

Taxon: <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson	Family: Annonaceae
Common Name(s): burahol kepel kepel apple kepel fruit keppel fruit	Synonym(s): Uvaria burahol Blume

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 29 Jun 2023
WRA Score: -3.0	Designation: L	Rating: Low Risk

Keywords: Tropical Tree, Ornamental, Edible Fruit, Large-Seeded, Animal-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	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	y = 1*multiplier (see Appendix 2), n = 0	n
303	Agricultural/forestry/horticultural weed	y = 2*multiplier (see Appendix 2), n = 0	n
304	Environmental weed	y = 2*multiplier (see Appendix 2), n = 0	n
305	Congeneric weed	y = 1*multiplier (see Appendix 2), n = 0	n
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	n
407	Causes allergies or is otherwise toxic to humans	y = 1, n = 0	n

Qsn #	Question	Answer Option	Answer
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
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
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)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	>3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y = 1, n = -1	n
702	Propagules dispersed intentionally by people	y = 1, n = -1	y
703	Propagules likely to disperse as a produce contaminant	y = 1, n = -1	n
704	Propagules adapted to wind dispersal	y = 1, n = -1	n
705	Propagules water dispersed	y = 1, n = -1	n
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y = 1, n = -1	y
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
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
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[No evidence] "It is indigenous to Java, Indonesia, and is grown also in Southeast Asia throughout Malesia as far as the Solomons. However, in the Philippines and Australia, it is a recent introduction. Its cultivation as a fruit tree seems to be limited to Java."
102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2023). Personal Communication	NA
103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2023). 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
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"It is indigenous to Java, Indonesia, and is grown also in Southeast Asia throughout Malesia as far as the Solomons."
202	Quality of climate match data	High
	Source(s)	Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"It is indigenous to Java, Indonesia, and is grown also in Southeast Asia throughout Malesia as far as the Solomons."
203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"Kepel is a tropical species, grows in its native habitat in hot, humid secondary forest on deep, moist clay soils in Java. It is found from sea level to an elevation of 600 m."
	Top Tropicals. (2023). <i>Stelechocarpus burahol</i> . https://toptropicals.com/catalog/uid/stelechocarpus_burahol.htm . [Accessed 27 Jun 2023]	"The USDA Hardiness Zone is 9-11. The tree grows best in a pot in cold regions."

Qsn #	Question	Answer
204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"It is indigenous to Java, Indonesia, and is grown also in Southeast Asia throughout Malesia as far as the Solomons."
	Gallaher, T.J., Brock, K., Kennedy, B.H., Imada, C.T., Imada, K., & Walvoord, N. (2023). Plants of Hawai'i. http://www.plantsofhawaii.org.. [Accessed 28 Jun 2023]	"Only found in cultivation"

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"However, in the Philippines and Australia, it is a recent introduction. Its cultivation as a fruit tree seems to be limited to Java."
	Gallaher, T.J., Brock, K., Kennedy, B.H., Imada, C.T., Imada, K., & Walvoord, N. (2023). Plants of Hawai'i. http://www.plantsofhawaii.org.. [Accessed 28 Jun 2023]	"Only found in cultivation"
	Morales, C. O. (2020). Origen, historia natural y usos de las plantas introducidas en Costa Rica. UNED Research Journal 12(2): e3098	[Cultivated in Costa Rica] " <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson (burahol, kepel), del sudeste de Asia, es un árbol mediano con follaje brillante y atractivo, que empieza a aparecer a la venta como ornamental (C.O. Morales 1741, USJ). Flores y frutos se producen en el tronco (especie cauliflora) y en la región de origen los frutos redondeados, dulces al madurar, son comestibles y se han usado para refrescar el aliento y reducir malos olores corporales (Fern, 2019b)."

301	Naturalized beyond native range	n
	Source(s)	Notes
	Gallaher, T.J., Brock, K., Kennedy, B.H., Imada, C.T., Imada, K., & Walvoord, N. (2023). Plants of Hawai'i. http://www.plantsofhawaii.org.. [Accessed 28 Jun 2023]	"Only found in cultivation"
	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
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2023). Invasive Species Compendium. Wallingford, UK: CAB International. https://www.cabidigitallibrary.org/product/qi . [Accessed 28 Jun 2023]	No evidence

Qsn #	Question	Answer
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
	CABI. (2023). Invasive Species Compendium. Wallingford, UK: CAB International. https://www.cabidigitallibrary.org/product/qi . [Accessed 28 Jun 2023]	No evidence

304	Environmental weed	n
	Source(s)	Notes
	Gallaher, T.J., Brock, K., Kennedy, B.H., Imada, C.T., Imada, K., & Walvoord, N. (2023). Plants of Hawai'i. http://www.plantsofhawaii.org . [Accessed 28 Jun 2023]	"Only found in cultivation"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2023). Invasive Species Compendium. Wallingford, UK: CAB International. https://www.cabidigitallibrary.org/product/qi . [Accessed 28 Jun 2023]	No evidence

305	Congeneric weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2023). Invasive Species Compendium. Wallingford, UK: CAB International. https://www.cabidigitallibrary.org/product/qi . [Accessed 28 Jun 2023]	No evidence

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	[No evidence] "Erect evergreen tree, up to 25 m tall. Trunk up to 40 cm in diameter, dark grey-brown to black, characteristically covered with numerous thick tubercles. Leaves elliptic-oblong to ovate-lanceolate, 12-27 cm × 5-9 cm, dark green, glabrous, thin leathery; petiole up to 1.5 cm long. Flowers unisexual, green turning whitish, fascicled on tubercles; male flowers on upper trunk and older branches, 8-16 together, up to 1 cm in diameter; female flowers only on the lower part of the trunk, up to 3 cm in diameter. Fruit with 1-13 berry-like ripe carpels, fruit stalk up to 8 cm long; ripe carpels almost globose, brownish, 5-6 cm in diameter; pericarp brown, juicy, edible. Seeds ellipsoid, 4-6, ca. 3 cm long."

402	Allelopathic	
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	[Unknown. No evidence found] "It grows well among bamboo clumps where other trees would not be able to compete."

Qsn #	Question	Answer
403	Parasitic	n
	Source(s)	Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"Large, erect evergreen tree, up to 25 m tall." [Annonaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	[Unknown. Foliage not mentioned as animal fodder] "Ripe fruit is eaten fresh. It is said that the orange, juicy pulp gives the fragrance of violets to body excretions (urine, transpiration, breath). Medicinally the pulp is a diuretic, prevents kidney inflammation, and causes sterility (temporarily) in women. Hence it served aristocratic ladies as a perfume and a family-planning agent; in Java its use was traditionally restricted to the consorts of the sultan of Yogya. The wood is suitable for household articles; the straight trunk, after immersion in water for several months, is used in house building and is said to last for more than 50 years. Keipel is a beautiful ornamental tree, the leaves of a flush changing from light pink into a burgundy red colour before turning a brilliant green. The tree habit, cylindrical or pyramidal with large numbers of systematically arranged lateral branches, and the cauliflory, add to the attraction. "
	WRA Specialist. (2023). Personal Communication	Unknown

405	Toxic to animals	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2023). <i>Stelechocarpus burahol</i> . https://tropical.theferns.info/viewtropical.php?id=Stelechocarpus+burahol . [Accessed 28 Jun 2023]	"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] "Pulp diuretic. Consumption of keppel apples causes all bodily excretions to smell like violets"

406	Host for recognized pests and pathogens	n
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	"No serious pests and diseases have been reported, but the trees have to be guarded against bats and rodents."

Qsn #	Question	Answer
407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2023). <i>Stelechocarpus burahol</i> . https://tropical.theferns.info/viewtropical.php?id=Stelechocarpus+burahol . [Accessed 28 Jun 2023]	"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] "Pulp diuretic. Consumption of keppel apples causes all bodily excretions to smell like violets"

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[No evidence] "Kepel is a tropical species, grows in its native habitat in hot, humid secondary forest on deep, moist clay soils in Java. It is found from sea level to an elevation of 600 m."

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Top Tropicals. (2023). <i>Stelechocarpus burahol</i> . https://toptropicals.com/catalog/uid/stelechocarpus_burahol.htm . [Accessed 28 Jun 2023]	"It requires full sun or semi-shade and regular to moderate water."
	Flora Fauna Web. (2023). <i>Stelechocarpus burahol</i> . https://www.nparks.gov.sg/florafauweb/flora/3/3/3344 . [Accessed 28 Jun 2023]	"Light Preference - Full Sun"
	Dave's Garden. (2023). Kepel 'Blume' <i>Stelechocarpus burahol</i> . https://davesgarden.com/guides/pf/go/188492/ . [Accessed 28 Jun 2023]	"Sun Exposure: Full Sun Partial to Full Shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	Flora Fauna Web. (2023). <i>Stelechocarpus burahol</i> . https://www.nparks.gov.sg/florafauweb/flora/3/3/3344 . [Accessed 28 Jun 2023]	"Fertile Loamy Soils, Well-Drained Soils"
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	"Kepel occurs wild on deep, moist clay soils in secondary forest in Java."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"Large, erect evergreen tree, up to 25 m tall."

412	Forms dense thickets	n
	Source(s)	Notes

Qsn #	Question	Answer
	Gallagher, T.J., Brock, K., Kennedy, B.H., Imada, C.T., Imada, K., & Walvoord, N. (2023). Plants of Hawai'i. http://www.plantsofhawaii.org.. [Accessed 28 Jun 2023]	"Only found in cultivation" [No evidence]
	Van Heusden, E. C. H. (1995). Revision of the southeast Asian genus <i>Stelechocarpus</i> (Annonaceae). <i>Blumea</i> , 40 (2), 429-438	[No evidence] "Habitat & Ecology- In primary or disturbed lowland forests, on sandstone soils, up to 800 m altitude."
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	[No evidence] "Kepel occurs wild on deep, moist clay soils in secondary forest in Java. It is cultivated as a fruit tree at elevations up to 600 m, and fruits at 18°S in Queensland. It grows well among bamboo clumps where other trees would not be able to compete. "

501	Aquatic	n
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	[Terrestrial] "Kepel occurs wild on deep, moist clay soils in secondary forest in Java. It is cultivated as a fruit tree at elevations up to 600 m, and fruits at 18°S in Queensland. It grows well among bamboo clumps where other trees would not be able to compete. "

502	Grass	n
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	Family: Annonaceae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	Family: Annonaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	"Erect evergreen tree, up to 25 m tall. Trunk up to 40 cm in diameter, dark grey-brown to black, characteristically covered with numerous thick tubercles."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	"Kepel is found in South-East Asia throughout Malesia as far as the Solomons; however, in the Philippines and Australia it is a recent introduction. Cultivation seems to be limited to Java. " [No evidence]

603	Hybridizes naturally	
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Qsn #	Question	Answer
	Source(s)	Notes
	WRA Specialist. (2023). Personal Communication	Unknown. No evidence found.

604	Self-compatible or apomictic	
	Source(s)	Notes
	Van Heusden, E. C. H. (1995). Revision of the southeast Asian genus <i>Stelechocarpus</i> (Annonaceae). <i>Blumea</i> , 40 (2), 429-438	"Judging from herbarium specimens, the flowers of <i>Stelechocarpus cauliflorus</i> seem to be (almost) cleistogamous. The inner petals remain closed at maturity and enclose the stamens or carpels (Fig. 1f). Cleistogamy has been reported in Annonaceae (e.g. Burck, 1890, 1906; Corner, 1988), so it could occur in <i>Stelechocarpus</i> also."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) <i>Plant resources of South-East Asia. No. 2: Edible fruits and nuts</i> . Prosea Foundation, Bogor, pp 290-291	"The female flowers are borne on the trunk and older portions of branches, and are visited by bees, ants and sometimes by butterflies."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) <i>Plant resources of South-East Asia. No. 2: Edible fruits and nuts</i> . Prosea Foundation, Bogor, pp 290-291	[No evidence] "Kepel is commonly propagated by seed taken from mature fruits and sown immediately. Cuttings and air layers have been tried without success. The seed is cleaned by washing and is dried under shade. Before sowing the seed is scarified, but germination may still take many months. Eventually a high percentage of the seeds does germinate. Germination is hypogeal, the taproot swollen and unbranched for some time. Initially seedlings are slow-growing."

607	Minimum generative time (years)	>3
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) <i>Plant resources of South-East Asia. No. 2: Edible fruits and nuts</i> . Prosea Foundation, Bogor, pp 290-291	[6-9 years] "At the 3-5-leaf stage the seedlings are potted up. When they reach a height of 0.5-1.0 m, the seedlings are transplanted into the field at 8-10 m apart. The juvenile phase lasts 6-9 years. "

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) <i>Plant resources of South-East Asia. No. 2: Edible fruits and nuts</i> . Prosea Foundation, Bogor, pp 290-291	"Fruit with 1-13 berry-like ripe carpels, fruit stalk up to 8 cm long; ripe carpels almost globose, brownish, 5-6 cm in diameter; pericarp brown, juicy, edible. Seeds ellipsoid, 4-6, ca. 3 cm long." [No evidence. Fruits and seeds relatively large and lack means of external attachment]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes

Qsn #	Question	Answer
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"Kepel is also planted as an ornamental tree for its beautiful foliage that changes from light pink into a burgundy red colour before turning a brilliant green."
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	"Kepel is found in South-East Asia throughout Malesia as far as the Solomons; however, in the Philippines and Australia it is a recent introduction. Cultivation seems to be limited to Java."
	Gallaher, T.J., Brock, K., Kennedy, B.H., Imada, C.T., Imada, K., & Walvoord, N. (2023). Plants of Hawai'i. http://www.plantsofhawaii.org.. [Accessed 28 Jun 2023]	"Only found in cultivation"

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	"Fruit with 1-13 berry-like ripe carpels, fruit stalk up to 8 cm long; ripe carpels almost globose, brownish, 5-6 cm in diameter; pericarp brown, juicy, edible. Seeds ellipsoid, 4-6, ca. 3 cm long." [No evidence. Fruits and seeds relatively large and unlikely to be inadvertently dispersed]

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	"Fruit with 1-13 berry-like ripe carpels, fruit stalk up to 8 cm long; ripe carpels almost globose, brownish, 5-6 cm in diameter; pericarp brown, juicy, edible. Seeds ellipsoid, 4-6, ca. 3 cm long."

705	Propagules water dispersed	n
	Source(s)	Notes
	Handayani, T. (2022). Seed dispersal of Annonaceae in the Bogor Botanical Gardens, Indonesia. <i>Prosiding Seminar Nasional Masyarakat Biodiversitas Indonesia</i> 8(2): 136-141	[Not reported to be water dispersed] "Seed dispersal is important for plants as an adaptation effort to maintain the existence of its species from extinction. Seeds that are spread far from the parent are expected to grow better because there is less competition for food and fewer environmental factors. The research reported in this paper aimed to determine the seed dispersal of the Annonaceae tribe has been carried out in the Bogor Botanical Gardens. The study used direct observation of the ten Gardens collection. Ten species of Annonaceae plant collections were used as observation. Fruit morphology, feeding behavior, and seed dispersal distance were observed with the naked eye. The results showed that the animal seed dispersers were birds, squirrels, civets and bats. The fruit of nine plant species is eaten and spread by birds. The seed of five plant species is dispersed by squirrels. The civet dispersed the seeds of two plant species. In addition, bats dispersed the seeds of five plant species. There are differences in feeding behavior and seed dispersal distance. The nearest distance in seed dispersal was carried out by squirrels, while the farthest distance was carried out by bats. Birds and squirrels eat the flesh of the fruit, whereas bats just eat the juice of the fruit, and civets eat both the fruit and its seeds."
	WRA Specialist. (2023). Personal Communication	Buoyancy of fruit and seeds unknown, but this species is not commonly associated with riparian habitats, and water is unlikely to be an important dispersal vector.

706	Propagules bird dispersed	

Qsn #	Question	Answer
	Source(s)	Notes
	Handayani, T. (2022). Seed dispersal of Annonaceae in the Bogor Botanical Gardens, Indonesia. Prosiding Seminar Nasional Masyarakat Biodiversitas Indonesia 8(2): 136-141	[Ambiguous. Birds observed to consume fruit, but not necessarily disperse seeds] "Dari tafsiran tersebut dapat diartikan jika burung yang memakan buah <i>Alphonsea elliptica</i> dan <i>Stelechocarpus burahol</i> tidak berfungsi sebagai pemencar biji, namun sekedar sebagai sumber pakan burung." [Translation: From this interpretation it can be interpreted that birds that eat the fruit of <i>Alphonsea elliptica</i> and <i>Stelechocarpus burahol</i> do not function as seed dispersers, but merely as a source of bird feed.]
	WRA Specialist. (2023). Personal Communication	The fruit and seeds may be too large for most birds present in the Hawaiian Islands to serve as effective seed dispersers, although larger game birds might be able to move seeds over short distances. [Fruit with 1-13 berry-like ripe carpels, fruit stalk up to 8 cm long; ripe carpels almost globose, brownish, 5-6 cm in diameter; pericarp brown, juicy, edible. Seeds ellipsoid, 4-6, ca. 3 cm long.]

707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	"No serious pests and diseases have been reported, but the trees have to be guarded against bats and rodents." [Possibly. Rodents serve as seed predators, but may act as seed dispersers by carrying fruit or seeds away from parent trees. In some instances, seeds may be cached and escape predation, or rodents, mongoose, or game birds may carry fruit to a new location to consume fruit pulp, and leave behind intact seeds.]

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Handayani, T. (2022). Seed dispersal of Annonaceae in the Bogor Botanical Gardens, Indonesia. Prosiding Seminar Nasional Masyarakat Biodiversitas Indonesia 8(2): 136-141	"Berdasarkan pengamatan pada kotoran musang, diketahui dua jenis tanaman di Kebun Raya Bogor yang buahnya sebagai sumber pakan musang, yaitu <i>Alphonsea elliptica</i> dan <i>Stelechocarpus burahol</i> . Buah-buah yang dimakan oleh musang berwarna kusam dan berbiji besar. Menurut Gautier-Hion (1985) buah-buahan yang dimakan oleh musang merupakan buah dengan predasi biji pra-penyebaran." [Translation: Based on observations on civet droppings, it is known that there are two types of plants in the Bogor Botanical Gardens whose fruit is a source of weasel food, namely <i>Alphonsea elliptica</i> and <i>Stelechocarpus burahol</i> . The fruits eaten by the weasel are dull in color and have large seeds.]

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) Plant resources of South-East Asia. No. 2: Edible fruits and nuts. Prosea Foundation, Bogor, pp 290-291	"A mature tree yields 1000-1500 fruit per year." [Unknown if seed densities ever exceed 1000 m-2]

Qsn #	Question	Answer
802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Ferreira, G., De-La-Cruz-Chacón, I., Boaro, C. S. F., Baron, D., & Lemos, E. E. P. D. (2019). Propagation of Annonaceous plants. <i>Revista Brasileira de Fruticultura</i> , 41 (1): (e-500)	"Table 1. Seed biological characteristics from Annonaceae species." [Stelechocarpus burahol - Storage behavior = Recalcitrant?]
803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2023). 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
	WRA Specialist. (2023). Personal Communication	Unknown
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	Sunarto, A. T. (1992). <i>Stelechocarpus burahol</i> (Blume) Hook. f. & Thomson. In: Verheij EWM, Coronel RE (eds.) <i>Plant resources of South-East Asia. No. 2: Edible fruits and nuts</i> . Prosea Foundation, Bogor, pp 290-291	[Unknown] "No serious pests and diseases have been reported, but the trees have to be guarded against bats and rodents."

Summary of Risk Traits:

Stelechocarpus burahol, also known as burahol, kepel, kepel fruit, keppel fruit, or kepel apple, is an erect evergreen tree from the humid evergreen forests of Southeast Asia. It produces an edible fruit that is cultivated in central Java, Indonesia. There are no reports that this tree has naturalized or become invasive worldwide. Its relatively large fruit and seeds, which may limit dispersal, and long time to maturity suggest it will pose a low risk of becoming naturalized or invasive in the Hawaiian Islands or other Pacific island ecosystems.

High Risk / Undesirable Traits

- Grows and could potentially spread in regions with tropical climates.
- Shade tolerant (could potentially spread into intact forest ecosystems).
- Reproduces by seeds.
- Self-fertile
- Within its native range, seeds are dispersed by civets and other fruit-eating animals, and through intentional cultivation.
- In the Hawaiian Islands, seeds could be spread by pigs, mongoose, rodents, and possibly larger game birds.

Low Risk Traits

- No reports of naturalization or invasiveness documented.
- Unarmed (no spines, thorns, or burrs)
- Edible fruit
- Relatively long time to reproductive maturity (6-9 years).
- Relatively large fruit and seeds reduce the risk of long distance or accidental dispersal.