Taxon: Monstera deliciosa Liebm. **Family:** Araceae

Common Name(s): cériman, cut leaf philodendron, fruit salad plant, Mexican breadfruit, monstera, Swiss cheese plan

Synonym(s): Monstera borsigiana K. Koch, Monstera lennea K. Koch, Monstera tacanaensis Matuda, Philodendron anatomicum Kunth, Tornelia fragrans Gut. ex Schott nom. ...

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 22 Feb 2023

WRA Score: 6.0 **Designation:** EVALUATE **Rating:** Evaluate

Keywords: Tropical Climber, Naturalized Elsewhere, Toxic Properties, Spreads Vegetatively, Specialized Pollination

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	y
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	y
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed		
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	y=1, n=-1	y
405	Toxic to animals	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	y
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)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	y
412	Forms dense thickets		
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	n
604	Self-compatible or apomictic	y=1, n=-1	n
605	Requires specialist pollinators	y=-1, n=0	y
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
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	y
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	y
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
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] "The ceriman is indigenous to the wet tropical forests of southern Mexico, Guatemala and parts of Costa Rica and Panama. Now it is pantropical and has naturalised in many areas for instance in Florida and coastal areas of North Coast and Central Coast, also scattered throughout the lower to mid Blue Mountains (Central Coast) of New South Wales in Australia."

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**
	Cedeño Fonseca, M. V., Hay, A., & Blanco Coto, M. A. (2022). A taxonomic revision of Monstera Adans.(Araceae: Monsteroideae) in Costa Rica. Aroideana 45(1): 4-198	"Distribution and habitat: From Mexico (Chiapas, Oaxaca and Veracruz) and Guatemala. In Costa Rica it is not native, but is widely cultivated as an ornamental at 0 2500 m. Apparently – it has begun to colonize the forests in some botanical gardens and private reserves."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"The ceriman is indigenous to the wet tropical forests of southern Mexico, Guatemala and parts of Costa Rica and Panama. Now it is pantropical and has naturalised in many areas for instance in Florida and coastal areas of North Coast and Central Coast, also scattered throughout the lower to mid Blue Mountains (Central Coast) of New South Wales in Australia."

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	"The ceriman is indigenous to the wet tropical forests of southern Mexico, Guatemala and parts of Costa Rica and Panama. Now it is pantropical and has naturalised in many areas for instance in Florida and coastal areas of North Coast and Central Coast, also scattered throughout the lower to mid Blue Mountains (Central Coast) of New South Wales in Australia."

203	**Broad climate suitability (environmental versatility)**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"Being a tropical plant, ceriman grows best at temperatures of 20–30°C, requires high humidity, and needs full or partial shade. It is found all over tropical America in the hot humid rainforest from 1 to 600 m elevation and where the annual rainfall is above 1,000 mm. It can withstand cold conditions provided it is sheltered from frost and cold winds. Growth ceases below 10°C and frost will kill it."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**
	Cedeño Fonseca, M. V., Hay, A., & Blanco Coto, M. A. (2022). A taxonomic revision of Monstera Adans.(Araceae: Monsteroideae) in Costa Rica. Aroideana 45(1): 4-198	"Distribution and habitat: From Mexico (Chiapas, Oaxaca and Veracruz) and Guatemala. In Costa Rica it is not native, but is widely cultivated as an ornamental at 0 2500 m. Apparently – it has begun to colonize the forests in some botanical gardens and private reserves."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 12 Feb 2023]	"Native Northern America SOUTHERN MEXICO: Mexico [Chiapas, Oaxaca, Veracruz de Ignacio de la Llave] Southern America CENTRAL AMERICA: Costa Rica, Guatemala, Panama"
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"The ceriman is indigenous to the wet tropical forests of southern Mexico, Guatemala and parts of Costa Rica and Panama. Now it is pantropical and has naturalised in many areas for instance in Florida and coastal areas of North Coast and Central Coast, also scattered throughout the lower to mid Blue Mountains (Central Coast) of New South Wales in Australia."

Qsn #	Question	Answer
205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	Cedeño Fonseca, M. V., Hay, A., & Blanco Coto, M. A. (2022). A taxonomic revision of Monstera Adans.(Araceae: Monsteroideae) in Costa Rica. Aroideana 45(1): 4-198	"From Mexico (Chiapas, Oaxaca and Veracruz) and Guatemala. In Costa Rica it is not native, but is widely cultivated as an ornamental at 0 2500 m. Apparently – it has begun to colonize the forests in some botanical gardens and private reserves."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"The ceriman is indigenous to the wet tropical forests of southern Mexico, Guatemala and parts of Costa Rica and Panama. Now it is pantropical and has naturalised in many areas for instance in Florida and coastal areas of North Coast and Central Coast, also scattered throughout the lower to mid Blue Mountains (Central Coast) of New South Wales in Australia."
	Janick, J.& Paull, R.E. (2008). The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"The species is native to the wet forest of southern Mexico, Guatemala, and parts of Costa Rica and Panama. In 1908, it was reported to be cultivated in Florida, Portugal and Algeria (Labroy, 1908). Though no longer cultivated on any scale for its fruit, it is found for sale at roadside markets in southern Florida (Fig. A.9). It has been spread around the world as an ornamental foliage plant that can be used indoors or outdoors generally climbing on some structure or tree."

301	**Naturalized beyond native range**	**y**
	Source(s)	**Notes**
	Morton, J.F. (1976). Pestiferous spread of many ornamental and fruit species in South Florida. Proceedings of the Florida State Horticultural Society 89: 348-353	"Monstera deliciosa Liebm. Ceriman. Guatemala and Mexico. Climbs and creeps out of bounds; "sometimes running for hundreds of feet". Aerial roots descend to the ground, may be 40 ft. long (9)."
	Ogle, C. C., & La Cock, G. D. (2019). Additional records and observations of monocotyledons naturalised or casual in Manawatu Ecological Region, New Zealand, 1980–2019, Perspectives in Biosecurity, 4, 5-31	"Notes: Garden Discard. Although CHR 354550 was collected from the wild in 1978, the species was not recorded by Healy and Edgar (1980). Since 1980, about 12 discrete collections of naturalised plants of Monstera deliciosa have been lodged in AK, and most were post-2000. All were from Northland and Auckland regions, including Great Barrier Island (Aotea). Four collections were stated to be derived from dumped garden waste and four presumed to have established from seed. The Whanganui collection (CHR 532881) was from garden waste and it has not persisted, being smothered in rank grasses and vines."

Qsn #	Question	Answer
	Hosking, J. R., Conn, B. J., Lepschi, B. J., & Barker, C. H. (2007). Plant species first recognised as naturalised for New South Wales in 2002 and 2003, with additional comments on species recognized as naturalised in 2000–2001. Cunninghamia, 10(1): 139-166	"Notes: The specimen was collected from a single plant occupying an area 5 m x 5 m. Naturalised plants are scattered over the lower to mid Blue Mountains City Council area. Plants have large leaves and fruit. They are readily recognised and this may explain why this species has not been collected previously. The authors know of naturalised plants in a number of coastal locations throughout N.S.W. but there are no herbarium specimens from these locations. In most cases plants appear to occur singly and have probably arisen from dumped garden waste. This also seems to be the case in Queensland (Batianoff pers. comm., Nov 2005) where the species is recorded as doubtfully naturalised (Batianoff 0308267, Phillips 1123 – BRI). The species appears to have naturalised in Victoria where plants were recorded growing in a drain in suburban Melbourne (Lepschi 6092 and Connors – CANB, MEL). The species has naturalised in Florida (Wunderlin & Hansen 2004)."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"The ceriman is indigenous to the wet tropical forests of southern Mexico, Guatemala and parts of Costa Rica and Panama. Now it is pantropical and has naturalised in many areas for instance in Florida and coastal areas of North Coast and Central Coast, also scattered throughout the lower to mid Blue Mountains (Central Coast) of New South Wales in Australia."
	Dawson, W., Mndolwa, A. S., Burslem, D. F., & Hulme, P. E. (2008). Assessing the risks of plant invasions arising from collections in tropical botanical gardens. Biodiversity and Conservation, 17(8): 1979-1995	"Two species were only found naturalising outside of compartments—Mimosa pudica was a common weed on paths and roadsides (Table 4), and the vine Monstera deliciosa, was observed growing up trees in a forest fragment (Table 4)"
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence in the Hawaiian Islands

302	Garden/amenity/disturbance weed	y
	Source(s)	**Notes**
	Martin, T. J. (2002). A Mexican migrant, the naturalisation of Monstera deliciosa (fruit salad plant) in New Zealand. Auckland Botanical Society Journal, 57, 151-154	"Established patches in the forest interior are locally preventing seedling recruitment and in some places the plant is invading the epiphytic niche. Although fruit salad plant is not regarded as a serious weed control at this site would be warranted."
	Morton, J. (1987). Ceriman. p. 15–17. In: Fruits of warm climates. Julia F. Morton, Miami, FL. https://www.hort.purdue.edu. [Accessed 22 Feb 2023]	"In Guatemala, it is raised in pots in patios to prevent too rampant growth, as it is apt to become an aggressive nuisance."
	Moodley, D. (2016). Assessing the invasiveness of alien aroids using modelling techniques and ecological assessments. PhD Dissertation. University of KwaZulu-Natal, Durban	"Monstera deliciosa is now grown in most of the warm countries of the world (temperate and tropical regions) as a potted indoor plant or as a garden plant. However, it has only been recorded as naturalized in a few regions, and is surprisingly not a major invader (Table 4.1)."
	Knox, G. W., Wilson, S. B., Deng, Z. and Freyre, R. (2018). Alternatives to Invasive Plants Commonly Found in South Florida Landscapes. ENH1222. Revised. University of Florida Institute of Food and Agricultural Sciences, Gainesville, FL. http://edis.ifas.ufl.edu. [Accessed 22 Feb 2023]	"Table 1. Invasive ornamentals commonly found in south Florida landscapes and commonly available native and non-native, noninvasive substitutes." [Monstera deliciosa recommended as a Non-native, non-invasive substitute for Colocasia esculenta]

Qsn #	Question	Answer
	Andriani, R. (2021). Frankenstein's monstera: how popular indoor plants go rogue in the Australian bush. The Guardian. Sun 11 Jul 2021. https://www.theguardian.com. [Accessed 22 Feb 2023]	[Potentially invasive. Locally naturalized] "Monstera's small roots and vigorous growth enables it to climb to the crowns of Australian giants such as Toona ciliata (Australian red cedar), Eucalyptus grandis (flooded gum) and Eucalyptus tereticornis (forest red gum). These trees are the main food sources for koalas and other animals. "When you've got something potentially ecosystem-transforming like monstera covering the whole tree, it blocks koalas' access to food," Gray says." ... "Fortunately, for the moment, infestations of monstera are still considered localised events."
	WRA Specialist. (2023). Personal Communication	Although there is conflicting evidence, there is sufficient information to regard this species as a nuisance or minor weed in areas where cultivated, with the potential to become an environmental weed in suitable habitats.

303	Agricultural/forestry/horticultural weed	n
	Source(s)	**Notes**
	Moodley, D. (2016). Assessing the invasiveness of alien aroids using modelling techniques and ecological assessments. PhD Dissertation. University of KwaZulu-Natal, Durban	"Monstera deliciosa is now grown in most of the warm countries of the world (temperate and tropical regions) as a potted indoor plant or as a garden plant. However, it has only been recorded as naturalized in a few regions, and is surprisingly not a major invader (Table 4.1)."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	Environmental weed	
	Source(s)	**Notes**
	Moodley, D. (2016). Assessing the invasiveness of alien aroids using modelling techniques and ecological assessments. PhD Dissertation. University of KwaZulu-Natal, Durban	[No evidence] "The naturalization of Monstera deliciosa was largely driven by anthropogenic effects in Limpopo, South Africa, despite the plants' occurrence in suitable habitat. Therefore, I concluded that M. deliciosa poses a low invasion risk to South Africa." ... "we conclude that M. deliciosa will not become a rampant invader based on the fact that the species already had a sufficiently long minimum residence time and high propagule pressure in South Africa and in several currently occupied regions globally, yet there are no records of invasiveness or impacts. Even if the species becomes invasive under ideal conditions, it can be controlled manually. As such, M. deliciosa can be recommended to the horticultural trade, landscaping sector and gardeners."

Qsn #	Question	Answer
	Queensland Government. (2023). Weeds of Australia. Monstera deliciosa. https://keyserver.lucidcentral.org/weeds/data/media/Html/monstera_deliciosa.htm. [Accessed 17 Feb 2023]	[Possibly Yes. Described as a weed, but impacts have not been specified, and description more closely matches status as naturalized, rather than an environmental weed] "Fruit salad plant (Monstera deliciosa) is regarded as an environmental weed in New South Wales. This very common garden plant has become a weed of riparian areas and urban bushland, particularly in the warmer parts of eastern Australia. It is relatively common in coastal areas, usually growing where garden refuse has been dumped. Fruit salad plant (Monstera deliciosa) is probably under-represented in herbarium collections as it is easily identified and its very large leaves make it difficult to collect. It was first recorded in New South Wales in 2003, but has probably been naturalised for some time. This species appears on some local environmental weed lists in coastal New South Wales (i.e. in Warringah City, Gosford City and Byron Shire). It is naturalised in coastal areas and is also scattered throughout the lower to mid Blue Mountains and has been recorded from urban bushland in the Hornsby Plateau region to the north of Sydney. For example, fruit salad plant (Monstera deliciosa) is listed as a common environmental weed in O'Regan Reserve in the Upper Parramatta River Catchment, a weed of disturbed woodlands and heathlands in Gosford, a weed of Crystal Waters Wetlands in Coffs Harbour, an environmental weed along Kincumber Creek in Gosford, a weed in Jackson Park in the Blue Mountains and a weed of Lamorna Avenue Reserve and Laurence Street Reserve in Hornsby. Fruit salad plant (Monstera deliciosa) was also only recently recorded as naturalised for the first time in Queensland. However, it is relatively common in bushland in suburban Brisbane, with some naturalised plants growing up 5 m or more into the canopies of trees. It is mainly found growing where garden waste has been dumped along roadsides and waterways (e.g. along Enoggera Creek, Ithaca Creek and the Brisbane River)."
	Andriani, R. (2021). Frankenstein's monstera: how popular indoor plants go rogue in the Australian bush. The Guardian. Sun 11 Jul 2021. https://www.theguardian.com. [Accessed 22 Feb 2023]	[Potentially invasive. Locally naturalized] "Monstera's small roots and vigorous growth enables it to climb to the crowns of Australian giants such as Toona ciliata (Australian red cedar), Eucalyptus grandis (flooded gum) and Eucalyptus tereticornis (forest red gum). These trees are the main food sources for koalas and other animals. "When you've got something potentially ecosystem-transforming like monstera covering the whole tree, it blocks koalas' access to food," Gray says." ... "Fortunately, for the moment, infestations of monstera are still considered localised events."

Qsn #	Question	Answer
305	**Congeneric weed**	
	Source(s)	**Notes**
	Madison, M. (1977). A Revision of Monstera (Araceae). Contributions from the Gray Herbarium of Harvard University, 207, 3-100	[M. adansonii described as weedy] "Only a single weedy species, M. adansonii, has colonized the Caribbean Islands and coastal Brazil." ... "Apparently they have adapted readily to the great increase in habitats resulting from disturbances by man, and Monstera adansonii has become a common neotropical weed on fence posts and telephone poles." ... "It has a weedy tendency and is found commonly on fenceposts and roadside trees. I have never encountered it in a deep forest."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Monstera lechleriana and Monstera pertusa listed as agricultural weeds of undetermined impacts.

401	**Produces spines, thorns or burrs**	**n**
	Source(s)	**Notes**
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[No evidence] "A robust, fast growing, stout, herbaceous or woody, scrambling or climbing vine growing to 20 m high (Plate 1). The stem is cylindrical, heavy, 6.0–7.5 cm diameter, rough with leaf scars, and producing numerous, long, tough, fibrous aerial roots. Leaves are large, leathery, glossy green, cordate, 25–90 cm long by 25–75 cm broad (Plate 1). Juvenile plants start out with smaller and entire leaves with no lobes or holes, but older leaves and plant soon produce leaves with deeply cut strips or lobes around the margins and perforated on each side of the midrib with elliptic or oblong holes of various sizes. Several inflorescences arise in a group from the leaf axils on tough, cylindrical stalks. Inflorescence is an erect, elongated, cylindrical (corn-like) spadix, creamy-white turning to bluish green and usually enclosed in a white, boat-shaped spathe (Plate 2). The spadix is fleshy upright spike growing to 20 cm long with tiny flowers on it covered by hexagonal scales or tiles. The spadix develops into the compound fruit (Plates 2–5). The hexagonal scales dry out and separate as the fruit ripens from the base upwards, revealing the white or pale yellow, sweet pulp and the thin, black particles (floral remnants) between the scales, usually there are no seed (Plate 5)."

402	**Allelopathic**	
	Source(s)	**Notes**
	WRA Specialist. (2023). Personal Communication	Unknown. No evidence found

403	**Parasitic**	**n**
	Source(s)	**Notes**
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"A robust, fast growing, stout, herbaceous or woody, scrambling or climbing vine growing to 20 m high" [Araceae. No evidence]

404	**Unpalatable to grazing animals**	**y**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Botha, C. J., & Penrith, M. L. (2008). Poisonous plants of veterinary and human importance in southern Africa. Journal of Ethnopharmacology, 119(3), 549-558	[Calcium oxalate crystals likely deter browsing] "Members of the family Araceae, such as Alocasia macrorrhiza, Dieffenbachia, Philodendron spp., Monstera deliciosa and Zantedeschia aethiopica (the only indigenous species) may cause severe stomatitis. These plants are grown for their beautiful foliage, sometimes as house plants, and contain insoluble calcium oxalate crystals (needle-sharp raphides), which are packed in specialised ampoule-shaped ejector cells, each with an operculum, called idioblasts. On pressure such as crushing of the stem when chewed the needle-like crystals are ejected and penetrate the surrounding tissue, resulting in intense irritation, discomfort and histamine release (Wiese et al., 1996). According to Gaillard and Paquin (1999), most of the victims in America are children, many under the age of 12 months."

405	Toxic to animals	y
	Source(s)	**Notes**
	ASPCA. (2023). Toxic and Non-Toxic Plants - Cutleaf Philodendron. https://www.aspca.org/pet-care/animal-poison-control/toxic-and-non-toxic-plants/cutleaf-philodendron. [Accessed 22 Feb 2023]	"Toxicity: Toxic to Dogs, Toxic to Cats Toxic Principles: Insoluble calcium oxalates Clinical Signs: Oral irritation, intense burning and irritation of mouth, tongue and lips, excessive drooling, vomiting, difficulty swallowing."

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Morton, J. (1987). Ceriman. p. 15–17. In: Fruits of warm climates. Julia F. Morton, Miami, FL. https://www.hort.purdue.edu. [Accessed 22 Feb 2023]	"When grown indoors, the plants are subject to infestation by scale insects, mites and mealybugs. Outdoors, they are usually pest-free. However, in dry seasons in Florida, the lubber grasshopper (Romalea microptera) has rapidly consumed entire leaves, leaving only the base of the midrib and the petiole. In India, wire cages are placed around developing fruits to protect them from rats, squirrels, monkeys and other creatures. The following diseases have been recorded in Florida: leaf spot caused by Leptosphaeria sp., Macrophoma philodendri, Phytophthora sp., and Pseudomonas cichorri; anthracnose from Glomerella cingulata; bacterial soft rot from infection by Erwinia carotovora; and root rot caused by Pythium splendens and Rhizoctonia solani."

407	Causes allergies or is otherwise toxic to humans	y
	Source(s)	**Notes**
	Whistler, W.A. (2000). Tropical Ornamentals: A Guide. Timber Press, Portland, OR	"Fruit is eaten when ripe but can cause irritation to the throat when unripe. Other parts of the plant can cause minor stomach problems, and contact with the sap may irritate the skin."

Qsn #	Question	Answer
	Children's Health Queensland. (2023). Fruit salad plant (Monstera deliciosa). https://www.childrens.health.qld.gov.au/poisonous-plant-fruit-salad-plant-monstera-deliciosa/. [Accessed 22 Feb 2023]	"Symptoms: All parts of the plant contain calcium oxalate crystals which if eaten or chewed can cause immediate burning pain, and swelling of the lips, mouth, tongue and throat. Swelling may cause copious salivation and difficulty breathing, swallowing or speaking. Nausea, abdominal pain and intense gastric irritation rarely occur. The fruit is considered edible when ripe but may cause rapidly developing urticaria or hives, a transient swollen, itchy rash."
	Morton, J. (1987). Ceriman. p. 15–17. In: Fruits of warm climates. Julia F. Morton, Miami, FL. https://www.hort.purdue.edu. [Accessed 17 Feb 2023]	"The oxalic acid, and possibly other unidentified principles, in the unripe fruit, the floral remnants of the ripe fruit, and all parts of the plant, cause oral and skin irritation. Some sensitive individuals claim that even the ripe fruit irritates the throat. It would be well to avoid eating the ceriman in quantity until it is determined that there are no undesirable reactions. Some individuals have experienced urticaria and anaphylaxis after eating ceriman. Some children and adults have reported diarrhea and intestinal gas after consuming the flesh or products made from it."
	Nellis, D.W. (1997). Poisonous plants and animals of Florida and the Caribbean. Pineapple Press Inc., Sarasota, FL	"Toxic properties. Cells containing calcium oxalate needles have beer identified in the aerial roots and other parts of the plant. Symptoms. Irritation of the mouth and throat results from biting the leaves or consumption of the sap or less-than-ripe fruit. Juice from the damaged plant is severely irritating to the eyes. Treatment. The pain and swelling begin to decline within 2 to 4 days and are usually gone within 2 weeks. In severe cases, swelling of the tongue and throat may require a tracheotomy to allow respiration. The dissolving of the calcium oxalate needles can be accelerated by the application of lime juice or vinegar. The oxalate content is not sufficient to produce systemic poisoning."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	**Notes**
	Janick, J.& Paull, R.E. (2008). The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	[No evidence. Unlikely. Herbaceous plant of wet habitats] "The species is native to the wet forest of southern Mexico, Guatemala, and parts of Costa Rica and Panama. In 1908, it was reported to be cultivated in Florida, Portugal and Algeria (Labroy, 1908)." ... "This fast-growing stout herbaceous vine up to 24 m long spreads over the ground forming mats and can climb trees."

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	**Notes**
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"Being a tropical plant, ceriman grows best at temperatures of 20–30°C, requires high humidity, and needs full or partial shade."
	Duarte, O., & Paull, R. (2015). Exotic fruits and nuts of the New World. CABI, Wallingford, UK	"It can stand full sun but the ideal is to grow it with some shade and as an ornamental. When grown for fruit it does best in semi-shade under high moisture conditions."
	Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida, Gainesville, FL	"Partial to deep shade."

Qsn #	Question	Answer
	Park, S. H., & Lee, Y. B. (1997). Effect of light acclimatization on photosynthetic activity of foliage plants. Journal of the Korean Society for Horticultural Science 38(1): 71-76	"The photosynthetic activities of 10 foliage plants (all more than or equal to 2-years-old), grown under 40 or 80% shade, were investigated in a plastic house. Plants grown under low light intensity (80% shade) showed high photosynthetic rates at less than or equal to 200 micro molm-2s-1. Plants grown under high light intensity (40% shade) showed high photosynthetic rates at more than or equal to 300 micro molm-2s-1. Spathiphyllum patinii , Monstera deliciosa , Ficus benjamina and Syngonium podophyllum showed relatively high photosynthetic rates under low photon flux density regardless of leaf temperature and shade levels. In conditions similar to the indoor environment (50 micro molm-2s-1 light and 22 deg C), plants grown under 80% shade showed higher photosynthetic rates than those grown under 40% shade except Pachira aquatica . It was concluded that plants should be fully acclimatized to 80% shade before growing in buildings whose light intensity is less than or equal to 50 micro molm-2s-1. In areas with a higher light intensity (200 micro molm-2s-1), plants acclimatized inside greenhouses (40% shade) are suitable."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"The plant grows vigorously in almost any soil, including calcareous but flourishes best in well-drained, loamy soils rich in organic matter. It is intolerant of saline conditions. It is especially suited for use as an ornamental on fences and tree stumps."
	Morton, J. (1987). Ceriman. p. 15–17. In: Fruits of warm climates. Julia F. Morton, Miami, FL. https://www.hort.purdue.edu. [Accessed 17 Feb 2023]	"The plant grows vigorously in almost any soil, including limestone but flourishes best in well drained, rich loam. It is not adapted to saline conditions."
	Duarte, O., & Paull, R. (2015). Exotic fruits and nuts of the New World. CABI, Wallingford, UK	"The plant grows well in almost any soil including calcareous soils that are welldrained and preferably rich in organic matter. It is intolerant of saline conditions. When cultivated in the wild it tends to be an epiphyte. As an ornamental, it will grow in the substrate used for most indoor foliage plants."

411	Climbing or smothering growth habit	y
	Source(s)	**Notes**
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"A robust, fast growing, stout, herbaceous or woody, scrambling or climbing vine growing to 20 m high"
	Cedeño Fonseca, M. V., Hay, A., & Blanco Coto, M. A. (2022). A taxonomic revision of Monstera Adans.(Araceae: Monsteroideae) in Costa Rica. Aroideana 45(1): 4-198	"Robust to massive herb, terrestrial or nomadic vine, appressed-climbing habit."

412	Forms dense thickets	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Moodley, D. (2016). Assessing the invasiveness of alien aroids using modelling techniques and ecological assessments. PhD Dissertation. University of KwaZulu-Natal, Durban	"This climber has been recorded to reach 20 m or more in height, often depending on the height of the support structure, and can also form a dense mat on the ground when unsupported." [Does not specify whether plants exclude other vegetation, but author concludes that M. deliciosa poses a low risk of invasion risk to South Africa]

501	Aquatic	n
	Source(s)	**Notes**
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Terrestrial] "It is found all over tropical America in the hot humid rainforest from 1 to 600 m elevation and where the annual rainfall is above 1,000 mm."

502	Grass	n
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 13 Feb 2023]	Family: Araceae Subfamily: Monsteroideae Tribe: Monstereae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 13 Feb 2023]	Family: Araceae Subfamily: Monsteroideae Tribe: Monstereae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Cedeño Fonseca, M. V., Hay, A., & Blanco Coto, M. A. (2022). A taxonomic revision of Monstera Adans.(Araceae: Monsteroideae) in Costa Rica. Aroideana 45(1): 4-198	[Generic description. No evidence] "Slender to massive nomadic vines, appressed-climbing or climbing with pendent stems" ... "Adults: stems cylindrical or dorsoventrally compressed, sometimes sulcate; roots dimorphic, positively geotropic growing to penetrate substrate, appressed to substrate or pendent, occasionally with peridermal tissue; anchor roots along stem or only at nodes; feeder roots one per node on opposite side to petiole"

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[No evidence] "The ceriman is indigenous to the wet tropical forests of southern Mexico, Guatemala and parts of Costa Rica and Panama. Now it is pantropical and has naturalised in many areas for instance in Florida and coastal areas of North Coast and Central Coast, also scattered throughout the lower to mid Blue Mountains (Central Coast) of New South Wales in Australia."

602	Produces viable seed	y
	Source(s)	**Notes**
	Janick, J.& Paull, R.E. (2008). The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"It can be raised from seed or by tissue culture, though generally it is by stem cuttings that take very easily; these cuttings are stem pieces, 15–30 cm long with two nodes or stem tips when there is no new leaf unfolding. Suckers with or without roots can also be used. Seeds are used occasionally and they should be sown as soon as possible after removal from the fruit since they are short lived."
	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 plant is usually propagated vegetatively by stem pieces chat include leaves and a few aerial roots, or by removal of suckers or offshoots from mature plants. Seed may be planted if available."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Seeds may be rare in cultivation] "The hexagonal scales dry out and separate as the fruit ripens from the base upwards, revealing the white or pale yellow, sweet pulp and the thin, black particles (floral remnants) between the scales, usually there are no seed (Plate 5)."

603	Hybridizes naturally	n
	Source(s)	**Notes**
	Madison, M. (1977). A Revision of Monstera (Araceae). Contributions from the Gray Herbarium of Harvard University, 207, 3-100	[Hybrids suspected in genus. No evidence for M. deliciosa] "The existence of these clines and of large numbers of intermediates suggests that barriers to genetic exchange between these species are weak and that hybridization and introgression are correspondingly common. Thus, for example, the genes for yellow fruit color have spread through the South American populations of all species in section Monstera but are absent from the Mexican populations. This results in the confusing situation where fruit color in populations of Monstera lechleriana of Venezuela more closely resemble M. adansonii in Venezuela than they do populations of M. lechleriana in Mexico." ... "Study of nearly 1,000 specimens of Monstera adansonii has led to the recognition of three varieties in the present treatment. These varieties are morphologically and geographically distinct, but in their regions of sympatry they appear to hybridize freely, so that in these areas varietal determinations are difficult or impossible. Thus, much of the material from Venezuela and the Guianas, the main area of sympatry, can only be determined to species."

Qsn #	Question	Answer
	Cedeño Fonseca, M. V., Hay, A., & Blanco Coto, M. A. (2022). A taxonomic revision of Monstera Adans.(Araceae: Monsteroideae) in Costa Rica. Aroideana 45(1): 4-198	[One putative hybrid suspected in genus. No evidence provided for M. deliciosa] "Some individuals of Monstera costaricensis growing in open areas on the Caribbean slope (e.g. at La Selva and La Tirimbina Biological Reserve) have characteristics intermediate with M. adansonii, such as minute white pustules at the base of the petiole, the deciduous petiolar sheath and unwavy petiolar sheaths, numerous primary veins bifurcated or not, white spathe with yellowish spots, and flowers with and without conical style in the same spathe. Such traits suggest that these individuals could represent natural hybrids. These characteristics were also mentioned by Grayum (2003a)."

604	Self-compatible or apomictic	n
	Source(s)	**Notes**
	Jiménez, P. D., Hentrich, H., Aguilar-Rodríguez, P. A., Krömer, T., Chartier, M., & Gibernau, M. (2019). A Review on the Pollination of Aroids with Bisexual Flowers. Annals of the Missouri Botanical Garden, 104(1), 83-104	"Self-pollination has only been reported for M. lentii, although with only a 10% average fruit-set per inflorescence (Prieto & Cascante-Marın, 2017)."
	Madison, M. (1977). A Revision of Monstera (Araceae). Contributions from the Gray Herbarium of Harvard University, 207, 3-100	"The axis of the flowering spadix bears numerous, spirally arranged, perfect flowers, each with four stamens and lacking a perianth. The flowers at the base of the spadix are usually sterile. The flowers are protogynous by one or two days, and maturation of the inflorescence is acropetal. Production of stigmatic drops has ceased by the beginning of anthesis, and thus self-fertilization is not possible within an inflorescence."

Qsn #	Question	Answer
605	**Requires specialist pollinators**	**y**
	Source(s)	**Notes**
	Madison, M. (1977). A Revision of Monstera (Araceae). Contributions from the Gray Herbarium of Harvard University, 207, 3-100	"Insect visitors to Monstera spadices are varied and numerous. In a single inflorescence I have observed several species of beetles, hemiptera, flies, and bees. Of these, the bees are the most mobile and are perhaps the effective pollinators. C. H. Dodson (personal communication) has observed trigonid bees to be the chief pollinators of M. lechleriana and M. dilacerata in Ecuador. The failure of seed set in isolated plants and in a number of species in cultivation underscores the necessity for a proper pollinating agent and suggests that Monstera may be free of the agamospermy which bedevils classification of other aroids, notably Anthurium."
	Ramirez B, W., & Gomez P, L. D. (1978). Production of nectar and gums by flowers of Monstera deliciosa (Araceae) and of some species of Clusia (Guttiferae) collected by New World Trigona bees. Brenesia (Costa Rica). Brenesia, 14/15: 407-412	"Monstera deliciosa, like other aroids, produces thick gum-like nectar which is deposited on the stigma. Large numbers of Trigona corvina were observed collecting this nectar with their mandibles, and packing it into their corbiculae; they also collected pollen. Several species of Trigona were seen collecting a gummy, resinous substance from the androecium of Clusia odorata. It is thought that the bees use these substances both for food and as a propolis-like building material. The secretions attract pollinators, provide a deceiving food source which prevents flower tissue destruction, and acts as an adhesive for the pollen grains." [The gummy reward will probably only attract specialist Trigona, but the pollen reward may attract some generalist bees]

606	**Reproduction by vegetative fragmentation**	**y**
	Source(s)	**Notes**
	Hosking, J. R., Conn, B. J., Lepschi, B. J., & Barker, C. H. (2007). Plant species first recognised as naturalised for New South Wales in 2002 and 2003, with additional comments on species recognized as naturalised in 2000–2001. Cunninghamia, 10(1): 139-166	"Grows in many coastal areas where garden refuse had been dumped."
	Morton, J. (1987). Ceriman. p. 15–17. In: Fruits of warm climates. Julia F. Morton, Miami, FL. https://www.hort.purdue.edu. [Accessed 21 Feb 2023]	"In some European nurseries, the ceriman is raised from imported seed. Rapid multiplication has been achieved through tissue culture in Denmark. Generally, propagation is by means of stem cuttings, which may be simply set in beds or pots in the ground where the vine is intended to grow. Suckers or offshoots, with or without roots, can be separated from parent plants and transplanted successfully. Mulching is desirable as well as watering until new roots have become well-established."

607	**Minimum generative time (years)**	**>3**
	Source(s)	**Notes**
	Morton, J. (1987). Ceriman. p. 15–17. In: Fruits of warm climates. Julia F. Morton, Miami, FL. https://www.hort.purdue.edu. [Accessed 22 Feb 2023]	"Suckers will fruit in 2 to 4 years; cuttings in 4 to 6 years, depending on the location, soil and attention given." [Presumably longer from seed]

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**y**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Ogle, C. C., & La Cock, G. D. (2019). Additional records and observations of monocotyledons naturalised or casual in Manawatu Ecological Region, New Zealand, 1980–2019, Perspectives in Biosecurity, 4, 5-31	"Four collections were stated to be derived from dumped garden waste and four presumed to have established from seed. The Whanganui collection (CHR 532881) was from garden waste and it has not persisted, being smothered in rank grasses and vines."
	Hosking, J. R., Conn, B. J., Lepschi, B. J., & Barker, C. H. (2007). Plant species first recognised as naturalised for New South Wales in 2002 and 2003, with additional comments on species recognized as naturalised in 2000–2001. Cunninghamia, 10(1): 139-166	"Grows in many coastal areas where garden refuse had been dumped."

702	**Propagules dispersed intentionally by people**	**y**
	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	"Ceriman is seldom grown in Hawai'i exclusively for its fruit, which is described as tasting like a mixture of banana and pineapple."
	Janick, J.& Paull, R.E. (2008). The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"In 1908, it was reported to be cultivated in Florida, Portugal and Algeria (Labroy, 1908). Though no longer cultivated on any scale for its fruit, it is found for sale at roadside markets in southern Florida (Fig. A.9). It has been spread around the world as an ornamental foliage plant that can be used indoors or outdoors generally climbing on some structure or tree."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"The ceriman is indigenous to the wet tropical forests of southern Mexico, Guatemala and parts of Costa Rica and Panama. Now it is pantropical and has naturalised in many areas for instance in Florida and coastal areas of North Coast and Central Coast, also scattered throughout the lower to mid Blue Mountains (Central Coast) of New South Wales in Australia."

703	**Propagules likely to disperse as a produce contaminant**	**n**
	Source(s)	**Notes**
	WRA Specialist. (2023). Personal Communication	No evidence. Seeds rarely produced where pollinators are absent. May be dispersed vegetatively by discarded cuttings or garden waste.

704	**Propagules adapted to wind dispersal**	**n**
	Source(s)	**Notes**
	Cedeño Fonseca, M. V., Hay, A., & Blanco Coto, M. A. (2022). A taxonomic revision of Monstera Adans.(Araceae: Monsteroideae) in Costa Rica. Aroideana 45(1): 4-198	"berries with a light green stylar cap during development, mature stylar cap yellowish; pulp white; seeds dark green, 5–10 mm long."
	Madison, M. (1977). A Revision of Monstera (Araceae). Contributions from the Gray Herbarium of Harvard University, 207, 3-100	[Seeds if produced, adapted for frugivory] "Monstera seeds are apparently dispersed by birds, and germinate on the ground."

705	**Propagules water dispersed**	**y**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Moodley, D. (2016). Assessing the invasiveness of alien aroids using modelling techniques and ecological assessments. PhD Dissertation. University of KwaZulu-Natal, Durban	"On the northern slopes of the garden (i.e. dry soils) we observed that M. deliciosa's distribution clearly follows an irrigation system occurring along the garden just outside the garden fence. On the southern slopes (i.e. wetter soils), the plants are much more abundant and dense and they are slowly moving downhill vegetatively, but the plants are only concentrated along the waterway."
	Martin, T. J. (2002). A Mexican migrant, the naturalisation of Monstera deliciosa (fruit salad plant) in New Zealand. Auckland Botanical Society Journal, 57, 151-154	[Can be dispersed by vegetative propagules] "At the Kaitoke swamp Great Barrier Island stems had been dumped into a tributary of the main swamp and then further dispersed downstream in floodwaters. This resulted in several plants becoming established along the course of the stream (pers. obs.)."

706	Propagules bird dispersed	
	Source(s)	**Notes**
	Morton, J. (1987). Ceriman. p. 15–17. In: Fruits of warm climates. Julia F. Morton, Miami, FL. https://www.hort.purdue.edu. [Accessed]	"In India, wire cages are placed around developing fruits to protect them from rats, squirrels, monkeys and other creatures." [No mention of birds]
	Moodley, D. (2016). Assessing the invasiveness of alien aroids using modelling techniques and ecological assessments. PhD Dissertation. University of KwaZulu-Natal, Durban	"The plants have moved outside the garden through dispersal by vegetative means which is occurring at a very slow rate since they are currently not too far from the garden area."
	Madison, M. (1977). A Revision of Monstera (Araceae). Contributions from the Gray Herbarium of Harvard University, 207, 3-100	[Generic description. Speculative and conflicting with other references] "Monstera seeds are apparently dispersed by birds, and germinate on the ground. The seedlings and juveniles grow as terrestrial plants until they encounter a tree and begin to climb."
	Voss, R. S., & Jansa, S. A. (2021). Opossums: an adaptive radiation of New World marsupials. Johns Hopkins University Press, Baltimore, MD	[No mention of birds] "In French Guiana, three species of opossums are known to consume fruits belonging to 45 genera of plants, of which sympatric placentals (bats, primates, procyonids, and ungulates) consume fruits of 40 genera, or about 89% (Appendix 2). Of the five plant genera whose fruits were found to be eaten only by opossums in these studies, four-Xylopia (Annonaceae), Monstera (Araceae), Pera (Euphorbiaceae), and Loreya (Melastomataceae)-are known from other Neotropical studies to be consumed by bats, primates, and/or procyonids."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Madison, M. (1977). A Revision of Monstera (Araceae). Contributions from the Gray Herbarium of Harvard University, 207, 3-100	[Seeds if produced, adapted for frugivory] "Monstera seeds are apparently dispersed by birds, and germinate on the ground."

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

Qsn #	Question	Answer
	Morton, J. (1987). Ceriman. p. 15–17. In: Fruits of warm climates. Julia F. Morton, Miami, FL. https://www.hort.purdue.edu. [Accessed 22 Feb 2023]	"In India, wire cages are placed around developing fruits to protect them from rats, squirrels, monkeys and other creatures."
	Martin, T. J. (2002). A Mexican migrant, the naturalisation of Monstera deliciosa (fruit salad plant) in New Zealand. Auckland Botanical Society Journal, 57, 151-154	"Monkeys are possibly the dispersal vectors for the seeds of fruit saiad plant (Mayo et al. 1997)."
	Madison, M. (1977). A Revision of Monstera (Araceae). Contributions from the Gray Herbarium of Harvard University, 207, 3-100	[Adapted for frugivory. Presumably yes] "Monstera seeds are apparently dispersed by birds, and germinate on the ground."
	WRA Specialist. (2023). Personal Communication	Possibly. Seed set in the Hawaiian Islands, or in locations where effective pollinators are not present, may be reduced or absent, thereby minimizing or reducing the risk of internal dispersal by frugivorous animals.

801	Prolific seed production (>1000/m2)	n
	Source(s)	**Notes**
	Martin, T. J. (2002). A Mexican migrant, the naturalisation of Monstera deliciosa (fruit salad plant) in New Zealand. Auckland Botanical Society Journal, 57, 151-154	"Fruit salad plant is not known to set seed in New Zealand and is unlikely to because of obligate outcrossing and the need for a pollinator."
	Morton, J. (1987). Ceriman. p. 15–17. In: Fruits of warm climates. Julia F. Morton, Miami, FL. https://www.hort.purdue.edu. [Accessed 13 Feb 2023]	"Generally there are no seeds, but sometimes, pale-green, hard seeds the size of large peas, may occur in a dozen or so of the segments."
	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	"Seed may be planted if available."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	"The hexagonal scales dry out and separate as the fruit ripens from the base upwards, revealing the white or pale yellow, sweet pulp and the thin, black particles (floral remnants) between the scales, usually there are no seed (Plate 5)."

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	**Notes**
	Duarte, O., & Paull, R. (2015). Exotic fruits and nuts of the New World. CABI, Wallingford, UK	"It can be raised from seeds that should be sown as soon as possible after removal from the fruit. The main propagation is by using stem cuttings (stem, internodal pieces, and apical tip with leaves) with at least two buds."
	Janick, J.& Paull, R.E. (2008). The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"Seeds are used occasionally and they should be sown as soon as possible after removal from the fruit since they are short lived."

803	Well controlled by herbicides	y
	Source(s)	**Notes**
	Andriani, R. (2021). Frankenstein's monstera: how popular indoor plants go rogue in the Australian bush. The Guardian. Sun 11 Jul 2021. https://www.theguardian.com. [Accessed 22 Feb 2023]	"Some of her methods of control include scraping the root of vines and painting them with herbicide. "The challenge with monstera is that the climbing vines are small and they've got aerial roots. They've got narrow leaves which makes them hard to treat without harming the host tree.""

Qsn #	Question	Answer
	Yinil, D. S. (2006). Control of Monstera species in cocoa: a preliminary investigation using various herbicide mixtures. In Pest and disease incursions: risks, threats and management in Papua New Guinea. Canberra, ACIAR Technical Reports No. 62	"The present preliminary investigation has shown that glyphosate + Li-700 and Ally + Li-700 herbicide mixtures can control Monstera spp. The effect on Monstera and other weed species was observed a week after spraying with glyphosate, whereas the effect of Ally was not seen until the second week after spraying. By the fourth week, all the weeds, including Monstera, were completely killed. Glyphosate is normally mixed with Chemwet when spraying in cocoa blocks. This mixture had no major effect on Monstera. Both glyphosate and Ally are systemic herbicides, whereas the other five are non-systemic. The combination of the two systemic herbicides with Li -700 enhanced their effectiveness in controlling Monstera. Addition of Li -700 to Gramoxone killed other weed species but not Monstera. This study has shown that Monstera cannot be killed by non-systemic herbicides or by a systemic herbicide mixture used for general weed control in cocoa."

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	
	Source(s)	**Notes**
	Moodley, D. (2016). Assessing the invasiveness of alien aroids using modelling techniques and ecological assessments. PhD Dissertation. University of KwaZulu-Natal, Durban	"M. deliciosa can be cleared by chopping off the base stem and removing the rooted base, as well as, removing any aerial roots hanging down. The rest of the plant will then slowly die in the trees and/or on the ground."
	WRA Specialist. (2023). Personal Communication	May be controlled mechanically, but also able to resprout and grow after repeated cutting

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. (2023). Personal Communication	Unknown

Summary of Risk Traits:

In the Hawaiian Islands, the risk of invasiveness of Monstera deliciosa may be minor to moderate due to limited seed set, but spread could occur by vegetative fragments in discarded garden waste or along streams. This climber may be locally aggressive and could poison animals or people if ingested. It has not been recorded as naturalized on any of the Hawaiian Islands to date.

High Risk / Undesirable Traits
• Thrives and spreads in regions with tropical climates.
• Naturalized in Florida, Australia, New Zealand, and perhaps elsewhere (but no evidence in the Hawaiian Islands to date)
• An aggressive, nuisance weed in some locations, with concerns for potential environmental impacts.
• Unpalatable to browsing and grazing animals due to presence of calcium oxalate crystals
• Toxic to animals and people if ingested.
• Tolerates many soil types.
• Climbing and potentially smothering habit
• Shade tolerant (could invade intact native forests)
• May form dense cover in some locations.
• May reproduce by seed where pollinators are present.
• Spreads vegetatively by suckers, offshoots, or stem fragments
• Seeds, if produced, may be dispersed by frugivorous animals.
• Dispersed by stem fragments in discarded garden waste and along waterways.
• May tolerate repeated cutting or damage.

Low Risk Traits
• In the Hawaiian Islands, a commonly cultivated ornamental plant with no evidence of naturalization to date.
• Unarmed (no spines, thorns, or burrs)
• Reproductive barriers to self-fertilization may limit seed set.
• Specialized pollinator requirements may limit seed set.
• Reduced or absent seed production limits risk of long distance dispersal
• Herbicides may provide effective control if required.

Second Screening Results for Vines & Lianas

(A) Reported as a weed of cultivated lands?> Yes. Weedy plant of landscapes that escapes into natural areas.
(B) Unpalatable to grazers or known to form dense stands?> Unpalatable. May form dense cover.
(C) Shade tolerant or known to form dense stands?> Yes. Shade tolerant. May form dense cover.
(D) Bird- Or clearly wind- dispersed?> Unknown. Suspected of being bird-dispersed, but seed set may be reduced due to pollinator limitations.
(E) Life cycle <4 years? Unclear.
Outcome = Evaluate