Taxon: Ocotea quixos (Lam.) Kosterm. **Family:** Lauraceae

Common Name(s): American cinnamon
canela americana
ishpingo

Synonym(s): Laurus quixos Lam.

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 1 Jun 2017

WRA Score: **-2.0** **Designation:** L **Rating:** Low Risk

Keywords: Tropical Tree, Unarmed, Aromatic, Slow-Growing, 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	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	n
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	n
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed		
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
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		

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	n
411	Climbing or smothering growth habit	y=1, n=0	n
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		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation		
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		
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	n
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	rarepalmseeds.com. 2017. Ocotea quixos. http://www.rarepalmseeds.com/pix/OcoQui.shtml. [Accessed 1 Jun 2017]	"A medium-sized to large tree native to lowland rainforests in Ecuador and into Colombia and Peru. Its bark is pink inside and emits a strong cinnamon smell as do the dark, glossy, evergreen leaves and the flower calices. Ocotea quixos has been used as a spice at least since Incan times. In cultivation it is best suited to tropical climates."
	Bruni, R., Medici, A., Andreotti, E., Fantin, C., Muzzoli, M., Dehesa, M., Romagnoli, C. & Sacchetti, G. (2004). Chemical composition and biological activities of Ishpingo essential oil, a traditional Ecuadorian spice from Ocotea quixos (Lam.) Kosterm.(Lauraceae) flower calices. Food Chemistry, 85(3), 415-421	[Cultivated for long periods, but evidence of domestication lacking] "Ocotea quixos (Lam.) Kosterm. (Lauraceae) is a medium sized tree native to Amazonian Ecuador and neighbouring countries (Jørgensen & Leon-Yanez, 1999), which is reputed to have known aromatic properties since the period of the Incas (Naranjo, 1969), but is not well known outside Ecuador."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	NA

201	**Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"**	**High**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 1 Jun 2017]	"Native: Southern America Western South America: Ecuador - Napo, - Pichincha, - Sucumbíos"

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 1 Jun 2017]	

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	**n**
	Source(s)	**Notes**
	Tropicos.org. 2017. Tropicos [Online Database]. Missouri Botanical Garden. http://www.tropicos.org/. [Accessed 1 Jun 2017]	Collected from 0 - 900 m elevation, in Ecuador and Peru

Qsn #	Question	Answer
204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 1 Jun 2017]	"Native: Southern America Western South America: Ecuador - Napo, - Pichincha, - Sucumbíos"

Qsn #	Question	Answer
205	**Does the species have a history of repeated introductions outside its natural range?**	**n**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 1 Jun 2017]	"Cultivated: Southern America Western South America: Ecuador"
	Bruni, R., Medici, A., Andreotti, E., Fantin, C., Muzzoli, M., Dehesa, M., Romagnoli, C. & Sacchetti, G. (2004). Chemical composition and biological activities of Ishpingo essential oil, a traditional Ecuadorian spice from Ocotea quixos (Lam.) Kosterm.(Lauraceae) flower calices. Food Chemistry, 85(3), 415-421	"Ocotea quixos (Lam.) Kosterm. (Lauraceae) is a medium sized tree native to Amazonian Ecuador and neighbouring countries (Jørgensen & Leon-Yanez, 1999), which is reputed to have known aromatic properties since the period of the Incas (Naranjo, 1969), but is not well known outside Ecuador."
	Hawaiian Tropical Plant Nursery. 2017. Spice & Beverage Plants. http://www.hawaiiantropicalplants.com/spice.html. [Accessed 1 Jun 2017]	"Rare in the US. This species has been difficult to establish. Young plants seem to drop leaves a couple of times per year. New growth sometimes starts and then dies back. Becomes more robust when about 4 or 5 years old. Once they are about 3 ft. to 4 ft. tall growth becomes more vigorous."

Qsn #	Question	Answer
301	**Naturalized beyond native range**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2017. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/. [Accessed 1 Jun 2017]	No evidence to date

Qsn #	Question	Answer
302	**Garden/amenity/disturbance weed**	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

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

305	**Congeneric weed**	
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[Listed as a weed. Unable to determine impacts] "Ocotea patens (Sw.) Nees Lauraceae Accepted name: Nectandra patens (Sw.) Griseb. Total N° of Refs: 2 Habit: Tree Origin: C Am References: Global-W-1376, Global-I- 1404."

401	**Produces spines, thorns or burrs**	n
	Source(s)	**Notes**
	rarepalmseeds.com. 2017. Ocotea quixos. http://www.rarepalmseeds.com/pix/OcoQui.shtml. [Accessed 1 Jun 2017]	[No evidence] "A medium-sized to large tree native to lowland rainforests in Ecuador and into Colombia and Peru."

402	**Allelopathic**	
	Source(s)	**Notes**
	Rolli, E., Marieschi, M., Maietti, S., Sacchetti, G., & Bruni, R. (2014). Comparative phytotoxicity of 25 essential oils on pre-and post emergence development of Solanum lycopersicum L.: A multivariate approach. Industrial Crops and Products, 60, 280-290	[Possibly. Oil demonstrates allelopathic properties] "Table 4 Post-emergence effects of essential oils applied at 1 ml/l on S. lycopersicum plantlets." [Ocotea quixos - Kill rate - Rate of mortality after the essential oil application on top of agar soil = 30.5; Damage rate - Visual score of damages induced by essential oil exposure = C: 40–0%]

Qsn #	Question	Answer
403	**Parasitic**	**n**
	Source(s)	**Notes**
	rarepalmseeds.com. 2017. Ocotea quixos. http://www.rarepalmseeds.com/pix/OcoQui.shtml. [Accessed 1 Jun 2017]	"A medium-sized to large tree native to lowland rainforests in Ecuador and into Colombia and Peru."

404	Unpalatable to grazing animals	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Palatability of foliage unknown

405	Toxic to animals	n
	Source(s)	**Notes**
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	Bruni, R., Medici, A., Andreotti, E., Fantin, C., Muzzoli, M., Dehesa, M., Romagnoli, C. & Sacchetti, G. (2004). Chemical composition and biological activities of Ishpingo essential oil, a traditional Ecuadorian spice from Ocotea quixos (Lam.) Kosterm.(Lauraceae) flower calices. Food Chemistry, 85(3), 415-421	"Recently, its use has become widespread also in nonrural areas under the name of Flor de Canela, due to its cinnamon-like perfume. It is traditionally used for flavouring cakes, beverages and infusions, besides being appreciated as an appetizer, eupeptic, a disinfectant and as a local anesthetic (Naranjo, Kijjoa, Giesbrecht, & Gottlieb, 1981)."
	Naranjo, P., Kijjoa, A., Giesbrecht, A. M., & Gottlieb, O. R. (1981). Ocotea quixos, American cinnamon. Journal of Ethnopharmacology, 4(2), 233-236	[No evidence] "Among the three South American Lauraceae with cinnamon odours, Ocotea quixos Lam. is distinguished with the richest historical legacy. Cinnamaldehyde, its odoriferous principle, occurs besides o-methoxycinnamaldehyde, cinnamic acid and methyl cinnamate in the fruit calyx. In contradistinction, 1-nitro-2-phenylethane is responsible for the cinnamon odour of bark and leaves of Aniba canelilla (H.B.K.) Mez and Ocotea pretiosa (Nees) Mez."
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	rarepalmseeds.com. 2017. Ocotea quixos. http://www.rarepalmseeds.com/pix/OcoQui.shtml. [Accessed 1 Jun 2017]	"A medium-sized to large tree native to lowland rainforests in Ecuador and into Colombia and Peru." [Unlikely given habitat]

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	**Notes**
	rarepalmseeds.com. 2017. Ocotea quixos. http://www.rarepalmseeds.com/pix/OcoQui.shtml. [Accessed 1 Jun 2017]	"A medium-sized to large tree native to lowland rainforests in Ecuador and into Colombia and Peru." [Light requirements unknown]

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	n
	Source(s)	**Notes**
	Hawaiian Tropical Plant Nursery. 2017. Spice & Beverage Plants. http://www.hawaiiantropicalplants.com/spice.html. [Accessed 1 Jun 2017]	"Rich slightly acid soil."

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	rarepalmseeds.com. 2017. Ocotea quixos. http://www.rarepalmseeds.com/pix/OcoQui.shtml. [Accessed 1 Jun 2017]	"A medium-sized to large tree native to lowland rainforests in Ecuador and into Colombia and Peru."

412	Forms dense thickets	
	Source(s)	**Notes**
	Ballabeni, V., Tognolini, M., Bertoni, S., Bruni, R., Guerrini, A., Rueda, G. M., & Barocelli, E. (2007). Antiplatelet and antithrombotic activities of essential oil from wild Ocotea quixos (Lam.) Kosterm (Lauraceae) calices from Amazonian Ecuador. Pharmacological Research, 55(1), 23-30	[Densities unknown] "Ocotea quixos (Lam.) Kosterm. (Lauraceae) (=Nectandra cinnamomoides Nees., = Laurus quixos Lam.) is a small tree (5–20 m) with greenish floral buds, white flowers, dimorphic fruits and coriaceous leaves with reddish venations, bright glossy green on adaxial surface and yellowish on the abaxial. Once considered endemic of the rainforests of Ecuador, it has recently been collected also in southern Colombia and Peru [2,3]."

Qsn #	Question	Answer
501	**Aquatic**	**n**
	Source(s)	**Notes**
	rarepalmseeds.com. 2017. Ocotea quixos. http://www.rarepalmseeds.com/pix/OcoQui.shtml. [Accessed 1 Jun 2017]	"A medium-sized to large tree native to lowland rainforests in Ecuador and into Colombia and Peru."
	Bruni, R., Medici, A., Andreotti, E., Fantin, C., Muzzoli, M., Dehesa, M., Romagnoli, C. & Sacchetti, G. (2004). Chemical composition and biological activities of Ishpingo essential oil, a traditional Ecuadorian spice from Ocotea quixos (Lam.) Kosterm.(Lauraceae) flower calices. Food Chemistry, 85(3), 415-421	[Terrestrial] "Ocotea quixos (Lam.) Kosterm. (Lauraceae) is a medium sized tree native to Amazonian Ecuador and neighbouring countries (Jørgensen & Leo´ n-Ya´ nez, 1999),"

502	Grass	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 1 Jun 2017]	Family: Lauraceae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 1 Jun 2017]	Family: Lauraceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	rarepalmseeds.com. 2017. Ocotea quixos. http://www.rarepalmseeds.com/pix/OcoQui.shtml. [Accessed 1 Jun 2017]	"A medium-sized to large tree native to lowland rainforests in Ecuador and into Colombia and Peru."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 1 Jun 2017]	"Native: Southern America Western South America: Ecuador - Napo, - Pichincha, - Sucumbíos"

602	Produces viable seed	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Torres, G. (2013). El aprovechamiento del Ishpink Ocotea quixos. Manual de buenas practices. Fundación Chankuap' Recursos para el Futuro, Macas, Ecuador	"Las plantas en estado Silvestre deben manejarse únicamente para la recolección del cáliz y de las semillas para propagar la planta." [Plants in the wild should be handled only for the collection of the calyces and seeds To propagate the plant.]
	Useful Tropical Plants Database. 2017. Ocotea cinnamomoides. http://tropical.theferns.info/viewtropical.php?id=Ocotea+cinnamomoides. [Accessed 1 Jun 2017]	"Propagation Seed -" ... "There is a great deal of confusion over the correct name for this species, with Nectandra cinnamomoides, Ocotea cymbarum and Ocotea quixos all being used by different authorities[K]. We have decided to go with Ocotea cinnamomoides for the present."

603	Hybridizes naturally	
	Source(s)	**Notes**
	Kubitzki, K., Rohwer, J.G. & Bittrich, V. (eds.). 1993. The Families and genera of vascular plants. Volume II. Springer-Verlag, Berlin, Heidelberg, New York	[Unknown] "About 350 spp. (?), most of them in tropical and subtropical America, ca. 50 in Madagascar, seven in Africa, and one in the Canary Islands. Ocotea is the dustbin of the Perseeae; in need of revision, though unlikely to be treated satisfactorily because of its size."

604	Self-compatible or apomictic	
	Source(s)	**Notes**
	Bawa, K., Bullock, S., Perry, D., Coville, R., & Grayum, M. (1985). Reproductive Biology of Tropical Lowland Rain Forest Trees. II. Pollination Systems. American Journal of Botany, 72(3), 346-356	"APPENDIX l. Pollination systems determined on the basis of direct observations of floral visitors andfloral morphology. (For author's name, voucher numbers, and location of specimens see Bawa et al., 1985). D = Dioecious, H = IIermaphroditic, M = Monoecious, C = Canopy, S = Subeanopy" [Ocotea sp. = H = IIermaphroditic]
	Kubitzki, K., Rohwer, J.G. & Bittrich, V. (eds.). 1993. The Families and genera of vascular plants. Volume II. Springer-Verlag, Berlin, Heidelberg, New York	[Unknown] "inflorescences thyrso-paniculate to (pleio-)botryoid flowers trimerous, bisexual, polygamous, or unisexual; tepals equal; fertile stamens 9, the third whorl with glands; filaments longer than the anthers to absent; anthers 4-locular (or some of the anthers 2-locular in a few C-American species), pollen sacs arranged in two pairs above each other (rarely in an arc), the first and second whorl introrse or with latrorse lower pollen sacs, the third whorl variable, most frequently with extrorse lower and latrorse upper pollen sacs; staminodes of whorl four absent to conspicuous (in bisexual species only), sometimes glandular on inside and clavate, never sagittate; receptacle very small and flat to deeply tubular; in male flowers rudimentary ovary almost fully developed to absent; fruit basically with a cupule,"

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	van Dulmen, A. (2001). Pollination and Phenology of Flowers in the Canopy of Two Contrasting Rain Forest Types in Amazonia, Colombia. Plant Ecology, 153(1/2), 73–85	"Appendix I" [Ocotea species pollinated by small diverse insects]

606	Reproduction by vegetative fragmentation	

Qsn #	Question	Answer
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown

607	Minimum generative time (years)	>3
	Source(s)	**Notes**
	Hawaiian Tropical Plant Nursery. 2017. Spice & Beverage Plants. http://www.hawaiiantropicalplants.com/spice.html. [Accessed 1 Jun 2017]	[Slow growing. Likely 3+ years] "Tree with lanceolate leaves. Slow growing when young. Only about 6 inches a year for the 1st 2 or 3 years. Leaves have a very pleasant smell like Dentene gum. Used in tea and flavoring." ... "Rare in the US. This species has been difficult to establish. Young plants seem to drop leaves a couple of times per year. New growth sometimes starts and then dies back. Becomes more robust when about 4 or 5 years old. Once they are about 3 ft. to 4 ft. tall growth becomes more vigorous. "

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	**Notes**
	Hawaiian Tropical Plant Nursery. 2017. Spice & Beverage Plants. http://www.hawaiiantropicalplants.com/spice.html. [Accessed 1 Jun 2017]	"Seeds are about 3/4 inch in diameter." [Presumably bird-dispersed. No means of external attachment]

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Hawaiian Tropical Plant Nursery. 2017. Spice & Beverage Plants. http://www.hawaiiantropicalplants.com/spice.html. [Accessed 1 Jun 2017]	"Rare in the US. This species has been difficult to establish. Young plants seem to drop leaves a couple of times per year. New growth sometimes starts and then dies back. Becomes more robust when about 4 or 5 years old. Once they are about 3 ft. to 4 ft. tall growth becomes more vigorous. "

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	Hawaiian Tropical Plant Nursery. 2017. Spice & Beverage Plants. http://www.hawaiiantropicalplants.com/spice.html. [Accessed 1 Jun 2017]	[No evidence. Unlikely. Slow-growing tree with large seeds] "Tree with lanceolate leaves. Slow growing when young. Only about 6 inches a year for the 1st 2 or 3 years. Leaves have a very pleasant smell like Dentene gum. Used in tea and flavoring. Bark can be harvested like cinnamon. Seeds are about 3/4 inch in diameter. Rich slightly acid soil. Rare in the US. This species has been difficult to establish. Young plants seem to drop leaves a couple of times per year. New growth sometimes starts and then dies back. Becomes more robust when about 4 or 5 years old. Once they are about 3 ft. to 4 ft. tall growth becomes more vigorous."

704	Propagules adapted to wind dispersal	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Kubitzki, K., Rohwer, J.G. & Bittrich, V. (eds.). 1993. The Families and genera of vascular plants. Volume II. Springer-Verlag, Berlin, Heidelberg, New York	"fruit basically with a cupule, fruit and cupule extremely variable in size and shape (from free on a thickened pedicel to completely enclosed), most frequently ± acorn-like; cupule occasionally doublerimmed, tepals rarely persistent on the rim."

705	Propagules water dispersed	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Buoyancy of fruit unknown. Depending on habitat, may be secondarily dispersed by water, but other species in the genus adapted for dispersal by frugivorous birds.

706	Propagules bird dispersed	y
	Source(s)	**Notes**
	Nathan, R., & Muller-Landau, H. C. (2000). Spatial patterns of seed dispersal, their determinants and consequences for recruitment. Trends in Ecology & Evolution, 15(7), 278-285	[Other Ocotea species are bird-dispersed] "New studies suggest that directed dispersal is more common than previously believed. For example, male bellbirds (Procnias tricarunculata) preferentially disperse the seeds of the Neotropical tree Ocotea endresiana to canopy gaps"
	Gibson, J. P., & Wheelwright, N. T. (1995). Genetic structure in a population of a tropical tree Ocotea tenera (Lauraceae): influence of avian seed dispersal. Oecologia, 103(1), 49-54	[Other Ocotea species are bird-dispersed] "We studied the influence of avian seed dispersal on the structuring of genetic diversity in a population of a tropical tree, Ocotea tenera (Lauraceae). The seeds of O. tenera are principally dispersed by four, relatively specialized, fruit-eating bird species (emerald toucanets, keel-billed toucans, resplendent quetzals, and three-wattled bellbirds)."
	WRA Specialist. 2017. Personal Communication	Presumably bird-dispersed, based on related Neotropical taxa

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Kubitzki, K., Rohwer, J.G. & Bittrich, V. (eds.). 1993. The Families and genera of vascular plants. Volume II. Springer-Verlag, Berlin, Heidelberg, New York	"fruit basically with a cupule, fruit and cupule extremely variable in size and shape (from free on a thickened pedicel to completely enclosed), most frequently ± acorn-like; cupule occasionally doublerimmed, tepals rarely persistent on the rim." [No means of external attachment]

708	Propagules survive passage through the gut	n
	Source(s)	**Notes**
	Wheelwright, N. T., Haber, W. A., Murray, K. G., & Guindon, C. (1984). Tropical fruit-eating birds and their food plants: a survey of a Costa Rican lower montane forest. Biotropica, 16(3): 173-192	"TABLE 4. Characteristics of fruits eaten by birds at Monteverde, Costa Rica." [Eight Ocotea species identified as bird-dispersed. Presumably yes based on traits of genus]

801	Prolific seed production (>1000/m2)	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Hawaiian Tropical Plant Nursery. 2017. Spice & Beverage Plants. http://www.hawaiiantropicalplants.com/spice.html. [Accessed 1 Jun 2017]	[Densities unknown, but probably unlikely given slow growth rate & relatively large seeds] "Tree with lanceolate leaves. Slow growing when young. Only about 6 inches a year for the 1st 2 or 3 years. Leaves have a very pleasant smell like Dentene gum. Used in tea and flavoring. Bark can be harvested like cinnamon. Seeds are about 3/4 inch in diameter. Rich slightly acid soil. Rare in the US. This species has been difficult to establish. Young plants seem to drop leaves a couple of times per year. New growth sometimes starts and then dies back. Becomes more robust when about 4 or 5 years old. Once they are about 3 ft. to 4 ft. tall growth becomes more vigorous. "

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Dias, L. L., Balbuena, T. S., Silveira, V., Santa-Catarina, C., Schevchenko, A., & Floh, E. I. (2010). Two-dimensional gel electrophoretic protein profile analysis during seed development of Ocotea catharinensis: a recalcitrant seed species. Brazilian Journal of Plant Physiology, 22(1), 23-33	[Unknown. Other Ocotea species is recalcitrant] "The aim of the present work was to characterize changes in the protein profile throughout seed development in O. catharinensis, a recalcitrant species, by two-dimensional gel electrophoresis. Protein extraction was undertaken by using a thiourea/urea buffer, followed by a precipitation step with 10% TCA. Comparative analysis during seed development showed that a large number of proteins were exclusively detected in each developmental stage. The cotyledonary stage, which represents the transition phase between embryogenesis and the beginning of metabolism related to maturation, presents the highest number of stage-specific spots. Protein identification, through MS/MS analysis, resulted in the identification of proteins mainly related to oxidative metabolism and storage synthesis. These findings contribute to a better understanding of protein metabolism during seed development in recalcitrant seeds, besides providing information on established markers that could be useful in defining and improving somatic embryogenesis protocols, besides monitoring the development of somatic embryos in this species. "

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown

Qsn #	Question	Answer
805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Thrives in tropical climates
• Reproduces by seeds
• Seeds presumably dispersed by birds & intentionally by people
• Poorly studies species. Limited ecological information may reduce accuracy of risk prediction

Low Risk Traits
• No reports of invasiveness or naturalization, but no evidence of widespread introduction outside native range
• Unarmed (no spines, thorns, or burrs)
• Used medicinally and for flavoring
• Slow growth rate
• Relatively large seeds may limit long distance & inadvertent dispersal