Taxon: Rubus glaucus Benth. **Family:** Rosaceae

Common Name(s): Andean blackberry
Andes-berry

Synonym(s):

Assessor: No Assessor **Status:** Assessor Approved **End Date:** 27 Jun 2018

WRA Score: 17.0 **Designation:** H(Hawai'i) **Rating:** High Risk

Keywords: Vine-like branches, Naturalized, Prickly, Apomictic, 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	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)	y
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	y
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		
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	y
411	Climbing or smothering growth habit	y=1, n=0	y
412	Forms dense thickets		
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	y
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	y
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	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	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	y
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)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	National Research Council. 1989. Lost Crops of the Incas: Little-Known Plants of the Andes with Promise for Worldwide Cultivation. National Academy Press, Washington. D.C.	"Like other Rubus species, it exhibits wide variability because of segregation. For this reason, selection of outstanding plants and vegetative propagation may be an easy way to establish superior cultivars. Successful crosses have been made between mora de Castilla and a number of other Rubus species. So far, however, most of the hybrids have been infertile and lacking in hardiness."
	Díaz Diez, C. A., Lobo Arias, M., Cartagena Valenzuela, J. R., & Medina Cano, C. I. (2013). Dormancy and Germination of Castilla Blackberry Seeds (Rubus glaucus Benth). Revista Facultad Nacional de Agronomía, Medellín, 66(1), 6855-6864	[Incipiently domesticated. Plants in Hawaiian Islands show no evidence of being highly domesticated] "These results are consistent with the fact that the blackberry (R. glaucus) is an incipiently domesticated crop whose dormancy has only been scarcely released, because, among other reasons, its propagation is mostly asexual, which limits intense selection of desirable characteristics."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. 2018. 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. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 27 Jun 2018]	"Native Southern America CENTRAL AMERICA: Costa Rica, Guatemala, Panama WESTERN SOUTH AMERICA: Colombia, Ecuador, Peru [Huanuco]"

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 27 Jun 2018]	

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

Qsn #	Question	Answer
	Source(s)	**Notes**
	Darrow, G. M. (1952). Rubus glaucus. The Andes blackberry of Central America and northern South America. Ceiba, 3(2), 97-100	"Rubus glaucus was found wild on a mountain side near Cali, Colombia, at about 4,500 feet but elsewhere at 6,000 to 11,000 feet. It is evidently a cool-climate fruit and probably does best at the 6,000 to 10,000 feet altitude."
	Allen, C.K. 1950. Flora of Panama. Part V. Fascicle II. Annals of the Missouri Botanical Garden 37(2): 121-314	[Elevation range >1000 m, demonstrating environmental versatility] "Panama, Colombia, Ecuador. CHIRIQUI: Volcan de Chiriqui, Loma Larga to summit, 2500-3880 m. alt., Woodson, Allen f5 Seibert I08I; vicinity of Cerro Punta, 1500-2000 m., Seibert 264; llanos de volcan, about 1300 m., Allen z546; :El Boquete, 1000-3000 m., Pittier 3135."

204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 27 Jun 2018]	"Native Southern America CENTRAL AMERICA: Costa Rica, Guatemala, Panama WESTERN SOUTH AMERICA: Colombia, Ecuador, Peru [Huanuco]"

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	National Research Council. 1989. Lost Crops of the Incas: Little-Known Plants of the Andes with Promise for Worldwide Cultivation. National Academy Press, Washington. D.C.	"Although it is often the most common blackberry in the Andean markets, the mora de Castilla is barely known elsewhere. However, it has flourished in Haiti and is being grown in a small way in Guatemala and El Salvador. This could be an indication of its future spread."
	Soria, M., Gardener, M. R., & Tye, A. (2002). Eradication of potentially invasive plants with limited distributions in the Galapagos Islands. Turning the tide: the eradication of invasive species, 287-292	"Rubus glaucus: This species (mountain blackberry) is native to the Andes in northern South America and was introduced into the Galapagos sometime before 1974."
	Smith, C.W. 1985. Impact of Alien Plants on Hawaii's Native Biota. Pp. 180-250 in Stone & Scott (eds.). Hawaii's terrestrial ecosystems: preservation & management. CPSU, Honolulu, HI	"This species is similar in many respects to R. ellipticus. It was introduced at Volcano and Pa'auilo Agricultural Experimental Stations, where it grew but did not provide commercially exploitable fruit crops."
	Wiersema, J.H. & León, B. 1999. World Economic Plants: A Standard Reference. CRC Press, Boca Raton, FL	"widely cult. in South America..."

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

Qsn #	Question	Answer
	Starr, F., Starr, K.& Loope, L.L. 2003. New plant records from the Hawaiian Archipelago. Bishop Museum Occasional Papers 74: 23-34	"Native from Mexico to Ecuador (St. John, 1973), R. glaucus was previously reported from the Puna district, Hawai'i, where fertile material had yet to be collected, but it was apparently naturalized and spreading Wagner et al. (1999). On Maui, naturalized populations of R. glaucus exist along the Waikamoi Flume Rd, Olinda; Crater Rd, Kula; and Waipoli Rd, Polipoli. At the Olinda site this thorny climber is naturalized over 0.75 mi [1.2 km] of flume road and adjacent forest where it sprawls on vegetation and climbs 20 ft [6 m] into the canopy and is not yet widespread but is definitely locally established and spreading. At the Kula site R. glaucus is currently only known from two small patches. At the Polipoli site gulch bottoms and walls are invaded over an undetermined extent. This species is distinguished by its thin white petals, sharp thorns, white undersides of leaves, and thimble-shaped fruits. Material examined: MAUI: E. Maui, Polipoli, Waipoli Rd, at DLNR gate and in Ka'ono'ulu gulch below hunter check-in station, 5400 ft [1654 m], 21 Feb 2002 Starr & Martz 020221-2; E. Maui, Olinda, Waikamoi Flume Rd, near pump house along road, 4200 ft [1280 m], 29 Oct 2000, Starr & Martz 001029-1; E. Maui, Kula, Crater Rd, sprawling over bank on side of road, 4000 ft [1220 m], 13 Jan 1999, Starr & Martz 990113-1 & 990113-2; E. Maui, Makawao district, Haiku uka, Ko'olau Forest Reserve, above road to Waikamoi flume, along pipeline west of old reservoirs, sprawling plants covering vegetation in wet forest and forming dense thickets, locally common and spreading, collected with Jennifer Geiger, 4300 ft [1310 m], 18 Jun 2001, Oppenheimer H60144."
	Soria, M., Gardener, M. R., & Tye, A. (2002). Eradication of potentially invasive plants with limited distributions in the Galapagos Islands. Turning the tide: the eradication of invasive species, 287-292	"Rubus glaucus: This species (mountain blackberry) is native to the Andes in northern South America and was introduced into the Galapagos sometime before 1974. It is the only species of this genus that is commonly cultivated in Ecuador and used commercially for its edible fruits (Romoleroux 1996). It is only naturalised within the National Park in the north-west highlands of Santa Cruz, in an area previously used for agriculture but which was incorporated into the National Park in 1974. This species is present in several Pacific islands and is considered by Sherley (2000) as having serious potential as an invasive."
	Tunison, J.T. 1992. Alien Plant Control Strategies in Hawaiii Volcanoes National Park. Pp485-505 in Stone et al. (eds.). Alien Plant Invasions in Native Ecosystems of Hawai`i: Management & Research. Coop. Nat. Park Res. Studies Unit, U Hawaii, Honolulu, HI	"Table 1. Important alien plant species in Hawai`i Volcanoes National Park and their management." [Rubus glaucus - Distribution in Park = Widespread; Management Status = Funding requested for parkwide control]

302	Garden/amenity/disturbance weed	n
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	A weed with negative environmental impacts in the Hawaiian Islands and the Galapagos [See 3.04]

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

304	Environmental weed	y
	Source(s)	**Notes**
	Soria, M., Gardener, M. R., & Tye, A. (2002). Eradication of potentially invasive plants with limited distributions in the Galapagos Islands. Turning the tide: the eradication of invasive species, 287-292	"Rubus glaucus has the potential to spread in both native forests and fern/grasslands. It occurs in well-drained soil from 600-700 m altitude. In Santa Cruz, the representative native species are the tree Scalesia pedunculata, the shrub Tournefortia rufo-sericea, the herbs Alternanthera halimifolia and Pilea baurii, and ferns such as Adiantum henslovianum and Blechnum occidentale."
	Tunison, J.T. 1992. Alien Plant Control Strategies in Hawaiii Volcanoes National Park. Pp485-505 in Stone et al. (eds.). Alien Plant Invasions in Native Ecosystems of Hawai`i: Management & Research. Coop. Nat. Park Res. Studies Unit, U Hawaii, Honolulu, HI	"Table 1. Important alien plant species in Hawai`i Volcanoes National Park and their management." [Rubus glaucus - Distribution in Park = Widespread; Management Status = Funding requested for parkwide control]
	Smith, C.W. 1985. Impact of Alien Plants on Hawaii's Native Biota. Pp. 180-250 in Stone & Scott (eds.). Hawaii's terrestrial ecosystems: preservation & management. CPSU, Honolulu, HI	"The canes were abandoned but the seeds were dispersed by birds; the plant is now threatening the 'Ola'a Tract of Hawai'i Volcanoes National Park."

305	Congeneric weed	y
	Source(s)	**Notes**
	Weber, E. 2017. Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	Several Rubus species are weeds of natural areas in Hawaii and around the world.

401	Produces spines, thorns or burrs	y
	Source(s)	**Notes**
	Allen, C.K. 1950. Flora of Panama. Part V. Fascicle II. Annals of the Missouri Botanical Garden 37(2): 121-314	"Diffuse or erect, to 1.5 m. tall; primocanes· smooth, glaucous, with uncinate scattered prickles 2-3 mm. long; leaves dull green, glabrous on upper surface, graytomentose underneath, minutely serrate, 3-foliolate; leaflets elliptic-ovate to ovate-lanceolate, 6-10 cm. long, long-acuminate, petiole with hooked prickles;"
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Shrub with vinelike branches, stems with whitish bloom, prickly, prickles to 0.3 cm, base wide, tip curved, stipules linear, to 1 cm long, 0.8 cm wide."

402	Allelopathic	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown. No evidence found

Qsn #	Question	Answer
403	**Parasitic**	**n**
	Source(s)	**Notes**
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Shrub with vinelike branches, stems with whitish bloom, prickly, prickles to 0.3 cm, base wide, tip curved, stipules linear, to 1 cm long, 0.8 cm wide." [Rosaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown, but prickles may deter browsing animals from consuming foliage

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**
	Hincapié Echeverri, O. D., Saldarriaga Cardona, A., & Díaz Diez, C. (2017). Biological, botanical and chemical alternatives for the control of blackberry (Rubus glaucus Benth.) diseases. Revista Facultad Nacional de Agronomía, Medellín, 70(2), 8169-8176	"Mora de Castilla (Rubus glaucus Benth.) is affected by diverse diseases mostly caused by fungi, amongst these diseases there is the Anthracnose, which is caused by Glomerella cingulate (Stoneman) Spauld. and Schrenk. (anamorph Colletotrichum gloeosporioides (Penz.) Penz. and Sacc.), Colletotrichum acutatum Simmonds., Colletotrichum boninense Moriw., Sato and Tsukib.; these pathogens affect stems, petioles and reproductive structures causing lesions that can end in the death of the plant's branches affecting the crop production (Saldarriaga et al., 2008; Saldarriaga, 2006; Afanador et al., 2009; Tamayo, 2009; Rueda, 2010)." … "The gray mold caused by Botrytis cinerea Pers, Ex. Fr., is another important disease that appears during the stage of production and postharvest of the blackberry." … "The downy mildew caused by Peronospora Corda affects the stems, stalks, flower buds, flowers and fruits. The sick stems and stalks show purple discolorations with whitish lesions on which a downiness of light gray color grows (Saldarriaga and Bernal, 2000; Tamayo, 2003)." … "Another disease that can affect the blackberry is the powdery mildew. This is caused by the fungus Oidium Link." … "There are reports of foliar conditions caused by the fungi Septoria Sacc, Phyllosticta Pers, Alternaria Nees, which importance is still secondary due to the low incidence of the diseases caused by them (Tamayo, 2009). The stems and roots of the blackberry also present some diseases caused by fungi such as: Coniothyrium fuckelii Sacc, Verticillium albo-atrum Reinke and Berth, Rosellinia De Not, Fusarium roseum Link: Fr. and Fusarium oxysporum Schlechtend. Fr, which importance has not been established yet (Tamayo, 2009)."

Qsn #	Question	Answer
	Darrow, G. M. (1952). Rubus glaucus. The Andes blackberry of Central America and northern South America. Ceiba, 3(2), 97-100	"They seem remarkably free from diseases but now and' then they show leaf rust and slight mildew on the cane tips."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	National Research Council. 1989. Lost Crops of the Incas: Little-Known Plants of the Andes with Promise for Worldwide Cultivation. National Academy Press, Washington. D.C.	[No evidence] "In two Ecuadorian towns, Ambato and Otavalo, nearly every garden has the plants, and mora de Castilla (pronounced mor-a dey cast-ee-ya) fruits appear in the markets most of the year. In Colombia, the mora de Castilla has become an increasingly important cash crop. During recent years, its cultivation has increased because it is profitable, and because its fruits are now exported to the United States. More than 2,500 hectares are planted in it, and near Bogotá 1,300 hectares are in commercial production. Three commercial varieties have been selected and are under cultivation in Colombia."
	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	
	Source(s)	**Notes**
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Habitat: Mountain forests, second growth, edges." [Unlikely. Not found in fire prone habitats]
	Starr, F., Starr, K.& Loope, L.L. 2003. New plant records from the Hawaiian Archipelago. Bishop Museum Occasional Papers 74: 23-34	[Unlikely, but could possibly serve as a fuel ladder into trees] "On Maui, naturalized populations of R. glaucus exist along the Waikamoi Flume Rd, Olinda; Crater Rd, Kula; and Waipoli Rd, Polipoli. At the Olinda site this thorny climber is naturalized over 0.75 mi [1.2 km] of flume road and adjacent forest where it sprawls on vegetation and climbs 20 ft [6 m] into the canopy and is not yet widespread but is definitely locally established and spreading."

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	**Notes**
	Useful Tropical Plants Database. 2018. Rubus glaucus. http://tropical.theferns.info/viewtropical.php?id=Rubus+glaucus. [Accessed 27 Jun 2018]	"Easily grown in a good well-drained loamy soil in sun or semi-shade"
	Plants for. a Future. 2018. Rubus glaucus. https://www.pfaf.org/user/Plant.aspx?LatinName=Rubus+glaucus. [Accessed 27 Jun 2018]	"It can grow in semi-shade (light woodland) or no shade." ... "Easily grown in a good well-drained loamy soil in sun or semi-shade"

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

Qsn #	Question	Answer
	Source(s)	**Notes**
	National Research Council. 1989. Lost Crops of the Incas: Little-Known Plants of the Andes with Promise for Worldwide Cultivation. National Academy Press, Washington. D.C.	"It grows well on many types of soil—reportedly thriving in almost anything from heavy clays to loose volcanic sands.3 Nonetheless, it does best on moist, organic soils."

411	Climbing or smothering growth habit	y
	Source(s)	**Notes**
	Starr, F., Starr, K.& Loope, L.L. 2003. New plant records from the Hawaiian Archipelago. Bishop Museum Occasional Papers 74: 23-34	"At the Olinda site this thorny climber is naturalized over 0.75 mi [1.2 km] of flume road and adjacent forest where it sprawls on vegetation and climbs 20 ft [6 m] into the canopy and is not yet widespread but is definitely locally established and spreading."
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Shrub with vinelike branches, stems with whitish bloom, prickly, prickles to 0.3 cm, base wide, tip curved, stipules linear, to 1 cm long, 0.8 cm wide."

412	Forms dense thickets	
	Source(s)	**Notes**
	Starr, F., Starr, K.& Loope, L.L. 2003. New plant records from the Hawaiian Archipelago. Bishop Museum Occasional Papers 74: 23-34	[Probably yes. Other invasive Rubus can form impenetrable thickets] "On Maui, naturalized populations of R. glaucus exist along the Waikamoi Flume Rd, Olinda; Crater Rd, Kula; and Waipoli Rd, Polipoli. At the Olinda site this thorny climber is naturalized over 0.75 mi [1.2 km] of flume road and adjacent forest where it sprawls on vegetation and climbs 20 ft [6 m] into the canopy and is not yet widespread but is definitely locally established and spreading. At the Kula site R. glaucus is currently only known from two small patches. At the Polipoli site gulch bottoms and walls are invaded over an undetermined extent."

501	Aquatic	n
	Source(s)	**Notes**
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	[Terrestrial] "Shrub with vinelike branches… Habitat: Mountain forests, second growth, edges."

502	Grass	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 27 Jun 2018]	Family: Rosaceae Subfamily: Rosoideae Tribe: Rubeae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 27 Jun 2018]	Genus: Rubus Subgenus: Rubus Family: Rosaceae Subfamily: Rosoideae Tribe: Rubeae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Shrub with vinelike branches, stems with whitish bloom, prickly, prickles to 0.3 cm, base wide, tip curved, stipules linear, to 1 cm long, 0.8 cm wide. Leaves alternate, 3-parted, stalk to 5–12 cm long, leaflets 5–13 cm long, 2–6 cm wide, narrowly egg-shaped, smooth above, whitish, feltlike below, margins toothed."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	National Research Council. 1989. Lost Crops of the Incas: Little-Known Plants of the Andes with Promise for Worldwide Cultivation. National Academy Press, Washington. D.C.	"This blackberry1 (Rubus glaucus) is native to the broad area from the northern Andes to the southern highlands of Mexico. Although common in the wild, it is also abundant in the gardens of hundreds of towns and villages, especially in Ecuador and Colombia."

602	Produces viable seed	y
	Source(s)	**Notes**
	Díaz Diez, C. A., Lobo Arias, M., Cartagena Valenzuela, J. R., & Medina Cano, C. I. (2013). Dormancy and Germination of Castilla Blackberry Seeds (Rubus glaucus Benth). Revista Facultad Nacional de Agronomía, Medellín, 66(1), 6855-6864	"Abstract. We categorized the dormancy and germination of blackberry (Rubus glaucus Benth) seeds from the Germplasm Bank System for Food and Agriculture of the Colombian Nation. A tetrazolium test showed normal seedling production viability, but seed coat impermeability prevented imbibition, which is considered an expression of exogenous dormancy; however, this was released by immersing the seeds in 5.25% sodium hypochlorite for 16 to 21 hours. The treatment was applied to 10 accessions of Castilla blackberry, harvested during the dry and rainy seasons. The seeds were germinated under light and dark conditions. The highest germination counts were obtained with the dry-season-collected seeds incubated in darkness and with the rainy-season seeds incubated under light conditions. Differential germination responses were also independently determined by genotype, incubation conditions (light or darkness) and collecting season."
	Darrow, G. M. (1952). Rubus glaucus. The Andes blackberry of Central America and northern South America. Ceiba, 3(2), 97-100	"Because seed of the Andes blackberry apparently reproduces the parent plant exactly, the hybrid originate usually as a result of its pollen fertilizing flowers of other species and the resulting seed of these other species developing into hybrid plant."
	Smith, C.W. 1985. Impact of Alien Plants on Hawaii's Native Biota. Pp. 180-250 in Stone & Scott (eds.). Hawaii's terrestrial ecosystems: preservation & management. CPSU, Honolulu, HI	"The canes were abandoned but the seeds were dispersed by birds; the plant is now threatening the 'Ola'a Tract of Hawai'i Volcanoes National Park."

Qsn #	Question	Answer
	National Research Council. 1989. Lost Crops of the Incas: Little-Known Plants of the Andes with Promise for Worldwide Cultivation. National Academy Press, Washington. D.C.	"This apomictic species can be grown from seeds, but is normally propagated vegetatively (using tip layers or stem pieces) because it yields sooner."

603	Hybridizes naturally	y
	Source(s)	**Notes**
	Darrow, G. M. (1952). Rubus glaucus. The Andes blackberry of Central America and northern South America. Ceiba, 3(2), 97-100	"I saw occasional hybrids, or hybrid segregates, of Rubus glaucus with other species that showed this puberulence but usually they showed other marks of hybridity. With Rubus glaucus, as with the Oregon Evergreen, natural hybrids can be found. They are abundant where the Andes blackberry grows with other species of Rubus."

604	Self-compatible or apomictic	y
	Source(s)	**Notes**
	Darrow, G. M. (1952). Rubus glaucus. The Andes blackberry of Central America and northern South America. Ceiba, 3(2), 97-100	"Rubus glaucus is probably apomictic, just as are the Oregon Evergreen and Himalaya blackberries of the coastal region of Oregon and Washington (1,2)." … "Rubus glaucus is an unusual berry, for, although it foliage and cane are similar to those of the black raspberry, it fruit is a blackberry. These characteristics and it true breeding habit (apomictic reproduction) suggest hybrid origin."
	Plants for. a Future. 2018. Rubus glaucus. https://www.pfaf.org/user/Plant.aspx?LatinName=Rubus+glaucus. [Accessed 27 Jun 2018]	"The species is hermaphrodite (has both male and female organs) and are pollinated by Apomictic. The plant is self-fertile."
	National Research Council. 1989. Lost Crops of the Incas: Little-Known Plants of the Andes with Promise for Worldwide Cultivation. National Academy Press, Washington. D.C.	"This apomictic species can be grown from seeds, but is normally propagated vegetatively (using tip layers or stem pieces) because it yields sooner."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	National Research Council. 1989. Lost Crops of the Incas: Little-Known Plants of the Andes with Promise for Worldwide Cultivation. National Academy Press, Washington. D.C.	"This apomictic species can be grown from seeds..."

606	Reproduction by vegetative fragmentation	y
	Source(s)	**Notes**
	National Research Council. 1989. Lost Crops of the Incas: Little-Known Plants of the Andes with Promise for Worldwide Cultivation. National Academy Press, Washington. D.C.	"This apomictic species can be grown from seeds, but is normally propagated vegetatively (using tip layers or stem pieces) because it yields sooner." [Probably yes. Vining species that can be propagated vegetatively. Canes contacting ground or fragmenting would likely establish under the right conditions]

607	Minimum generative time (years)	2

Qsn #	Question	Answer
	Source(s)	**Notes**
	Soria, M., Gardener, M. R., & Tye, A. (2002). Eradication of potentially invasive plants with limited distributions in the Galapagos Islands. Turning the tide: the eradication of invasive species, 287-292	"few seeds are produced by R. glaucus (which can probably reproduce after 12 months)"
	Useful Tropical Plants Database. 2018. Rubus glaucus. http://tropical.theferns.info/viewtropical.php?id=Rubus+glaucus. [Accessed 27 Jun 2018]	"The stems only produce leaves, and do not flower, in their first year of growth; forming flowering branches in their second year and then dying after fruiting" … "Seedlings can commence fruiting when 2 years old"

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Fruit fleshy, red to black, 1.5–2.5 cm long and about as wide, of many tiny individual fruits fused together, edible." [No means of external attachment. No evidence to date. Bird & mammal dispersed]

702	**Propagules dispersed intentionally by people**	**y**
	Source(s)	**Notes**
	National Research Council. 1989. Lost Crops of the Incas: Little-Known Plants of the Andes with Promise for Worldwide Cultivation. National Academy Press, Washington. D.C.	"Although it is often the most common blackberry in the Andean markets, the mora de Castilla is barely known elsewhere. However, it has flourished in Haiti and is being grown in a small way in Guatemala and El Salvador. This could be an indication of its future spread."
	Soria, M., Gardener, M. R., & Tye, A. (2002). Eradication of potentially invasive plants with limited distributions in the Galapagos Islands. Turning the tide: the eradication of invasive species, 287-292	"Rubus glaucus: This species (mountain blackberry) is native to the Andes in northern South America and was introduced into the Galapagos sometime before 1974. It is the only species of this genus that is commonly cultivated in Ecuador and used commercially for its edible fruits (Romoleroux 1996)."
	Smith, C.W. 1985. Impact of Alien Plants on Hawaii's Native Biota. Pp. 180-250 in Stone & Scott (eds.). Hawaii's terrestrial ecosystems: preservation & management. CPSU, Honolulu, HI	"This species is similar in many respects to R. ellipticus. It was introduced at Volcano and Pa'auilo Agricultural Experimental Stations, where it grew but did not provide commercially exploitable fruit crops."

703	**Propagules likely to disperse as a produce contaminant**	**n**
	Source(s)	**Notes**
	Soria, M., Gardener, M. R., & Tye, A. (2002). Eradication of potentially invasive plants with limited distributions in the Galapagos Islands. Turning the tide: the eradication of invasive species, 287-292	"...few seeds are produced by R. glaucus (which can probably reproduce after 12 months),..." [Few seeds would limit potential for produce contamination]
	Smith, C.W. 1985. Impact of Alien Plants on Hawaii's Native Biota. Pp. 180-250 in Stone & Scott (eds.). Hawaii's terrestrial ecosystems: preservation & management. CPSU, Honolulu, HI	"It was introduced at Volcano and Pa'auilo Agricultural Experimental Stations, where it grew but did not provide commercially exploitable fruit crops." [No evidence that this plant is currently cultivated with commercial produce. Limited seed production could minimize risk of contamination]

Qsn #	Question	Answer
704	**Propagules adapted to wind dispersal**	**n**
	Source(s)	**Notes**
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Fruit fleshy, red to black, 1.5–2.5 cm long and about as wide, of many tiny individual fruits fused together, edible."
	Soria, M., Gardener, M. R., & Tye, A. (2002). Eradication of potentially invasive plants with limited distributions in the Galapagos Islands. Turning the tide: the eradication of invasive species, 287-292	"In Galapagos, wind-dispersed species are among the most difficult to control, since there are few bird species that are efficient seed dispersers. Both R. glaucus and C. gentryi to date have little dispersal potential and are mainly dispersed short distances by gravity. Rubus glaucus has a fleshy drupe which is evolved for animal dispersal, but few potential agents exist. The Galapagos flycatcher has been observed to disperse R. niveus (A. M. Guerrero pers. comm.) and may also disperse R. glaucus. Citharexylum gentryi has a berry-like drupe but no animal dispersal has been observed. Dispersal by water seems to have caused the occurrence of these species along streams, which makes them easier to locate."

705	**Propagules water dispersed**	**y**
	Source(s)	**Notes**
	Soria, M., Gardener, M. R., & Tye, A. (2002). Eradication of potentially invasive plants with limited distributions in the Galapagos Islands. Turning the tide: the eradication of invasive species, 287-292	"Rubus glaucus has a fleshy drupe which is evolved for animal dispersal, but few potential agents exist. The Galapagos flycatcher has been observed to disperse R. niveus (A. M. Guerrero pers. comm.) and may also disperse R. glaucus." … "Dispersal by water seems to have caused the occurrence of these species along streams, which makes them easier to locate."

706	**Propagules bird dispersed**	**y**
	Source(s)	**Notes**
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Fruit fleshy, red to black, 1.5–2.5 cm long and about as wide, of many tiny individual fruits fused together, edible."
	Smith, C.W. 1985. Impact of Alien Plants on Hawaii's Native Biota. Pp. 180-250 in Stone & Scott (eds.). Hawaii's terrestrial ecosystems: preservation & management. CPSU, Honolulu, HI	"The canes were abandoned but the seeds were dispersed by birds; the plant is now threatening the 'Ola'a Tract of Hawai'i Volcanoes National Park."

707	**Propagules dispersed by other animals (externally)**	**n**
	Source(s)	**Notes**
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Fruit fleshy, red to black, 1.5–2.5 cm long and about as wide, of many tiny individual fruits fused together, edible." [Seeds dispersed internally with no means of external attachment]

Qsn #	Question	Answer
	Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. 2003. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI	[Herbicides provide control of other invasive Rubus spp.] "Rubus argutus ... Sensitive to foliar applications of triclopyr and picloram; dicamba not effective(50). Sensitive to metsulfuron. Susceptible to drizzle applications of triclopyr and of glyphosate in trail work on the Napali Coast of Kauai. Chris Zimmer and Tim Tunison at HAVO reported triclopyr amine at 0.5 % of product without surfactant, sprayed to wet the foliage, was effective. Pat Bily (TNC) confirmed triclopyr amine at 0.5% of product without surfactant effective. Bily also reported 10% triclopyr ester product in vegetable-oil based carrier applied to 2-3 inches at base of each cane very effective." ... "Rubus ellipticus ... Effective control was achieved by drizzle application of triclopyr ester at 40% in water and picloram at 20% product in water applied to cut stumps(66). Applications to cut stumps with 50% imazapyr product in water, 50% triclopyr amine product in water, triclopyr ester in diesel oil, and metsulfuron (about 1 oz/qt or 28 g/l,) were effective. Applications of 20% picloram product and 50% of Crossbow® (Dow Agrosciences) in water were less effective(65). Sensitive to foliar applications of triclopyr at 1 lb/acre and metsulfuron at 0.75 oz/acre. Also very sensitive to triclopyr at 1 lb/acre applied by drizzle application in a crop oil carrier. HAVO staff reported control with foliar application of glyphosate at 1% product or cut stump applications at 10% product in water (Chris Zimmer, HAVO)." ... "Rubus niveus ... Sensitive to drizzle application of triclopyr ester in a crop oil carrier at 1 lb/acre, and to very-low volume basal bark applications of triclopyr ester at 15% product in a crop oil carrier. Reportedly tolerant of triclopyr with water as the carrier (Glenn Shishido, DOFAW)." ... "Rubus rosifolius… Sensitive to triclopyr ester in water and very sensitive to triclopyr ester in a crop oil carrier, each applied by the drizzle method at 1 lb/acre. HAVO staff reported control with foliar application of either glyphosate at 1% product or triclopyr ester at 1% product in water (Chris Zimmer, HAVO)."

708	Propagules survive passage through the gut	y
	Source(s)	**Notes**
	Vázquez, L., Cameron, G., & Medellín, R. (2004). Characteristics of Diet of Peromyscus aztecus and Reithrodontomys fulvescens in Montane Western Mexico. Journal of Mammalogy, 85(2), 196-205	"APPENDIX I. Species of plants (and plant part) included in the diet of Peromyscus aztecus and Reithrodontomys fulvescens in mature cloud forest and disturbed cloud forest in western Mexico during dry-cold (November-February), wet (July-October), and dry hot (March-June) seasons." [Includes Rubus (fruit)]
	Smith, C.W. 1985. Impact of Alien Plants on Hawaii's Native Biota. Pp. 180-250 in Stone & Scott (eds.). Hawaii's terrestrial ecosystems: preservation & management. CPSU, Honolulu, HI	"The canes were abandoned but the seeds were dispersed by birds; the plant is now threatening the 'Ola'a Tract of Hawai'i Volcanoes National Park."

Qsn #	Question	Answer
801	**Prolific seed production (>1000/m2)**	**n**
	Source(s)	**Notes**
	Soria, M., Gardener, M. R., & Tye, A. (2002). Eradication of potentially invasive plants with limited distributions in the Galapagos Islands. Turning the tide: the eradication of invasive species, 287-292	"few seeds are produced by R. glaucus (which can probably reproduce after 12 months)"

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	**y**
	Source(s)	**Notes**
	Díaz Diez, C. A., Lobo Arias, M., Cartagena Valenzuela, J. R., & Medina Cano, C. I. (2013). Dormancy and Germination of Castilla Blackberry Seeds (Rubus glaucus Benth). Revista Facultad Nacional de Agronomía, Medellín, 66(1), 6855-6864	"In this context, several researchers (Krepting and Roe, 1949; Nybom, 1980; Dale and Jarvis, 1983; Barnes, 1985; Maxwell, 1990; Zasada et al., 1994) have determined that germination of Rubus spp. seeds under field conditions might take from two to three years, and that some of them are likely to remain dormant for decades, depending on the taxa and on the conditions to which the seeds are exposed." … "Wada (2010) reported that diverse Rubus species, including R. glaucus, tend to acquire deep dormancy after the drying process they undergo when stored in the cold rooms of germplasm banks. The release of this particular mode of dormancy may take place under cold storage conditions over months or years, probably setting a significant contrast with initial seed viability. As a consequence, the effect of storage conditions (namely temperature and moisture) on seeds should be thoroughly studied."

803	**Well controlled by herbicides**	**y**
	Source(s)	**Notes**
	Soria, M., Gardener, M. R., & Tye, A. (2002). Eradication of potentially invasive plants with limited distributions in the Galapagos Islands. Turning the tide: the eradication of invasive species, 287-292	"Rubus glaucus: Thickets were sprayed with a 2% solution of Roundup (41% glyphosate salt) until leaves were wet. Germinating seedlings were sprayed with a 1.5% solution of Roundup. Treatment commenced in April 2000 and is continuing." … "The foliar application of 2% Roundup resulted in high mortality of adult plants but also resulted in the death of much surrounding vegetation. However, good regeneration of Scalesia pedunculata was recorded on the bare ground. A total of 490 person-hours has been spent so far on the treatment and monitoring of this plant."

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**
	Pacific Island Ecosystems at Risk (PIER). 2018. Rubus glaucus. http://www.hear.org/Pier. [Accessed 27 Jun 2018]	"Isolated plants may be grubbed out, but any remaining roots will sprout."

Qsn #	Question	Answer
805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown. Seven Rubus species naturalized in the Hawaiian Islands. No biological control releases to date

Summary of Risk Traits:

High Risk / Undesirable Traits
• Elevation range exceeds 1000 m, demonstrating environmental versatility
• Grows in high elevation regions with tropical climates
• Naturalized on Maui & Hawaii (Hawaiian Islands), Galapagos, & possibly elsewhere
• Invasive in natural areas of the Hawaiian Islands & Galapagos
• Other Rubus species are invasive
• Prickly stems
• Tolerates many soil types
• Climbing & smothering habit
• Reproduces by seeds & vegetatively by canes
• Hybridizes with other Rubus species
• Apomictic
• Reaches maturity in 2 years or less
• Seeds dispersed by birds, frugivorous mammals water & intentionally by people
• Seeds may form a persistent seed bank
• Able to resprout from roots after cutting

Low Risk Traits
• Non-toxic
• Edible fruit
• Herbicides may provide effective control