

Family: *Primulaceae*

Taxon: *Bonellia macrocarpa*

Synonym: *B. macrocarpa* ssp. *panamensis* (Lundell) B.S. **Common Name:** jacquinia
Jacquinia panamensis Lundell knock-me-back

Questionnaire :	current 20090513	Assessor:	Assessor	Designation:	EVALUATE
Status:	Assessor Approved	Data Entry Person:	Assessor	WRA Score	6
101	Is the species highly domesticated?		y=-3, n=0		n
102	Has the species become naturalized where grown?		y=1, n=-1		
103	Does the species have weedy races?		y=1, n=-1		
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		y
302	Garden/amenity/disturbance weed		n=0, y = 1*multiplier (see Appendix 2)		
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)		
401	Produces spines, thorns or burrs		y=1, n=0		y
402	Allelopathic		y=1, n=0		
403	Parasitic		y=1, n=0		n
404	Unpalatable to grazing animals		y=1, n=-1		
405	Toxic to animals		y=1, n=0		
406	Host for recognized pests and pathogens		y=1, n=0		n
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		
409	Is a shade tolerant plant at some stage of its life cycle		y=1, n=0		y
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		y=1, n=0		y
411	Climbing or smothering growth habit		y=1, n=0		n

412	Forms dense thickets	y=1, n=0	
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	
604	Self-compatible or apomictic	y=1, n=-1	
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	
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	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	
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	
803	Well controlled by herbicides	y=-1, n=1	
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: EVALUATE

WRA Score 6

Supporting Data:

101	2004. Ståhl, B./Källersjö, M.. Reinstatement of <i>Bonellia</i> (Theophrastaceae). <i>Novon.</i> 14(1): 115-118.	[Is the species highly domesticated? No] "Following the results of a recent phylogenetic study showing that the genus <i>Jacquinia</i> is paraphyletic, the following new combinations in the genus <i>Bonellia</i> are made ... <i>B. macrocarpa</i> (Cavanilles) Stahl & Källersjö subsp. <i>Panamensis</i> (Lundell), ... "DC.). The genus <i>Bonellia</i> is distinguished from <i>Jacquinia</i> s. str. by its mostly orange flowers and alternate leaves, flattened seeds that are incompletely covered by placental tissue, and two-layered testa"
102	2013. WRA Specialist. Personal Communication.	NA
103	2013. WRA Specialist. Personal Communication.	NA
201	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. <i>Flora of Panama</i> . Part VIII. Family 151. Theophrastaceae. <i>Annals of the Missouri Botanical Garden.</i> 67(4): 1047-1055.	[Species suited to tropical or subtropical climate(s) 2-High] "In Panama it is confined to the Pacific Coast where it grows along the strand..."
202	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. <i>Flora of Panama</i> . Part VIII. Family 151. Theophrastaceae. <i>Annals of the Missouri Botanical Garden.</i> 67(4): 1047-1055.	[Quality of climate match data 2-High]
203	1987. Clay, H.F./Hubbard, J.C./Golt, R.. <i>Tropical shrubs</i> . University of Hawaii Press,	[Broad climate suitability (environmental versatility)? Yes] "Adaptable; will grow anywhere in Hawaii, even in the teeth of the salt wind at the beach, on dry slopes, or in the wettest valleys; it will grow in sun or shade, is very wind resistant, drought resistant, and will grow in almost any soil, even beach sand."
204	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. <i>Flora of Panama</i> . Part VIII. Family 151. Theophrastaceae. <i>Annals of the Missouri Botanical Garden.</i> 67(4): 1047-1055.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "In Panama it is confined to the Pacific Coast where it grows along the strand..."
205	2006. Carr, G.D.. <i>Manoa Campus Plants</i> . University of Hawaii Botany Department, Honolulu, HI http://www.botany.hawaii.edu/faculty/carr/160webindex.htm	[Does the species have a history of repeated introductions outside its natural range? No] "Location: St. John Courtyard."
205	2008. Kobayashi, K./Criley, R./Kaufman, A./Tsugawa, S./Ricordi, A./Clifford, P.. <i>Barrier Plants</i> . L-20. College of Tropical Agriculture and Human Resources (CTAHR, Honolulu, HI http://www.ctahr.hawaii.edu/freepubs	[Does the species have a history of repeated introductions outside its natural range? Hawaii]
205	2009. Burgess, H./Possley, J.. <i>Reconciling Plant Introduction and Conservation at Fairchild Tropical Botanic Garden</i> . <i>Wildland Weeds.</i> 13(1): 4-6.	Does the species have a history of repeated introductions outside its natural range? Florida]
301	2009. Burgess, H./Possley, J.. <i>Reconciling Plant Introduction and Conservation at Fairchild Tropical Botanic Garden</i> . <i>Wildland Weeds.</i> 13(1): 4-6.	[Naturalized beyond native range? Yes] "In the 1930s and 40s, Fairchild horticulturists collected several specimens of the shrub <i>Bonellia macrocarpa</i> from mountainous regions in the Mexican states of Yucatan and Chiapas. In the ensuing years, approximately ten were planted for display in Fairchild Tropical Botanic Garden, where they flourished for decades. In 1995, Keith Bradley from The Institute for Regional Conservation deposited plant specimens into the Fairchild Herbarium, documenting the escape of <i>B. macrocarpa</i> into lake margins in Fairchild's lowlands and in two neighboring Miami-Dade County preserves that share borders with Fairchild."
302	2009. Burgess, H./Possley, J.. <i>Reconciling Plant Introduction and Conservation at Fairchild Tropical Botanic Garden</i> . <i>Wildland Weeds.</i> 13(1): 4-6.	[Garden/amenity/disturbance weed? Showing weedy tendencies in Fairchild Tropical Botanic Garden] "Most recently FTBG staff members have been controlling the shrubs <i>Bonellia macrocarpa</i> and <i>Lumnitzera racemosa</i> (see sidebars). These escapes have highlighted the importance of early detection, and are an impetus for more diligent monitoring,"
303	2012. Randall, R.P.. <i>A Global Compendium of Weeds</i> . 2nd Edition. Department of Agriculture and Food, Western Australia	[Agricultural/forestry/horticultural weed? No evidence]
304	2012. Randall, R.P.. <i>A Global Compendium of Weeds</i> . 2nd Edition. Department of Agriculture and Food, Western Australia	[Environmental weed? No evidence]

305	2010. Hadden, K./Frank, K./Norris, K./Gass, D.. Identification Guide For Invasive Exotic Plants of the Florida Keys 2010-2012. Florida Keys Invasive Exotics Task Force, http://www.keysgreenthumb.net/Invasives_Guide_2010-2012.pdf	[Congeneric weed? Possibly <i>Jacquinia arborea</i>] "Category III: Invasive Exotics that have not yet become a problem in the Florida Keys but are to be watched" [Includes <i>Jacquinia arborea</i>] ... "Seeded by birds and is showing up in Key Largo" ... "remove manually; or use 5%-15% triclopyr ester basal"
305	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Congeneric weed? Possibly] <i>Jacquinia arborea</i> listed as a weed of unspecified impacts
401	1987. Clay, H.F./Hubbard, J.C./Golt, R.. Tropical shrubs. University of Hawaii Press,	[Produces spines, thorns or burrs? Yes] "It is lovely to look at, but definitely not delightful to hold: this sturdy shrub is prepared to defend itself with needle-sharp spines at the tips of each stiff leaf." ... "Because of painfully spiny leaf tips, this plant is difficult to cultivate or work around."
401	2008. Kobayashi, K./Criley, R./Kaufman, A./Tsugawa, S./Ricordi, A./Clifford, P.. Barrier Plants. L-20. College of Tropical Agriculture and Human Resources (CTAHR, Honolulu, HI http://www.ctahr.hawaii.edu/freepubs	[Produces spines, thorns or burrs? Yes] "A slow-growing woody shrub that grows up to 12 feet high, it has glossy, bright green, stiff leaves with needle-sharp spines at each tip."
402	2013. WRA Specialist. Personal Communication.	[Allelopathic? Unknown]
403	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. Flora of Panama. Part VIII. Family 151. Theophrastaceae. Annals of the Missouri Botanical Garden. 67(4): 1047-1055.	[Parasitic? No] "Shrub or small tree to 8 m tall; branches brittle; stems drying dark reddish brown, the twigs scurfy puberulent, soon glabrescent." [Primulaceae. Also placed in: Theophrastaceae]
404	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. Flora of Panama. Part VIII. Family 151. Theophrastaceae. Annals of the Missouri Botanical Garden. 67(4): 1047-1055.	[Unpalatable to grazing animals? Unknown, but spines on leaves would probably deter browsing] "Leaves mostly elliptical, often narrow, mostly 5-7 cm long, 1.5-2.5 cm wide, apically obtuse or acute with a strong dark spine,"
405	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. Flora of Panama. Part VIII. Family 151. Theophrastaceae. Annals of the Missouri Botanical Garden. 67(4): 1047-1055.	[Toxic to animals? Unknown] "In some places species of <i>Jacquinia</i> are used as barbascos to kill fish,..."
406	1987. Clay, H.F./Hubbard, J.C./Golt, R.. Tropical shrubs. University of Hawaii Press,	[Host for recognized pests and pathogens? No] "It is hardy, resistant to most insects, diseases, drought or downpour, and to very salty conditions."
407	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Causes allergies or is otherwise toxic to humans? No evidence]
408	2013. WRA Specialist. Personal Communication.	[Creates a fire hazard in natural ecosystems? Unknown]
409	1987. Clay, H.F./Hubbard, J.C./Golt, R.. Tropical shrubs. University of Hawaii Press,	[Is a shade tolerant plant at some stage of its life cycle? Yes] "it will grow in sun or shade"
410	1987. Clay, H.F./Hubbard, J.C./Golt, R.. Tropical shrubs. University of Hawaii Press,	[Tolerates a wide range of soil conditions? Yes] "Adaptable; will grow anywhere in Hawaii, even in the teeth of the salt wind at the beach, on dry slopes, or in the wettest valleys; it will grow in sun or shade, is very wind resistant, drought resistant, and will grow in almost any soil, even beach sand."
411	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. Flora of Panama. Part VIII. Family 151. Theophrastaceae. Annals of the Missouri Botanical Garden. 67(4): 1047-1055.	[Climbing or smothering growth habit? No] "Shrub or small tree to 8 m tall; branches brittle; stems drying dark reddish brown, the twigs scurfy puberulent, soon glabrescent."
412	1987. Clay, H.F./Hubbard, J.C./Golt, R.. Tropical shrubs. University of Hawaii Press,	[Forms dense thickets? Unknown] "the foliage of several of these shrubs makes an impenetrable thicket." [Artificial thickets created in cultivation. Unknown if this occurs under natural conditions]
501	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. Flora of Panama. Part VIII. Family 151. Theophrastaceae. Annals of the Missouri Botanical Garden. 67(4): 1047-1055.	[Aquatic? No] "In Panama it is confined to the Pacific Coast where it grows along the strand with <i>Hippomane mancinella</i> L. (Euphorbiaceae)."
502	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. Flora of Panama. Part VIII. Family 151. Theophrastaceae. Annals of the Missouri Botanical Garden. 67(4): 1047-1055.	[Grass? No] "Shrub or small tree to 8 m tall"
503	2013. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Nitrogen fixing woody plant? No] "Primulaceae subfamily: Theophrastoideae tribe: Theophrasteae. Also placed in: Theophrastaceae "

504	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. Flora of Panama. Part VIII. Family 151. Theophrastaceae. Annals of the Missouri Botanical Garden. 67(4): 1047-1055.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Shrub or small tree to 8 m tall"
601	2013. WRA Specialist. Personal Communication.	[Evidence of substantial reproductive failure in native habitat? No evidence]
602	1987. Clay, H.F./Hubbard, J.C./Golt, R.. Tropical shrubs. University of Hawaii Press,	[Produces viable seed? Yes] "Growth from cuttings or seeds"
603	2013. WRA Specialist. Personal Communication.	[Hybridizes naturally? Unknown]
604	1997. Pascarella, J.B.. Breeding Systems of <i>Ardisia</i> Sw. (Myrsinaceae). Brittonia. 49(1): 45-53.	[Self-compatible or apomictic? Possibly No] "The genus <i>Jacquinia</i> L. has extrorse anther dehiscence and protogyny, characters that would likely prevent intrafloral autogamy (Channel & Wood, 1959; Tomlinson, 1974; Stahl, 1989; Stearn, 1992)."
605	1994. Knudsen, J.T./Stahl, B.. Floral odours in the Theophrastaceae. Biochemical systematics and ecology. 22(3): 259-268.	[Requires specialist pollinators? No. Bee-pollinated] "Floral morphology and scent chemistry suggest that <i>Theophrasta</i> and <i>Deherainia</i> are sapromyophilous, while <i>Jacquinia</i> and <i>Clavija</i> are melittophilous. Melittophily is suggested to be the ancient condition in the family, while the derived condition, sapromyophily, may have evolved independently in <i>Deherainia</i> and <i>Theophrasta</i> ."
606	1987. Clay, H.F./Hubbard, J.C./Golt, R.. Tropical shrubs. University of Hawaii Press,	[Reproduction by vegetative fragmentation? No evidence] "Growth from cuttings or seeds" ... "Withstands sever pruning, even to the ground; develops new sprouts readily; may be trimmed into informal natural hedges, or may be organized into treelike forms."
607	1987. Clay, H.F./Hubbard, J.C./Golt, R.. Tropical shrubs. University of Hawaii Press,	[Minimum generative time (years)? Unknown] "Slow growth rate"
701	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. Flora of Panama. Part VIII. Family 151. Theophrastaceae. Annals of the Missouri Botanical Garden. 67(4): 1047-1055.	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? No. Unlikely as fruits and seeds lack means of external attachment] "Fruit a coriaceous berry, ovoid or ellipsoidal, 3-4 cm across, brown, rugose, the pericarp ca. 5 mm thick; seeds 1-several, ca. 2 cm long, faboid, immersed in a soft yellowish matrix."
702	2008. Kobayashi, K./Criley, R./Kaufman, A./Tsugawa, S./Ricordi, A./Clifford, P.. Barrier Plants. L-20. College of Tropical Agriculture and Human Resources (CTAHR, Honolulu, HI http://www.ctahr.hawaii.edu/freepubs	[Propagules dispersed intentionally by people? Yes. Barrier plant] " <i>Jacquinia</i> - <i>Jacquinia panamensis</i> , Thephrastaceae. A slow-growing woody shrub that grows up to 12 feet high, it has glossy, bright green, stiff leaves with needle-sharp spines at each tip. Small orange flowers lead to orange, marble-like fruits. Adaptable, growing in sun or shade, it is very wind and drought resistant."
703	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. Flora of Panama. Part VIII. Family 151. Theophrastaceae. Annals of the Missouri Botanical Garden. 67(4): 1047-1055.	[Propagules likely to disperse as a produce contaminant? No. Fruits and seeds relatively large] "Fruit a coriaceous berry, ovoid or ellipsoidal, 3-4 cm across, brown, rugose, the pericarp ca. 5 mm thick; seeds 1-several, ca. 2 cm long, faboid, immersed in a soft yellowish matrix."
704	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. Flora of Panama. Part VIII. Family 151. Theophrastaceae. Annals of the Missouri Botanical Garden. 67(4): 1047-1055.	[Propagules adapted to wind dispersal? No] "Fruit a coriaceous berry, ovoid or ellipsoidal, 3-4 cm across, brown, rugose, the pericarp ca. 5 mm thick; seeds 1-several, ca. 2 cm long, faboid, immersed in a soft yellowish matrix."
705	2009. Burgess, H./Possley, J.. Reconciling Plant Introduction and Conservation at Fairchild Tropical Botanic Garden. Wildland Weeds. 13(1): 4-6.	[Propagules water dispersed? No evidence] "Dispersal of the fleshy, orange fruits of <i>B. macrocarpa</i> likely was aided by raccoons and other animals."
706	1980. Woodson, Jr., R.E./Schery, R.W./D'Arcy, W.G. et al.. Flora of Panama. Part VIII. Family 151. Theophrastaceae. Annals of the Missouri Botanical Garden. 67(4): 1047-1055.	[Propagules bird dispersed? Presumably Yes, although dispersal may be limited due to size of fruits and seeds] "Fruit a coriaceous berry, ovoid or ellipsoidal, 3-4 cm across, brown, rugose, the pericarp ca. 5 mm thick; seeds 1-several, ca. 2 cm long, faboid, immersed in a soft yellowish matrix."
706	2006. Carr, G.D.. Manoa Campus Plants. University of Hawaii Botany Department, Honolulu, HI http://www.botany.hawaii.edu/faculty/carr/160webindex.htm	[Propagules bird dispersed? Yes] " <i>Jacquinia panamensis</i> " ... "This one has bright fruits that are attractive to birds."
707	2009. Burgess, H./Possley, J.. Reconciling Plant Introduction and Conservation at Fairchild Tropical Botanic Garden. Wildland Weeds. 13(1): 4-6.	[Propagules dispersed by other animals (externally)? No. Adapted for internal dispersal,. Although animals may also transport fruit & consume pulp without ingesting seeds] "Dispersal of the fleshy, orange fruits of <i>B. macrocarpa</i> likely was aided by raccoons and other animals."
708	2009. Burgess, H./Possley, J.. Reconciling Plant Introduction and Conservation at Fairchild Tropical Botanic Garden. Wildland Weeds. 13(1): 4-6.	[Propagules survive passage through the gut? Presumably Yes] "Dispersal of the fleshy, orange fruits of <i>B. macrocarpa</i> likely was aided by raccoons and other animals."

801	2013. WRA Specialist. Personal Communication.	[Prolific seed production (>1000/m2)? Unknown]
802	2008. Royal Botanic Gardens Kew. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown. Other <i>Jacquinia</i> species have orthodox seeds]
803	2009. Burgess, H./Possley, J.. Reconciling Plant Introduction and Conservation at Fairchild Tropical Botanic Garden. <i>Wildland Weeds</i> . 13(1): 4-6.	[Well controlled by herbicides? Unknown] "Everglades Cooperative Invasive Species Management Area (ECISMA) team members gave us a strong head start, and FTBG staff volunteers now remove <i>B. macrocarpa</i> on a weekly basis, pulling seedlings by hand or using a cut stump method of herbicide application using 50% Renovate (triclopyr) diluted in water."
804	1987. Clay, H.F./Hubbard, J.C./Golt, R.. <i>Tropical shrubs</i> . University of Hawaii Press,	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] "Withstands sever pruning, even to the ground; develops new sprouts readily; may be trimmed into informal natural hedges, or may be organized into treelike forms."
805	2013. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown]

Summary of Risk Traits

High Risk / Undesirable Traits

- Grows in tropical climates
- Can grow in a range of environmental conditions
- Naturalizing in Florida
- Leaves with needle-sharp spines
- Shade tolerant
- Tolerates many soil types
- Seeds dispersed by birds and other frugivorous animals
- Tolerates severe pruning
- Lack of biological and ecological information makes risk prediction difficult

Low Risk Traits

- Used as a barrier plant and ornamental