

Key Words: Evaluate, Possibly Naturalized, Spiny Tree, Edible Fruit, Mammal-dispersed

Family: Rutaceae

Taxon: *Aegle marmelos*

Synonym: *Crateva marmelos* L. (basionym)
Belou marmelos (L.) A. Lyons

Common Name: bael
Bengal quince
golden apple
Indian baelfruit

Questionnaire : current 20090513 **Assessor:** Chuck Chimera **Designation:** EVALUATE
Status: Assessor Approved **Data Entry Person:** Assessor **WRA Score** 4

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	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	
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	y
402	Allelopathic	y=1, n=0	
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	
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	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	y
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	
707	Propagules dispersed by other animals (externally)	y=1, n=-1	
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	
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 4

Supporting Data:

101	1979. Roy, S.K./Singh, R.N.. Bael Fruit (Aegle marmelos): A Potential Fruit for Processing. Economic Botany. 33(2): 203-212.	[Is the species highly domesticated? No. Assessment is for wild type, but certain cultivars may be highly domesticated] "History.-The bael fruit has been known in India from prehistoric times. The leaves of the tree are traditionally used as sacred offerings to "Lord Siva," according to Hindu customs." ... "Cultivars.-There are no standardized names of bael fruit cultivars. They are named for the names of the locality where they are most easily available. Reports on the cultivars available so far are mainly from the Uttar Pradesh and Bihar States of India (Singh, 1961; Teatota et al., 1963; Jauhari et al., 1969; Jauhari & Singh, 1971). Yield per tree, weight of fruit, number of seeds per fruit, thickness of rind, total soluble solids, total sugars, and vitamin C of bael fruit varied from 200 to 400, 1,283 to 2,818 g, 74 to 207, 0.16 to 0.28 cm, 28 to 36 percent, 11.74 to 16.89 percent and 13.4 to 22.7 mg/100 g, respectively."
102	2012. WRA Specialist. Personal Communication.	NA
103	2012. WRA Specialist. Personal Communication.	NA
201	1979. Roy, S.K./Singh, R.N.. Bael Fruit (Aegle marmelos): A Potential Fruit for Processing. Economic Botany. 33(2): 203-212.	[Species suited to tropical or subtropical climate(s) 2-High] "Bael fruit (Aegle marmelos Correa, Rutaceae) is an indigenous fruit of India. It grows throughout the Indian Peninsula as well as in Sri Lanka, Pakistan, Bangladesh, Burma, Thailand and most of the southeastern Asian countries. It is a very hardy subtropical,..."
202	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Quality of climate match data 2-High] "Native: ASIA-TROPICAL Indian Subcontinent: India - Andhra Pradesh, Bihar, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal; Nepal North Indian Ocean: India - Andaman and Nicobar Indo-China: Myanmar"
203	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Broad climate suitability (environmental versatility)? Yes] "A. marmelos is a small to medium-size deciduous tree, 10-15 m tall and 25-50 cm in diameter. It is found wild throughout most of India and adjacent countries and can tolerate harsh conditions, including a very wide temperature range." ..."- Altitude range: 0 - 1200 m - Mean annual rainfall: 500 - 4000 mm - Rainfall regime: summer; winter; bimodal; uniform - Dry season duration: 0 - 8 months - Mean annual temperature: 13 - 32°C - Mean maximum temperature of hottest month: 30 - 43°C - Mean minimum temperature of coldest month: 4 - 22°C - Absolute minimum temperature: -1 - 22°C"
204	1979. Roy, S.K./Singh, R.N.. Bael Fruit (Aegle marmelos): A Potential Fruit for Processing. Economic Botany. 33(2): 203-212.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Bael fruit (Aegle marmelos Correa, Rutaceae) is an indigenous fruit of India. It grows throughout the Indian Peninsula as well as in Sri Lanka, Pakistan, Bangladesh, Burma, Thailand and most of the southeastern Asian countries. It is a very hardy subtropical, deciduous tree that can thrive well in various soil-climatic conditions (from swampy to dry soils) and can tolerate alkaline soil, and is not injured by temperatures as low as -7°C."
205	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Does the species have a history of repeated introductions outside its natural range? Yes] "[Indonesia] Java planted; [Malaysia] Peninsular Malaysia planted; Myanmar natural; Nepal planted; Pakistan Philippines planted; Sri Lanka natural; Thailand planted"
205	2008. Wu, Z.Y./Raven,P.H./Hong, D.Y. (eds.). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Does the species have a history of repeated introductions outside its natural range? China] "Cultivated in forests on slightly dry hillsides; 600-1000 m. S and SW Yunnan [native to India]."
205	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. Agroforestry Database:a tree reference and selection guide version 4.0. World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Does the species have a history of repeated introductions outside its natural range? Yes] "Exotic: Bangladesh, Egypt, Malaysia, Myanmar, Pakistan, Sri Lanka, Thailand"
301	2007. Newman, M./Ketphanh, S./Svengsuksa, B./Thomas, P./Sengdala, K./Lamxay, V./Armstrong, K.. A Checklist of the Vascular Plants of Lao PDR. Royal Botanic Garden Edinburgh, Edinburgh, UK	[Naturalized beyond native range? Possibly Lao] "Table 4. Introduced, cultivated or naturalized taxa recorded on the checklist." [Status is Lao unspecified]

301	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Naturalized beyond native range? Possibly Pohnpei, but unable to confirm status]
302	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Garden/amenity/disturbance weed? 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 evidence]
304	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Environmental weed? No evidence]
305	2012. Randall, R.P.. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Congeneric weed? No evidence]
401	2008. Janick, J./Paull, R.E.. The Encyclopedia of Fruit & Nuts. Cabi Publishing, Wallingford, UK	[Produces spines, thorns or burrs? Yes] "Mature branches may or may not be spiny (1-2 cm long); young suckers are spiny."
401	2008. Wu, Z.Y./Raven,P.H./Hong, D.Y. (eds.). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Produces spines, thorns or burrs? Yes] "Trees, deciduous, with straight axillary spines." ... "Trees to 10 m tall; spines to 3 cm. Leaflet blades ovate to elliptic, 4–12 x 2–6 cm, base rounded to narrowly cuneate, margin crenulate, apex acuminate or sometimes acute."
402	2008. Thapaliyal, S./Bali, R.S./Singh & N. P. Todaria. Allelopathic Effects of Tree of Economic Importance on Germination and Growth of Food Crops. Journal of Herbs, Spices & Medicinal Plants. 13(4): 11-23.	[Allelopathic? Possibly. Unknown from field conditions] "The allelopathic effect of Aegle marmelos leaf and bark might be due to the presence of alkaloids aegeline, condensed tannins, phlobatannins, flavonoid, glycosides, skimmianine, and α -sterosterol (3)." ... "Results of the present investigation demonstrate that the tested tree species have allelopathic potential and contain water-soluble substances. The effect is dependent on concentration of the leachate in water as inhibitory effects were noted at higher concentrations and stimulatory effects were noted at lower concentrations (16). Of these tree crops as agroforestry tree species, the most valuable is S. mukorossi followed by A. marmelos, T. chebula, and T. bellirica."
403	2008. Wu, Z.Y./Raven,P.H./Hong, D.Y. (eds.). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Parasitic? No] "Trees to 10 m tall; spines to 3 cm. Leaflet blades ovate to elliptic, 4–12 x 2–6 cm, base rounded to narrowly cuneate, margin crenulate, apex acuminate or sometimes acute." [Rutaceae]
404	1997. Mandal, L.. Nutritive values of tree leaves of some tropical species for goats. Small Ruminant Research. 24(2): 95-105.	[Unpalatable to grazing animals? No] "Aegle marmelos Correa. is a good fodder tree and it is a native of North India in the sub Himalayan tract and grows as a forest tree in northern dry mixed deciduous forests, dry plains, sal forests and Aegle forests."
404	1998. Sahni, K.C.. The Book of Indian Trees. Bombay Natural History Society & Oxford University Press, Oxford, UK	[Unpalatable to grazing animals? No] "The leaves are good fodder and the wood is used in agricultural implements."
405	1997. Mandal, L.. Nutritive values of tree leaves of some tropical species for goats. Small Ruminant Research. 24(2): 95-105.	[Toxic to animals? No evidence] "Aegle marmelos Correa. is a good fodder tree and it is a native of North India in the sub Himalayan tract and grows as a forest tree in northern dry mixed deciduous forests, dry plains, sal forests and Aegle forests."
405	2007. Veerappana, A./Miyazaki, S./Kadarkaraisamy, M./Ranganathan, D.. Acute and subacute toxicity studies of Aegle marmelos Corr., an Indian medicinal plant. Phytomedicine. 14: 209–215.	[Toxic to animals? Not acutely toxic to rats] "Intraperitoneal administration of the extracts of the leaves of A. marmelos at doses of 50, 70, 90 and 100 mg/kg body wt for 14 consecutive days to male and female Wistar rats did not induce any short-term toxicity. Collectively, these data demonstrate that the extracts of the leaves of A. marmelos have a high margin of drug safety."
406	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Host for recognized pests and pathogens?] "An allelopathic effect of leaf and bark extracts of A. marmelos, T. chebula, T. bellirica and S. mukorossi on seed germination of the test crops was observed" ... "Pests recorded Insects: Aonidiella orientalis (oriental yellow scale) Bactrocera caryae Bactrocera dorsalis (Oriental fruit fly) Bactrocera tryoni (Queensland fruit fly) Bactrocera zonata (guava fruit fly) Myllocerus undecimpustulatus Psorosticha zizyphi (citrus leafroller) Fungus diseases: Alternaria alternata (alternaria leaf spot) Aspergillus niger (collar rot)"
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? No evidence] "The bael fruit seems to be relatively free from pests and diseases except for the fungi causing deterioration in storage."

407	1979. Roy, S.K./Singh, R.N.. Bael Fruit (<i>Aegle marmelos</i>): A Potential Fruit for Processing. <i>Economic Botany</i> . 33(2): 203-212.	[Causes allergies or is otherwise toxic to humans? No evidence] "It appears that bael fruit is one of the most nutritious fruits of India; its therapeutic and medicinal properties have long been known."
407	2007. Veerappana, A./Miyazaki, S./Kadarkaraisamy, M./Ranganathan, D.. Acute and subacute toxicity studies of <i>Aegle marmelos</i> Corr., an Indian medicinal plant. <i>Phytomedicine</i> . 14: 209–215.	[Causes allergies or is otherwise toxic to humans? No evidence of acute toxicity] "Although several pharmacological studies have been carried out with this plant, there is no experimental evidence on its toxicity. Hence, in the present study, we planned to evaluate its toxicity effects."
407	2009. Orwa, C./Mutua, A./Kindt, R./Jamnadass, R./Simons, A.. <i>Agroforestry Database: a tree reference and selection guide version 4.0</i> . World Agroforestry Centre, (http://www.worldagroforestry.org/af/treedb/)	[Causes allergies or is otherwise toxic to humans? Possible] "Poison: The leaves are said to cause abortion and sterility in women. The bark is used as a fish poison in the Celebes. Tannin, ingested frequently and in quantity over a long period of time, is antinutrient and carcinogenic. Leaf extract from <i>A. marmelos</i> has been found to have insecticidal activity against the brown plant hopper (<i>Nilaparvata lugens</i> Stål), an important pest of rice plant in Asia."
408	2007. Saxena, A./Srivastava, P.. Integrating biophysical characters, microclimate and human factors in forest fire risk modeling. In: <i>Proceedings of 4th international wildland fire conference</i> , Seville, Spain.	[Creates a fire hazard in natural ecosystems?] "Fire is among the most dangerous threats to the forest ecosystem. In India 90 percent forest fires are estimated to be man made. About 3.73 million hectare forest area is affected by fires leading to a loss of Rs 440 crores annually. A fire risk model has been developed for Dholkhand Range of Rajaji National Park (India) by combining the weather data, fuel conditions and human activity within the area of study." [No evidence that <i>A. marmelos</i> increases fire risk itself, but this tree is a component of a fire-prone ecosystem]
409	2005. CAB International. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Is a shade tolerant plant at some stage of its life cycle? Yes] "- Tolerates drought; shade; frost"
409	2006. Khurana, E./Sagar, R./Singh, J.S.. Seed size: a key trait determining species distribution and diversity of dry tropical forest in northern India. <i>Acta Oecologica</i> . 29: 196 -204.	[Is a shade tolerant plant at some stage of its life cycle? Yes] "Shade tolerance" ... "MT = moderate tolerance"
410	1979. Roy, S.K./Singh, R.N.. Bael Fruit (<i>Aegle marmelos</i>): A Potential Fruit for Processing. <i>Economic Botany</i> . 33(2): 203-212.	[Tolerates a wide range of soil conditions? Yes] "It is a very hardy subtropical, deciduous tree that can thrive well in various soil-climatic conditions (from swampy to dry soils) and can tolerate alkaline soil, and is not injured by temperatures as low as -7°C."
410	2005. CAB International. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Tolerates a wide range of soil conditions? Yes] "It grows on swampy land as well as dry soils, and can tolerate alkalinity."
411	2008. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). <i>Flora of China</i> . Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Climbing or smothering growth habit? No] "Trees to 10 m tall; spines to 3 cm."
412	2001. Saha, S.. Vegetation composition and structure of <i>Tectona grandis</i> (teak, Family Verbanaceae) plantations and dry deciduous forests in central India. <i>Forest Ecology and Management</i> . 148(1–3): 159–167.	[Forms dense thickets? No evidence] "Table 1. Abundance, basal area, and mode of seed dispersal of species found in plantations and secondary forests" [<i>Aegle marmelos</i> - Adults/ha = 23; Seedlings/ha = 489]
412	2005. CAB International. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Forms dense thickets? No evidence]
501	2008. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). <i>Flora of China</i> . Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Aquatic? No] "Cultivated in forests on slightly dry hillsides; 600–1000 m. S and SW Yunnan [native to India]."
502	2008. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). <i>Flora of China</i> . Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Grass? No] Rutaceae
503	2008. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). <i>Flora of China</i> . Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Nitrogen fixing woody plant? No] Rutaceae
504	2005. CAB International. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] " <i>A. marmelos</i> is a small to medium-size deciduous tree, 10-15 m tall and 25-50 cm in diameter. "
601	2005. CAB International. <i>Forestry Compendium</i> . CAB International, Wallingford, UK	[Evidence of substantial reproductive failure in native habitat? No evidence]

602	1979. Roy, S.K./Singh, R.N.. Bael Fruit (Aegle marmelos): A Potential Fruit for Processing. Economic Botany. 33(2): 203-212.	[Produces viable seed? Yes] "Bael fruit is usually propagated by seeds which are sown in June; seedlings are transplanted a year later."
602	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Produces viable seed? Yes] "Its germination is hypogeous and seedling development is very slow. "
603	2011. Singhal, V.K./Salwan, A./Kumar, P./Kaur, J.. Phenology, pollination and breeding system of Aegle marmelos (Linn.) correa (Rutaceae) from India. New Forests. 42: 85–100.	[Hybridizes naturally? Unknown]
604	2008. Wu, Z.Y./Raven,P.H./Hong, D.Y. (eds.). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Self-compatible or apomictic?] "Flowers bisexual, fragrant."
604	2011. Singhal, V.K./Salwan, A./Kumar, P./Kaur, J.. Phenology, pollination and breeding system of Aegle marmelos (Linn.) correa (Rutaceae) from India. New Forests. 42: 85–100.	[Self-compatible or apomictic? Yes] "Levels of fruit set following open pollination was quite high and is reduced considerably following hand pollination probably due to some injury caused to stigma during experiments. In spite of synchronous nature of anther dehiscence and stigmatic receptivity, selfing in a flower was avoided due to herkogamy. Some selfing, however, occurred through geitonogamous mode as bagging of panicles yielded 12.21 ± 0.99 to 14.12 ± 0.91% fruit set."
605	2008. Wu, Z.Y./Raven,P.H./Hong, D.Y. (eds.). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Requires specialist pollinators?] "Flowers bisexual, fragrant. Calyx cup shaped, 4- or 5-lobed. Petals 4 or 5, imbricate in bud. Stamens 30–50 or more; filaments short, subulate, distinct or irregularly coherent at base; anthers linear-lanceolate. Disk columnar or bell-shaped. Gynoecium 8–20-loculed, syncarpous; ovules many per locule, in 2 rows style short and thick; stigma capitate, cylindrical, or bluntly conic, longitudinally grooved."
605	2011. Singhal, V.K./Salwan, A./Kumar, P./Kaur, J.. Phenology, pollination and breeding system of Aegle marmelos (Linn.) correa (Rutaceae) from India. New Forests. 42: 85–100.	[Requires specialist pollinators? No] "The species suited to insect and wind mode of pollination. High amount of air borne pollen grains deposited on glycerine smeared glass microscopic slides suggested towards the wind mode of pollination. Though flowers are dull coloured a variety of insects visited the flowers due to sweet fragrance and stamen/pollen as food reward. Among insect pollinators, honey bee (<i>Apis dorsata</i>) was the major and legitimate pollinator while the rest were either minor pollinators or mere visitors."
606	1997. Mandal, L.. Nutritive values of tree leaves of some tropical species for goats. Small Ruminant Research. 24(2): 95-105.	[Reproduction by vegetative fragmentation? Yes] "Natural reproduction is mainly through coppice and root suckers."
606	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Reproduction by vegetative fragmentation? Yes] "It can be propagated vegetatively by root suckers or through budding." ... "- Ability to sucker; regenerate rapidly; coppice"
607	1979. Roy, S.K./Singh, R.N.. Bael Fruit (Aegle marmelos): A Potential Fruit for Processing. Economic Botany. 33(2): 203-212.	[Minimum generative time (years)? 5+] "In vegetatively propagated plants, fruiting begins after five years, and full bearing can be attained in about 15 years. Seedlings take a longer time to commence fruiting."
607	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Minimum generative time (years)? 5+] "It starts fruiting about the age of 5 years and is generally at its best in the 10th year."
701	2008. Wu, Z.Y./Raven,P.H./Hong, D.Y. (eds.). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? No] "Fruit greenish yellow, 10–12 × 6–8 cm; mesocarp ca. 3 mm thick. Seeds ca. 8 mm." [Fruits/seeds lack means of external attachment]
702	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Propagules dispersed intentionally by people? Yes] "Almost every part of the tree is useful. A. marmelos is recognized as one of the sacred trees of India, the leaves being considered indispensable for Saivite Hindu worship."
703	2008. Wu, Z.Y./Raven,P.H./Hong, D.Y. (eds.). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Propagules likely to disperse as a produce contaminant? No evidence] "Fruit greenish yellow, 10–12 × 6–8 cm; mesocarp ca. 3 mm thick. Seeds ca. 8 mm." [Fruit too large, and seeds relatively large, to become a produce contaminant]
704	2008. Wu, Z.Y./Raven,P.H./Hong, D.Y. (eds.). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Propagules adapted to wind dispersal? No] "Fruit a berry, globose to ellipsoid to pyriform; exocarp thin, parenchymatous; mesocarp woody; endocarp fleshy, soft and pulpy, becoming hard and reddish orange when dry, composed largely of elongate sessile pulp vesicles which are lacking within seed locules. Seeds depressed ovoid, woolly when ripe, embedded in a clear glutinous substance that becomes hard when dry; seed coat fleshy"

705	1991. Dhungel, S.K./O'Gara, B.W.. Ecology of the Hog Deer in Royal Chitwan National Park, Nepal. Wildlife Monographs. 119: 3-40.	[Propagules water dispersed? Possibly based on distribution] "Species such as <i>Ficus glomerata</i> , <i>Aegle marmelos</i> , <i>Mallotua philippinensis</i> , and <i>Macaranga denticulata</i> grow in patches along the water courses and moist areas within the Park."
705	2005. Jha, S.. Comparative Analysis of the Flora of Morang District and Adjoining Areas of Nepal. Our Nature. 3: 63-68.	[Propagules water dispersed? Possibly based on distribution] "...riverine forest on old alluvial deposits is mainly composed of <i>Acacia catechu</i> , <i>Adina cordifolia</i> , <i>Aegle marmelos</i> , <i>Salmalia malabarica</i> , <i>Syzygium cumini</i> , <i>Terminalia alata</i> , <i>Trewia nudiflora</i> , etc."
706	2006. Khurana, E./Sagar, R./Singh, J.S.. Seed size: a key trait determining species distribution and diversity of dry tropical forest in northern India. Acta Oecologica. 29: 196 -204.	[Propagules bird dispersed? Possibly] "Table 1 – Seed weight, abundance, dispersal mode and shade tolerance of dry forest tree species of India. Seeds of some species are known to be dispersed both by birds and mammals. Here we have taken only the predominant mode for each species." [Aegle marmelos - Predominant dispersal mode = M = mammal-dispersed]
706	2008. Wu, Z.Y./Raven,P.H./Hong, D.Y. (eds.). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Propagules bird dispersed? Seeds inside fleshy fruit may be bird dispersed] "Fruit greenish yellow, 10–12 × 6–8 cm; mesocarp ca. 3 mm thick. Seeds ca. 8 mm."
707	2001. Saha, S.. Vegetation composition and structure of <i>Tectona grandis</i> (teak, Family Verbanaceae) plantations and dry deciduous forests in central India. Forest Ecology and Management. 148(1–3): 159–167.	[Propagules dispersed by other animals (externally)? Large fruit may possibly be carried externally by frugivorous birds or mammals] "Table 1. Abundance, basal area, and mode of seed dispersal of species found in plantations and secondary forests" [Aegle marmelos - Dispersal mode = Animal+gravity]
708	1998. Corlett, R.T.. Frugivory and seed dispersal by vertebrates in the Oriental (Indomalayan) Region. Biological Reviews. 73: 413-448.	[Propagules survive passage through the gut? Presumably Yes] "The Dhole, <i>Cuon alpinus</i> , seems to be the least frugivorous of Asian canids, but Cohen et al. (1978) found one scat in 150 examined to be composed entirely of <i>Zizyphus jujuba</i> and Shrestha (1997) says that it takes fallen fruit of <i>Aegle marmelos</i> in Nepal."
708	1998. Sahni, K.C.. The Book of Indian Trees. Bombay Natural History Society & Oxford University Press, Oxford, UK	[Propagules survive passage through the gut? Yes] "The fruit is broken open by deer, pigs, monkeys and possibly bears which eat the pulp. In this way the seeds get dispersed."
708	2008. Campos-Arceiz, A./Htun, T.Z.L.W./Takatsuki, S./Leimgruber, P.. Working with mahouts to explore the diet of work elephants in Myanmar (Burma). Ecological Research. 23: 1057–1064.	[Propagules survive passage through the gut? Yes] "Elephants consumed the fruits of 29 species" ... "For the following seven tree species, the fruit was the only partly consumed by elephants: <i>Aegle marmelos</i> (L.) Correa; <i>Samanea saman</i> (Jacq.) Merr.; <i>Cassia fistula</i> L.; <i>Diospyros</i> sp.; <i>Heritiera fomes</i> Buch.-Ham.; <i>Mangifera indica</i> L.; and <i>Mischocarpus pentapetalus</i> (Roxb.) Radlk. The seeds or fruit remains of <i>A. marmelos</i> ; <i>S. saman</i> ; <i>Bauhinia malabarica</i> Roxb.; <i>Cordia grandis</i> Roxb.; <i>Ficus glomerata</i> Roxb.; <i>F. cunia</i> Buch.-Ham.; <i>M. indica</i> ; and one unidentified herbaceous species were found in elephant dung. Seedlings of <i>A. marmelos</i> ; <i>S. saman</i> ; <i>Amaranthus spinosus</i> L.; <i>Mimosa pudica</i> L.; and at least six nonidentified plant species were found emerging from elephant dung piles."
708	2012. WRA Specialist. Personal Communication.	[Propagules survive passage through the gut?] Feral pigs may potentially consume fruit & disperse seeds in the Hawaiian Islands & other locations with pigs or omnivorous and frugivorous mammals.
801	2011. Singhal, V.K./Salwan, A./Kumar, P./Kaur, J.. Phenology, pollination and breeding system of <i>Aegle marmelos</i> (Linn.) correa (Rutaceae) from India. New Forests. 42: 85–100.	[Prolific seed production (>1000/m ²)? Unlikely] "In spite of high fruit/ seed set, natural regeneration through seeds was poor as fallen fruits were destroyed by fungal pathogens and white ants."
802	1997. Mandal, L.. Nutritive values of tree leaves of some tropical species for goats. Small Ruminant Research. 24(2): 95-105.	[Evidence that a persistent propagule bank is formed (>1 yr)? No] "The seeds have no dormancy and start germinating when provided with favourable conditions."
802	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Evidence that a persistent propagule bank is formed (>1 yr)? Possibly No] "- Seed storage recalcitrant"
802	2008. Janick, J./Paull, R.E.. The Encyclopedia of Fruit & Nuts. Cabi Publishing, Wallingford, UK	[Evidence that a persistent propagule bank is formed (>1 yr)? No] "Seeds are recalcitrant and should be sown soon after extraction from the pulp."
803	2012. WRA Specialist. Personal Communication.	[Well controlled by herbicides? Unknown] No information on herbicide efficacy or chemical control of this species
804	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] "- Ability to sucker; regenerate rapidly; coppice"
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

- Possibly naturalized in Lao, Pohnpei and maybe elsewhere
- Thrives in tropical climates
- Environmentally versatile
- Young suckers are spiny
- Potentially allelopathic
- Shade tolerant
- Tolerates many soil conditions (and potentially able to exploit many different habitat types)
- Self-compatible
- Seeds dispersed by mammals, people and possibly birds
- Able to coppice and sprout from root suckers

Low Risk / Desirable Traits

- Despite potential to spread, no negative impacts have been documented
- Fodder tree
- Edible fruit
- Reaches maturity in 5 or more years
- Landscaping and ornamental value
- Medicinal uses
- Seeds will not persist in the soil