

Taxon: *Alibertia patinoi* (Cuatrec.) Delprete & C.H.Perss. **Family:** Rubiaceae

Common Name(s): burijo
buroj6

Synonym(s): Borojoa patinoi Cuatrec.

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 1 Apr 2016

WRA Score: -5.0

Designation: L

Rating: Low Risk

Keywords: Tropical Tree, Domesticated, Edible Fruit, Shade-Tolerant, Dioecious

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	y
102	Has the species become naturalized where grown?	y=1, n=-1	n
103	Does the species have weedy races?	y=1, n=-1	n
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	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	n=0, y = 1*multiplier (see Appendix 2)	n
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	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	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	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	n
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	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	y
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	Is the species highly domesticated?	y
	Source(s)	Notes
	Escobar Escobar, D. F., Torres, G., & Marina, A. (2013). Morphology, ecophysiology and germination of seeds of the Neotropical tree <i>Alibertia patinoi</i> (Rubiaceae). <i>Revista de Biología Tropical</i> , 61(2), 547-556	"According to this author, it is a dioecious species, propagated by seeds, domesticated long ago and apparently without wild populations."
	Janick, J. & Paull, R.E. 2008. <i>The Encyclopedia of Fruit & Nuts</i> . CABI Publishing, Wallingford, UK	"The tree was domesticated by the indigenous people between the Rio San Juan and Rio Atrato de Pacifico in Colombia (Mejia Gutierrez, 1983)."

102	Has the species become naturalized where grown?	n
	Source(s)	Notes
	Escobar Escobar, D. F., Torres, G., & Marina, A. (2013). Morphology, ecophysiology and germination of seeds of the Neotropical tree <i>Alibertia patinoi</i> (Rubiaceae). <i>Revista de Biología Tropical</i> , 61(2), 547-556	"According to this author, it is a dioecious species, propagated by seeds, domesticated long ago and apparently without wild populations."
	Randall, R.P. 2012. <i>A Global Compendium of Weeds</i> . 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

103	Does the species have weedy races?	n
	Source(s)	Notes
	Randall, R.P. 2012. <i>A Global Compendium of Weeds</i> . 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

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
	Taylor, C. M., Sánchez-González, J., Hammel, B., Lorence, D. H., Persson, C., Delprete, P. G., & Gereau, R. E. (2011). <i>Rubiacearum Americanarum Magna Hama Pars XXVIII: New Taxa, New Combinations, New Names, and Lectotypification for Several Species Found in Mexico and Central America</i> . <i>Novon</i> , 21(1), 133-148	" <i>Alibertia patinoi</i> is a shrub, treelet, or tree with a natural distribution ranging from Costa Rica through Panama, along the Pacific coast of the Choco Region of Colombia to the province of Esmeraldas, Ecuador."

Qsn #	Question	Answer
202	Quality of climate match data	High
	Source(s)	Notes
	Taylor, C. M., Sánchez-González, J., Hammel, B., Lorence, D. H., Persson, C., Delprete, P. G., & Gereau, R. E. (2011). Rubiacearum Americanarum Magna Hama Pars XXVIII: New Taxa, New Combinations, New Names, and Lectotypification for Several Species Found in Mexico and Central America. <i>Novon</i> , 21(1), 133–148	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Janick, J. & Paull, R.E. 2008. <i>The Encyclopedia of Fruit & Nuts</i> . CABI Publishing, Wallingford, UK	"This understory species is found in the humid rainforest with rainfall up to 4000 mm/year and average temperatures of 26°C and relative humidity of 85%. In full sun, the tree is shorter (3.5 m). In the area along the Pacific coast, it is found up to 1200 m. The soil are well drained and the nutrient poor." [Elevation range exceeds 1000 m, demonstrating some environmental versatility]

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Taylor, C. M., Sánchez-González, J., Hammel, B., Lorence, D. H., Persson, C., Delprete, P. G., & Gereau, R. E. (2011). Rubiacearum Americanarum Magna Hama Pars XXVIII: New Taxa, New Combinations, New Names, and Lectotypification for Several Species Found in Mexico and Central America. <i>Novon</i> , 21(1), 133–148	" <i>Alibertia patinoi</i> is a shrub, treelet, or tree with a natural distribution ranging from Costa Rica through Panama, along the Pacific coast of the Choco Region of Colombia to the province of Esmeraldas, Ecuador."

205	Does the species have a history of repeated introductions outside its natural range?	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 31 Mar 2016]	"Cultivated: Southern America Western South America: Colombia"

Qsn #	Question	Answer
301	Naturalized beyond native range	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2016. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm . [Accessed]	No evidence

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Escobar Escobar, D. F., Torres, G., & Marina, A. (2013). Morphology, ecophysiology and germination of seeds of the Neotropical tree <i>Alibertia patinoi</i> (Rubiaceae). <i>Revista de Biología Tropical</i> , 61(2), 547-556	[Non-pioneer. Not adapted to disturbance] "This temperature fluctuation is characteristic of soils of forests with dense vegetation cover, indicating that <i>A. patinoi</i> germinates more efficiently in shady forests than in clearings and forest gaps, confirming that the species is a non-pioneer."
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

305	Congeneric weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

401	Produces spines, thorns or burrs	n
	Source(s)	Notes

Qsn #	Question	Answer
	Woodson, R. E., Schery, R. W., & Dwyer, J. D. (1980). Flora of Panama. Part IX. Family 179. Rubiaceae--Part 1. Annals of the Missouri Botanical Garden, 67(1), 1-256	[No evidence] "Trees to 7 m tall, the branchlets smooth, plane, glabrous, the bark rimose, the nodes well spaced, to 6 cm apart, the pedicel scars often prominent. Leaves elliptic, to 36 cm long, to 17 cm wide, cuneate at the apex, basally cuneate, truncate or obtuse, the costa prominulous above, prominent beneath, to 1.8 mm wide, obviously porcate distally, the lateral veins 13-15, widely arcuate, to 3 cm apart, usually 1-1.5 cm apart, the venules pinnatifid, spreading, discolourous, subcoriaceous, glabrous; petioles to 4 cm long, glabrous; stipules tending to persist, often reflexed at maturity, connate, appressed to stem, the sheath cylindrical, the parts ovate elliptic to ovate, 2.5-4 cm long, to 1.2 cm wide, acute at the apex, stiffly chartaceous with a slender, median keel, venose, the veins crowded, prominulous."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown

403	Parasitic	n
	Source(s)	Notes
	Woodson, R. E., Schery, R. W., & Dwyer, J. D. (1980). Flora of Panama. Part IX. Family 179. Rubiaceae--Part 1. Annals of the Missouri Botanical Garden, 67(1), 1-256	"Trees to 7 m tall, the branchlets smooth, plane, glabrous, the bark rimose, the nodes well spaced, to 6 cm apart, the pedicel scars often prominent." [Rubiaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	Janick, J. & Paull, R.E. 2008. The Encyclopedia of Fruit & Nuts. CABI Publishing, Wallingford, UK	"The fruit is consumed fresh and as a juice, jelly and sauces." [Palatable to humans, & presumably frugivorous animals. 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 of toxicity
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence of toxicity

406	Host for recognized pests and pathogens	
	Source(s)	Notes

Qsn #	Question	Answer
	Janick, J.& Paull, R.E. 2008. The Encyclopedia of Fruit & Nuts. CABI Publishing, Wallingford, UK	"Diseases, Pests and Weeds. A number of insect pests have been reported including leaf cutting ants, leaf scale and the larvae of an unidentified moth. Anthracnose (<i>Colletotrichum</i> spp.) is a problem on the fruit."
	Ricker, M., Jessen, J. H., & Daly, D. (1997). The case for <i>Borojoa patinoi</i> (Rubiaceae) in the Chocó region, Colombia. <i>Economic Botany</i> , 51(1), 39-48	"Pests of <i>Borojoa patinoi</i> include the leaf-cutting ant <i>Atta cephalotes</i> var. <i>istmicola</i> , the leaf- scale <i>Chrisomphales dictiespermi</i> , and the larvae of an unidentified moth. Colonies of fungi of the genera <i>Aspergillus</i> and <i>Penicillium</i> can develop on the fruit during maturation but do not appear to cause any damage. The fungus <i>Colletotrichum</i> sp., on the other hand, attacks the stem and can cause the fruits to fall prematurely (Arenas, Cuellar, and De la Cruz 1985)."

407	Causes allergies or is otherwise toxic to humans	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
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Janick, J.& Paull, R.E. 2008. The Encyclopedia of Fruit & Nuts. CABI Publishing, Wallingford, UK	[No evidence. Occurs in wet forest] "This understory species is found in the humid rainforest with rainfall up to 4000 mm/year and average temperatures of 26°C and relative humidity of 85%."

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Lynch, J., & González, A. (1993). Canopy nutrient allocation in relation to incident light in the tropical fruit tree <i>Borojoa patinoi</i> (Cuatr.). <i>Journal of the American Society for Horticultural Science</i> , 118(6), 777-785	"Although it is a successful understory species adapted to low-light intensity, <i>B. patinoi</i> also adapts to higher light intensities, as evidenced by its occurrence in light gaps, the presence of occasional individuals that emerge from the forest canopy, and its cultivation as a horticultural crop in clearings. The <i>B. patinoi</i> canopy is dense, and there is significant self-shading."
	Escobar Escobar, D. F., Torres, G., & Marina, A. (2013). Morphology, ecophysiology and germination of seeds of the Neotropical tree <i>Alibertia patinoi</i> (Rubiaceae). <i>Revista de Biología Tropical</i> , 61(2), 547-556	"This temperature fluctuation is characteristic of soils of forests with dense vegetation cover, indicating that <i>A. patinoi</i> germinates more efficiently in shady forests than in clearings and forest gaps, confirming that the species is a non-pioneer."
	Janick, J.& Paull, R.E. 2008. The Encyclopedia of Fruit & Nuts. CABI Publishing, Wallingford, UK	[Understory tree. Presumably shade tolerant] "This understory species is found in the humid rainforest with rainfall up to 4000 mm/year and average temperatures of 26°C and relative humidity of 85%. In full sun, the tree is shorter (3.5 m)."

Qsn #	Question	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	Ricker, M., Jessen, J. H., & Daly, D. (1997). The case for <i>Borojoa patinoi</i> (Rubiaceae) in the Chocó region, Colombia. <i>Economic Botany</i> , 51(1), 39-48	" <i>Borojoa patinoi</i> grows well in areas of high rainfall (e.g., in Bajo Calima, 9000 mm/year), mean temperatures around 26°C, and well-drained soils (Arenas, Cuellar, and De la Cruz, 1985). The soils in the area are nutrient-poor."
	Ecocrop. 2007. <i>Borojoa patinoi</i> . http://ecocrop.fao.org/ecocrop/srv/en/cropView?id=3771 . [Accessed 31 Mar 2016]	"Soil PH: Optimal = 4.5-6.5; Absolute = 4-7" "Soil texture: Optimal = heavy, medium; Absolute = heavy, medium"
	Janick, J. & Paull, R.E. 2008. <i>The Encyclopedia of Fruit & Nuts</i> . CABI Publishing, Wallingford, UK	"The soils are well-drained and nutrient poor."
	Lynch, J., & González, A. (1993). Canopy nutrient allocation in relation to incident light in the tropical fruit tree <i>Borojoa patinoi</i> (Cuatr.). <i>Journal of the American Society for Horticultural Science</i> , 118(6), 777-785	"The study site's soil was moderately acid, was low in readily available P..."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Woodson, R. E., Schery, R. W., & Dwyer, J. D. (1980). <i>Flora of Panama</i> . Part IX. Family 179. Rubiaceae--Part 1. <i>Annals of the Missouri Botanical Garden</i> , 67(1), 1-256	"Trees to 7 m tall, the branchlets smooth, plane, glabrous, the bark rimose, the nodes well spaced, to 6 cm apart, the pedicel scars often prominent."

412	Forms dense thickets	n
	Source(s)	Notes
	Escobar Escobar, D. F., Torres, G., & Marina, A. (2013). Morphology, ecophysiology and germination of seeds of the Neotropical tree <i>Alibertia patinoi</i> (Rubiaceae). <i>Revista de Biología Tropical</i> , 61(2), 547-556	[No evidence. Only cultivated] "According to this author, it is a dioecious species, propagated by seeds, domesticated long ago and apparently without wild populations."

501	Aquatic	n
	Source(s)	Notes
	Janick, J. & Paull, R.E. 2008. <i>The Encyclopedia of Fruit & Nuts</i> . CABI Publishing, Wallingford, UK	[Terrestrial] "This understory species is found in the humid rainforest with rainfall up to 4000 mm/year and average temperatures of 26°C and relative humidity of 85%. In full sun, the tree is shorter (3.5 m). In the area along the Pacific coast, it is found up to 1200 m. The soil are well drained and the nutrient poor."

502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 31 Mar 2016]	Family: Rubiaceae Subfamily: Ixoroideae

Qsn #	Question	Answer
503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	Taylor, C. M., Sánchez-González, J., Hammel, B., Lorence, D. H., Persson, C., Delprete, P. G., & Gereau, R. E. (2011). Rubiacearum Americanarum Magna Hama Pars XXVIII: New Taxa, New Combinations, New Names, and Lectotypification for Several Species Found in Mexico and Central America. <i>Novon</i> , 21(1), 133–148	"The Neotropical genus <i>Borojoa</i> Cuatrec. (Rubiaceae) is now considered a synonym of <i>Alibertia</i> A. Rich, ex DC." [Rubiaceae]

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Taylor, C. M., Sánchez-González, J., Hammel, B., Lorence, D. H., Persson, C., Delprete, P. G., & Gereau, R. E. (2011). Rubiacearum Americanarum Magna Hama Pars XXVIII: New Taxa, New Combinations, New Names, and Lectotypification for Several Species Found in Mexico and Central America. <i>Novon</i> , 21(1), 133–148	" <i>Alibertia patinoi</i> is a shrub, treelet, or tree..."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Taylor, C. M., Sánchez-González, J., Hammel, B., Lorence, D. H., Persson, C., Delprete, P. G., & Gereau, R. E. (2011). Rubiacearum Americanarum Magna Hama Pars XXVIII: New Taxa, New Combinations, New Names, and Lectotypification for Several Species Found in Mexico and Central America. <i>Novon</i> , 21(1), 133–148	[No evidence] " <i>Alibertia patinoi</i> is a shrub, treelet, or tree with a natural distribution ranging from Costa Rica through Panama, along the Pacific coast of the Choco Region of Colombia to the province of Esmeraldas, Ecuador. It is often cultivated in the Choco Region for its large, edible fruits (locally called borojo) and occasionally also in the Amazonian region of Colombia and Ecuador."

602	Produces viable seed	y
	Source(s)	Notes
	Escobar Escobar, D. F., Torres, G., & Marina, A. (2013). Morphology, ecophysiology and germination of seeds of the Neotropical tree <i>Alibertia patinoi</i> (Rubiaceae). <i>Revista de Biología Tropical</i> , 61(2), 547-556	"Behavior of seeds in storage: <i>A. patinoi</i> seeds were sensitive to desiccation and had recalcitrant storage behavior. When seed moisture content was high (40.3%), the viability of the seeds was high (98.8%), but when seed moisture content was below or equal to 11%, the viability of seeds was drastically reduced and all the seeds died."
	Janick, J. & Paull, R.E. 2008. <i>The Encyclopedia of Fruit & Nuts</i> . CABI Publishing, Wallingford, UK	"Borojo is propagated by seeds that germinate in 20-45 days. There are a few reports that suggest it can be propagated by cutting, aerial layering or grafting with limited success."

603	Hybridizes naturally	
	Source(s)	Notes

Qsn #	Question	Answer
	Taylor, C. M., Sánchez-González, J., Hammel, B., Lorence, D. H., Persson, C., Delprete, P. G., & Gereau, R. E. (2011). Rubiacearum Americanarum Magna Hama Pars XXVIII: New Taxa, New Combinations, New Names, and Lectotypification for Several Species Found in Mexico and Central America. <i>Novon</i> , 21(1), 133–148	Unknown. No hybrids reported

604	Self-compatible or apomictic	n
	Source(s)	Notes
	Woodson, R. E., Schery, R. W., & Dwyer, J. D. (1980). Flora of Panama. Part IX. Family 179. Rubiaceae--Part 1. <i>Annals of the Missouri Botanical Garden</i> , 67(1), 1–256	"Borojoa ... Small dioecious trees"

605	Requires specialist pollinators	n
	Source(s)	Notes
	Janick, J. & Paull, R.E. 2008. <i>The Encyclopedia of Fruit & Nuts</i> . CABI Publishing, Wallingford, UK	"Pollination is via insects, hummingbirds, and bats."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Janick, J. & Paull, R.E. 2008. <i>The Encyclopedia of Fruit & Nuts</i> . CABI Publishing, Wallingford, UK	"Borojo is propagated by seeds that germinate in 20-45 days. There are a few reports that suggest it can be propagated by cutting, aerial layering or grafting with limited success."
	Ricker, M., Jessen, J. H., & Daly, D. (1997). The case for <i>Borojoa patinoi</i> (Rubiaceae) in the Chocó region, Colombia. <i>Economic Botany</i> , 51(1), 39-48	" <i>Borojoa patinoi</i> is usually propagated by seeds, which germinate after 20 to 45 days (Gomez 1988; Patifno 1950). The grafting experiments attempted to date have shown poor results (Arenas, Cuellar, and De la Cruz 1985), but further investigations should be undertaken. For many fruit-tree species, grafting accelerates the start of fruit production and permits selection of varieties. For dioecious species such as <i>B. patinoi</i> , the proportion of female (i.e., fruit-bearing) plants may be effected by grafting female scions on rootstock of either gender."

607	Minimum generative time (years)	2
	Source(s)	Notes
	Janick, J. & Paull, R.E. 2008. <i>The Encyclopedia of Fruit & Nuts</i> . CABI Publishing, Wallingford, UK	"The first flowers are produced when the tree is about 3 m tall at 1.5 years of age."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes

Qsn #	Question	Answer
	Woodson, R. E., Schery, R. W., & Dwyer, J. D. (1980). Flora of Panama. Part IX. Family 179. Rubiaceae--Part 1. Annals of the Missouri Botanical Garden, 67(1), 1-256	[No means of external attachment, although some seeds could potentially adhere to something if covered in pulp] "Fruits sessile, rotund, applelike, 7-8 cm in diam., subtended by the persistent bracts, glabrous, the remains of the calyx represented by a delicate ring bordering a terminal cavity, ca. 1 mm deep, the wall very thick, 1.2 cm in diam.; seeds subplane, subovoid, 6-7 mm long, 7-12 mm wide, embedded in a pulp."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Taylor, C. M., Sánchez-González, J., Hammel, B., Lorence, D. H., Persson, C., Delprete, P. G., & Gereau, R. E. (2011). Rubiacearum Americanarum Magna Hama Pars XXVIII: New Taxa, New Combinations, New Names, and Lectotypification for Several Species Found in Mexico and Central America. Novon, 21(1), 133-148	"It is often cultivated in the Choco Region for its large, edible fruits (locally called borojo) and occasionally also in the Amazonian region of Colombia and Ecuador."
	Plant World Seeds. 2016. Borojoa patinoi. http://www.plant-world-seeds.com/store/view_seed_item/3833 . [Accessed 7 Apr 2016]	Seeds sold online

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Woodson, R. E., Schery, R. W., & Dwyer, J. D. (1980). Flora of Panama. Part IX. Family 179. Rubiaceae--Part 1. Annals of the Missouri Botanical Garden, 67(1), 1-256	[No evidence. Relatively large fruits & seeds] "Fruits sessile, rotund, applelike, 7-8 cm in diam., subtended by the persistent bracts, glabrous, the remains of the calyx represented by a delicate ring bordering a terminal cavity, ca. 1 mm deep, the wall very thick, 1.2 cm in diam.; seeds subplane, subovoid, 6-7 mm long, 7-12 mm wide, embedded in a pulp."

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Woodson, R. E., Schery, R. W., & Dwyer, J. D. (1980). Flora of Panama. Part IX. Family 179. Rubiaceae--Part 1. Annals of the Missouri Botanical Garden, 67(1), 1-256	"Fruits sessile, rotund, applelike, 7-8 cm in diam., subtended by the persistent bracts, glabrous, the remains of the calyx represented by a delicate ring bordering a terminal cavity, ca. 1 mm deep, the wall very thick, 1.2 cm in diam.; seeds subplane, subovoid, 6-7 mm long, 7-12 mm wide, embedded in a pulp."

705	Propagules water dispersed	
	Source(s)	Notes
	Ricker, M., Jessen, J. H., & Daly, D. (1997). The case for Borojoa patinoi (Rubiaceae) in the Chocó region, Colombia. Economic Botany, 51(1), 39-48	[Buoyancy of fruit unknown. Possible that they may be dispersed by water if growing in riparian areas] "Indigenous communities in the Choco cultivate B. patinoi close to the river banks, where the trees are periodically subjected to floods, as well as on terraces and on small hills (Arenas, Cuellar, and De la Cruz 1985; Patifio 1950)."

Qsn #	Question	Answer
706	Propagules bird dispersed	y
	Source(s)	Notes
	Sandor, M. E. (2012). Forest regeneration on the Osa Peninsula, Costa Rica. Master's Thesis. Vassar College, Poughkeepsie, NY	"Appendix 2. Reproductive traits by species." [Borojoa patinoi - Disperser = Animal. Presumably has the potential to be dispersed by frugivorous birds]
	Janick, J.& Paull, R.E. 2008. The Encyclopedia of Fruit & Nuts. CABI Publishing, Wallingford, UK	"The large, globose, green fruit, a berry, is 8-13 cm in diameter (250-1100 g) when mature." ... "The pulp encloses about 300 seeds (6 by 10 mm)."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Woodson, R. E., Schery, R. W., & Dwyer, J. D. (1980). Flora of Panama. Part IX. Family 179. Rubiaceae--Part 1. Annals of the Missouri Botanical Garden, 67(1), 1-256	[No means of external attachment, although some seeds could potentially stick to animals if covered in pulp] "Fruits sessile, rotund, applelike, 7-8 cm in diam., subtended by the persistent bracts, glabrous, the remains of the calyx represented by a delicate ring bordering a terminal cavity, ca. 1 mm deep, the wall very thick, 1.2 cm in diam.; seeds subplane, subovoid, 6-7 mm long, 7-12 mm wide, embedded in a pulp."

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Sandor, M. E. (2012). Forest regeneration on the Osa Peninsula, Costa Rica. Master's Thesis. Vassar College, Poughkeepsie, NY	"Appendix 2. Reproductive traits by species." [Borojoa patinoi - Disperser = Animal. Presumed to be able to survive ingestion and gut passage]

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Janick, J.& Paull, R.E. 2008. The Encyclopedia of Fruit & Nuts. CABI Publishing, Wallingford, UK	"The tree produces about 16 fruit/year from the fifth year (Ricker et al., 1997)." ... "The pulp encloses about 300 seed (6 by 10 mm)." [Seed production after 5 years would be approximately 4800, but seeds are recalcitrant & lack dormancy. Unlikely to achieve high densities]

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	Notes

Qsn #	Question	Answer
	Escobar Escobar, D. F., Torres, G., & Marina, A. (2013). Morphology, ecophysiology and germination of seeds of the Neotropical tree <i>Alibertia patinoi</i> (Rubiaceae). <i>Revista de Biología Tropical</i> , 61(2), 547-556	[Recalcitrant seeds that lack dormancy] "The seed germination percentage was observed to be higher under the specific dense canopy forest light and temperature conditions; furthermore, neither enriched far-red light nor darkness conditions inhibited germination. We concluded that rapid germination could be the establishment strategy of this species. Also, the physiological traits (i.e., rapid germination rate, low germination requirements, absence of primary dormancy, and recalcitrant behavior) and seed size and mass, suggest that <i>A. patinoi</i> is adapted to conditions of mature tropical rain forests." ... "The rapid germination rate (sensu Ng 1978) is the establishment strategy of <i>A. patinoi</i> , and this behaviour is favored by seed physiological traits such as: (1) lack of primary dormancy; (2) ability to germinate over a range of light conditions; and (3) recalcitrant behavior, seeds with high moisture content, and continuous metabolism. However, ability to germinate rapidly depends on seeds being exposed to the high temperatures characteristic of the shady tropical rainforest floor. This establishment strategy is the most common in species of trees from the mature tropical rainforest, under which all the seeds germinate in a short period of time, presenting high density of seedlings, not forming banks of persistent seeds and not presenting primary dormancy, along with low germination requirements (Ng 1978, Vázquez-Yáñez & Orozco-Segovia 1993, Baskin & Baskin 1998)."

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2016. 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. 2016. Personal Communication	Unknown

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Shade tolerant
- Reproduces by seeds
- Reaches maturity in 1.5 years
- Seeds presumably dispersed by birds, other frugivorous animals & intentionally by people

Low Risk Traits

- Domesticated by indigenous people
- No reports of invasiveness or naturalization, but no evidence of widespread introduction outside native range
- Unarmed (no spines, thorns or burrs)
- Non-toxic
- Edible fruit
- Dioecious
- Not reported to spread vegetatively
- Relatively large fruit & seeds unlikely to be inadvertently dispersed
- Recalcitrant seeds lack dormancy & unlikely to form a persistent seed bank