Taxon: Zamioculcas zamiifolia (Lodd. et al.) Engl. **Family:** Araceae

Common Name(s): aroid palm, aroid plant, emerald palm, eternity plant, Zanzibar gem, zuzu plant, zz plant

Synonym(s): Caladium zamiifolium Lodd. et al.

Assessor: Chuck Chimera **Status:** Approved **End Date:** 12 Jul 2023

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

Keywords: Succulent Herb, Toxic Properties, Shade-Tolerant, Vegetative Propagation, Fleshy-Fruited

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	y
406	Host for recognized pests and pathogens	y = 1, n = 0	n

Qsn #	Question	Answer Option	Answer
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	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	y
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		
605	Requires specialist pollinators		
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	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)	y = 1, n = -1	n
708	Propagules survive passage through the gut	y = 1, n = -1	n
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		
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**
	Mayo, S. J. (1985). Flora of Tropical East Africa - Araceae. A.A. Balkema, Rotterdam, Netherlands	"A monotypic genus endemic to eastern and south-eastern tropical Africa." [No evidence of domestication]
	Dehgan, B. (2023). Garden Plants Taxonomy: Volume 1: Fern.s, Gymnosperms, and Angiosperms (Monocots). Springer Nature, Cham, Switzerland	"Native Habitat: dry grasslands and lowland forests of eastern Africa, from Kenya to northeastern South Africa."

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**
	Mayo, S. J. (1985). Flora of Tropical East Africa - Araceae. A.A. Balkema, Rotterdam, Netherlands	"A monotypic genus endemic to eastern and south-eastern tropical Africa."

202	Quality of climate match data	High
	Source(s)	**Notes**
	Mayo, S. J. (1985). Flora of Tropical East Africa - Araceae. A.A. Balkema, Rotterdam, Netherlands	"A monotypic genus endemic to eastern and south-eastern tropical Africa."

203	Broad climate suitability (environmental versatility)	n
	Source(s)	**Notes**
	Mayo, S. J. (1985). Flora of Tropical East Africa - Araceae. A.A. Balkema, Rotterdam, Netherlands	"HAB. Humid to dry evergreen forest, Brachystegia woodland, dry wooded grassland, bushland thicket, often on rocks, locally abundant; o-610 m."
	Dehgan, B. (2023). Garden Plants Taxonomy: Volume 1: Fern.s, Gymnosperms, and Angiosperms (Monocots). Springer Nature, Cham, Switzerland	"Hardiness Zones: 10B-13B. It does not tolerate temperatures below 45 °F (15 °C)."
	NC State Extension. (2023). Zamioculcas zamiifolia. https://plants.ces.ncsu.edu/plants/zamioculcas-zamiifolia/. [Accessed 11 Jul 2023]	"USDA Plant Hardiness Zone: 9a, 9b, 10a, 10b"

Qsn #	Question	Answer
204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	Mayo, S. J. (1985). Flora of Tropical East Africa - Araceae. A.A. Balkema, Rotterdam, Netherlands	"A monotypic genus endemic to eastern and south-eastern tropical Africa."
	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 11 Jul 2023]	"Only found in cultivation"

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	Dehgan, B. (2023). Garden Plants Taxonomy: Volume 1: Fern.s, Gymnosperms, and Angiosperms (Monocots). Springer Nature, Cham, Switzerland	"Landscape Uses: container plant for outdoors in warmer climates or indoors as foliage for relatively short time. HARDINESS ZONES: 10B-13B."
	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 12 Jul 2023]	"Only found in cultivation"
	Dave's Garden. (2023). Zamioculcas zamiifolia. https://davesgarden.com/guides/pf/go/2142/. [Accessed 12 Jul 2023]	"This plant is said to grow outdoors in the following regions: Phoenix, Arizona(2 reports) Scottsdale, Arizona Brea, California Burbank, California Carlsbad, California Clayton, California Fontana, California Merced, California Redlands, California San Diego, California Susanville, California Tulare, California Upland, California Alamosa, Colorado Meriden, Connecticut Wilmington, Delaware Big Pine Key, Florida Boca Raton, Florida Brooksville, Florida Englewood, Florida Fort Lauderdale, Florida(2 reports) Fort Myers, Florida(2 reports) Green Cove Springs, Florida Homestead, Florida(2 reports) Jacksonville, Florida Lake City, Florida Lake Worth, Florida Lakeland, Florida Marianna, Florida Miami, Florida Miami Beach, Florida New Port Richey, Florida Oldsmar, Florida Pompano Beach, Florida Winter Haven, Florida Hampton, Georgia Loganville, Georgia Villa Rica, Georgia Chicago, Illinois Davenport, Iowa Chalmette, Louisiana Gonzales, Louisiana Kenner, Louisiana Slidell, Louisiana Thibodaux, Louisiana Violet, Louisiana Greenfield, Massachusetts Columbia, Missouri Dunellen, New Jersey Lanoka Harbor, New Jersey Woodstown, New Jersey Warne, North Carolina Ada, Oklahoma Hulbert, Oklahoma Mannford, Oklahoma Mcalester, Oklahoma Harrisburg, Pennsylvania Middleton, Tennessee Abilene, Texas Alvin, Texas Austin, Texas Broaddus, Texas Bryan, Texas College Station, Texas Dallas, Texas Greenville, Texas Kerrville, Texas Lockhart, Texas Mont Belvieu, Texas Pearsall, Texas Portland, Texas Richmond, Texas Rowlett, Texas Saratoga, Texas Trinity, Texas"

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 11 Jul 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**

Qsn #	Question	Answer
	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 12 Jul 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 12 Jul 2023]	No evidence

303	Agricultural/forestry/horticultural 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 12 Jul 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 12 Jul 2023]	No evidence

304	Environmental weed	n
	Source(s)	**Notes**
	Invasive.org: Center for Invasive Species and Ecosystem Health. (2023). Zamioculcas zamiifolia. https://www.invasive.org/browse/subinfo.cfm?sub=15148. [Accessed 12 Jul 2023]	"No reference that we have lists this species as invasive in North America. This species is included for comparison to other species that are considered invasive."
	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 12 Jul 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 12 Jul 2023]	No evidence

305	Congeneric weed	n
	Source(s)	**Notes**
	Kubitzki, K. (ed.). (1998). The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	"Only one sp., Z. zamiifolia (Loddiges) Engler, tropical and southern subtropical Africa (Kenya to Natal); in moist forest and savannas, seasonally dormant or evergreen."

Qsn #	Question	Answer
401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Mayo, S. J. (1985). Flora of Tropical East Africa - Araceae. A.A. Balkema, Rotterdam, Netherlands	[No evidence] "Fleshy seasonally-dormant herbs with stem reduced to a stout, ± rhizomatous underground tuber. Leaves erect, l- several, subtended by several basal cataphylls; petiole stout, fleshy, pulvinate in upper half, base massively swollen and persistent in dormant phase; blade compound, pinnate; leaflets distant, fleshy, eventually deciduous, propagating vegetatively by formation of tuber at leaflet-base."

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

403	Parasitic	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]	"Monoecious evergreen succulent perennial herb, 20-25 in. (50-60 cm) tall; medium texture; rapid growth rate." [No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	NC State Extension. (2023). Zamioculcas zamiifolia. https://plants.ces.ncsu.edu/plants/zamioculcas-zamiifolia/. [Accessed 12 Jul 2023]	"Poison Toxic Principle: calcium oxalate" [Calcium oxalate may deter browsing]

405	Toxic to animals	y
	Source(s)	Notes
	NC State Extension. (2023). Zamioculcas zamiifolia. https://plants.ces.ncsu.edu/plants/zamioculcas-zamiifolia/. [Accessed 12 Jul 2023]	"Problems: Problem for Cats Problem for Dogs"
	Dehgan, B. (2023). Garden Plants Taxonomy: Volume 1: Fern.s, Gymnosperms, and Angiosperms (Monocots). Springer Nature, Cham, Switzerland	"Zamioculcas is a monotypic genus with Z. zamiifolia as its only known species. All parts of the plant are said to contain calcium oxalate and are poisonous."
	McKenzie, R. (2020). Australia's Poisonous Plants, Fungi and Cyanobacteria: A Guide to Species of Medical and Veterinary Importance. CSIRO Publishing, Clayton South, VIC	"Zamioculcas zamiifolia - Toxin = Oxalate rhaphide crystals and possibly other unidentified toxins; Animals at risk = Humans, dogs, cats, herbivores; Syndrome = One dog had vomiting and bloody diarrhoea after eating leaves"

Qsn #	Question	Answer
406	Host for recognized pests and pathogens	n
	Source(s)	**Notes**
	NC State Extension. (2023). Zamioculcas zamiifolia. https://plants.ces.ncsu.edu/plants/zamioculcas-zamiifolia/. [Accessed 12 Jul 2023]	"Insects, Diseases, and Other Plant Problems: No significant problems."
	Lopez, R. G., Blanchard, M. G., & Runkle, E. S. (2009). Propagation and production of Zamioculcas zamiifolia. Acta Horticulturae 813: 559-564	"The potential for Zamioculcas to become a popular foliage plant exists because it has naturally dark green glossy foliage, limited disease and insect pests, and it performs well in low light and dry conditions (Chen and Henny, 2003; Blanchard and Lopez, 2007)."

407	Causes allergies or is otherwise toxic to humans	y
	Source(s)	**Notes**
	NC State Extension. (2023). Zamioculcas zamiifolia. https://plants.ces.ncsu.edu/plants/zamioculcas-zamiifolia/. [Accessed 12 Jul 2023]	"Poisonous to Humans: Poison Severity: Medium Poison Symptoms: diarrhea, vomiting Poison Toxic Principle: calcium oxalate Causes Contact Dermatitis: No Poison Part: Leaves"
	Dehgan, B. (2023). Garden Plants Taxonomy: Volume 1: Fern.s, Gymnosperms, and Angiosperms (Monocots). Springer Nature, Cham, Switzerland	"Zamioculcas is a monotypic genus with Z. zamiifolia as its only known species. All parts of the plant are said to contain calcium oxalate and are poisonous."
	McKenzie, R. (2020). Australia's Poisonous Plants, Fungi and Cyanobacteria: A Guide to Species of Medical and Veterinary Importance. CSIRO Publishing, Clayton South, VIC	"Zamioculcas zamiifolia - Toxin = Oxalate rhaphide crystals and possibly other unidentified toxins; Animals at risk = Humans, dogs, cats, herbivores; Syndrome = One dog had vomiting and bloody diarrhoea after eating leaves"

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	**Notes**
	Mayo, S.J., Bogner, J. & Boyce, P.C. (1997). The Genera of Araceae. Royal Botanic Gardens, Kew, London, UK	"Zamioculcas zamiifolia is a succulent plant which stores water in its thick petioles and is sometimes found in very dry habitats, but it is more common in evergreen seasonal forests and savannas." [No evidence. Succulent habit suggests it is unlikely to burn]

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	**Notes**
	Dehgan, B. (2023). Garden Plants Taxonomy: Volume 1: Fern.s, Gymnosperms, and Angiosperms (Monocots). Springer Nature, Cham, Switzerland	"Culture: Bright indirect light or partial shade, in well-drained organic soil that should not be allowed to remain wet for long (too much water causes the rhizome to rot), otherwise no serious problems."
	NC State Extension. (2023). Zamioculcas zamiifolia. https://plants.ces.ncsu.edu/plants/zamioculcas-zamiifolia/. [Accessed 12 Jul 2023]	"Light: Deep shade (Less than 2 hours to no direct sunlight) Partial Shade (Direct sunlight only part of the day, 2-6 hours)"
	Lopez, R. G., Blanchard, M. G., & Runkle, E. S. (2009). Propagation and production of Zamioculcas zamiifolia. Acta Horticulturae 813: 559-564	"The potential for Zamioculcas to become a popular foliage plant exists because it has naturally dark green glossy foliage, limited disease and insect pests, and it performs well in low light and dry conditions (Chen and Henny, 2003; Blanchard and Lopez, 2007)."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Henny, R. J. and Chen, J. (2016). Florida Foliage House Plant Care: ZZ Plant. ENH1219. Revised. UF/IFAS Extension Service, University of Florida, Gainesville, FL	"Soil preference: Any well-drained peat- or bark-based potting soil can be used."
	NC State Extension. (2023). Zamioculcas zamiifolia. https://plants.ces.ncsu.edu/plants/zamioculcas-zamiifolia/. [Accessed 12 Jul 2023]	"Soil Texture: High Organic Matter Sand Soil Drainage: Good Drainage"

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Dehgan, B. (2023). Garden Plants Taxonomy: Volume 1: Fern.s, Gymnosperms, and Angiosperms (Monocots). Springer Nature, Cham, Switzerland	"Monoecious evergreen succulent perennial herb, 20-25 in. (50-60 cm) tall; medium texture; rapid growth rate. Stem/Bark: stemless but with stout succulent rhizome. Leaves: pinnately compound, with 6-8 pairs of elliptic glossy dark green, alternately arranged coriaceous-succulent leaflets of 2-5 in. (5-13 cm) long and nearly as wide; margins entire; petiole thick and succulent."

412	Forms dense thickets	n
	Source(s)	**Notes**
	Mayo, S.J., Bogner, J. & Boyce, P.C. (1997). The Genera of Araceae. Royal Botanic Gardens, Kew, London, UK	"Ecology: tropical moist forest, savannas; geophytes on forest floor or in stony ground." [No evidence]
	Dehgan, B. (2023). Garden Plants Taxonomy: Volume 1: Fern.s, Gymnosperms, and Angiosperms (Monocots). Springer Nature, Cham, Switzerland	"Native Habitat: dry grasslands and lowland forests of eastern Africa, from Kenya to northeastern South Africa." ... "Landscape Uses: container plant for outdoors in warmer climates or indoors as foliage for relatively short time." [No evidence from native or cultivated range]

501	Aquatic	n
	Source(s)	**Notes**
	Mayo, S. J. (1985). Flora of Tropical East Africa - Araceae. A.A. Balkema, Rotterdam, Netherlands	[Terrestrial] "Humid to dry evergreen forest, Brachystegia woodland, dry wooded grassland, bushland thicket, often on rocks, locally abundant; o-610 m."

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 11 Jul 2023]	"Family: Araceae Subfamily: Aroideae Tribe: Zamioculcadeae"

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 11 Jul 2023]	"Family: Araceae Subfamily: Aroideae Tribe: Zamioculcadeae"

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Mayo, S.J., Bogner, J. & Boyce, P.C. (1997). The Genera of Araceae. Royal Botanic Gardens, Kew, London, UK	"Ecology: tropical moist forest, savannas; geophytes on forest floor or in stony ground."
	Kubitzki, K. (ed.). (1998). The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	"Rhizome short, very thick; leaves few to several, petiole thickened basally, geniculate distally; leaf blade pinnately compound, leaflets oblong-elliptic, thick, deciduous, capable of rooting to form new plants"
	Mayo, S. J. (1985). Flora of Tropical East Africa - Araceae. A.A. Balkema, Rotterdam, Netherlands	"Tuber subcylindric, ± 3-:4 cm. in diameter or more, tough, woody."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	Dehgan, B. (2023). Garden Plants Taxonomy: Volume 1: Fern.s, Gymnosperms, and Angiosperms (Monocots). Springer Nature, Cham, Switzerland	"dry grasslands and lowland forests of eastern Africa, from Kenya to northeastern South Africa." [No evidence]

602	Produces viable seed	y
	Source(s)	**Notes**
	Dehgan, B. (2023). Garden Plants Taxonomy: Volume 1: Fern.s, Gymnosperms, and Angiosperms (Monocots). Springer Nature, Cham, Switzerland	"Fruit: white berries, containing 1-2 brown seeds." ... "Propagation: single leaves or separation of the rhizome."
	Exotic Rainforest. (2023). Zamioculcas zamiifolia. https://www.exoticrainforest.com/Zamioculcas%20zamiifolia%20pc.html. [Accessed 12 Jul 2023]	"Most Zamioculcas zamiifolia are mass produced for sale. The majority of specimens sold in discount nurseries are not grown from seed but instead created in a laboratory by a chemical process known as tissue culture (TC or cloning). The genetic material was extracted from an adult plant, replicated in a laboratory and grown in a lab dish. Once the plants begin to form they are then grown in multi-chambered trays before being sold to a commercial grower who transfers each plant to an individual pot." ... "If pollinated the berries that contain the seeds will be white."
	WRA Specialist. (2023). Personal Communication	Presumably will produce seeds, but typically propagated vegetatively.

603	Hybridizes naturally	n
	Source(s)	**Notes**
	Kubitzki, K. (ed.). (1998). The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	[No evidence] "Only one sp., Z. zamiifolia (Loddiges) Engler, tropical and southern subtropical Africa (Kenya to Natal); in moist forest and savannas, seasonally dormant or evergreen."

604	Self-compatible or apomictic	
	Source(s)	**Notes**
	Exotic Rainforest. (2023). Zamioculcas zamiifolia. https://www.exoticrainforest.com/Zamioculcas%20zamiifolia%20pc.html. [Accessed 12 Jul 2023]	"It is unknown for certain if this species is capable of self pollination and science is not currently aware of the exact insect species involved in the process."
	Chouteau, M., Gibernau, M., & Barabé, D. (2008). Relationships between floral characters, pollination mechanisms, life forms, and habitats in Araceae. Botanical Journal of the Linnean Society, 156(1), 29-42	"Table 1. Climatic region, life form, growth mode, pollinator, floral traits measured, and self-pollination capacity for 54 aroid species in 32 genera" [Zamioculcas zamiifolia - Self-pollination capacity = No]

Qsn #	Question	Answer
605	Requires specialist pollinators	
	Source(s)	Notes
	Exotic Rainforest. (2023). Zamioculcas zamiifolia. https://www.exoticrainforest.com/Zamioculcas%20zamiifolia%20pc.html. [Accessed 12 Jul 2023]	"As explained by Julius, the goal of the plant appears to be to reach the ground thus facilitating possible ground dwelling pollinators such as an ant or beetle to climb into the tiny blooms in to spread pollen from other specimens to the female flowers thus causing pollination."
	Chouteau, M., Gibernau, M., & Barabé, D. (2008). Relationships between floral characters, pollination mechanisms, life forms, and habitats in Araceae. Botanical Journal of the Linnean Society, 156(1), 29-42	"Synandrospadix vermitoxicus, Pseudodracontium fallax, the two Gonatopus species, and Zamioculcas zamiifolia were considered to be fly-pollinated" [Possibly fly or beetle pollinated]
	Chen, J., & Henny, R. J. (2003). ZZ: a unique tropical ornamental foliage plant. HortTechnology, 13(3), 458-462	"The plant has starchy pollen with a diameter of 60 µm (Grayum, 1985) suggesting that beetles (Staphylinidae) are the probable pollinators. Seeds are ellipsoid; embryos are large and rich in starch."

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Mayo, S.J., Bogner, J. & Boyce, P.C. (1997). The Genera of Araceae. Royal Botanic Gardens, Kew, London, UK	"Regeneration of tubers, leaves and roots from leaf segments is well known in Zamioculcas zamiifolia and Gonatopus boivinii (Engler 1881, Schubert 1913, Cutter 1962). Isolated entire leaflets of Zamioculcas and Gonatopus spontaneously develop a basal swelling, followed by the formation of roots and up to 3 buds, over a 6-9 week period for Zamioculcas."

607	Minimum generative time (years)	>3
	Source(s)	Notes
	NC State Extension. (2023). Zamioculcas zamiifolia. https://plants.ces.ncsu.edu/plants/zamioculcas-zamiifolia/. [Accessed 12 Jul 2023]	"This plant has a slow growth rate, reaching 2 to 4 feet in height and width."
	Brooklyn Botanic Garden. (2023). ZZ Plant: A Narrative Guide. https://www.bbg.org/article/zz_plant_a_narrative_guide. [Accessed 12 Jul 2023]	[Two grower comments on this site indicate that this plant hasn't flowered until 7-8 years of growth] "My ZZ plant is over 7 years old. For The last 3 years it has flowered over and over (about 8 times) but has had no new leaf growth." ... "My ZZ plant is over 7 years old. For The last 3 years it has flowered over and over (about 8 times) but has had no new leaf growth."
	Chen, J., & Henny, R. J. (2003). ZZ: a unique tropical ornamental foliage plant. HortTechnology, 13(3), 458-462	[Unclear] "Flowering appears to be agedependent, occurring in mature plants during spring and early summer." ... "Due to its slow-growing nature, the strategy for ZZ production typically has one group of growers specializing in propagation and the other group focusing on finished plant production. Some growers prefer to conduct both operations. Propagation involves rooting cuttings, rhizome production, and marketing rhizomes based on size."
	WRA Specialist. (2023). Personal Communication	The exact time to maturity for this plant is unknown, but the reported slow-growth rate, and anecdotal observations from growers suggest maturity is not reach until several years.

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Mayo, S.J., Bogner, J. & Boyce, P.C. (1997). The Genera of Araceae. Royal Botanic Gardens, Kew, London, UK	"BERRY: depressed-globose with furrow at septum, 1-2-seeded, surrounded by persistent tepals, white, infructescence ellipsoid. SEED: ellipsoid" [No evidence. No means of external attachment]

702	Propagules dispersed intentionally by people	y

Qsn #	Question	Answer
	Source(s)	Notes
	Dehgan, B. (2023). Garden Plants Taxonomy: Volume 1: Fern.s, Gymnosperms, and Angiosperms (Monocots). Springer Nature, Cham, Switzerland	"Landscape Uses: container plant for outdoors in warmer climates or indoors as foliage for relatively short time."
	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 12 Jul 2023]	"Only found in cultivation"

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Mayo, S.J., Bogner, J. & Boyce, P.C. (1997). The Genera of Araceae. Royal Botanic Gardens, Kew, London, UK	"Another important generalization that can be made is that animal dispersal, and more specifically, ornithochory (bird dispersal), must be the dominant mode, due to the universality of berried fruits in Araceae." [No evidence]
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Mayo, S.J., Bogner, J. & Boyce, P.C. (1997). The Genera of Araceae. Royal Botanic Gardens, Kew, London, UK	"Another important generalization that can be made is that animal dispersal, and more specifically, ornithochory (bird dispersal), must be the dominant mode, due to the universality of berried fruits in Araceae." [No evidence]
	Mayo, S. J. (1985). Flora of Tropical East Africa - Araceae. A.A. Balkema, Rotterdam, Netherlands	"Berry white, surrounded by persistent tepals, with septa) suture, up to 1.2 cm. broad, 1- 2-seeded. Seeds brown, ellipsoid, ± 0.8 cm. long, 0.5 cm. broad." [No evidence. Fleshy-fruited]

705	Propagules water dispersed	n
	Source(s)	Notes
	Mayo, S.J., Bogner, J. & Boyce, P.C. (1997). The Genera of Araceae. Royal Botanic Gardens, Kew, London, UK	[Not identified among the water dispersed genera] "Dispersal by water (hydrochory) is very probable in the helophytic genera Montrichardia and Typhonodorum, which have very large berries and floating seeds. Lagenandra, Cryptocoryne and Pistia are certainly water-dispersed and have much smaller fruits and floating seeds."

Qsn #	Question	Answer
706	**Propagules bird dispersed**	
	Source(s)	**Notes**
	Exotic Rainforest. (2023). Zamioculcas zamiifolia. https://www.exoticrainforest.com/Zamioculcas%20zamiifolia%20pc.html. [Accessed 12 Jul 2023]	"If one is successful in pollination and fruit/seed production, it will be most interesting to learn what strategy is employed by this plant for dispersal of its fruit and seed, based on the size and texture of its fruit and seeds, to speculate what insects or birds or mammals might be the distributors!"
	Mayo, S.J., Bogner, J. & Boyce, P.C. (1997). The Genera of Araceae. Royal Botanic Gardens, Kew, London, UK	[Possibly bird-dispersed, but direct evidence is lacking] "Another important generalization that can be made is that animal dispersal, and more specifically, ornithochory (bird dispersal), must be the dominant mode, due to the universality of berried fruits in Araceae. Reliable data on dispersal is very scarce, a recent exception being that of Barbara and David Snow (1988) for bird dispersal by blackbirds (Turdus merula) and robins (Erithacus rubecula) of Arum maculatum in England." ... "Berry: depressed-globose with furrow at septum, 1-2-seeded, surrounded by persistent tepals, white, infructescence ellipsoid. Seed: ellipsoid, testa smooth, brown, raphe conspicuous, embryo large, rich in starch, endosperm nearly absent, present only as a few cell layers at chalazal end."

707	**Propagules dispersed by other animals (externally)**	**n**
	Source(s)	**Notes**
	Mayo, S. J. (1985). Flora of Tropical East Africa - Araceae. A.A. Balkema, Rotterdam, Netherlands	"Berry white, surrounded by persistent tepals, with septa) suture, up to 1.2 cm. broad, 1- 2-seeded. Seeds brown, ellipsoid, ± 0.8 cm. long, 0.5 cm." [No means of external attachment]
	Mayo, S.J., Bogner, J. & Boyce, P.C. (1997). The Genera of Araceae. Royal Botanic Gardens, Kew, London, UK	[Not identified among the ant-dispersed genera] "Dispersal by ants (myrmecochory) has been observed in Biarum, in which the strophiole of the seed is probably implicated. In the tropics it is likely that ant dispersal is involved in the occurrence of certain aroids in Amazonian root gardens (e.g. Philodendron megalophyllum (syn. P. myrmecophilum), Anthurium ernestii, A. gracile; see Ule 1905). Anthurium gracile is a characteristic plant of ant-gardens (Benzing in Huxley & Cutler 1991). T. Croat (pers. comm.) has observed ants dispersing seeds of Philodendron megalophyllum."

708	**Propagules survive passage through the gut**	**n**
	Source(s)	**Notes**
	Mayo, S.J., Bogner, J. & Boyce, P.C. (1997). The Genera of Araceae. Royal Botanic Gardens, Kew, London, UK	[Possibly. Other species in the family Araceae may survive gut passage, but direct evidence is lacking for Zamioculcas zamiifolia] "Shaw et al. (1985) reported Lewin's honeyeater birds (Meliphaga lewinii) and regant bowerbird (Sericulus chrysocephalus) eating the ripe berries of Alocasia brisbanensis (as "A. macrorrhiza") in eastern Australia. It is not known if the seeds are regurgitated, destroyed in the gizzard or stomach, or voided intact in the faeces. Circumstantial evidence for other genera points to birds (Anthurium) and mammals, including primates (Anchomanes, Philodendron) and bats (? Philodendron), as the commonest vectors. The tawny-capped euphonia (Euphonia anneae) was reported to feed heavily on fruits of Anthurium (Loiselle & Blake 1990). Wheelright et al. (1983) observed three different birds (resplendent quetzal: Pharomachrus mocinno, long-tailed manakin: Chiroxiphia linearis, common bush tanager: Chlorospingus ophthalmicus) feeding on three unidentified species of Anthurium. A fecal sample of the wood thrush (Hylocichla mustelina) was observed containing seeds of an unidentified species of Dieffenbachia by Blake & Loiselle (1992)."

Qsn #	Question	Answer
801	**Prolific seed production (>1000/m2)**	n
	Source(s)	**Notes**
	Mayo, S. J. (1985). Flora of Tropical East Africa - Araceae. A.A. Balkema, Rotterdam, Netherlands	"Berry white, surrounded by persistent tepals, with septa) suture, up to 1.2 cm. broad, 1- 2-seeded. Seeds brown, ellipsoid, ± 0.8 cm. long, 0.5 cm." [Unlikely. 1-2 seeded fruit, and rarely used for cultivation, suggesting they are not readily produced or available.]

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	n
	Source(s)	**Notes**
	Mayo, S.J., Bogner, J. & Boyce, P.C. (1997). The Genera of Araceae. Royal Botanic Gardens, Kew, London, UK	"The seeds of most Araceae do not remain viable for long. Those lacking endosperm and with large embryos cannot withstand dessication and the genera with fleshy testas are similarly vulnerable."

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. (2023). Personal Communication	Unknown. No information that this species has been controlled with herbicides.

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	
	Source(s)	**Notes**
	Mayo, S.J., Bogner, J. & Boyce, P.C. (1997). The Genera of Araceae. Royal Botanic Gardens, Kew, London, UK	[Unknown if plants can regenerate vegetatively after damage] "Regeneration of tubers, leaves and roots from leaf segments is well known in Zamioculcas zamiifolia and Gonatopus boivinii (Engler 1881, Schubert 1913, Cutter 1962). Isolated entire leaflets of Zamioculcas and Gonatopus spontaneously develop a basal swelling, followed by the formation of roots and up to 3 buds, over a 6-9 week period for Zamioculcas."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	Chen, J., & Henny, R. J. (2003). ZZ: a unique tropical ornamental foliage plant. HortTechnology, 13(3), 458-462	"No disease or pest problems have been reported in either production or interior use."
	WRA Specialist. (2023). Personal Communication	Unknown

Summary of Risk Traits:

Zamioculcas zamiifolia, commonly known as the ZZ plant, is a perennial herb native to tropical Eastern Africa, from Kenya to northeastern South Africa. The plant is popular for its attractive foliage and ability to thrive in low-light conditions, making it a favorite choice for indoor gardening. Although it produces fleshy berries that may be dispersed by birds or other animals and can reproduce vegetatively from its tuberous rhizomes and succulent leaves, it is not currently known to be naturalized or invasive anywhere in the world.

High Risk / Undesirable Traits
• Thrives and could potentially spread in regions with tropical climates.
• Contains calcium oxalate that may be toxic or harmful to animals and humans if ingested.
• Shade-tolerant (could potentially spread into intact forest understories).
• Tolerates many soil types.
• A functional geophyte, with tuberous rhizomes.
• May be able to reproduce by seeds and vegetatively from rhizomes and leaves.
• Fleshy-fruited. Possibly dispersed by birds or other frugivorous animals (although direct evidence is lacking).
• Dispersed intentionally through cultivation.

Low Risk Traits
• No reports of naturalization or invasiveness where cultivated.
• Unarmed (no spines, thorns, or burrs)
• Not reported to be a host of any important pests or pathogens.
• Succulent. May be suitable for cultivation in fire prone areas.
• Although seeds may be produced, propagation is primarily through vegetative means, and seed production may be reduced in cultivation due to pollinator limitations.
• Seed longevity may be limited (unlikely to form a persistent seed bank).