

Key Words: Low Risk, Ornamental, Tropical Tree, Showy Flowers, Moth-pollinated

**Family:** *Rubiaceae*

**Taxon:** *Osa pulchra*

**Synonym:** *Hintonia pulchra* D. R. Simpson (*basionym*)      **Common Name:** Osa

Questionnaire :	current 20090513	Assessor:	Chuck Chimera	Designation:	L
Status:	Assessor Approved	Data Entry Person:	Chuck Chimera	WRA Score	-3
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		n
204	Native or naturalized in regions with tropical or subtropical climates		y=1, n=0		y
205	Does the species have a history of repeated introductions outside its natural range?		y=-2, ?=-1, n=0		n
301	Naturalized beyond native range		y = 1*multiplier (see Appendix 2), n= question 205		n
302	Garden/amenity/disturbance weed		n=0, y = 1*multiplier (see Appendix 2)		n
303	Agricultural/forestry/horticultural weed		n=0, y = 2*multiplier (see Appendix 2)		n
304	Environmental weed		n=0, y = 2*multiplier (see Appendix 2)		n
305	Congeneric weed		n=0, y = 1*multiplier (see Appendix 2)		n
401	Produces spines, thorns or burrs		y=1, n=0		n
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		
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
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		y=1, n=0		
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	
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	y
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	y=1, n=-1	
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	
708	Propagules survive passage through the gut	y=1, n=-1	
801	Prolific seed production (>1000/m <sup>2</sup> )	y=1, n=-1	n
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	
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: L

WRA Score -3

## Supporting Data:

101	1996. Missouri Botanical Garden. Plant Map of Costa Rica - Rubiaceae: <i>Osa pulchra</i> [Accessed 02 Sep 2012]. <a href="http://www.mobot.org/mobot/plantmap/Osa.html">http://www.mobot.org/mobot/plantmap/Osa.html</a>	[Is the species highly domesticated? No evidence] " <i>Osa pulchra</i> , a member of the Rubiaceae (coffee family) is one of Costa Rica's most spectacular and rare endemic species of flowering plants. The genus, named after the <i>Osa</i> peninsula, was formally described in 1979, and has only this one species. <i>Pulchra</i> , of course, means beautiful. Until recently, the species was known from only one small population of about 8 plants on private property not far from Rincón de <i>Osa</i> . Fortunately, the owners and others in the area are aware of the uniqueness of the species, protect it and have it carefully marked for visitors. In November of 1996 another small population was found on the Atlantic lowlands, near Puerto Viejo de Limón. Except for its huge flowers and elongate green, capsular fruits, <i>Osa pulchra</i> looks very much like a coffee plant and would seem to be an excellent candidate for cultivation for tropical gardens and green houses."
102	2012. WRA Specialist. Personal Communication.	NA
103	2012. WRA Specialist. Personal Communication.	NA
201	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Species suited to tropical or subtropical climate(s) 2-High] "Mesoamerica: Costa Rica - Puntarenas; Panama - Bocas del Toro"
202	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Quality of climate match data 2-High]
203	1993. Burger, W. (ed.). <i>Flora Costaricensis - Family #202 Rubiaceae</i> . Fieldiana: Botany. 33: 1-333.	[Broad climate suitability (environmental versatility)? No evidence] "This species is known from only a few collections in lowland rain forest near Rincon de <i>Osa</i> at ca. 50 m elevation on the <i>Osa</i> Peninsula. Flowering in January-February, with immature fruits in June and mature fruits in January."
204	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Mesoamerica: Costa Rica - Puntarenas; Panama - Bocas del Toro"
205	2012. WRA Specialist. Personal Communication.	[Does the species have a history of repeated introductions outside its natural range? No evidence]
301	2012. Randall, R.P.. <i>A Global Compendium of Weeds</i> . 2nd Edition. Department of Agriculture and Food, Western Australia	[Naturalized beyond native range? No evidence]
301	2012. Wagner, W.L./Herbst, D.R./Khan, N./Flynn, T.. <i>Hawaiian Vascular Plant Updates: A Supplement to the Manual of the Flowering Plants of Hawai'i &amp; Hawai'i's Ferns &amp; Fern Allies</i> . <a href="http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/supplement.htm">http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/supplement.htm</a>	[Naturalized beyond native range? No evidence]
302	2012. Randall, R.P.. <i>A Global Compendium of Weeds</i> . 2nd Edition. Department of Agriculture and Food, Western Australia	[Garden/amenity/disturbance weed? No evidence]
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	1993. Burger, W. (ed.). <i>Flora Costaricensis - Family #202 Rubiaceae</i> . Fieldiana: Botany. 33: 1-333.	[Congeneric weed? No evidence] "A monotypic genus known only from the <i>Osa</i> Peninsula of Costa Rica. No other species of Costa Rican Rubiaceae has such large flowers. This genus is related to <i>Portlandia</i> and to a lesser extent to <i>Hintonia</i> ."
305	2012. Randall, R.P.. <i>A Global Compendium of Weeds</i> . 2nd Edition. Department of Agriculture and Food, Western Australia	[Congeneric weed? No evidence]
401	1974. Simpson, D.R. .. <i>A new Hintonia (Rubiaceae) from Costa Rica</i> . <i>Phytologia</i> . 29: 277-280.	[Produces spines, thorns or burrs? No] "Tree 15 m. tall. Leaves elliptic to narrowly oblong 16.5- 18 cm. long, membranous to chartaceous."

402	2012. WRA Specialist. Personal Communication.	[Allelopathic? Unknown]
403	1974. Simpson, D.R .. A new <i>Hintonia</i> (Rubiaceae) from Costa Rica. <i>Phytologia</i> . 29: 277-280.	[Parasitic? No] "Tree 15 m. tall. Leaves elliptic to narrowly oblong 16.5- 18 cm. long, membranous to chartaceous." [Rubiaceae]
404	2012. WRA Specialist. Personal Communication.	[Unpalatable to grazing animals? Unknown]
405	2012. WRA Specialist. Personal Communication.	[Toxic to animals? Unknown] No evidence of toxicity reported in literature, but plant is rare in cultivation
406	2012. WRA Specialist. Personal Communication.	[Host for recognized pests and pathogens? Unknown] Plant is rare in cultivation
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]
407	2012. Lara, A.. Take a Walk with Me on the Rare Side!. <i>The Tropical Dispatch</i> . 39(1): 3-4.	[Causes allergies or is otherwise toxic to humans? No evidence]
408	1993. Burger, W. (ed.). <i>Flora Costaricensis - Family #202 Rubiaceae</i> . <i>Fieldiana: Botany</i> . 33: 1-333.	[Creates a fire hazard in natural ecosystems? No evidence] "This species is known from only a few collections in lowland rain forest near Rincon de Osa at ca. 50 m elevation on the Osa Peninsula." [Unlikely given rain forest habitat]
409	1974. Simpson, D.R .. A new <i>Hintonia</i> (Rubiaceae) from Costa Rica. <i>Phytologia</i> . 29: 277-280.	[Is a shade tolerant plant at some stage of its life cycle? Presumably Yes] "Its ecological adaptation and floral biology are unknown but in general aspect the plant is suggestive of certain species of <i>Tocoyena</i> and <i>Randia</i> (viz. <i>T. guianensis</i> K. Schum., <i>R. ruiziana</i> DC., and <i>R. williamsii</i> Standl.). These are species of small trees or shrubs apparently adapted to the heavily shaded shrub layer of tropical, evergreen, rain forest."
410	2012. WRA Specialist. Personal Communication.	[Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)? Unknown]
411	1974. Simpson, D.R .. A new <i>Hintonia</i> (Rubiaceae) from Costa Rica. <i>Phytologia</i> . 29: 277-280.	[Climbing or smothering growth habit? No] "Tree 15 m. tall. Leaves elliptic to narrowly oblong 16.5- 18 cm. long, membranous to chartaceous." [Rubiaceae]
412	1993. Burger, W. (ed.). <i>Flora Costaricensis - Family #202 Rubiaceae</i> . <i>Fieldiana: Botany</i> . 33: 1-333.	[Forms dense thickets? No evidence from native range] "This species is known from only a few collections in lowland rain forest near Rincon de Osa at ca. 50 m elevation on the Osa Peninsula."
501	1974. Simpson, D.R .. A new <i>Hintonia</i> (Rubiaceae) from Costa Rica. <i>Phytologia</i> . 29: 277-280.	[Aquatic? No] "Tree 15 m. tall. Leaves elliptic to narrowly oblong 16.5- 18 cm. long, membranous to chartaceous." [Terrestrial]
502	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Grass? No] Rubiaceae
503	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). <a href="http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl">http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl</a>	[Nitrogen fixing woody plant? No] Rubiaceae
504	1974. Simpson, D.R .. A new <i>Hintonia</i> (Rubiaceae) from Costa Rica. <i>Phytologia</i> . 29: 277-280.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Tree 15 m. tall. Leaves elliptic to narrowly oblong 16.5- 18 cm. long, membranous to chartaceous."
601	1993. Burger, W. (ed.). <i>Flora Costaricensis - Family #202 Rubiaceae</i> . <i>Fieldiana: Botany</i> . 33: 1-333.	[Evidence of substantial reproductive failure in native habitat? Unknown] "This species is known from only a few collections in lowland rain forest near Rincon de Osa at ca. 50 m elevation on the Osa Peninsula. Flowering in January-February, with immature fruits in June and mature fruits in January."
602	1974. Simpson, D.R .. A new <i>Hintonia</i> (Rubiaceae) from Costa Rica. <i>Phytologia</i> . 29: 277-280.	[Produces viable seed? Presumably Yes] "fruiting pedicel 2.2 cm. long, angled by the continuation of the capsule ribs down the pedicel almost to the base; sepal lobes persistent in fruit, 3.4 cm. long, 1.5-2 mm. broad. Seeds attached horizontally, not winged, flattened, shield shaped (i.e. one surface convex, the opposite concave), irregularly circular or somewhat angled in outline, ca. 6 mm. across by 1.5-2.5 mm. thick; seed coat uniformly granular roughened, reddish brown in dried material."

602	2010. Jacob Uluwehi's photostream. <i>Osa pulchra</i> [Accessed 02 Sep 2012]. <a href="http://www.flickr.com/photos/morabeza79/4732565090/">http://www.flickr.com/photos/morabeza79/4732565090/</a>	[Produces viable seed? Viability poor in cultivation] "In the past two years I have sown 207 seeds with a rate of 16% successful germination. Of the 200 seed that I have distributed to 8 different botanical institutions, only 20 plants have resulted (10% success). Sprouts can take up to 2 months to push themselves out to a vertical position from the medium and at least an additional month to shed their seed coats. In addition to the 16% of my successful germinations, at least 4.5% sprouts failed to develop at a sustainable pace and slowly perished, perhaps due to the depressed gene pool."
602	2012. Lara, A.. Take a Walk with Me on the Rare Side!. The Tropical Dispatch. 39(1): 3-4.	[Produces viable seed? Viability poor in cultivation] "Unfortunately they do not propagate from cuttings, and because of inbreeding do not grow easily from seed."
603	1993. Burger, W. (ed.). Flora Costaricensis - Family #202 Rubiaceae. Fieldiana: Botany. 33: 1-333.	[Hybridizes naturally? Unknown] "A monotypic genus known only from the Osa Peninsula of Costa Rica. No other species of Costa Rican Rubiaceae has such large flowers. This genus is related to <i>Portlandia</i> and to a lesser extent to <i>Hintonia</i> ." [Unknown. Possibility of inter-generic hybridization]
604	2010. Jacob Uluwehi's photostream. <i>Osa pulchra</i> [Accessed 02 Sep 2012]. <a href="http://www.flickr.com/photos/morabeza79/4732565090/">http://www.flickr.com/photos/morabeza79/4732565090/</a>	[Self-compatible or apomictic? Possibly No] "Hand pollination must be carried out between two different clones because individual flowers are infertile. Gestation will take up to 11 months, upon which seeds must be sown with haste due to their limited window of viability."
604	2012. WRA Specialist. Personal Communication.	[Self-compatible or apomictic? Unknown] No information on breeding system
605	1974. Simpson, D.R .. A new <i>Hintonia</i> (Rubiaceae) from Costa Rica. Phytologia. 29: 277-280.	[Requires specialist pollinators? Unknown. Possibly] "Flower buds two at a node (i.e. borne singly in each leaf axil), but seemingly one of the two aborting; pedicel ca. 17. mm. long, bract1ess; receptacle glabrous; calyx lobes 5, narrowly linear or filiform, glabrous, 27- 30 mm. long , corolla white, trumpet shaped, ca. 27 cm. long, ca. 6 mm. wide below, 11 cm. wide at apex; stamens 5, included, anthers linear. 5-6 cm . long, ca. 0.7 mm. wide; style equaling the stamens, undivided; stigmatic surface ca. 3.5 cm. long by 1.5 cm. in diameter, oblong, base acute, apex rounded obtuse, glabrous longitudinally 5-nerved and 5-ribbed, the ribs and nerves alternating, nerves slightly raised in dried material, ribs subulate" ... "They produce only a few flowers at a time whose most striking features are the extremely long, tubular, white corollas, and often , the release of a strong fragrance in late evening. The combination of elongated corolla tube, light color, and very strong fragrance released in the evening are presumably adaptations to specialized pollinators, probably some of the species of lepidopterans that are most active at dusk ."
605	1993. Burger, W. (ed.). Flora Costaricensis - Family #202 Rubiaceae. Fieldiana: Botany. 33: 1-333.	[Requires specialist pollinators? Probably Yes] " <i>Osa pulchra</i> is distinguished by its very large trumpet-shaped flowers that are thin in texture. No other Costa Rican member of the Rubiaceae has so long a flower. The long narrow basal tube suggests pollination by a long-tongued sphingid moth. The flowers are reminiscent of those of ornamental species of <i>Brugmansia</i> (formerly included in <i>Datura</i> , <i>Solanaceae</i> )."
606	2012. Lara, A.. Take a Walk with Me on the Rare Side!. The Tropical Dispatch. 39(1): 3-4.	[Reproduction by vegetative fragmentation? Probably No] "Unfortunately they do not propagate from cuttings, and because of inbreeding do not grow easily from seed. A recent discovery of a population of this species in Panama may provide fresh genetic diversity that will enable horticulturists to successfully produce viable <i>Osa pulchra</i> seed."
607	2010. Jacob Uluwehi's photostream. <i>Osa pulchra</i> [Accessed 02 Sep 2012]. <a href="http://www.flickr.com/photos/morabeza79/4732565090/">http://www.flickr.com/photos/morabeza79/4732565090/</a>	[Minimum generative time (years)? 2+] "**Update July 2010. This seedling pictured bloomed for the 1st time at Lyon Arboretum recently with two flowers. So this bloomed in two years from seed, pretty good! Here is a picture of the same seedling 8 months prior, an example of how the growth rate for the species speeds up one it is past 10cm or so in height."
701	1993. Burger, W. (ed.). Flora Costaricensis - Family #202 Rubiaceae. Fieldiana: Botany. 33: 1-333.	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Probably No] "Fruits ca. 3 cm long and 1.5 cm broad, oblong ellipsoid, dark brown, the sepal lobes persisting but breaking off; seeds ca. 6 mm long, testa tuberculate." [Fruit & seeds lack means of external attachment, and seed viability may be low]
702	2012. Lara, A.. Take a Walk with Me on the Rare Side!. The Tropical Dispatch. 39(1): 3-4.	[Propagules dispersed intentionally by people? Yes. Ornamental potential] "Unusually large for the family, the pendulous flowers are fragrant, creamy-white, bell-shaped, and are dead-ringers for the flowers of the angel trumpet tree (a common ornamental in the tomato family). These unique and highly attractive characteristics make <i>Osa pulchra</i> a desirable candidate for future cultivation in greenhouses and tropical landscapes."

703	2012. Lara, A.. Take a Walk with Me on the Rare Side!. The Tropical Dispatch. 39(1): 3-4.	[Propagules likely to disperse as a produce contaminant? No evidence] "Unfortunately they do not propagate from cuttings, and because of inbreeding do not grow easily from seed." [Unlikely. Not grown with produce, and limited seed viability]
704	1974. Simpson, D.R .. A new <i>Hintonia</i> (Rubiaceae) from Costa Rica. Phytologia. 29: 277-280.	[Propagules adapted to wind dispersal? No. Wingless] "fruiting pedicel 2.2 cm. long, angled by the continuation of the capsule ribs down the pedicel almost to the base; sepal lobes persistent in fruit, 3.4 cm . long , 1.5-2 mm. broad. Seeds attached horizontally , not winged, flattened, shield shaped (i.e. one surface convex, the opposite concave), irregularly circular or somewhat angled in outline, ca . 6 mm. across by 1.5-2.5 mm. thick; seed coat uniformly granular roughened, reddish brown in dried material." ... "The exceptional features found in this species, and especially the wingless condition of the seeds, would perhaps be interpreted by some taxonomists as reason for proposing a new monotypic genus. It has not been uncommon for specialists in the Rubiaceae to use the distinction "winged vs. wingless seeds " as a criterion for distinguishing taxa at the generic level."
705	1993. Burger, W. (ed.). Flora Costaricensis - Family #202 Rubiaceae. Fieldiana: Botany. 33: 1-333.	[Propagules water dispersed? Fruit/seed buoyancy unknown] "Fruits ca. 3 cm long and 1.5 cm broad, oblong ellipsoid, dark brown, the sepal lobes persisting but breaking off; seeds ca. 6 mm long, testa tuberculate."
706	1993. Burger, W. (ed.). Flora Costaricensis - Family #202 Rubiaceae. Fieldiana: Botany. 33: 1-333.	[Propagules bird dispersed? Probably Not. Not fleshy-fruited] "Fruits thin-walled capsules, ellipsoid, with 6 longitudinal ribs, apparently opening septoidally, the calyx lobes persisting distally; seeds biseriate, slightly compressed, lacking wings, not imbricate, with persisting funicle." ... "Fruits ca. 3 cm long and 1.5 cm broad, oblong ellipsoid, dark brown, the sepal lobes persisting but breaking off; seeds ca. 6 mm long, testa tuberculate."
707	1993. Burger, W. (ed.). Flora Costaricensis - Family #202 Rubiaceae. Fieldiana: Botany. 33: 1-333.	[Propagules dispersed by other animals (externally)? Unknown, but unlikely given fruit morphology] "Fruits ca. 3 cm long and 1.5 cm broad, oblong ellipsoid, dark brown, the sepal lobes persisting but breaking off; seeds ca. 6 mm long, testa tuberculate."
708	1993. Burger, W. (ed.). Flora Costaricensis - Family #202 Rubiaceae. Fieldiana: Botany. 33: 1-333.	[Propagules survive passage through the gut? Unknown, but unlikely given fruit morphology] "Fruits ca. 3 cm long and 1.5 cm broad, oblong ellipsoid, dark brown, the sepal lobes persisting but breaking off; seeds ca. 6 mm long, testa tuberculate."
801	1974. Simpson, D.R .. A new <i>Hintonia</i> (Rubiaceae) from Costa Rica. Phytologia. 29: 277-280.	[Prolific seed production (>1000/m <sup>2</sup> )? No. Unlikely] "They produce only a few flowers at a time whose most striking features are the extremely long, tubular, white corollas, and often , the release of a strong fragrance in late evening. The combination of elongated corolla tube, light color, and very strong fragrance released in the evening are presumably adaptations to specialized pollinators, probably some of the species of lepidopterans that are most active at dusk ."
802	2008. Royal Botanic Gardens Kew. Seed Information Database (SID). Version 7.1. <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a>	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown] No storage information available
802	2010. Jacob Uluwehi's photostream. <i>Osa pulchra</i> [Accessed 02 Sep 2012]. <a href="http://www.flickr.com/photos/morabeza79/4732565090/">http://www.flickr.com/photos/morabeza79/4732565090/</a>	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown] "Gestation will take up to 11 months, upon which seeds must be sown with haste due to their limited window of viability." {Probably not given the personal observation of the author]
803	2012. WRA Specialist. Personal Communication.	[Well controlled by herbicides? Unknown] No information on herbicide efficacy or chemical control of this species.
804	2010. Jacob Uluwehi's photostream. <i>Osa pulchra</i> [Accessed 02 Sep 2012]. <a href="http://www.flickr.com/photos/morabeza79/4732565090/">http://www.flickr.com/photos/morabeza79/4732565090/</a>	[Tolerates, or benefits from, mutilation, cultivation, or fire? Possibly No] "Asexual propagation is possible but it exacts a sacrifice of the terminal stem. As with <i>Portlandia</i> , <i>Osa</i> have exhibited stubborn apical dominance, sometimes referred to as the 'conifer effect'."
805	2012. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown]

## **Summary of Risk Traits**

### **High Risk / Undesirable Traits**

- Thrives in tropical climates
- Shade tolerant
- Ecology and biology poorly understood. Unknown potential to exploit or become invasive in Hawaiian or other tropical island ecosystems

### **Low Risk / Desirable Traits**

- Rare in cultivation, but no evidence of naturalization or weediness reported
- Unarmed (No spines, thorns or burrs)
- Landscaping and ornamental value
- Showy flowers
- Low seed viability, possibly due to lowered genetic diversity and inbreeding depression (would limit ability to escape via seed production and dispersal)