, R. Hobdy 2699; HAWAII: Hakalau Forest National Wildlife Refuge, 1585 m, Nauhi, naturalized in this area, 25 Aug 1993, A. Kikuta s.n.; Nauhi, 6000+ ft, native of the Himalayan region, 1 Mar 1940, E. L. Caum s.n."
	Webb, C.J., Sykes, W.R., Garnock-Jones, P.J., Given, D.R., & Brownsey, P.J. (1989). Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised in New Zealand: Additional records and corrections. New Zealand Journal of Botany 27(2): 139-162	"Stranvaesia davidiana" ... "Christchurch; occasional escape from cultivation."

302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	Stewart, M.C. (2010). Mauna Kea Watershed Management Plan. Mauna Kea Watershed Alliance, Hilo, HI	"Table 12: Invasive Plant Species in the MKWA area" [Includes Photinia davidiana]
	U.S. Fish and Wildlife Service. 2010. Hakalau Forest National Wildlife Refuge Comprehensive Conservation Plan. USFWS, Honolulu, HI	[A disturbance-adapted weed managed for its environmental impact] "Table 4-10. List of Invasive Plant Species Known to Currently Occur at Hakalau Forest NWR." ... "Photinia is listed as one of Hawaii's worst invasive horticultural plants by DOFAW. The shrub threatens mesic forests on Hawaii and Oahu from 4,500-6,000 ft" ... "At the HFU, photinia has been shown to be spreading from its past distribution in 1987, in the upper elevation forests in the Nauhi Cabin area (Jacobi and Price 2007). Currently, it occurs in the forests both above and below Nauhi cabin, on both sides of Nauhi Stream, and at elevations 5,200 5,500 ft. Photinia produces a large number of red fleshy fruits that are dispersed by birds (Jacobi and Price 2007)."

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

304	Environmental weed	y
	Source(s)	Notes

Qsn #	Question	Answer
	U.S. Fish and Wildlife Service. 2010. Hakalau Forest National Wildlife Refuge Comprehensive Conservation Plan. USFWS, Honolulu, HI	"At the HFU, photinia has been shown to be spreading from its past distribution in 1987, in the upper elevation forests in the Nauhi Cabin area (Jacobi and Price 2007). Currently, it occurs in the forests both above and below Nauhi cabin, on both sides of Nauhi Stream, and at elevations 5,200 5,500 ft. Photinia produces a large number of red fleshy fruits that are dispersed by birds (Jacobi and Price 2007)."
	Cole, C. (2015). Control of an Incipient Plant, <i>Photinia davidiana</i> , on Windward Mauna Kea, Hawai'i Island. HISC FY15 Funded Projects. https://dlnr.hawaii.gov/hisc/projects/fy15/ . [Accessed 31 Aug 2018]	[Managed as an environmental weed] " <i>Photinia davidiana</i> is a shade tolerant, perennial, 1-3 m tall that forms dense thickets. It is an invasive weed that competes with native plants for space and nutrients. <i>Photinia</i> inhabits, at low to medium density, several hundred acres of the Hakalau Forest National Wildlife refuge, and the adjacent State Game Management Area (Piha). A previous weed survey in the refuge, documented a large increase in the frequency and abundance of this species between 1987 and 2007. TMA staff began working in this area with ISST in 2013 and observed the expansion of the weed since 2007, although it is still limited to one area in Hakalau and Piha. The current limited distribution of <i>Photinia</i> , coupled with the serious threat posed by this species, recommend the plant as a candidate for island eradication. TMA and partners including MKWA, BIISC, and FWS can pool resources and capacity to apply a consistent and comprehensive control effort of <i>Photinia</i> . TMA and partners plan to thoroughly map the infestation at Hakalau and Piha. Additionally, TMA and partners will conduct herbicide treatment trials to improve on current treatment success and efficiency. And lastly, once a successful and effective treatment is identified, TMA will develop a strategy for control, either eradication or suppression, and implement control strategies across the infested area."

305	Congeneric weed	
	Source(s)	Notes
	Nesom, G. L. (2008). <i>Photinia serratifolia</i> (Rosaceae) naturalized in Texas. <i>Phytologia</i> 90: 375-377	" <i>Photinia serratifolia</i> and <i>P. x fraseri</i> Dress (red tip) are among plants listed by the Invaders of Texas (2008) Citizen Science early detection program. These are species "known to occur in or around Texas that are suspected of causing invasive problems." Of the three Texas records for <i>P. x fraseri</i> , one is clearly <i>P. serratifolia</i> (the same record also listed for that species) and the other two appear to be planted, persistent hedges of <i>P. glabra</i> ."
	Hiltner, S. (2008). Princeton Nature Notes - Asian <i>Photinia</i> --A Newly Identified Invasive. http://princetonnaturenotes.blogspot.com/2008/05/oriental-photinia-newly-identified.html . [Accessed 17 Oct 2013]	"Sometimes Mother Nature can fool those who don't look closely enough. It was recently pointed out to me that the large, aggressive shrub in our Princeton, NJ preserves that I was happily calling <i>Aronia arbutifolia</i> is in fact an exotic invasive, <i>Photinia villosa</i> . It did seem strange that a species I had had no luck with growing in the past could be doing so well and acting strangely dominant and exclusionary in the local wilds."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	<i>Photinia arbutifolia</i> , <i>Photinia beauverdiana</i> , <i>Photinia davidsoniae</i> , <i>Photinia floribunda</i> , <i>Photinia glabra</i> , <i>Photinia serratifolia</i> , <i>Photinia serrulata</i> , <i>Photinia villosa</i> listed as naturalized, garden escapes, or potential weeds

Qsn #	Question	Answer
401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Kalkman, C. 1993. Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 11, part. 2. Rosaceae. Rijksherbarium / Hortus Botanicus, Leiden, The Netherlands	"Unarmed trees or shrubs, evergreen or deciduous, Malesian species all evergreen."
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence] "Shrubs or small trees, 110 m tall, densely branched. Branchlets grayish brown when old, terete, initially densely villous, gradually glabrescent, with sparse, inconspicuous lenticels; buds reddish brown, narrowly ovoid, apex shortly acuminate; scales subglabrous or pubescent at margin. Petiole 1.2-2 cm, pilose, gradually glabrescent; stipules caducous, subulate, 5-6 mm, membranous, slightly pilose; leaf blade oblong, oblong-lanceolate, or oblanceolate, (3-)5-12 × 2-4.5 cm, midvein raised abaxially and impressed adaxially, lateral veins 8-16 pairs and inconspicuous, both surfaces grayish brown villous along midvein, base cuneate to broadly cuneate, margin entire or undulate, apex acute or abruptly pointed."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Shrubs or small trees, 1-10 m tall, densely branched." [Rosaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	Backyard Gardener. (2018). <i>Photinia davidiana</i> . https://www.backyardgardener.com . [Accessed]	"Tolerances: deer, drought, heat & humidity, pollution, rabbits, slope, wind"

Qsn #	Question	Answer
405	Toxic to animals	n
	Source(s)	Notes
	Plants for a Future. 2013. <i>Photinia davidiana</i> . http://www.pfaf.org . [Accessed 17 Oct 2013]	"Known Hazards: None known"
	Gardenersworld.com. (2018). <i>Photinia davidiana</i> . https://www.gardenersworld.com/plants/photinia-davidiana/ . [Accessed 3 Sep 2018]	" <i>Photinia davidiana</i> has no toxic effects reported."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	y
	Source(s)	Notes
	Steffen, K., Grousset, F., Schrader, G., Petter, F., & Suffert, M. (2015). Identification of pests and pathogens recorded in Europe with relation to fruit imports. EPPO Bulletin, 45 (2), 223-239	"Table 1 Species used as case examples in this review, with information on whether they were intercepted in import inspections or introduced into the EPPO region during the last 10–15 years, on their potential to cause damage to fruit crops, their regulation status in the EU and whether they are likely to be moved with fruit" [Pest group = Bacteria; Species name = <i>Erwinia amylovora</i> ; Damage = Dieback of stems, wilting, collapse of the leaves and fruit; Regulated in EU = <i>Photinia davidiana</i>]
	Finelli, F., Contessi, A., Calzolari, A., Saccardi, A., Zecchin, G. & Vettorazzo, M. (2004). Fireblight in the Po valley (Italy): the monitoring programmes of Emilia-Romagna and Veneto regions. EPPO Bulletin 34: 331–334	[Host for recognized pests and pathogens? Yes] "Table 1 Results of the official inspections on fireblight spread in Emilia-Romagna (absolute number of cases in 1994/1996, % of total cases in 1997/2002)" [<i>Photinia davidiana</i> can be a host]
	CABI and EPPO. (1991). Data Sheets on Quarantine Pests: <i>Erwinia amylovora</i> . http://www.eppo.int/QUARANTINE/bacteria/Erwinia_amylovora/ERWIAM_ds.pdf . [Accessed 16 Oct 2013]	[Host for recognized pests and pathogens? Yes] "The principal and most susceptible hosts are in the sub-family Pomoideae of the family Rosaceae." ... "The following plants are considered as important hosts, from both economic and epidemiological points of view: <i>Amelanchier alnifolia</i> , <i>A. canadensis</i> , apples, <i>Chaenomeles</i> spp., <i>Cotoneaster</i> spp., <i>Crataegus</i> spp., <i>Cydonia</i> spp., loquats, medlars, pears, <i>Pyracantha</i> spp., <i>Pyrus amygdaliformis</i> , <i>Sorbus</i> spp., <i>Stranvaesia davidiana</i> ."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Plants for a Future. 2018. <i>Photinia davidiana</i> . https://pfaf.org . [Accessed 3 Sep 2018]	"Known Hazards: None known"
	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
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	
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Qsn #	Question	Answer
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	Flammability or contribution to fuel load unknown

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Legler, B. (2015). WTU Herbarium Database: <i>Photinia davidiana</i> . Collection # 13412. Burke Museum of Natural History and Culture. Seattle, WA. http://biology.burke.washington.edu . [Accessed 3 Sep 2018]	"Brushy, shaded understory of mature <i>Pseudotsuga menziesii</i> forest, with some <i>Arbutus menziesii</i> ; understory of <i>Gaultheria shallon</i> , <i>Vaccinium parviflorum</i> , <i>Berberis nervosa</i> , <i>Ilex aquifolium</i> , <i>Hedera helix</i> , and other native and introduced shrubs."
	Plants for a Future. 2018. <i>Photinia davidiana</i> . https://pfaf.org . [Accessed 3 Sep 2018]	"It can grow in semi-shade (light woodland) or no shade."
	Cole, C. (2015). Control of an Incipient Plant, <i>Photinia davidiana</i> , on Windward Mauna Kea, Hawai'i Island. HISC FY15 Funded Projects. https://dlnr.hawaii.gov/hisc/projects/fy15/ . [Accessed 3 Sep 2018]	" <i>Photinia davidiana</i> is a shade tolerant, perennial, 1--3 m tall that forms dense thickets. It is an invasive weed that competes with native plants for space and nutrients."
	Gardiner, J. 2011. The Timber Press Encyclopedia of Flowering Shrubs. Timber Press, Portland, OR	"sun or partial shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	The Royal Horticultural Society. (2018). <i>Photinia</i> . https://www.rhs.org.uk/advice/profile?PID=145 . [Accessed 3 Sep 2018]	" <i>Photinia</i> is tolerant of most soils, even clay as long as it has been improved by incorporating well rotted compost or manure."
	Gardenersworld.com. (2018). <i>Photinia davidiana</i> . https://www.gardenersworld.com/plants/photinia-davidiana/ . [Accessed 3 Sep 2018]	"Soil type: Well drained / light / sandy / clay / heavy / moist"
	Plants for a Future. 2018. <i>Photinia davidiana</i> . https://pfaf.org . [Accessed 3 Sep 2018]	"Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: acid, neutral and basic (alkaline) soils and can grow in very alkaline soils." ... "Succeeds in most soils including calcareous and heavy clays"

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Shrubs or small trees, 1-10 m tall, densely branched. Branchlets grayish brown when old, terete, initially densely villous, gradually glabrescent, with sparse, inconspicuous lenticels; buds reddish brown, narrowly ovoid, apex shortly acuminate; scales subglabrous or pubescent at margin."

412	Forms dense thickets	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Cole, C. (2015). Control of an Incipient Plant, <i>Photinia davidiana</i> , on Windward Mauna Kea, Hawai'i Island. HISC FY15 Funded Projects. https://dlnr.hawaii.gov/hisc/projects/fy15/ . [Accessed 3 Sep 2018]	" <i>Photinia davidiana</i> is a shade tolerant, perennial, 1--3 m tall that forms dense thickets. It is an invasive weed that competes with native plants for space and nutrients."
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. <i>Flora of China</i> . Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Slopes, mountain summits, roadsides, thickets, river valleys, damp gullies; 900-3000 m" [Not specified from native range]
	Zika, P. F. (2006). WTU Herbarium Database: <i>Photinia davidiana</i> . Collection # 22693. Burke Museum of Natural History and Culture. Seattle, WA. http://biology.burke.washington.edu . [Accessed 17 Oct 2013]	[A component of thicket vegetation] " <i>Photinia davidiana</i> " ... "Thickets in holly section, occasional weed with bird-sown shrubs like <i>Ilex aquifolium</i> , <i>Cotoneaster horizontalis</i> , <i>Cotoneaster simonsii</i> , <i>Rubus ursinus</i> . Adventive evergreen shrub 2 meters tall"

501	Aquatic	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. <i>Flora of China</i> . Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Slopes, mountain summits, roadsides, thickets, river valleys, damp gullies; 900-3000 m. Fujian, Gansu, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Malaysia, N Vietnam]."

502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 3 Sep 2018]	Family: Rosaceae Subfamily: Amygdaloideae Tribe: Maleae Subtribe: Malinae
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. <i>Flora of China</i> . Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	Rosaceae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. <i>Flora of China</i> . Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	Rosaceae [Not one of the four genera of Rosaceae documented as N-fixers]

Qsn #	Question	Answer
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Shrubs or small trees, 1-10 m tall, densely branched."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence] "Slopes, mountain summits, roadsides, thickets; 1000 --3000 m. Gansu, Guangxi, Guizhou, Hubei, Jiangxi, Shaanxi, Sichuan, Taiwan, Yunnan [Malaysia, N Vietnam]."

602	Produces viable seed	y
	Source(s)	Notes
	Sheat, B. & Schofield, G. 1995. Complete Gardening in Southern Africa. Struik Publishers, Cape Town, South Africa	"Propagate from seed sown in autumn."
	Plants for a Future. 2018. <i>Photinia davidiana</i> . https://pfaf.org . [Accessed 3 Sep 2018]	"Seed - best sown in a cold frame as soon as it is ripe in the autumn. Stored seed will probably require stratification and should be sown as early in the year as possible[78]. Germination is usually good[78]."
	Kalkman, G. 1973. Malesian Maloideae. <i>Blumea</i> 21(2): 427-428	"Seeds 1-5, ellipsoid to obovoid, c. 4 by 2 mm, testa firm, lightbrown; endosperm thin (or absent?); cotyledons planoconvex."

603	Hybridizes naturally	
	Source(s)	Notes
	Guo, W., Yu, Y., Shen, R. J., Liao, W. B., Chin, S. W., & Potter, D. (2011). A phylogeny of <i>Photinia</i> sensu lato (Rosaceae) and related genera based on nrITS and cpDNA analysis. <i>Plant Systematics and Evolution</i> , 291(1-2), 91-102	"Many intergeneric hybrids in Pyrinae have been reported (Robertson et al. 1991). Hybridization between <i>Photinia</i> and <i>Crataegus</i> , <i>Pyrus</i> , or <i>Chaenomeles</i> could have occurred as many species in these genera are widely distributed and their ranges overlap in eastern Asia."
	WRA Specialist. 2018. Personal Communication	Unknown. No evidence of hybridization found

Qsn #	Question	Answer
604	Self-compatible or apomictic	y
	Source(s)	Notes
	Kudo, G. & Suzuki, S. (2004). Flowering Phenology of Tropical-Alpine Dwarf Trees on Mount Kinabalu, Borneo. <i>Journal of Tropical Ecology</i> 20(5): 563-571	"Two fleshy-fruited species, <i>P. davidiana</i> and <i>V. stapfianum</i> , had high selfing ability for fruit production and showed relatively low flowering synchrony among individuals in comparison with the other species" ... "The fruit set under natural pollination and the selfing ability independent of pollinator service varied among species. <i>Photinia davidiana</i> and <i>V. stapfianum</i> had very high selfing abilities and bagged inflorescences showed similar or even higher fruit sets in comparison with naturally pollinated inflorescences"
605	Requires specialist pollinators	n
	Source(s)	Notes
	Kudo, G. & Suzuki, S. (2004). Flowering Phenology of Tropical-Alpine Dwarf Trees on Mount Kinabalu, Borneo. <i>Journal of Tropical Ecology</i> 20(5): 563-571	"Flowers of <i>L. recurvum</i> and <i>P. davidiana</i> are visited by dipteran insects (personal observation)."
	Plants for a Future. 2018. <i>Photinia davidiana</i> . https://pfaf.org . [Accessed 3 Sep 2018]	"The flowers are hermaphrodite (have both male and female organs) and are pollinated by Insects."
606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Sheat, B. & Schofield, G. 1995. <i>Complete Gardening in Southern Africa</i> . Struik Publishers, Cape Town, South Africa	"Propagate from seed sown in autumn."
607	Minimum generative time (years)	
	Source(s)	Notes
	Shoot Gardening. (2018). <i>Photinia davidiana</i> 'Palette' (Christmas berry 'Palette'). https://www.shootgardening.co.uk/plant/photinia-davidiana-palette . [Accessed 3 Sep 2018]	"10-20 years To maturity" [Possibly >4 years, but unclear if this refers to reproductive maturity, or time to reach ultimate size in a landscape setting]
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Kalkman, C. 1993. <i>Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 11, part. 2. Rosaceae. Rijksherbarium / Hortus Botanicus, Leiden, The Netherlands</i>	"Fruits (sub)globular, up to 8 by 8 mm when dry, free part of hypanthium and sepals closely appressed against the top, exocarp sparsely hairy, red, mesocarp thick and fleshy, up to 2 mm thick when dry, endocarp thin, bony. Seeds 1-5, ellipsoid to obovoid, c. 4 by 2 mm, with firm, brown testa." [No evidence, and fruits and seeds lack means of external attachment]
702	Propagules dispersed intentionally by people	y

Qsn #	Question	Answer
	Source(s)	Notes
	Plants for a Future. 2018. <i>Photinia davidiana</i> . https://pfaf.org . [Accessed 3 Sep 2018]	"A useful informal hedge or screening plant[200]. The wood is hard and heavy, suitable for making furniture and other small articles [266]."
703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	No evidence that this plant is grown with or has become an inadvertent seed contaminant of produce
704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Fruit orangish red, subglobose, 7-8 mm in diam.; sepals erect; seeds narrowly ellipsoid." [Fleshy-fruited]
705	Propagules water dispersed	
	Source(s)	Notes
	U.S. Fish and Wildlife Service. 2010. Hakalau Forest National Wildlife Refuge Comprehensive Conservation Plan. USFWS, Honolulu, HI	[Possibly. Although adapted for frugivory, distribution along stream suggests water may be aiding in dispersal of the seeds] "At the HFU, photinia has been shown to be spreading from its past distribution in 1987, in the upper elevation forests in the Nauhi Cabin area (Jacobi and Price 2007). Currently, it occurs in the forests both above and below Nauhi cabin, on both sides of Nauhi Stream, and at elevations 5,200 5,500 ft. <i>Photinia</i> produces a large number of red fleshy fruits that are dispersed by birds (Jacobi and Price 2007)."
706	Propagules bird dispersed	y
	Source(s)	Notes
	Kudo, G. & Suzuki, S. (2004). Flowering Phenology of Tropical-Alpine Dwarf Trees on Mount Kinabalu, Borneo. <i>Journal of Tropical Ecology</i> 20(5): 563-571	"Among the target species in this study, <i>P. davidiana</i> and <i>V. stapfianum</i> produce fleshy fruits suggesting bird dispersal, and the others produce dehiscent fruits that are gravity dispersed."
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Fruit a pome, ovoid to subglobose, fleshy, with persistent sepals; carpel crustaceous; locules abaxially loculicidally dehiscent; seeds oblong, compressed, testa leathery; cotyledons nearly flat." [Genus description] "Fruit orangish red, subglobose, 7-8 mm in diam.; sepals erect; seeds narrowly ellipsoid." [Species description]
	U.S. Fish and Wildlife Service. 2010. Hakalau Forest National Wildlife Refuge Comprehensive Conservation Plan. USFWS, Honolulu, HI	" <i>Photinia</i> produces a large number of red fleshy fruits that are dispersed by birds (Jacobi and Price 2007)."
707	Propagules dispersed by other animals (externally)	n

Qsn #	Question	Answer
	Source(s)	Notes
	Kalkman, C. 1993. Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 11, part. 2. Rosaceae. Rijksherbarium / Hortus Botanicus, Leiden, The Netherlands	"Fruits (sub)globular, up to 8 by 8 mm when dry, free part of hypanthium and sepals closely appressed against the top, exocarp sparsely hairy, red, mesocarp thick and fleshy, up to 2 mm thick when dry, endocarp thin, bony. Seeds 1-5, ellipsoid to obovoid, c. 4 by 2 mm, with firm, brown testa." [No evidence, and fruits and seeds lack means of external attachment]

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Grueter, C.C., Li, D., Ren, B., Wei, F. & van Schaik, C.P. (2009). Dietary profile of <i>Rhinopithecus bieti</i> and its socioecological implications. <i>International Journal of Primatology</i> 30(4): 601-624	"Table II Food repertoire of <i>Rhinopithecus bieti</i> at Samage" [Stranvaesia davidiana - Mature leaf & Fruit are consumed]
	Kudo, G. & Suzuki, S. (2004). Flowering Phenology of Tropical-Alpine Dwarf Trees on Mount Kinabalu, Borneo. <i>Journal of Tropical Ecology</i> 20(5): 563-571	[Presumably Yes] "Among the target species in this study, <i>P. davidiana</i> and <i>V. stapfianum</i> produce fleshy fruits suggesting bird dispersal, and the others produce dehiscent fruits that are gravity dispersed."

801	Prolific seed production (>1000/m2)	n
	Source(s)	Notes
	Kalkman, C. 1993. Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 11, part. 2. Rosaceae. Rijksherbarium / Hortus Botanicus, Leiden, The Netherlands	"Fruit a pome, covered at apex by the persistent free part of the hypanthium and the sepals, core consisting of the bony endocarp. Seeds 1 or 2 per cell, rather small, testa rather hard, endosperm thin or absent." [few seeded pome] "Fruits (sub)globular, up to 8 by 8 mm when dry, free part of hypanthium and sepals closely appressed against the top, exocarp sparsely hairy, red, mesocarp thick and fleshy, up to 2 mm thick when dry, endocarp thin, bony. Seeds 1-5, ellipsoid to obovoid, c. 4 by 2 mm, with firm, brown testa."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Biodiversity International. 2013. Species Compendium Database - <i>Photinia davidiana</i> . http://scdb.biodiversityinternational.org . [Accessed 17 Oct 2013]	"Storage behaviour: This species may show orthodox seed storage behaviour."
	Royal Botanic Gardens Kew. (2018) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/ . [Accessed 3 Sep 2018]	"Storage Behaviour: No data available for species. Of 8 known taxa of genus <i>Photinia</i> , 100.00% Orthodox(p/?)"

803	Well controlled by herbicides	y
	Source(s)	Notes

Qsn #	Question	Answer
	Big Island Invasive Species Committee. (2015). Detection and Control of Invasive Species on the Island of Hawaii (Grant C51507) Final Report to the Hawaii Invasive Species Council. https://dlnr.hawaii.gov/hisc/files/2014/04/BISC-FY2015-HISC-Final-Report.pdf . [Accessed 3 Sep 2018]	"2015-16 funding also supported herbicide trials conducted by BIISC and Dr. James Leary of CTAHR. Previous work had attempted to control the plants with triclopyr (Garlon 4) which is problematic in rainy conditions, and was found to have little effect on Photinia even when applied during good weather (BIISC 2015). The preferred method identified for controlling Photinia is a very light hack and squirt application of 100% imazapyr, applied with a 7oz thin-line bottle. This method has been proven effective at controlling small to large plants. The application of minute quantities of imazapyr directly into the tissues using shallow slices into the cambium (sap wood) of each stem is safe and effective in mist-to-light rain, which is nearly constant at Hakalau."
	Leary, J. 2008. CTAHR Videos: Weed Management and Control: HBT™ for Control of Photinia. University of Hawai'i - College of Tropical Agriculture and Human Resources. http://www.youtube.com/watch?v=2kA18fel90g . [Accessed 3 Sep 2018]	"Dr. James Leary, UH-CTAHR Invasive Weed Specialist, conducts HBT (herbicide ballistic technology) trials on Photinia davidiana with imazapyr (Habitat©). Includes footage showing herbicide damage to photinia and minimal damage to adjacent ohia and Acacia koa." [Imazapyr starting to affect young leaf tips 60 days after application]

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Grows on You. (2009). When can I prune Photinia davidiana to keep it tidy also to preserve the colour. 7 Apr, 2009. http://www.growsonyou.com . [Accessed 3 Sep 2018]	[Tolerates frequent pruning] "We prune ours four times a year. We have shrubs that are 17 years old and they are still only 2 foot high. By pruning them regularly - when losing their red colour and going and uninteresting brown - we get lots of fresh red growth. We try and disguise the cuts and keep the plant a pleasing shape."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	Herbarium Pacificum Staff. 1996. New Hawaiian pest plant records for 1995. Bishop Museum Occasional Papers. 46: 3-8	[Unknown] "First collected in 1940 around Nauhi at an elevation of ± 6000 ft, there is now a population "one half mile or more around Nauhi Camp, Nauhi Gulch, and upper Piha area" [from label A. Kikuta s.n.]. A collection from Maui is included here because P. davidiana is very likely naturalized there as well, and field collections are needed to establish its status in and near the Kula Forest Reserve. Material examined. MAUI: E Maui, Kula Forest Reserve, Polipoli Park, 1830 m, Oct 1986, R. Hobdy 2699; HAWAII: Hakalau Forest National Wildlife Refuge, 1585 m, Nauhi, naturalized in this area, 25 Aug 1993, A. Kikuta s.n.; Nauhi, 6000+ ft, native of the Himalayan region, 1 Mar 1940, E. L. Caum s.n."

Summary of Risk Traits:

High Risk / Undesirable Traits

- Can grow in upper elevation tropical climates
- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Naturalized in upper elevations of Maui, and Hawaii (Hawaiian Islands), and elsewhere
- An environmental weed in forest reserves of Hawaii
- Related *Photinia* species may be invasive
- Host of fireblight pathogen
- Tolerates some shade
- Tolerates many soil types
- Reported to form dense thickets in higher elevations of Hawaiian Islands
- Self-compatible
- Fleshy-fruited with seeds dispersed by birds and mammals
- Tolerates frequent pruning

Low Risk Traits

- May require cold stratification for seeds to germinate
- Possible long time to reproductive maturity
- Not known to spread vegetatively
- Herbicide imazapyr provides effective control