Keywords: Naturalized, Tropical Tree, Edible Fruit, Self-compatible, Fleshy-fruited

Family: ***Myrtaceae***

Taxon: ***Syzygium samarangense***

Synonym: *Eugenia javanica Lam.*
Jambosa javanica (Lam.) K.Schum. & Lauterb
Myrtus samarangensis Blume
Eugenia samarangensis (Blume) O.Berg

Common Name: wax jambu
Semarang rose apple
Java apple

Questionaire : current 20090513 **Assessor:** Assessor **Designation:** L
Status: Assessor Approved **Data Entry Person:** Assessor **WRA Score 0**

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**	
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)**	**n**
305	**Congeneric weed**	**n=0, y = 1*multiplier (see Appendix 2)**	**y**
401	**Produces spines, thorns or burrs**	**y=1, n=0**	**n**
402	**Allelopathic**	**y=1, n=0**	**n**
403	**Parasitic**	**y=1, n=0**	**n**
404	**Unpalatable to grazing animals**	**y=1, n=-1**	**n**
405	**Toxic to animals**	**y=1, n=0**	**n**
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**	

410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**y=1, n=0**	**n**
411	**Climbing or smothering growth habit**	**y=1, n=0**	**n**
412	**Forms dense thickets**	**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**	**y=1, n=-1**	
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**	**n**
607	**Minimum generative time (years)**	**1 year = 1, 2 or 3 years = 0, 4+ years = -1**	**>3**
701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**y=1, n=-1**	**n**
702	**Propagules dispersed intentionally by people**	**y=1, n=-1**	**y**
703	**Propagules likely to disperse as a produce contaminant**	**y=1, n=-1**	**n**
704	**Propagules adapted to wind dispersal**	**y=1, n=-1**	**n**
705	**Propagules water dispersed**	**y=1, n=-1**	
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**	**n**
803	**Well controlled by herbicides**	**y=-1, n=1**	**y**
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** **0**

Supporting Data:

101	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 3, Fruits. Springer, New York	[Is the species highly domesticated? No] "Since the last two decades remarkable success has been achieved in the development of wax jambu varieties which are larger, firmer, crispier, juicier, better flavoured and mildly sweeter and have better handling and keeping qualities." [Assessment refers to the wild type]
102	2013. WRA Specialist. Personal Communication.	NA
103	2013. WRA Specialist. Personal Communication.	NA
201	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 3, Fruits. Springer, New York	[Species suited to tropical or subtropical climate(s) 2-High] "Java apple is indigenous in Bangladesh to the Solomon Islands."
202	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 3, Fruits. Springer, New York	[Quality of climate match data 2-High]
203	1987. Morton, J.. Fruits of warm climates - Java Apple (Syzygium samarangense). J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/java_apple.html [Accessed 26 Apr 2013]	[Broad climate suitability (environmental versatility)?] "The Java apple is extra tropical, growing only at the lower altitudes–up to 4,000 ft (1,220m)–in India. It does best in parts of the Philippines that have a long dry season." [Elevation range exceeds 1000 m in tropical climates, but unknown for subtropical latitudes]
203	2003. Llamas, K.A.. Tropical Flowering Plants. Timber Press, Portland, OR	[Broad climate suitability (environmental versatility)?] "zones 10-11"
204	1987. Morton, J.. Fruits of warm climates - Java Apple (Syzygium samarangense). J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/java_apple.html [Accessed 26 Apr 2013]	[Native or naturalized in regions with tropical or subtropical climates? Yes] "The tree is indigenous from Malaya to the Andaman and Nicobar Islands where there are wild trees in the coastal forests. It was introduced into the Philippines in prehistoric times and is widely grown throughout those islands."
204	2007. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). Flora of China. Vol. 13 (Clusiaceae through Araliaceae). Science Press and Missouri Botanical Garden Press, Beijing & St. Louis	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Cultivated in Fujian, Guangdong, Guangxi, Sichuan, Taiwan, and Yunnan [native to Indonesia, Malaysia, Papua New Guinea, and Thailand]."
205	1982. Amerson Jr, A.B./Whistler, W.A./Schwaner, T.D.. Wildlife and wildlife habitat of American Samoa. II. Accounts of flora and fauna. US Fish and Wildlife Service, Honolulu, HI	[Does the species have a history of repeated introductions outside its natural range? Yes] "Syzygium samarangense (Bl.) Merr. & Perry. Nonu vao (?): A small to medium-sized tree, occasional from the lowland to cloud forest. Found also in Fiji, Tonga, Niue, the Horne Islands, and elsewhere. It may be a recent introduction; it was not collected in Samoa until 193 1, but now it is fairly common and occurs on all the high islands of Samoa"
205	1987. Morton, J.. Fruits of warm climates - Java Apple (Syzygium samarangense). J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/java_apple.html [Accessed 26 Apr 2013]	[Does the species have a history of repeated introductions outside its natural range? Yes "It is common in Thailand, Cambodia, Laos, Vietnam and Taiwan, frequently cultivated in India and in Zanzibar and Pemba, but primarily as an ornamental, seldom for its fruits which are little valued. It was introduced into Jamaica before 1903 and also into Surinam and the islands of Curacao, Aruba and Bonaire. A few trees have been grown in Israel but have borne sparsely."
301	1998. Whistler, A.. A Study of the Rare Plants of American Samoa. US Fsh & Wildlife Service, Honolulu, HI	[Naturalized beyond native range? Yes] "Small to medium-sized tree common in coastal to montane forest, reported from 20 to 740 m elevation. Probably a modern introduction and naturalized as it is on Niue, native to Malaysia."
301	2006. Whistler, W.A./Elevitch, C.R.. Syzygium malaccense (Malay apple), ver. 2.1. In:Elevitch, C.R. (ed.). Species Profiles for Pacific Island Grogorestry. Permanent Agriculture Resources (PAR), Holualoa, HI http://www.traditionaltree.org/	[Naturalized beyond native range? Yes] "It is also similar to Syzygium samarangense, a tree sometimes cultivated in the Pacific and becoming naturalized in native forests."
301	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 3, Fruits. Springer, New York	[Naturalized beyond native range? Yes] "It has naturalized in the Philippines since prehistoric times."
302	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Garden/amenity/disturbance weed? No] No evidence
303	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Agricultural/forestry/horticultural weed? No] No evidence
304	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Environmental weed? No] No evidence

305	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Congeneric weed? Yes] "Syzygium jambos: It is invasive because it forms dense impenetrable thickets that expand rapidly. The dense canopies shade out almost all native species and lead to monospecific stands. The tree resprouts vigorously after damage."
401	1987. Morton, J.. Fruits of warm climates - Java Apple (Syzygium samarangense). J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/java_apple.html [Accessed 26 Apr 2013]	[Produces spines, thorns or burrs? No] "The tree, 16 to 50 ft (5-15 m) tall, has a short trunk 10 to 12 in (25-30 cm) thick, and open, widespreading crown, and pinkish gray, flaking bark. The opposite leaves are nearly sessile, elliptic-oblong, rounded or slightly cordate at the base; yellowish to dark bluish green; 4 to 10 in (10-25 cm) long and 2 to 4 3/4 in (5-12 cm) wide; very aromatic when crushed."
402	2003. Fujii, Y./Parvez, S. S./Parvez, M.M./Ohmae, Y./Iida, O.. Screening of 239 medicinal plant species for allelopathic activity using the sandwich method. Weed Biology and Management. 3: 233–241.	[Allelopathic? No] "Table 1. Screening of leaf litter of 239 medicinal plant species under different families using the sandwich method" [No significant inhibitory effects listed for Eugenia javanica]
403	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 3, Fruits. Springer, New York	[Parasitic? No] Myrtaceae
404	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Unpalatable to grazing animals? No. Presumably palatable based on palatability of related species] "It is a multipurpose tree which is highly valued for its edible fruits (also used medicinally), and as a fodder tree (foliage and seeds are both utilized)...susceptible to browsing" [Relative S. cumini is palatable to grazing animals]
405	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Toxic to animals? No] No evidence
406	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestree Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Host for recognized pests and pathogens? Unknown] "Pests and Diseases - There are no specific recommendations for crop protection, but the incidence of pests and diseases certainly warrants a study of the causal organisms and their control."
407	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestree Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Causes allergies or is otherwise toxic to humans? No] "Food: The tree is grown for their fruit, which substitute for one another in the marketplace. It is not easy to distinguish between the various S. aqueum and S. samarangense fruits. The ripe fruit is sweet and is mainly eaten fresh."
408	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestree Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Creates a fire hazard in natural ecosystems? No] "The trees are at home in fairly moist tropical lowlands up to 1200 m elevation." [No evidence, and unlikely given moist habitat]
409	2003. Llamas, K.A.. Tropical Flowering Plants. Timber Press, Portland, OR	[Is a shade tolerant plant at some stage of its life cycle?] "Full to part sun]
409	2013. Dave's Garden. PlantFiles: Java Apple, Java Rose Apple, Samarang Rose Apple, Water Apple, Wax Jambu, Wax Apple Syzygium samarangense. http://davesgarden.com/guides/pf/go/57647/ [Accessed 26 Apr 2013]	[Is a shade tolerant plant at some stage of its life cycle?] "Sun Exposure: Full Sun"
409	2013. Desert Tropicals. Java Apple, Makopa - Syzygium samarangense. Faucon, P., http://www.desert-tropicals.com/Plants/Myrtaceae/Syzygium_samarangense.html [Accessed 26 Apr 2013]	[Is a shade tolerant plant at some stage of its life cycle?] "Sun Exposure: Light shade to full sun"
410	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestree Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Tolerates a wide range of soil conditions? No] "Soil types: The trees prefer heavy soils and easy access to water instead of having to search for water in light deep soils."
411	2007. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). Flora of China. Vol. 13 (Clusiaceae through Araliaceae). Science Press and Missouri Botanical Garden Press, Beijing & St. Louis	[Climbing or smothering growth habit? No] "Trees, to 12 m tall."

412	2006. Seamon, J.O./Mann, S.S./Steele, O.C./Utzurrum, R.C.. Conservation Value of Remnant Forest Patches: Tree Composition, Spatial Patterns, and Recruitment in the Ottoville Lowland Forest, American Samoa. Pacific Science. 60(3): 319-332.	[Forms dense thickets? Not in American Samoa] "Second, the randomly distributed but relatively uncommon Syzygium samarangense may be at generally increased risk of local extinction (Boughton and Malvadkar 2002)."
412	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestree Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Forms dense thickets? No] No evidence
501	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestree Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Aquatic? No] "The trees are at home in fairly moist tropical lowlands up to 1200 m elevation. Wax jambu grows best in areas with a fairly long dry season. This does not mean that this species is drought-resistant."
502	2007. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). Flora of China. Vol. 13 (Clusiaceae through Araliaceae). Science Press and Missouri Botanical Garden Press, Beijing & St. Louis	[Grass? No] Myrtaceae
503	2007. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). Flora of China. Vol. 13 (Clusiaceae through Araliaceae). Science Press and Missouri Botanical Garden Press, Beijing & St. Louis	[Nitrogen fixing woody plant? No] Myrtaceae
504	2007. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). Flora of China. Vol. 13 (Clusiaceae through Araliaceae). Science Press and Missouri Botanical Garden Press, Beijing & St. Louis	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Branchlets compressed. Petiole less than 4 mm to sometimes nearly absent; leaf blade elliptic to oblong, 10–22 × 5–8 cm, thinly leathery, abaxially with numerous small glands, adaxially turning yellowish brown when dry, secondary veins 14–19 on each side of midvein, 6–10 mm apart, and at an angle of ca. 45° from midvein, reticule veins conspicuous, intramarginal veins ca. 5 mm from margin and an additional intramarginal vein ca. 1.5 mm from margin, base narrow, rounded, or slightly cordate, apex obtuse to slightly acute."
601	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestree Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Evidence of substantial reproductive failure in native habitat? No] No evidence
602	1987. Morton, J.. Fruits of warm climates - Java Apple (Syzygium samarangense). J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/java_apple.html [Accessed 26 Apr 2013]	[Produces viable seed? Yes] "The trees grow spontaneously from seed. Preferred types are reproduced by layering, budding onto their own rootstocks, or onto seedlings of S. densiflorum A. DC., (the beautiful Wild Rose Apple of Malaya, which has edible flowers, undesirable fruits, but is not attacked by termites). Sometimes the Java apple is grafted onto the cultivated Rose Apple (q.v.)."
603	1993. Hines, D.A. /Eckman , K.. Indigenous multipurpose trees of Tanzania: Uses and economic benefits for people. Food and Agriculture Organization (FAO), Ottawa, Ontario, Canada http://www.fao.org/docrep/x5327e/x5327e00.htm#Contents	[Hybridizes naturally? Unknown for S. samarangense] "Syzygium guineense" … "It has an ability to hybridize with other species in the genus, and is 'appallingly variable' (Dale and Greenway 1961)." [Evidence of hybridization in genus]
604	1994. Chantaranothai, P./Parnell, J.A.N.. The breeding biology of some Thai Syzygium species. Tropical Ecology. 35(2): 199-208.	[Self-compatible or apomictic? Yes] "Pollination experiments were carried out on S. samarangense cv. See-nak and S. jambos (both cultivated species), and S. megacarpum and S. formosum (both wild species). Three breeding systems were shown to occur: apomixis, inbreeding and outbreeding. Seed set via apomixis, autogamy and geitonogamy appeared to be enhanced by the act of pollination. All species studied were self compatible and self pollination is probably common. Only a small number of daytime floral visitors were noted. These were, in order of importance, yellow-bellied sunbirds (Nectarinia jugularis), honey bees (Apis cerana), ants (Oecophylla smaragdina and 2 unidentified species) and a butterfly (Lycaenidae)."
604	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestree Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Self-compatible or apomictic? Yes] "Wax jambu commonly flowers early or late in the dry season; the flowers appear to be self-compatible and the fruit ripens 30-40 days after anthesis."

605	2011. Suwannapong, G./Benbow, M.E./Nieh, J.C.. Biology of Thai honeybees: natural history and threats. Pp 1-98 in R.M. Florio (ed.). Bees: Biology, Threats and Colonies. Nova Science Publishers, Inc, Hauppauge, NY	[Requires specialist pollinators? No] "Table 4. Nectar, pollen and Nectar and pollen source plants of Thai honeybees" [Eugenia javanica (syn. Syzygium samarangense) visited, and presumably pollinated by honeybees]
606	2007. Peter, K.V. (e.d.). Underutilized and underexploited horticultural crops, Volume 2. New India Publishing, New Delhi, India	[Reproduction by vegetative fragmentation? No] "Propagation - By seeds and by cuttings." [No evidence]
607	1987. Morton, J.. Fruits of warm climates - Java Apple (Syzygium samarangense). J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/java_apple.html [Accessed 26 Apr 2013]	[Minimum generative time (years)? 4+] "The Java apple is a heavy bearer on good soil. When 5 years old it may yield a crop of 700 fruits."
607	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestree Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Minimum generative time (years)? 3+] "Shoot growth proceeds in flushes which are more or less synchronous, depending on the climate. The juvenile period lasts for 3-7 years. Bearing of clonal trees starts after 3-5 years."
701	2007. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). Flora of China. Vol. 13 (Clusiaceae through Araliaceae). Science Press and Missouri Botanical Garden Press, Beijing & St. Louis	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? No] "Fruit dark red, pyriform to conic, 4–5 cm, fleshy, glossy, apex impressed; persistent sepals fleshy. Seed 1." [Unlikely as fruits and seeds are relatively large and lack means of external attachment]
702	2008. Janick, J./Paull, R.E.. The Encyclopedia of Fruit & Nuts. Cabi Publishing, Wallingford, UK	[Propagules dispersed intentionally by people? Yes] "Primarily grown for its fruit."
703	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestree Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Propagules likely to disperse as a produce contaminant? No] "Fruit a berry, broadly pyriform, crowned by the fleshy calyx with incurved lobes, 3.5-5.5 cm x 4.5-5.5 cm, light red to white; flesh white spongy, juicy, aromatic, sweet-sour in taste. Seeds 0-2, mostly suppressed, globose, up to 8 mm in diameter." [No evidence, and relatively large seeds unlikely to become an inadvertent produce contaminant]
704	1987. Morton, J.. Fruits of warm climates - Java Apple (Syzygium samarangense). J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/java_apple.html [Accessed 26 Apr 2013]	[Propagules adapted to wind dispersal? No] "The waxy fruit, usually light-red, sometimes greenish-white or cream-colored, is pear shaped, narrow at the base, very broad, flattened, indented and adorned with the 4 fleshy calyx lobes at the apex; 1 1/3 to 2 in (3.4-5 cm) long, 1 3/4 to 2 1/8 in (4.5-5.4 cm) wide. The skin is very thin, the flesh white, spongy, dry to juicy, subacid and very bland in flavor. There may be 1 or 2 somewhat rounded seeds 3/16 to 5/16 in (0.5-0.8 cm) wide, or none."
705	1999. Jensen, M.. Trees Commonly Cultivated in Southeast Asia: An Illustrated Field Guide. 2nd Edition. FAO Regional Office for Asia and the Pacific, Bangkok, Thailand	[Propagules water dispersed? Unknown] "Belongs to fairly moist tropical lowlands up to 1,200 m altitude, preferring heavy soils and easy access to water, also during the dry season, often planted along streams and ponds." [May be moved by water if planted along streams]
705	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestree Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Propagules water dispersed? No] "The species require a reliable water supply and are often planted along streams or ponds."
706	2006. Whistler, W.A./Elevitch, C.R.. Syzygium malaccense (Malay apple), ver. 2.1. In:Elevitch, C.R. (ed.). Species Profiles for Pacific Island Grogorestry. Permanent Agriculture Resources (PAR), Holualoa, HI http://www.traditionaltree.org/	[Propagules bird dispersed? Yes] "Syzygium malaccense" … "In its native range, the seeds are probably dispersed by birds (particularly pigeons), who eat the fruit, and also by fruit bats. Where suitable dispersers are absent, the tree disperses poorly, probably not spreading far from the parent tree…" [Probably applies to S. samarangense, which has similar sized fruit (4-5 cm) but smaller seeds (0.5cm, rounded)]
707	2007. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). Flora of China. Vol. 13 (Clusiaceae through Araliaceae). Science Press and Missouri Botanical Garden Press, Beijing & St. Louis	[Propagules dispersed by other animals (externally)? No] "Fruit dark red, pyriform to conic, 4–5 cm, fleshy, glossy, apex impressed; persistent sepals fleshy. Seed 1." [Unlikely, as fruits and seeds lack means of external attachment]
707	2013. WRA Specialist. Personal Communication.	Propagules dispersed by other animals (externally) No] Unlikely, but in areas with fruit bats, fruits may be carried away and the seed discarded without being internally dispersed. It may be possible that rodents and mongoose could also carry fruit without consuming seeds.
708	2006. Whistler, W.A./Elevitch, C.R.. Syzygium malaccense (Malay apple), ver. 2.1. In:Elevitch, C.R. (ed.). Species Profiles for Pacific Island Grogorestry. Permanent Agriculture Resources (PAR), Holualoa, HI http://www.traditionaltree.org/	[Propagules survive passage through the gut? Probably Yes] "Syzygium malaccense" … "Many birds enjoy eating the ripe fruit, both on the tree and after falling to the ground. Pigs most certainly will eat fallen fruit." [Probably applies to S. samarangense, which has similar sized fruit (4-5 cm) but smaller seeds (0.5cm, rounded)]

708	2009. Nakamoto, A./Kinjo, K./Izawa, M.. The role of Orii's flying-fox (Pteropus dasymallus inopinatus) as a pollinator and a seed disperser on Okinawa-jima Island, the Ryukyu Archipelago, Japan.. Ecological research. 24(2): 405-414.	[Propagules survive passage through the gut? Possibly] "Table 2 Dispersal types of seeds and characteristics of fruits used by Orii's flying-foxes on Okinawa-jima Island" [Seeds of Syzygium samarangense are reported as being "dropped" by flying-foxes, suggesting that they are not internally dispersed by them]
801	2001. Hanelt, P. (ed.). Mansfeld's encyclopedia of agricultural and horticultural crops: (except ornamentals). Vol. 1. Springer-Verlag, Berlin, Heidelberg, New York	[Prolific seed production (>1000/m2)? No] "…the juicy, often seedless ripe fruits are suitable for eating out-of hand or for stewing with sugar."
801	2008. Janick, J./Paull, R.E.. The Encyclopedia of Fruit & Nuts. Cabi Publishing, Wallingford, UK	[Prolific seed production (>1000/m2)? No] "There may be one or two somewhat rounded seeds 0.5 cm wide, or none." [Fruits and seeds relatively large, and fruits often few or no seeded]
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)? No] "Storage Conditions: Seeds lose viability quickly"
802	2013. World Agroforestry Centre. Agroforestry tree database - Syzygium samarangense. PROSEA, http://www.worldagroforestrycentre.org/sea/products/afdbases/af/asp/SpeciesInfo.asp?SpID=18099 [Accessed 26 Apr 2013]	[Evidence that a persistent propagule bank is formed (>1 yr)? No] "Propagation from seed is common. Seeds are sometimes abortive, and some wax jambus tend to be seedless. Seeds lose their viability quickly and should be sown fresh from the fruit."
803	2003. Motooka, P./Castro, L./Nelson, D./Nagai, G./Ching,L.. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI http://www.ctahr.hawaii.edu/invweed/weedsHi.html	[Well controlled by herbicides? Presumably Yes]. "Sensitive to picloram applied cut surface and to glyphosate applied to drilled holes. Good control with triclopyr applied basal bark and cut-surface(30)." [Herbicides effective on related invasive species S. jambos, so would likely also be effective on non invasive relatives]
803	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Well controlled by herbicides? Presumably Yes] "Syzygium cumini" … "Seedlings and saplings can be removed manually. Larger trees are cut and the cut stumps treated with herbicide to prevent regrowth." [Herbicides effective on related invasive species S. cumini, so would likely also be effective on non-invasive relatives]
804	2013. WRA Specialist. Personal Communication.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Unknown] Other Syzygium species are able to resprout or coppice
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

- Naturalized in several places
- Thrives in tropical climates
- Related Syzygium species are invasive
- Self-compatible
- Seeds dispersed by birds in certain areas, frugivorous mammals and people

Low Risk / Desirable Traits

- Despite ability to spread, no negative impacts have been documented
- Unarmed
- Non-toxic
- Edible fruit
- Landscaping and ornamental value
- Not able to spread vegetativel
- Reaches maturity in 3-7 years
- Relatively large seeds unlikely to be accidentally dispersed
- Fruits often seedless
- Seeds will not form a persistent seed bank