Taxon: Ardisia crenata Sims **Family:** Primulaceae

Common Name(s): coralberry
coralberry tree
coralbush
hen's eyes
spiceberry

Synonym(s): Ardisia crenulata hort. Lodd., nom.

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 4 May 2021

WRA Score: 14.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Understory Shrub, Environmental Weed (Florida), Shade-Tolerant, Self-Compatible, Bird-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	y
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed		
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	y
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
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	n
405	Toxic to animals		
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		
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	y
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	2
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	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/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	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	n

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	Kitajima, K., Fox, A. M., Sato, T., & Nagamatsu, D. (2006). Cultivar selection prior to introduction may increase invasiveness: evidence from Ardisia crenata. Biological Invasions, 8(7), 1471-1482	[No, although cultivars exist that are more invasive than the wild varieties] "Comparison of the wild genotype that grows in mature evergreen broadleaf forests in central Kyushu, Japan, with the ecotype invading north central Florida revealed how selection for desirable cultivars might have inadvertently selected for traits that enhance the invasive potential of the species."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	NA

Qsn #	Question	Answer
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**
	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	"Ardisia crenata is the most widely distributed species of the genus, with a natural range that extends from northeastern India and Tibet to Japan, southern Asia, and east as far as the Philapines."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 30 Apr 2021]	"Native Asia-Temperate CHINA: China [Anhui Sheng, Zhejiang Sheng, Fujian Sheng, Hunan Sheng, Hubei Sheng, Jiangxi Sheng, Jiangsu Sheng, Guangdong Sheng, Yunnan Sheng, Guangxi Zhuangzu Zizhiqu, Xizang Zizhiqu (s.w.), Hainan Sheng] EASTERN ASIA: Japan [Honshu (s.), Kyushu, Ryukyu Islands, Shikoku], Korea, South, Taiwan Asia-Tropical INDIAN SUBCONTINENT: India (s.w.) INDO-CHINA: Myanmar, Thailand, Vietnam MALESIA: Malaysia, Philippines Cultivated (also cult.) Naturalized Africa WESTERN INDIAN OCEAN: Seychelles Northern America REGION: United States (s.e.) Pacific NORTH-CENTRAL PACIFIC: United States [Hawaii]"

202	Quality of climate match data	High
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 30 Apr 2021]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	**Notes**
	Wu, Z. Y. & P. H. Raven, eds. (1996). Flora of China. Vol. 15 (Myrsinaceae through Loganiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Forests, hillsides, valleys, shrubby areas, dark damp places; 100–2400 m. Anhui, Fujian, Guangdong, Guangxi, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Taiwan, SW Xizang, Yunnan, Zhejiang [SW India, Japan, Malaysia, Philippines, Vietnam]."

Qsn #	Question	Answer
	Langeland, K.A., Cherry, H.M., McCormick, C.M. & Craddock Burks, K.A. (2008). Identification and Biology of Non-Native Plants in Florida's Natural Areas. Second Edition. IFAS Publications, Gainesville, FL	"Most widely distributed Ardisia worldwide. Naturalized on 2 islands in Hawaii, and noted as an escapee in wet forest remnants in Mauritius over 60 years ago. Reported from Florida natural areas in Alachua, Flagler, Gadsden, Highlands, Hillsborough, Leon, Liberty, Marion, Martin, and Orange counties. Recorded by herbarium specimens from Alachua, Citrus, Franklin, Gadsden, Hernando, Highlands, Leon, Marion, Orange, and Pasco counties."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 4, Fruits. Springer, New York	[Elevation range >2000 m] "In its native habitat, it is found in the forests, hillsides, valleys, shrubby areas, dark damp places, lowlands forest woods, in low mountains of Central China and S. Japan from 100 to 2,400 m elevation. The plant grows on all soil types from acid to alkaline soils provided they are well-drained. It prefers partial shade but can withstand full sun. The plant performs poorly in cold climate and is killed by hard freeze."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI.	"Native to southern Asia; in Hawai'i naturalized in disturbed mesic valleys and forest, at least in WaiaholeWaikane and upper Manoa valleys, O'ahu, and vicinity of Hilo, Hawai'i, commonly cultivated elsewhere. Cultivated as early as 1930 at the Kamehameha Schools nursery (Judd s.n., BISH)."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 4, Fruits. Springer, New York	"The species’ native range stretches from Asia temperate– Japan (Honshu (south), Kyushu, Ryukyu Islands, Shikoku); South Korea; Taiwan, China (Anhui, Fujian, Guangdong, Guangxi, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, SW Xizang, Yunnan, Zhejiang) to Bhutan and Asia tropical, India, Sri Lanka, Myanmar; Thailand; Vietnam, Malaysia and Philippines."

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	**Notes**
	Harrison, M. (2009). Flowering Shrubs and Small Trees for the South. Pineapple Press Inc, Sarasota, FL	"Coral ardisia is naturalized on two islands in Hawaii. In Florida and Louisiana it has invaded natural areas in several places, and it has been reported in Texas too, where it dominates the understory in parts of two reserves."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI.	"in Hawai'i naturalized in disturbed mesic valleys and forest, at least in Waiahole-Waikane and upper Manoa valleys, O'ahu, and vicinity of Hilo, Hawai'i, commonly cultivated elsewhere."

301	Naturalized beyond native range	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Jackes, B. (2009). Taxonomic revision of Australian Myrsinaceae: Ardisia Sw. and Tetrardisia Mez. Austrobaileya, 8(1), 1-23	"Distribution and habitat: A native of the Asian region extending from India to Japan and into the Malaysian area (Malesian subkingdom). This commonly cultivated plant has become naturalised, chiefly in urban localities as well as along margins of rainforest and in wet sclerophyll forest in moist shady sites. It is currently found in eastern Australia from c. 16°30'S to 29°S (Map 3). Since fruits are dispersed by birds, this species has the potential to spread into more localities."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"in Hawai'i naturalized in disturbed mesic valleys and forest, at least in Waiahole-Waikane and upper Manoa valleys, O'ahu, and vicinity of Hilo, Hawai'i, commonly cultivated elsewhere. Cultivated as early as 1930 at the Kamehameha Schools nursery (Judd s.n., BISH)."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 3 May 2021]	"Naturalized Africa WESTERN INDIAN OCEAN: Seychelles Northern America REGION: United States (s.e.) Pacific NORTH-CENTRAL PACIFIC: United States [Hawaii]"
	Langeland, K.A., Cherry, H.M., McCormick, C.M. & Craddock Burks, K.A. (2008). Identification and Biology of Non-Native Plants in Florida's Natural Areas. Second Edition. IFAS Publications, Gainesville, FL	"Seen naturalized in hardwood hammocks across USDA Plant Hardiness Zone 9, including several areas in northern Florida"
	Frohlich, D. & Lau, A. (2012). New plant records for the Hawaiian islands. Bishop Museum Occasional Papers 113: 27–54	[Kauai] "Ardisia crenata Sims New island record Known in Hawai'i as Hilo holly, this ornamental plant has escaped cultivation to become an occasional to common element of mesic and wet lowland forests, where it commonly grows in densely shady understory. it has been documented as naturalized on O'ahu, Maui, and Hawai'i islands. it is documented here as very sparingly naturalized along a roadside on Kaua'i. it is not unlikely that this species is also established in forested areas of Kaua'i, although surveys of these areas have not been done by the collectors mentioned here. Material examined. KAUA'I: Lāwa'i, off Piko Rd. 1 m tall columnar shrub. No flowers seen; fruits abundant, red. Single naturalized plant coming out of cultivated hedge. Very sparingly naturalized in immediate area, 24 Feb 2010, D. Frohlich & A. Lau 2010022401."
	Oppenheimer, H. L. (2004). New Hawaiian plant records for 2003. Bishop Museum Occasional Papers. 79: 8-20	[West Maui] "Myrsinaceae Ardisia crenata Sims New island record Naturalized on O'ahu and Hawai'i and commonly cultivated elsewhere (Wagner et al., 1999: 932), this taxon is also sparingly naturalized on Maui, where it may have been formerly cultivated. Material examined: MAUI: West Maui, Wailuku Distr,'Iao Valley, 244 m, sparingly naturalized near roadside, 30 Mar 2002, Oppenheimer, F. Duvall, & L. Nelson H30220."

Qsn #	Question	Answer
302	**Garden/amenity/disturbance weed**	
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"in Hawai'i naturalized in disturbed mesic valleys and forest," [May benefit from disturbance]

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

304	**Environmental weed**	**y**
	Source(s)	**Notes**
	Queensland Government. (2021). Weeds of Australia. Ardisia crenata. https://keyserver.lucidcentral.org/weeds. [Accessed 3 May 2021]	"Coral berry (Ardisia crenata) is regarded as an environmental weed in New South Wales and Queensland and as a "sleeper weed" in other parts of northern Australia. In Queensland, it is an emerging species in the south-eastern parts of the state and is also causing concern in tropical northern regions. It is on the list of environmental weeds for the Gold Coast and has been reported from bushland near urban areas in this region, particularly near Currumbin Creek. In the Brisbane area it is established in densely forested riparian zones (e.g. along Enoggera Creek) and it is also on the undesirable plant list for Noosa Shire, on the Sunshine Coast. Coral berry (Ardisia crenata) is also naturalised in remnant rainforests in north-eastern New South Wales (e.g. near Mullumbimby) and has been recorded from bushland in the Sydney area. It is particularly invasive in rainforests and other closed forests, largely because its seeds will germinate in low light conditions under a dense forest canopy."
	Langeland, K.A., Cherry, H.M., McCormick, C.M. & Craddock Burks, K.A. (2008). Identification and Biology of Non-Native Plants in Florida's Natural Areas. Second Edition. IFAS Publications, Gainesville, FL	[Florida environmental weed] "Ecological Significance: Introduced into Florida for ornament near the beginning of this century (Royal Palm Nurseries 1900). Noted as escaping into moist woods in 1982 (Wunderlin). Seen naturalized in hardwood hammocks across USDA Plant Hardiness Zone 9, including several areas in northern Florida (H. Dozier, University of Florida, personal observations). Recently reported as new to Texas flora, dominating understories in portions of two reserves (Singhurst et al. 1997). May reach densities of greater than 100 plants per m2 (H. Dozier, University of Florida, unpublished data). Native plant species richness substantially lower in its presence, regardless of its density or the site history; also reduces the already dim light of forest understories by an additional 70%, potentially shading out native seedlings (H. Dozier, University of Florida, unpublished data). Mature naturalized plants usually surrounded by a carpet of seedlings, displacing small native ground cover such as violets, Viola spp., and wakerobins, Trillium spp., (M. Zeller and K. C. Burks, Florida Department of Environmental Protection, personal observations)."

305	**Congeneric weed**	**y**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Siso, C. L., & Burzycki, G. M. (2004). Survival of shoebutton ardisia (Ardisia elliptica) in forested wetlands after cut-stump treatment with triclopyr. Weed Technology, 18, 1422-1426	"Abstract: Shoebutton ardisia is an invasive plant from Asia that infests subtropical forests and seasonal wetlands in southern Florida. Removal of invasive species is crucial to maintaining the ecological integrity of these habitats. This study tested the effectiveness of triclopyr applied in a cutstump treatment to shoebutton ardisia in a forested seasonal wetland setting in southern Miami-Dade County, Florida. A total of 300 individuals of shoebutton ardisia were selected from three sites (100/ site); half were assigned to treatment and half to control groups. All plants were cut off at the base, and plants in the treatment group received an application of triclopyr (in amine form). Survival rates after 1 yr were 5.3% for treated vs. 97% for nontreated plants, indicating that triclopyr is effective at controlling shoebutton ardisia. However, results were significantly different at one site, indicating that further study is needed."
	Tropics Management Authority. (2004). Wet Tropics Conservation Strategy: the conservation, rehabilitation and transmission to future generations of the Wet Tropics World Heritage Area. WTMA, Cairns, Australia	"High priority weeds - new infestations to be eradicated and larger, established outbreaks to be contained" … "Ardisia solanacea" ... "Recent invader from domestic gardens around Cairns" [Targeted for control]
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Ardisia elliptica] The shrub is invasive because it forms dense singlespecies stands, preventing establishment and regeneration of all other species due to the dense foliage casting shade. In Florida, it invades disturbed wetlands and tree islands in the Everglades, as well as cypress and mangrove swamps (Langeland and Craddock Burks, 1998). In Jamaica, the shrub forms extensive secondary thickets (Langeland and Craddock Burks, 1998). In parts of the Northern Territory, Australia, shoe-button ardisia has become established in monsoon vine forests and melaleuca woodlands (State of Queensland, 2014). The shrub prolifically produces seeds, and seedlings can cover almost 100% of the forest floor."

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No evidence] "Small erect shrubs up to 1.5 m tall, unbranched except for flowering branches, glabrous throughout. Leaves alternate, coriaceous or chartaceous, elliptic-lanceolate or oblanceolate, 6-20 cm long, 1-4 cm wide, with 12-18 pairs of lateral nerves, the nerves slightly raised on lower surface, merging into a usually distinct marginal nerve, this often hidden beneath the revolute margins, margins revolute, crisped, and also usually undulate, apex acute to acuminate, base cuneate, petioles 6-10 mm long."

402	Allelopathic	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Appiah, K., Li, Z., Zeng, R. S., Luo, S., Oikawa, Y., & Fujii, Y. (2015). Determination of allelopathic potentials in plant species in Sino-Japanese floristic region by sandwich method and dish pack method. International Journal of Basic and Applied Sciences, 4(4), 381-394	[Potentially. Leachates of Ardisia crenata demonstrated to have "stronger inhibitory activity of test sample on the radicle elongation of lettuce by standard deviation variance (SDV) where: * = M–0.5 (SD),"] "The Sino-Japanese Floristic Region appears as one of the major centers of development of higher plants. This region have been relevant for the study of evolution and systematics of many flowering plants. The taxonomic richness of endemic plant species in this region have survived several years of extreme climate conditions. Endemic mountainous plant species that have survived extreme climate conditions are of allelopathic and medicinal interest. For this reason, 251 plant species collected from the Sino-Japanese Floristic Region were screened for allelopathic plant species. Sandwich method and dish pack method were respectively used to screen plant leaf leachates and volatile materials with lettuce (Lactuca sativa CV. Great Lakes 366) as receptor plant."

403	Parasitic	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Small erect shrubs up to 1.5 m tall, unbranched except for flowering branches, glabrous throughout." [Primulaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	Sellers, B.A., Langeland, K.A., Ferrell, J.A., Meisenberg, M. & Walter, J. (2007). Identification and Control of Coral Ardisia (Ardisia crenata): A Potentially Poisonous Plant. SS AGR 276. University of Florida IFAS, Gainesville, FL.	"There are two cases in Florida where this plant was suspected to be the causal agent for the death of livestock in 2001 and 2007." [This suggests that the plant was eaten by livestock voluntarily]
	Koda, R., & Fujita, N. (2011). Is deer herbivory directly proportional to deer population density? Comparison of deer feeding frequencies among six forests with different deer density. Forest Ecology and Management, 262(3), 432-439	[Possible low palatability. Ardisia crenata categorized in a group of plants with low incidence of browsing by Japanese sika deer] "Seven species that showed significantly higher feeding frequency in NKSG and/or NGKB than expected by chance were categorized as group A, and seven species which showed significantly lower frequency in NKNO and/or HNYM were categorized as group D. We also included Ardisia crenata in group D, because this species showed low frequency in NKNO (0.08), although the number of individuals was small (13) and feeding frequency did not show a significant difference."

405	Toxic to animals	
	Source(s)	**Notes**
	Sellers, B.A., Langeland, K.A., Ferrell, J.A., Meisenberg, M. & Walter, J. (2007). Identification and Control of Coral Ardisia (Ardisia crenata): A Potentially Poisonous Plant. SS AGR 276. University of Florida IFAS, Gainesville, FL.	[Possibly] "Toxicity. Although there is no published literature supporting the theory that coral ardisia is toxic, it is suspected that the berries and/or foliage are poisonous to livestock, pets, and humans. In 2001, 2007, and 2012, the plant was the suspected causal agent for livestock deaths in Florida."

Qsn #	Question	Answer
406	**Host for recognized pests and pathogens**	**n**
	Source(s)	**Notes**
	Epic Gardening. (2021). Ardisia: Caring For Christmas Berry Plants. https://www.epicgardening.com/ardisia/. [Accessed 4 May 2021]	"Pests: Leafcutter ants, birds, raccoons, mealybugs Diseases: Fungal root rot"
	Fu, C. H., & Chang, T. T. (1999). Foot rot of Ardisia crenata caused by Fusarium solani. Taiwan Journal of Forest Science, 14(2), 223-227	Alhough attacked by Fusarium solani, Ardisia is one of many host plant species

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	**Notes**
	Sellers, B.A., Langeland, K.A., Ferrell, J.A., Meisenberg, M. & Walter, J. (2007). Identification and Control of Coral Ardisia (Ardisia crenata): A Potentially Poisonous Plant. SS AGR 276. University of Florida IFAS, Gainesville, FL.	[Suspected but not confirmed] "Although there is no published literature supporting the theory that coral ardisia is toxic, it is suspected that the berries and/or foliage are poisonous to livestock, pets, and humans. In 2001, 2007, and 2012, the plant was the suspected causal agent for livestock deaths in Florida."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	**Notes**
	Langeland, K.A., Cherry, H.M., McCormick, C.M. & Craddock Burks, K.A. (2008). Identification and Biology of Non-Native Plants in Florida's Natural Areas. Second Edition. IFAS Publications, Gainesville, FL	"Does not carry fire well through its thick foliage and resprouts following fire (F. E. Putz, University of Florida, 1996 personal communication)."
	Wu, Z. Y. & P. H. Raven, eds. (1996). Flora of China. Vol. 15 (Myrsinaceae through Loganiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Unlikely given habitat] "Forests, hillsides, valleys, shrubby areas, dark damp places; 100–2400 m."

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	**Notes**
	Wu, Z. Y. & P. H. Raven, eds. (1996). Flora of China. Vol. 15 (Myrsinaceae through Loganiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Forests, hillsides, valleys, shrubby areas, dark damp places; 100–2400 m."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 4, Fruits. Springer, New York	"It prefers partial shade but can withstand full sun."
	Frohlich, D. & Lau, A. (2012). New plant records for the Hawaiian islands. Bishop Museum Occasional Papers 113: 27–54	"Known in Hawai'i as Hilo holly, this ornamental plant has escaped cultivation to become an occasional to common element of mesic and wet lowland forests, where it commonly grows in densely shady understory."
	Queensland Government. (2021). Weeds of Australia. Ardisia crenata. https://keyserver.lucidcentral.org/weeds. [Accessed 3 May 2021]	"This species prefers rich, well-drained, soils in partially shaded positions (e.g. in closed forests, near forest margins and along waterways)."

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

Qsn #	Question	Answer
	Source(s)	**Notes**
	Langeland, K.A., Cherry, H.M., McCormick, C.M. & Craddock Burks, K.A. (2008). Identification and Biology of Non-Native Plants in Florida's Natural Areas. Second Edition. IFAS Publications, Gainesville, FL	"Prefers moist soil (Chabot 1952, Odenwald and Turner 1980), but may succumb to fungal rot in flooded soil (J. Tea, University of Florida, 1996 personal communication)."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 4, Fruits. Springer, New York	"The plant grows on all soil types from acid to alkaline soils provided they are well-drained."

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Small erect shrubs up to 1.5 m tall, unbranched except for flowering branches, glabrous throughout."

412	Forms dense thickets	y
	Source(s)	**Notes**
	Dozier, H. (1999). Plant introductions to invasion: History, public awareness, and the case of Ardisia crenata. PhD Dissertation. University of Florida, Gainesville, FL	"Apparently A. crenata invasions currently are limited to mixed hardwood forests in warm regions. It is found growing in dense stands in the Gulf Coastal Plain from Florida to Louisiana (I. Ignatov, Louisiana State University, 1996 personal communication; W. Finch, The Mobile Register 1996 personal communication)." … "Once established, A. crenata can be very invasive. In north central Florida moderate to dense stands o f A. crenata (up to 60 plants > S cm tall/m3) (Pinzon, unpublished data) dominate understory vegetation and have a negative relationship on species diversity, regardless o f A. crenata density or site history (MacDonald, unpublished data). On such sites, where the dense canopy o f matured, crenata reduces dim understory light by an additional 70% (Kinnard, unpublished data), little else can be found growing at ground level but A. crenata seedlings."
	Demers, C., Long, A., & Williams, R. (2012). Controlling invasive exotic plants in north Florida forests. SS-FOR19. UF/IFAS Cooperative Extension Service, Gainesville, FL	"Coral ardisia, or spice ardisia, is an evergreen shrub, 2–6 ft tall, with dark green scallop-margined leaves. Flowers and fruit are produced in axillary, not terminal, clusters, usually drooping below the foliage. Fruit are small, bright red, one-seeded drupes. It was introduced into Florida for ornamental purposes in the early 1900s and has spread and become naturalized in hardwood hammocks across the north part of the state. It does not grow well in full sunlight. Seedlings of native plant species are shaded out where it forms dense thickets of more than 100 plants per square meter."

Qsn #	Question	Answer
	Langeland, K.A., Cherry, H.M., McCormick, C.M. & Craddock Burks, K.A. (2008). Identification and Biology of Non-Native Plants in Florida's Natural Areas. Second Edition. IFAS Publications, Gainesville, FL	"Recently reported as new to Texas flora, dominating understories in portions of two reserves (Singhurst et al. 1997). May reach densities of greater than 100 plants per m2 (H. Dozier, University of Florida, unpublished data). Native plant species richness substantially lower in its presence, regardless of its density or the site history; also reduces the already dim light of forest understories by an additional 70%, potentially shading out native seedlings (H. Dozier, University of Florida, unpublished data). Mature naturalized plants usually surrounded by a carpet of seedlings, displacing small native ground cover such as violets, Viola spp., and wakerobins, Trillium spp., (M. Zeller and K. C. Burks, Florida Department of Environmental Protection, personal observations)."

501	Aquatic	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Terrestrial] "in Hawai'i naturalized in disturbed mesic valleys and forest, at least in Waiahole-Waikane and upper Manoa valleys, O'ahu, and vicinity of Hilo, Hawai'i, commonly cultivated elsewhere."

502	Grass	n
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 3 May 2021]	"Family: Primulaceae Subfamily: Myrsinoideae"

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 3 May 2021]	"Family: Primulaceae Subfamily: Myrsinoideae"

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Small erect shrubs up to 1.5 m tall, unbranched except for flowering branches, glabrous throughout."

601	Evidence of substantial reproductive failure in native habitat	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Tezuka, T., Yokoyama, H., Tanaka, H., Shiozaki, S., & Oda, M. (2012). Seed and embryo germination in Ardisia crenata. Journal of Botany, Volume 2012, Article ID 679765, 7 pages	[No evidence] "Ardisia crenata is one of the most widely grown species in the genus and is distributed throughout East Asia, including Japan. It grows to approximately 1m high and has glossy, dark green leaves, and attractive bright red berries. It is grown as an ornamental plant in gardens and as a houseplant."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 4, Fruits. Springer, New York	[Widespread] "The species' native range stretches from Asia temperate – Japan (Honshu (south), Kyushu, Ryukyu Islands, Shikoku); South Korea; Taiwan, China (Anhui, Fujian, Guangdong, Guangxi, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, SW Xizang, Yunnan, Zhejiang) to Bhutan and Asia tropical, India, Sri Lanka, Myanmar; Thailand; Vietnam, Malaysia and Philippines."

602	Produces viable seed	y
	Source(s)	**Notes**
	Lee, A. K., Suh, J. K., & Roh, M. S. (2000). Propagation of Ardisia species native to Korea by seeds or by rooting of stem tip cuttings. Acta Horticulturae 541, 135-145	"A. japonica (Thunb.) Blume, A. crenata Sims, and A. pusilla A. DC. are small evergreen shrubs growing under a shade near the seacoast of the southern part of Korea. Germination of A. japonica and A. pusilla was higher in dark than in light, whereas A. crenata in the light. Although A. japonica and A. crenata seeds germinated well at 25°C, A. pusilla germinated well at 30 °C. Seed germination of A. japonica was significantly promoted by 50 mg·L-1 BA treatment compared with the control and other growth regulators, while that of A. crenata was also promoted by 50 mg·L-1 BA as well as 100 mg·L-1 Promalin treatment. Seed germination of three Ardisia species was higher when the seeds are stored in moist condition at 23 °C."
	Tezuka, T., Yokoyama, H., Tanaka, H., Shiozaki, S., & Oda, M. (2012). Seed and embryo germination in Ardisia crenata. Journal of Botany, Volume 2012, Article ID 679765, 7 pages	"Ardisia crenata is an evergreen shrub with attractive bright red berries. Although this species is usually propagated by seed, the seeds take a long time to germinate with conventional sowing methods. We investigated the germination capacity of seeds and embryos collected in different months and the effects of seed storage conditions, germination temperature, water permeability of the seed coat, and the endosperm on seed germination. Seeds and embryos collected in late September or later showed good germination rates. Seeds germinated more rapidly after longer periods of storage at low temperature (approximately 5◦C), and those stored in dry conditions showed lower emergence frequency than those stored in wet conditions. Seeds germinated at 15– 30◦C, but not at 5–10◦C. Removal of the seed coat enhanced water uptake and seed germination. Seeds with various proportions of the removed seed coat were sown on a medium supplemented with sucrose. The germination frequency increased as the size of the remaining endosperm decreased. However, the opposite results were obtained when seeds were sown on a medium without sucrose.We concluded that the optimal temperature of 25◦C is the most critical factor for seed germination in A. crenata."

Qsn #	Question	Answer
	Chimera, C. G., & Drake, D. R. (2010). Effects of pulp removal on seed germination of five invasive plants in Hawaii. Plant Protection Quarterly, 25(3), 137-140	"As part of the processing of fleshy fruits, many frugivores remove pulp from seeds by external handling or internal processing in the digestive system. External processing was simulated for five fleshy-fruited, non-native invasive trees in Hawaii through manual removal of pulp from seeds. Species used were coralberry (Ardisia crenata), green cestrum (Cestrum nocturnum), Padang cassia (Cinnamomum burmannii), fiddlewood (Citharexylum caudatum) and Brazilian peppertree (Schinus terebinthifolius). Depulping of fruits significantly increased seed germination over all species. Mean germination of de-pulped fruits of coralberry, green cestrum, Padang cassia, fiddlewood, and Brazilian peppertree was, on average 72, 37, 47, 18 and 17% greater compared with pulped fruits. In general, de-pulped fruits germinate faster compared with pulped fruits. Mean germination rate index (50%) for coralberry, green cestrum, Padang cassia, and Brazilian peppertree was faster by 26.7, 64.1, 19.5 and 44.3% compared with pulped fruits."
	Langeland, K.A., Cherry, H.M., McCormick, C.M. & Craddock Burks, K.A. (2008). Identification and Biology of Non-Native Plants in Florida's Natural Areas. Second Edition. IFAS Publications, Gainesville, FL	"Seeds dispersed by birds, including mockingbirds and cedar waxwings (K. Brady, Birdsong Nature Center, 1997 personal communication) and by raccoons (H. Dozier, University of Florida, personal observations). Seeds able to germinate in a range of soil pH, from pH 4 (acid) to pH 10 (alkaline), with germination rates of 84 to 98% within 40 days (M. Zeller, Florida Department of Environmental Protection, unpublished data)."

603	Hybridizes naturally	
	Source(s)	**Notes**
	Jackes, B. (2009). Taxonomic revision of Australian Myrsinaceae: Ardisia Sw. and Tetrardisia Mez. Austrobaileya, 8(1), 1-23	Unknown. No evidence found

604	Self-compatible or apomictic	y
	Source(s)	**Notes**
	Zeng, X., Michalski, S. G., Fischer, M., & Durka, W. (2012). Species diversity and population density affect genetic structure and gene dispersal in a subtropical understory shrub. Journal of Plant Ecology, 5(3), 270-278	"Ardisia crenata Sims (Myrsinaceae) is a small evergreen shrub native in a range from Japan to India occurring in the understory of tropical and subtropical forests (Bailey 1925; Roh et al. 2006). The species is insect-pollinated and self-compatible like many congeners (Cheon et al. 2000; Pascarella 1997; Zhao et al. 2006)."
	Jackes, B. (2009). Taxonomic revision of Australian Myrsinaceae: Ardisia Sw. and Tetrardisia Mez. Austrobaileya, 8(1), 1-23	"Breeding systems: Self-compatibility appears to be common in the genus although only about seven species have been studied (Bawa 1974; Bawa eta/., 1985; Pascarella 1997)."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Kubitzki, K. (ed.). (2004). The Families and genera of vascular plants. Volume VI. Flowering plants, Dicotyledons: Celastrales, Oxalidales, Rosales, Cornales, Ericales. Springer-Verlag, Berlin, Heidelberg, New York	"Most Myrsinaceae appear to be pollinated by insects, notably bees and flies." … "Some genera have flowers with a protruding anther cone and these are likely to be buzz-pollinated by pollen-gathering bees, as was shown by Pascarella (1997a) for Ardisia escallonioides. Autogamy has been reported for several species of Ardisia (Pascarella 1997b),"

Qsn #	Question	Answer
	Dozier, H. (1999). Plant introductions to invasion: History, public awareness, and the case of Ardisia crenata. PhD Dissertation. University of Florida, Gainesville, FL	"Research on other Ardisia species suggests that A. crenata may self pollinate and therefore not rely on pollinators for spread (Pascarella, unpublished data)."

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Langeland, K.A., Cherry, H.M., McCormick, C.M. & Craddock Burks, K.A. (2008). Identification and Biology of Non-Native Plants in Florida's Natural Areas. Second Edition. IFAS Publications, Gainesville, FL	"Resprouts vigorously after cutting; propagated by cuttings for compact growth (Chabot 1952)." [No evidence that plants sucker or spread vegetatively]
	Queensland Government. (2021). Weeds of Australia. Ardisia crenata. https://keyserver.lucidcentral.org/weeds. [Accessed 4 May 2021]	"This species reproduces by seed. The seeds may be spread by humans (i.e. in dumped garden waste), birds (i.e. which disperse the seed after consuming the attractive fruit), and by water movement (i.e. during floods)."

607	Minimum generative time (years)	2
	Source(s)	**Notes**
	Langeland, K.A., Cherry, H.M., McCormick, C.M. & Craddock Burks, K.A. (2008). Identification and Biology of Non-Native Plants in Florida's Natural Areas. Second Edition. IFAS Publications, Gainesville, FL	"Produces fruit within 2 years from seed (Odenwald and Turner 1980)."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	**Notes**
	Queensland Government. (2021). Weeds of Australia. Ardisia crenata. https://keyserver.lucidcentral.org/weeds. [Accessed 4 May 2021]	[Spread accidentally in dumped garden waste] "This species reproduces by seed. The seeds may be spread by humans (i.e. in dumped garden waste), birds (i.e. which disperse the seed after consuming the attractive fruit), and by water movement (i.e. during floods)."

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Harrison, M. (2009). Flowering Shrubs and Small Trees for the South. Pineapple Press Inc, Sarasota, FL	"Coral ardisia is naturalized on two islands in Hawaii. In Florida and Louisiana it has invaded natural areas in several places, and it has been reported in Texas too, where it dominates the understory in parts of two reserves. In Florida coral ardisia is listed as a Category I exotic invasive that is capable of displacing native species. Gardeners in mild coastal areas of the South are discouraged from including this plant in their gardens."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"in Hawai'i naturalized in disturbed mesic valleys and forest, at least in Waiahole-Waikane and upper Manoa valleys, O'ahu, and vicinity of Hilo, Hawai'i, commonly cultivated elsewhere. Cultivated as early as 1930 at the Kamehameha Schools nursery (Judd s.n., BISH)."

703	Propagules likely to disperse as a produce contaminant	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Queensland Government. (2021). Weeds of Australia. Ardisia crenata. https://keyserver.lucidcentral.org/weeds. [Accessed 4 May 2021]	"This species reproduces by seed. The seeds may be spread by humans (i.e. in dumped garden waste), birds (i.e. which disperse the seed after consuming the attractive fruit), and by water movement (i.e. during floods)."

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Drupes dark red, globose, 5-8 mm diameter."

705	Propagules water dispersed	y
	Source(s)	**Notes**
	Queensland Government. (2021). Weeds of Australia. Ardisia crenata. https://keyserver.lucidcentral.org/weeds. [Accessed 4 May 2021]	"This species reproduces by seed. The seeds may be spread by humans (i.e. in dumped garden waste), birds (i.e. which disperse the seed after consuming the attractive fruit), and by water movement (i.e. during floods)."

706	Propagules bird dispersed	y
	Source(s)	**Notes**
	Meisenburg, M. J., & Fox, A. M. (2002). What role do birds play in dispersal of invasive plants. Wildland Weeds, 2, 8-14	"In our own feeding trials with the fruit of Ardisia crenata (containing seeds of approximately 5mm diameter), northern mockingbirds typically regurgitate the seeds, while cedar waxwings will defecate them."
	Langeland, K.A., Cherry, H.M., McCormick, C.M. & Craddock Burks, K.A. (2008). Identification and Biology of Non-Native Plants in Florida's Natural Areas. Second Edition. IFAS Publications, Gainesville, FL	"Seeds dispersed by birds, including mockingbirds and cedar waxwings (K. Brady, Birdsong Nature Center, 1997 personal communication) and by raccoons (H. Dozier, University of Florida, personal observations)."
	Hutchinson, J. T., Langeland, K. A., & Meisenburg, M. (2011). Field trials for herbicide control of coral ardisia (Ardisia crenata) in natural areas of north-central Florida. Invasive Plant Science and Management, 4(2), 234-238	"Seeds of Ardisia crenata are also dispersed after ingestion by vertebrates such as cedar waxwings [Bombycilla cedrorum (Vieillot, 1808)], gray catbirds [Dumetella carolinensis (Linnaeus, 1766)] and northern mockingbirds [Mimus polyglottos (Linnaeus, 1758)] (Meisenburg 2007; Meisenburg and Fox 2002), or raccoons [Procyon lotor (Linnaeus, 1758)] (G. Jubinsky, personal communication)."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Langeland, K.A., Cherry, H.M., McCormick, C.M. & Craddock Burks, K.A. (2008). Identification and Biology of Non-Native Plants in Florida's Natural Areas. Second Edition. IFAS Publications, Gainesville, FL	"Fruit a bright red, globose, 1-seeded drupe, to 8 mm in diameter." [No means of external attachment]

708	Propagules survive passage through the gut	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Meisenburg, M. J., & Fox, A. M. (2002). What role do birds play in dispersal of invasive plants. Wildland Weeds, 2, 8-14	"In our own feeding trials with the fruit of Ardisia crenata (containing seeds of approximately 5mm diameter), northern mockingbirds typically regurgitate the seeds, while cedar waxwings will defecate them."
	Dozier, H. (1999). Plant introductions to invasion: History, public awareness, and the case of Ardisia crenata. PhD Dissertation. University of Florida, Gainesville, FL	"Seeds also have been found in mammalian (possibly raccoon or opossum) focal deposits near parent populations. It is unclear how far these animals carry A crenata seeds or how chemical properties o f A. crenata fruits may influence retention and thus dispersal distance."

801	Prolific seed production (>1000/m2)	n
	Source(s)	**Notes**
	Langeland, K.A., Cherry, H.M., McCormick, C.M. & Craddock Burks, K.A. (2008). Identification and Biology of Non-Native Plants in Florida's Natural Areas. Second Edition. IFAS Publications, Gainesville, FL	"Fruit a bright red, globose, 1-seeded drupe, to 8 mm in diameter." [Unlikely given 1-seeded fruit]
	Hutchinson, J. T., Langeland, K. A., & Meisenburg, M. (2011). Field trials for herbicide control of coral ardisia (Ardisia crenata) in natural areas of north-central Florida. Invasive Plant Science and Management, 4(2), 234-238	[High seedling densities, but not near a density of 1000 seeds m-2] "In northern Florida, understory cover of Ardisia crenata at six sites was 50 to 100%, with 14 to 96 stems m-2, and 184 to 286 seedlings m-2 (Kitajima et al. 2006)."
	Au, A. Y., Corlett, R. T., & Hau, B. C. (2006). Seed rain into upland plant communities in Hong Kong, China. Plant Ecology, 186(1), 13-22	[Low densities reported in this study] "Appendix 1. Woody seed rain (m)2 year)1) into six habitats in upland Hong Kong." [Additional seed taxa found in traps but not contributing >5 seeds m -2 year -1 in any one habitat: Includes Ardisia crenata]

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	**Notes**
	Roh, M. S. et al. (2008). Evaluation, characterization, and identification of woody landscape plants. Acta Horticulturae 769, 327-338	"The viability of Ardisia crenata seeds, which are recalcitrant and viable for about 2 to 4 weeks, can be extended to 15 weeks."

803	Well controlled by herbicides	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Hutchinson, J. T., Langeland, K. A., & Meisenburg, M. (2011). Field trials for herbicide control of coral ardisia (Ardisia crenata) in natural areas of north-central Florida. Invasive Plant Science and Management, 4(2), 234-238	"Coral ardisia (Ardisia crenata) has been present in Florida for more than 100 yr as an ornamental and has become invasive in hammocks of natural areas. This plant forms dense understory cover, often greater than 90%, which can suppress native plant recruitment and growth. Results from herbicide trials at two sites in Florida indicate that a single foliar treatment applied as a spot application of triclopyr amine, triclopyr ester, glyphosate, imazapic, dicamba, triclopyr amine + imazapic, or triclopyr ester + fluroxypyr reduced Ardisia crenata to less than 13% at 12 mo after treatment (MAT). A single treatment of imazapic (2.4 g ae L21) or imazapic (2.4 g ae L21) + triclopyr (10.8 g ae L21) reduced cover of mature plants to less than 0.5% and seedlings to less than or equal to 4% at 12 MAT. Native plant cover was less than 5% prior to treatment indicating that dense infestations of Ardisia crenata may suppress native vegetation. In the dense infestations of Ardisia crenata observed in this study, nontarget damage was not a concern due to the rarity of native plants. However, applicators should use caution applying triclopyr and imazapic when small shrubs and trees are present in the treatment area. Additional follow-up treatments will be required for control of seedling and possible resprouts at 12 MAT."
	Sellers, B.A., Langeland, K.A., Ferrell, J.A., Meisenberg, M. & Walter, J. (2007). Identification and Control of Coral Ardisia (Ardisia crenata): A Potentially Poisonous Plant. SS AGR 276. University of Florida IFAS, Gainesville, FL.	"Coral ardisia can be suppressed by using foliar applications of 2.25% v/v (volume to volume) solution of triclopyr ester-containing products (Garlon 4 Ultra, Remedy Ultra, others), 3% triclopyr amine-containing products (Garlon 3A, others), or 1% imazapic-containing products (Impose, Panoramic, Plateau) (Table 1). Basal bark applications with an 18% v/v solution of Garlon 4 or Remedy Ultra in an oil carrier can also control the plant. Complete coverage is essential when using foliar applications. Do not apply more than 8 quarts of Remedy or Garlon 4 per acre. If applying greater than 2 quarts, then treat no more than 10% of the total grazed area. Since formulations can evaporate when temperatures exceed 85°F, use care when applying high rates of these herbicides. The herbicide imazapic has been shown to reduce seedling germination within 12 months after application. Regardless of the application method, retreatment will be necessary for complete control, as there will typically be a new flush of seedlings following most treatments."

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**
	Langeland, K.A., Cherry, H.M., McCormick, C.M. & Craddock Burks, K.A. (2008). Identification and Biology of Non-Native Plants in Florida's Natural Areas. Second Edition. IFAS Publications, Gainesville, FL	"Resprouts vigorously after cutting; propagated by cuttings for compact growth (Chabot 1952). Does not carry fire well through its thick foliage and resprouts following fire (F. E. Putz, University of Florida, 1996 personal communication)."
	Demers, C., Long, A., & Williams, R. (2012). Controlling invasive exotic plants in north Florida forests. SS-FOR19. UF/IFAS Cooperative Extension Service, Gainesville, FL	[Requires herbicide to keep adult plants from regrowing] "Seedlings can be hand-pulled. Mowing can keep the plants at ground level and inhibit seed production, but most effective control of this plant can be achieved through herbicide application. With the herbicide treatments below, application timing in mid to late fall, when many native desirable plants are dormant, improves selectivity in control."

Qsn #	Question	Answer
805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	**n**
	Source(s)	**Notes**
	Center for Aquatic and Invasive Plants. (2021). Ardisia crenata - Coral ardisia. https://plants.ifas.ufl.edu/plant-directory/ardisia-crenata/. [Accessed 3 May 2021]	"Biological There are no known biological control agents for coral ardisia."
	WRA Specialist. (2021). Personal Communication	Naturalized on the Hawaiian islands of Kauai, Oahu, Maui and Hawaii, with no documented evidence of limiting factors or effective natural enemies

Summary of Risk Traits:

High Risk / Undesirable Traits
• Broad climate suitability; elevation range exceeds 1000 m, demonstrating environmental versatility
• Native to, and able to spread in, regions with temperate to tropical climates
• Naturalized on Kauai, Oahu, Maui, and Hawaii (Hawaiian Islands) and elsewhere
• An environmental weed in Florida, Australia and potentially Hawaii
• Other Ardisia species are invasive
• Possibly allelopathic
• Potentially toxic to animals and people
• Shade-tolerant
• Tolerates many soil types
• Forms dense stands that can exclude other vegetation
• Reproduces by prolific seed production
• Self-compatible
• Reaches maturity in 2 years
• Seeds dispersed by birds, other frugivores, dumped garden waste, water and intentionally by people
• Resprouts after cutting and fire

Low Risk Traits
• Unarmed (no spines, thorns, or burrs)
• Not reported to spread vegetatively
• Recalcitrant seeds lose viability after 2 to 4 weeks, and will not form a persistent seed bank
• Herbicides provide effective control