

<b>Taxon:</b> <i>Leea guineensis</i> G. Don	<b>Family:</b> Leeaceae
<b>Common Name(s):</b> burgundy leea Hawaiian holly West Indian holly	<b>Synonym(s):</b> <i>Leea coccinea</i> Planch. <i>Leea manillensis</i> Walp.

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 8 Oct 2019
<b>WRA Score:</b> -1.0	<b>Designation:</b> L	<b>Rating:</b> <span style="background-color: yellow;">Low Risk</span>

**Keywords:** Tropical Shrub, Unarmed, Ornamental, Shade-Tolerant, 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)	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	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	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	n
407	Causes allergies or is otherwise toxic to humans		
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y

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	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 <sup>2</sup> )		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

**Supporting Data:**

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Ridsdale, C. E. (1974). A revision of the family Leeaceae. <i>Blumea</i> , 22(1), 57-100	[No evidence of domestication] "In the present circumscription the species shows a wide range of variability, both geographically and ecologically. It is undoubtedly a complex species composed of overlapping entities which cannot be satisfactorily delimited from each other, these entities sometimes having different ecological preferences."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2019). 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"	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2019). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 8 Oct 2019]	"Native Africa NORTHEAST TROPICAL AFRICA: Sudan EAST TROPICAL AFRICA: Kenya, Tanzania, Uganda WEST-CENTRAL TROPICAL AFRICA: Burundi, Cameroon, Central African Republic, Democratic Republic of the Congo, Gabon WEST TROPICAL AFRICA: Benin, Cote D'Ivoire, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Nigeria, Sierra Leone, Togo SOUTH TROPICAL AFRICA: Angola, Malawi, Zambia WESTERN INDIAN OCEAN: Madagascar, Mauritius Asia-Temperate EASTERN ASIA: Taiwan Asia-Tropical INDIAN SUBCONTINENT: Bhutan, India [Assam, Maharashtra, Manipur, Meghalaya, Sikkim, Tamil Nadu, Uttar Pradesh] PAPUASIA: Indonesia [Papua Barat] INDO-CHINA: Cambodia, India, [Andaman and Nicobar Islands] Laos, Myanmar, Thailand MALESIA: Indonesia, [Sulawesi (n.), Jawa, Lesser Sunda Islands, Sumatera] Malaysia (Malaya), Philippines"

202	Quality of climate match data	High
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2019). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 8 Oct 2019]	

203	Broad climate suitability (environmental versatility)	y
	<b>Source(s)</b>	<b>Notes</b>
	Missouri Botanical Garden. (2019). <i>Leea guineensis</i> . <a href="http://www.missouribotanicalgarden.org">http://www.missouribotanicalgarden.org</a> . [Accessed 8 Oct 2019]	" Native Range: Tropical Africa, tropical Asia Zone: 10 to 11" [Restricted to tropical climates, but with broad elevation range]
	Uji, T. (2001). <i>Leea van Royen</i> ex L.. In: van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors): Plant Resources of South-East Asia No 12(2): Medicinal and poisonous plants 2. PROSEA Foundation, Bogor, Indonesia. <a href="http://prota4u.org/prosea">prota4u.org/prosea</a>	"The majority of the widespread <i>Leea</i> species are found below 100 m altitude, but a few species ascend occasionally to 1500 m ( <i>Leea guineensis</i> ) or even to 1700 m ( <i>Leea indica</i> ) altitude."
	Steenis, C.G.G.J. van (ed.). (1976). <i>Flora Malesiana</i> . Series I, Spermatophyta: Flowering plants. Volume 7, part 4. Sijthoff & Noordhoff International Publishers, Leiden, The Netherlands	[Broad elevation range, demonstrating environmental versatility] "Ecol. In the Philippines, Taiwan and Micronesia replacing <i>L. indica</i> as the wide-spread component of secondary regrowth vegetation, but also found in primary forest; throughout the remainder of Malesia, a rather rare shrub of primary forest and shaded localities, in the area India to Vietnam and also in Africa it is once more a common component of secondary vegetation. From sea-level up to 1500 m, in the Himalayas ascending to 2250 m."

204	Native or naturalized in regions with tropical or subtropical climates	y
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2007. <i>Flora of China</i> . Vol. 12 (Hippocastanaceae through Theaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Forests, shrublands. Taiwan [Bangladesh, Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Thailand, Vietnam; Africa, Madagascar]."

Qsn #	Question	Answer
	<p>USDA, Agricultural Research Service, National Plant Germplasm System. (2019). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a>. [Accessed 8 Oct 2019]</p>	<p>"Native Africa            NORTHEAST TROPICAL AFRICA: Sudan            EAST TROPICAL AFRICA: Kenya, Tanzania, Uganda            WEST-CENTRAL TROPICAL AFRICA: Burundi, Cameroon, Central African Republic, Democratic Republic of the Congo, Gabon            WEST TROPICAL AFRICA: Benin, Cote D'Ivoire, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Nigeria, Sierra Leone, Togo            SOUTH TROPICAL AFRICA: Angola, Malawi, Zambia            WESTERN INDIAN OCEAN: Madagascar, Mauritius            Asia-Temperate            EASTERN ASIA: Taiwan            Asia-Tropical            INDIAN SUBCONTINENT: Bhutan, India [Assam, Maharashtra, Manipur, Meghalaya, Sikkim, Tamil Nadu, Uttar Pradesh]            PAPUASIA: Indonesia [Papua Barat]            INDO-CHINA: Cambodia, India, [Andaman and Nicobar Islands] Laos, Myanmar, Thailand            MALESIA: Indonesia, [Sulawesi (n.), Jawa, Lesser Sunda Islands, Sumatera] Malaysia (Malaya), Philippines"</p>

205	Does the species have a history of repeated introductions outside its natural range?	y
	<b>Source(s)</b>	<b>Notes</b>
	<p>Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York</p>	<p>"Economic Importance. <i>Leea guineensis</i> and <i>L. indica</i> have been cultivated in tropical regions as ornamentals, and the former is often marketed under the name of <i>L. coccinea</i>."</p>
	<p>Imada, C.T., Staples, G.W. &amp; Herbst, D.R. 2005. Annotated Checklist of Cultivated Plants of Hawai'i. <a href="http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/">http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/</a>. [Accessed 8 Oct 2019]</p>	<p>"First Collected: 1968            Locations:            Foster Botanical Garden            Harold L. Lyon Arboretum (Confirmed)            Ho'omaluhia Botanical Garden            Pacific Tropical Botanical Garden (now National Tropical Botanical Garden)            Wahiawa Botanical Garden            Waimea Arboretum &amp; Botanical Garden (Confirmed)"</p>
	<p>Uji, T. (2001). <i>Leea</i> van Royen ex L.. In: van Valkenburg, J.L.C.H. and Bunyaphatsara, N. (Editors): Plant Resources of South-East Asia No 12(2): Medicinal and poisonous plants 2. PROSEA Foundation, Bogor, Indonesia. <a href="http://prota4u.org/prosea">prota4u.org/prosea</a></p>	<p>"Some <i>Leea</i> species are well-known garden and pot plants in tropical and subtropical regions e.g. <i>Leea guineensis</i> and <i>Leea indica</i>."</p>
	<p>Whistler, W.A. 2000. Tropical Ornamentals: A Guide. Timber Press, Portland, OR</p>	<p>"widely cultivated for its glossy green or sometimes purplish foliage and large clusters of red and purplish flowers." ... "It is usually cultivated as a screen or hedge plant, or grown in mass plantings, especially in Florida, where it is one of the most common hedge plants."</p>

301	Naturalized beyond native range	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Imada, C. 2012. Hawaiian Native and Naturalized Vascular Plants Checklist (December 2012 update). Bishop Museum Technical Report 60. 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
	Wagner, W.L., Herbst, D.R. & Lorence, D.H. (2019). Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. <a href="http://botany.si.edu/">http://botany.si.edu/</a> . [Accessed 8 Oct 2019]	No evidence to date

302	Garden/amenity/disturbance weed	n
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"References: India-W-1977" [Reference cited indicates no evidence of impacts]
	Global Register of Introduced and Invasive Species. (2019). <i>Leea guineense</i> . <a href="http://griis.org/">http://griis.org/</a> . [Accessed 8 Oct 2019]	Recorded in India and the Seychelles with no evidence of impacts

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

304	Environmental weed	n
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"References: India-W-1977" [Reference cited indicates no evidence of impacts]
	Global Register of Introduced and Invasive Species. (2019). <i>Leea guineense</i> . <a href="http://griis.org/">http://griis.org/</a> . [Accessed 8 Oct 2019]	Recorded in India and the Seychelles with no evidence of impacts

305	Congeneric weed	n
	<b>Source(s)</b>	<b>Notes</b>
	Galinato, M.I., Moody, K. & Piggin, C.M. 1999. Upland rice weeds of south and southeast Asia. International Rice Research Institute, Los Baños, Philippines	"Appendix 4. An inventory of spontaneous and cultivated vegetation occurring in upland rice in South and Southeast Asia." [ <i>Leea indica</i> listed as a weed of rice crops in Thailand. Impacts have not been specified]

401	Produces spines, thorns or burrs	n
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2007. Flora of China. Vol. 12 (Hippocastanaceae through Theaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence] "Shrubs or small trees. Branchlets terete, almost glabrous. Leaves 2- or 3-pinnate; petiole 6–13 cm, central petiolules 1.5– 4 cm, lateral petiolules 0.5–1.5 cm, glabrous; leaflets oval elliptic to long and roundly lanceolate, 5–15 × 2.5–8 cm, base broadly cuneate, or rarely suborbicular, margin with acute teeth, apex acuminate, glabrous; lateral veins 6–11 pairs, abaxial veinlets conspicuous but not protruding. Inflorescences a corymbose-like compound dichasium, ca. 50 cm in diam. Pedicel very short or nearly none, sparsely with papillary hairs; buds ca. 3 mm. Calyx tube cupulate; sepal triangular, with an acute apex, glabrous. Petals 5, elliptic, red. Stamens 5; filaments 1.2–1.6 mm; anthers yellow. Ovary ovate; stigma expanded slightly. Berry subglobose, ca. 0.8 cm in diam."

402	Allelopathic	n
	Source(s)	Notes
	Fujii, Y., Parvez, S. S., Parvez, M., Ohmae, Y., & Iida, O. 2003. Screening of 239 medicinal plant species for allelopathic activity using the sandwich method. <i>Weed Biology and Management</i> , 3(4): 233-241	"Table 1. Screening of leaf litter of 239 medicinal plant species under different families using the sandwich method" [Unknown for <i>L. indica</i> . <i>Leea guineensis</i> extracts evaluated for allelopathy, but results were not significant]

403	Parasitic	n
	Source(s)	Notes
	Steenis, C.G.G.J. van (ed.). (1976). <i>Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 7, part 4.</i> Sijthoff & Noordhoff International Publishers, Leiden, The Netherlands	"Shrub, sometimes with a creeping rootstock, or ± herbaceous branches, or tree 1-5 (-10) m" [Vitaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Rode, K. D., Chiyo, P. I., Chapman, C. A., & McDowell, L. R. (2006). Nutritional ecology of elephants in Kibale National Park, Uganda, and its relationship with crop-raiding behaviour. <i>Journal of Tropical Ecology</i> , 22(4), 441-449	"Table 2. Acid detergent fibre (ADF) and sodium (Na) concentrations of wild foods consumed by elephants in Kibale National Park, Uganda." [Leaves of <i>Leea guineensis</i> consumed]

405	Toxic to animals	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2019). <i>Leea guineensis</i> . <a href="http://tropical.theferns.info/viewtropical.php?id=Leea+guineensis">http://tropical.theferns.info/viewtropical.php?id=Leea+guineensis</a> . [Accessed 8 Oct 2019]	"Known Hazards - None known"
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"The juice from the berries, however, is reportedly irritating to humans." [But no evidence of toxicity to animals]

406	Host for recognized pests and pathogens	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Uji, T. (2001). <i>Leea van Royen ex L.</i> . In: van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors): Plant Resources of South-East Asia No 12(2): Medicinal and poisonous plants 2. PROSEA Foundation, Bogor, Indonesia. <a href="http://prota4u.org/prosea">prota4u.org/prosea</a>	"In Hawaii cultivated <i>Leea guineensis</i> is susceptible to <i>Phytophthora meadii</i> causing leaf spot, blight, defoliation and death of young plants, and <i>Calonectria crotalariae</i> causing collar rot and leaf spot. In France, <i>Phytophthora nicotianae</i> var. <i>nicotiana</i> may cause problems in <i>Leea guineensis</i> ."
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"Insect pests do not bother <i>leea</i> . Under conditions of excessive moisture and high humidity, a leaf spot and blight caused by a fungus ( <i>Phytophthora</i> sp.) may attack the plant, causing leaf drop, wilting, and death of small plants in the nursery."
	Missouri Botanical Garden. (2019). <i>Leea guineensis</i> . <a href="http://www.missouribotanicalgarden.org">http://www.missouribotanicalgarden.org</a> . [Accessed 8 Oct 2019]	"No serious insect or disease problems. Leaves/berries are toxic if ingested and may cause skin irritations. Leaf spot may develop in plants grown in areas of excessive moisture."

407	Causes allergies or is otherwise toxic to humans	
	<b>Source(s)</b>	<b>Notes</b>
	Missouri Botanical Garden. (2019). <i>Leea guineensis</i> . <a href="http://www.missouribotanicalgarden.org">http://www.missouribotanicalgarden.org</a> . [Accessed 8 Oct 2019]	"Leaves/berries are toxic if ingested and may cause skin irritations."
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"The juice from the berries, however, is reportedly irritating to humans."
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	[No evidence. Used medicinally] "Bark ground and applied on deep wounds. Roots, branches and leaves decoction used as vulnerary. Leaves and roots antiseptic, antibacterial, analgesic, antidiabetic, aphrodisiac."

408	Creates a fire hazard in natural ecosystems	n
	<b>Source(s)</b>	<b>Notes</b>
	Steenis, C.G.G.J. van (ed.). (1976). <i>Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 7, part 4</i> . Sijthoff & Noordhoff International Publishers, Leiden, The Netherlands	"In the Philippines, Taiwan and Micronesia replacing <i>L. indica</i> as the wide-spread component of secondary regrowth vegetation, but also found in primary forest; throughout the remainder of Malesia, a rather rare shrub of primary forest and shaded localities, in the area India to Vietnam and also in Africa it is once more a common component of secondary vegetation." [No evidence found]
	Top Tropicals. (2019). <i>Leea guineensis</i> . <a href="https://toptropicals.com/catalog/uid/leea_guineensis.htm">https://toptropicals.com/catalog/uid/leea_guineensis.htm</a> . [Accessed 8 Oct 2019]	" <i>Leea guineensis</i> need partial shade with intermediate to warm temperatures. The plant cannot withstand much drought and should be kept moist at all times." [No evidence. Unlikely. Evergreen shrub or tree of moist habitats]

409	Is a shade tolerant plant at some stage of its life cycle	y
	<b>Source(s)</b>	<b>Notes</b>
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"An understory species that grows naturally on the forest floor, <i>L. guineensis</i> is adapted to low light levels and is an excellent indoor or outdoor container plant"



Qsn #	Question	Answer
	Missouri Botanical Garden. (2019). <i>Leea guineensis</i> . <a href="http://www.missouribotanicalgarden.org">http://www.missouribotanicalgarden.org</a> . [Accessed 8 Oct 2019]	"Sun: Part shade to full shade" ... "Tolerate: Heavy Shade"
	Steenis, C.G.G.J. van (ed.). (1976). <i>Flora Malesiana</i> . Series I, Spermatophyta: Flowering plants. Volume 7, part 4. Sijthoff & Noordhoff International Publishers, Leiden, The Netherlands	"throughout the remainder of Malesia, a rather rare shrub of primary forest and shaded localities"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Whistler, W.A. 2000. <i>Tropical Ornamentals: A Guide</i> . Timber Press, Portland, OR	"Fertile, moist but well-drained soils are preferred."
	Missouri Botanical Garden. (2019). <i>Leea guineensis</i> . <a href="http://www.missouribotanicalgarden.org">http://www.missouribotanicalgarden.org</a> . [Accessed 8 Oct 2019]	"It is best grown in rich, evenly moist but well-drained soils in part shade."
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"requires rich, well-drained soil, constant moisture, and regular applications of fertilizer."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2007. <i>Flora of China</i> . Vol. 12 (Hippocastanaceae through Theaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Shrubs or small trees."

412	Forms dense thickets	n
	Source(s)	Notes
	Steenis, C.G.G.J. van (ed.). (1976). <i>Flora Malesiana</i> . Series I, Spermatophyta: Flowering plants. Volume 7, part 4. Sijthoff & Noordhoff International Publishers, Leiden, The Netherlands	[No evidence] "Ecol. In the Philippines, Taiwan and Micronesia replacing <i>L. indica</i> as the wide-spread component of secondary regrowth vegetation, but also found in primary forest; throughout the remainder of Malesia, a rather rare shrub of primary forest and shaded localities, in the area India to Vietnam and also in Africa it is once more a common component of secondary vegetation. From sea- level up to 1500 m, in the Himalayas ascending to 2250 m."
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2007. <i>Flora of China</i> . Vol. 12 (Hippocastanaceae through Theaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence] "Forests, shrublands. Taiwan [Bangladesh, Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, New Guinea, Philippines, Thailand, Vietnam; Africa, Madagascar]."

Qsn #	Question	Answer
501	<b>Aquatic</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2007. Flora of China. Vol. 12 (Hippocastanaceae through Theaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Terrestrial] "Shrubs or small trees." ... "Forests, shrublands."
502	<b>Grass</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2019). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 8 Oct 2019]	Family: Vitaceae Subfamily: Leeoideae Alternate family(ies): Leeaceae
503	<b>Nitrogen fixing woody plant</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2019). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 8 Oct 2019]	Family: Vitaceae Subfamily: Leeoideae Alternate family(ies): Leeaceae
504	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2007. Flora of China. Vol. 12 (Hippocastanaceae through Theaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Shrubs or small trees."
601	<b>Evidence of substantial reproductive failure in native habitat</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Ridsdale, C. E. (1974). A revision of the family Leeaceae. <i>Blumea</i> , 22(1), 57-100	[No evidence] "Africa: West Tropical (incl. Gulf of Guinea Is. to Sao Tome), Central and East Tropical Madagascar, Bourbon, Mauritius; Asia: India (Bombay, Madras northwards to United Prov., eastwards to Sikkim and Assam), Andaman Is., Burma, Thailand, Cambodia, Laos; southwards becoming very rare: Peninsular Thailand, Malaya, Sumatra, Java, Lesser Sunda Is. (apparently absent from Borneo), Philippines (abundant throughout), Taiwan, Micronesia (Palau), N. Celebes, New Guinea (rare in this area)."
602	<b>Produces viable seed</b>	y

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Herrmann, J. D. (2012). The germination of <i>Leea guineensis</i> (Leeaceae) and its role in arthropod communities. <i>Journal of Tropical Forest Science</i> , 24(2), 178-186	"Despite the evolutionary affinity of <i>Leea</i> spp. with grapes and their potential use as medicinal herb, the ecology of <i>Leea guineensis</i> is poorly known. Information on its ecology is important if <i>L. guineensis</i> is to be included in high diversity forest farming systems. Therefore, the aim of this study was to investigate the general germination requirements of <i>L. guineensis</i> and its importance to arthropod communities. <i>Leea guineensis</i> had low germination rate under laboratory conditions. The best germination rate was 27 °C with exposure to light, a characteristic of pioneer plants. The study highlighted the role of <i>L. guineensis</i> as food source for a variety of arthropod species. It is classified as myrmecophyte, showing mutualistic relationship with ants from the genus <i>Crematogaster</i> . The study suggests the use of this plant as a pioneer species in high diversity forest farming systems."
	Steenis, C.G.G.J. van (ed.). (1976). <i>Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 7, part 4.</i> Sijthoff & Noordhoff International Publishers, Leiden, The Netherlands	"Fruit 5 -15 mm Ø, red; seeds usually 6, c. 5 by 4 mm, rumination outline simple, endosperm simply ruminant."
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places.</i> Bishop Museum Press, Honolulu, HI	" <i>Leea</i> can be propagated by seed or from 3-4" long semiwoody cuttings."
	Whistler, W.A. 2000. <i>Tropical Ornamentals: A Guide.</i> Timber Press, Portland, OR	"Propagate by cuttings or seeds."

603	Hybridizes naturally	
	<b>Source(s)</b>	<b>Notes</b>
	Molina, J. E. (2009). <i>Evolution, Pollination Biology, and Biogeography of the Grape Relative Leea (Leeaceae, Vitales).</i> PhD Dissertation. Rutgers University, New Brunswick, New Jersey	[Hybridization may be possible in genus] " <i>Leea asiatica</i> , as circumscribed by Ridsdale (1974, 1980), may be a species complex composed of two distinct morphotypes: <i>L. crispa</i> and <i>L. aspera</i> (Molina, chapter 1). <i>Leea asiatica</i> s. str. (= <i>L. crispa</i> sensu Lawson 1875) is a polyploid (2n=48). It is characterized by petioles and peduncles with crisped wings and acutely serrate leaves that are glabrous above. On the other hand, <i>L. aspera</i> (sensu Lawson 1875) displays the common ploidy level of 2n=24. It differs from <i>L. asiatica</i> s. str. in having leaves with white scattered appressed hairs between nerves and generally crenate-serrate margin (Lawson 1875). I have personally seen intermediates, probably hybrids, which may have prompted Ridsdale (1974) to combine these entities. Detailed cytological and phylogeographic work are needed to resolve this species complex."

604	Self-compatible or apomictic	
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Molina, J. (2009). Floral biology of Philippine morphospecies of the grape relative <i>Leea</i> (Leeaceae). <i>Plant Species Biology</i> , 24(1), 53-60	[Possibly No] "Significantly diminished fruit set in the bagged treatments demonstrates the inability of <i>Leea</i> to be autogamous and its need for insect-mediated pollination, although it is unclear whether it requires insect-mediated selfing, outcrossing or both. Previous flower emasculations by hand to determine <i>Leea</i> 's potential reliance on insect-mediated outcrossing were futile, resulting in aborted flowers the following day (J. Molina, pers. obs., 2005), perhaps because of inadvertent mechanical injury or a lack of pollen gatherers, which might be necessary to progress to the female phase."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Uji, T. (2001). <i>Leea van Royen ex L.</i> . In: van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors): <i>Plant Resources of South-East Asia No 12(2): Medicinal and poisonous plants 2</i> . PROSEA Foundation, Bogor, Indonesia. <a href="http://prota4u.org/prosea">prota4u.org/prosea</a>	"In general flowers of <i>Leea</i> are pollinated by flies and the fruits are dispersed by birds. The inconspicuous, scentless flowers of the greenish-white flowered species are frequented by short tongued bees and sylphids."
	Molina, J. (2009). Floral biology of Philippine morphospecies of the grape relative <i>Leea</i> (Leeaceae). <i>Plant Species Biology</i> , 24(1), 53-60	" <i>Leea guineensis</i> received more than twice the number of visitations than either form of <i>L. indica</i> . <i>Leea guineensis</i> attracted 12 species of visitors, including four wasp species (Fig. 3h,i,m; one not shown), five butterfly species (Fig. 3q,t; three not shown), two bee species (Fig. 3j,l) and one fly species (Fig. 3f). Two <i>L. guineensis</i> individuals growing in an open area approximately 2 km from the plot were frequented by additional visitors (Fig. 3c,d,g,k,n-p,r,s), including two types of spiders (Fig. 3a,b) that are unlikely to be pollinators."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Uji, T. (2001). <i>Leea van Royen ex L.</i> . In: van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors): <i>Plant Resources of South-East Asia No 12(2): Medicinal and poisonous plants 2</i> . PROSEA Foundation, Bogor, Indonesia. <a href="http://prota4u.org/prosea">prota4u.org/prosea</a>	" <i>Leea</i> can be propagated by stem cuttings, air-layering or by seed." [No evidence of vegetative spread]

607	Minimum generative time (years)	n
	Source(s)	Notes
	Flora Fauna Web. (2019). <i>Leea guineensis</i> . <a href="https://www.nparks.gov.sg/florafaunaweb/flora/4/3/4371">https://www.nparks.gov.sg/florafaunaweb/flora/4/3/4371</a> . [Accessed 8 Oct 2019]	"Plant Growth Rate: Moderate" [Unknown]

Qsn #	Question	Answer
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Steenis, C.G.G.J. van (ed.). (1976). Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 7, part 4. Sijthoff & Noordhoff International Publishers, Leiden, The Netherlands	"Fruit 5 -15 mm $\emptyset$ , red; seeds usually 6, c. 5 by 4 mm" [No means of external attachment]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. 2007. The families and genera of vascular plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"Economic Importance. <i>Leea guineensis</i> and <i>L. indica</i> have been cultivated in tropical regions as ornamentals, and the former is often marketed under the name of <i>L. coccinea</i> ."
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"The precise origin of cultivated plants is not known, but the species was first introduced to cultivation in Europe about 1853. J. F. Rock mentions that he was responsible for bringing this species into Hawai'i (under the name <i>L. manillensis</i> ) from the Philippines."
	Whistler, W.A. 2000. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	"widely cultivated for its glossy green or sometimes purplish foliage and large clusters of red and purplish flowers."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Steenis, C.G.G.J. van (ed.). (1976). Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 7, part 4. Sijthoff & Noordhoff International Publishers, Leiden, The Netherlands	"Fruit 5 -15 mm $\emptyset$ , red; seeds usually 6, c. 5 by 4 mm" [No evidence]

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Steenis, C.G.G.J. van (ed.). (1976). Flora Malesiana. Series I, Spermatophyta: Flowering plants. Volume 7, part 4. Sijthoff & Noordhoff International Publishers, Leiden, The Netherlands	"Fruit 5 -15 mm $\emptyset$ , red; seeds usually 6, c. 5 by 4 mm"
	Uji, T. (2001). <i>Leea</i> van Royen ex L.. In: van Valkenburg, J.L.C.H. and Bunyaphatsara, N. (Editors): Plant Resources of South-East Asia No 12(2): Medicinal and poisonous plants 2. PROSEA Foundation, Bogor, Indonesia. <a href="http://prota4u.org/prosea">prota4u.org/prosea</a>	"In general flowers of <i>Leea</i> are pollinated by flies and the fruits are dispersed by birds."

Qsn #	Question	Answer
705	Propagules water dispersed	
	Source(s)	Notes
	Townes, W. (2010). Seed dispersal of the genus <i>Leea</i> in forest patches of Bataan, Philippines. <i>Ecotropica</i> , 16(2), 145-148	" <i>Leea</i> trees were located along two intermittent streams near the Kanawan Aeta community, Morong, Bataan" [Distribution along streams suggests water may move seeds, in addition to birds and other frugivorous animals]

706	Propagules bird dispersed	y
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2007. <i>Flora of China</i> . Vol. 12 (Hippocastanaceae through Theaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Berry subglobose, ca. 0.8 cm in diam."
	Uji, T. (2001). <i>Leea van Royen ex L.</i> . In: van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors): <i>Plant Resources of South-East Asia No 12(2): Medicinal and poisonous plants 2</i> . PROSEA Foundation, Bogor, Indonesia. <a href="http://prota4u.org/prosea">prota4u.org/prosea</a>	"In general flowers of <i>Leea</i> are pollinated by flies and the fruits are dispersed by birds."
	Townes, W. (2010). Seed dispersal of the genus <i>Leea</i> in forest patches of Bataan, Philippines. <i>Ecotropica</i> , 16(2), 145-148	"None of the 12 fruiting <i>Leea</i> trees monitored were flowering, preventing species identification. However, habitat (and a local botanist) suggested they were likely <i>Leea guineensis</i> (Ferrerias, pers. comm.)." ... "Philippine Bulbuls ( <i>Hypsipetes philippinus</i> Forster) fed on about 10-15 whole fruits twice without dropping any. The bulbuls flew in pairs and fed in the morning, spending only 10-20 seconds on each infructescence and calling loudly. Besides these, the frugivorous birds <i>Phapitreron leucotis</i> (Temminck), <i>Pycnonotus goiavier</i> (Scopoli), and <i>Lanius schach</i> (L.) were frequently seen near the <i>Leea</i> trees. We also observed small bats and the monkey <i>Macaca fascicularis</i> (Raffles); however none of the mammals was seen directly feeding on the fruits."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Steenis, C.G.G.J. van (ed.). (1976). <i>Flora Malesiana</i> . Series I, Spermatophyta: Flowering plants. Volume 7, part 4. Sijthoff & Noordhoff International Publishers, Leiden, The Netherlands	"Fruit 5-15 mm $\emptyset$ , red; seeds usually 6, c. 5 by 4 mm" [No means of external attachment]

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

Qsn #	Question	Answer
	Townes, W. (2010). Seed dispersal of the genus <i>Leea</i> in forest patches of Bataan, Philippines. <i>Ecotropica</i> , 16(2), 145-148	" <i>Hypsipetes philippinus</i> alone was observed feeding on <i>Leea</i> fruits. Few fruits remained on trees or nearby to rot. Since the dye technique failed to detect propagules within a 50-m radius of source trees, dispersal may be medium to long. Further, the bulbul's mean gut passage time (GPT) for <i>Leea aculeate</i> (Blume) seeds is 9.5 minutes (Schabacker & Curio 2000). Future studies could compare <i>H. philippinus</i> to <i>Pycnonotus sinensis</i> (Gmelin) and <i>P. jocosus</i> (L.), which disperse seeds across open areas wider than 1 km from forest patches in the Hong Kong hills (Weir & Corlett 2007). The bulbul may similarly spread <i>Leea</i> trees between isolated forest patches."
	Chang, S. Y., Lee, Y. F., Kuo, Y. M., & Chen, J. H. (2012). Frugivory by Taiwan Barbets ( <i>Megalaima nuchalis</i> ) and the effects of deinhhibition and scarification on seed germination. <i>Canadian Journal of Zoology</i> , 90(5), 640-650	"We investigated the frugivory of Taiwan Barbets ( <i>Megalaima nuchalis</i> Gould, 1863) on passage time and germination of 19 species of commonly consumed fruits, distinguished the deinhhibition and scarification effects, and tested if complete bird-gut passage increases seed germination. We measured fruit and seed size and seed retention times (SRTs) and examined the germination of intact fruits and pulp-removed and defecated seeds." ... "In contrast, all 10 species in the defecated–regurgitated (~44.5%–100%) and depulped (~33.3%–94.7%) groups germinated."

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Steenis, C.G.G.J. van (ed.). (1976). <i>Flora Malesiana</i> . Series I, Spermatophyta: Flowering plants. Volume 7, part 4. Sijthoff & Noordhoff International Publishers, Leiden, The Netherlands	[Unknown] "Fruit 5-15 mm Ø, red; seeds usually 6, c. 5 by 4 mm"

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	Notes
	Baskin, C.C. & Baskin, J.M. 2014. <i>Seeds Ecology, Biogeography, and Evolution of Dormancy and Germination</i> . Second Edition. Academic Press, San Francisco, CA	"TABLE 9.4 Dormancy class or nondormancy (D/ND) in seeds of pioneer trees of evergreen rainforests." [ <i>Leea guineensis</i> - ND = nondormant]

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2019). Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	Uji, T. (2001). <i>Leea van Royen</i> ex L.. In: van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors): <i>Plant Resources of South-East Asia No 12(2): Medicinal and poisonous plants 2</i> . PROSEA Foundation, Bogor, Indonesia. <a href="http://prota4u.org/prosea">prota4u.org/prosea</a>	" <i>Leea</i> grown as ornamental can be pruned to shape. <i>Leea indica</i> responds well to coppicing." [Unknown for <i>Leea guineensis</i> ]

Qsn #	Question	Answer
	Whistler, W.A. 2000. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	"Sometimes it is trimmed to form a small tree."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"Insect pests do not bother leea. Under conditions of excessive moisture and high humidity, a leaf spot and blight caused by a fungus ( <i>Phytophthora</i> sp.) may attack the plant, causing leaf drop, wilting, and death of small plants in the nursery."



**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Juice from fruit may be irritating to humans
- Shade tolerant
- Reproduces by seeds
- Seeds dispersed by birds, other animals, and intentionally by people

## Low Risk Traits

- Widely cultivated, with no reports of naturalization or invasiveness
- Unarmed (no spines, thorns, or burrs)
- Palatable to browsing animals
- Valued as an ornamental and for medicinal uses