

Family: *Salicaceae*

Taxon: *Flacourtia indica*

Synonym: *Flacourtia ramontchi* L'Hér.
Flacourtia sepiaria Roxb.
Gmelina indica Burm. f. (basionym)

Common Name: batoko plum
governor's plum
Indian plum
Madagascar plum
ramontchi

Questionnaire :	current 20090513	Assessor:	Chuck Chimera	Designation: H(HPWRA)
Status:	Assessor Approved	Data Entry Person:	Chuck Chimera	WRA Score 12
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	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)	y
305	Congeneric weed		n=0, y = 1*multiplier (see Appendix 2)	y
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	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	n

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	y
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	
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	
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	
803	Well controlled by herbicides	y=-1, n=1	y
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: H(HPWRA)		WRA Score	12

Supporting Data:

101	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	[Is the species highly domesticated? No evidence] "The taxonomy of <i>Flacourtia indica</i> is complex. Some authors have treated the species in a broad sense, and include in synonymy not only <i>F. ramontchi</i> (see below) but also several other entities found across tropical Asia and Africa. For an introduction to the problem, see Matthew (Fl. Tamilnadu Carnatic 3(1): 59–61. 1983), Mitra (in Sharma et al., Fl. India 2: 402–403. 1993), Sleumer (Fl. Males., ser. 1, 5(1): 76–77. 1954), and Verdcourt (in Dassanayake & Clayton, Rev. Handb. Fl. Ceylon 10: 222–224. 1996). Some of the taxonomic confusion might be due to a loss of significant field characters during the preparation of herbarium material (Verdcourt, loc. cit.). In the present account, <i>F. ramontchi</i> is treated as a separate species because, on the evidence of herbarium material at PE, it seems to be a distinct and recognizable entity within China. Descriptions of <i>F. ramontchi</i> vary; for example, compare that below with Matthew (loc. cit.)."
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). http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Species suited to tropical or subtropical climate(s) 2-High] "Native: AFRICA Northeast Tropical Africa: Ethiopia; Somalia East Tropical Africa: Kenya; Tanzania; Uganda South Tropical Africa: Malawi; Mozambique; Zambia; Zimbabwe Southern Africa: Botswana; Namibia; South Africa - Cape Province, Transvaal Western Indian Ocean: Madagascar ASIA-TEMPERATE China: China - Fujian, Guangdong, Guangxi, Hainan ASIA-TROPICAL Indian Subcontinent: India; Nepal; Sri Lanka Indo-China: Cambodia; Laos; Thailand; Vietnam Malesia: Indonesia; Malaysia; Philippines"
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]
203	1988. Booth, F.E.M./Wickens, G.E.. Non-Timber Uses of Selected Arid Zone Trees and Shrubs in Africa. Volume 19 of FAO Conservation Guide. Food & Agriculture Org, Rome	[Broad climate suitability (environmental versatility)? Yes] "Climate - Occurs in a wide range of climatic regions." ... "Altitude - Sea level to 2400 m."
203	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	[Broad climate suitability (environmental versatility)? Yes. Broad native range and elevation distribution exceeds 1000 m] "Broad-leaved forests; sea level to 1400 m. Fujian, Guangdong, Guangxi, Hainan [widespread and cultivated in tropical and subtropical regions of Africa, Asia, and the Pacific islands]."
203	2008. Janick, J./Paull, R.E.. The Encyclopedia of Fruit & Nuts. Cabi Publishing, Wallingford, UK	[Broad climate suitability (environmental versatility)? Yes] "...slow growing and is found near homes and in fields in a variety of climates and soils south of the Sahara."
204	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Native: AFRICA Northeast Tropical Africa: Ethiopia; Somalia East Tropical Africa: Kenya; Tanzania; Uganda South Tropical Africa: Malawi; Mozambique; Zambia; Zimbabwe Southern Africa: Botswana; Namibia; South Africa - Cape Province, Transvaal Western Indian Ocean: Madagascar ASIA-TEMPERATE China: China - Fujian, Guangdong, Guangxi, Hainan ASIA-TROPICAL Indian Subcontinent: India; Nepal; Sri Lanka Indo-China: Cambodia; Laos; Thailand; Vietnam Malesia: Indonesia; Malaysia; Philippines"
205	2008. Janick, J./Paull, R.E.. The Encyclopedia of Fruit & Nuts. Cabi Publishing, Wallingford, UK	[Does the species have a history of repeated introductions outside its natural range? Yes] "It has been spread to the Caribbean, Central America, India and China."

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] "Antigua and Barbuda, Barbados, China, Cuba, Dominica, Dominican Republic, Grenada, Indonesia, Jamaica, Madagascar, Malaysia, Puerto Rico, Seychelles, Sri Lanka, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Trinidad and Tobago, Virgin Islands (US)"
301	1976. Morton, J.F.. Pestiferous spread of many ornamental and fruit species in South Florida. Proceedings of the Florida State Horticultural Society. 89: 348-353.	[Naturalized beyond native range? Yes] "Flacourtia indica Merr. (F. ramontchi L'Her.) GOVERNOR'S PLUM. Seedlings found in hammocks and disturbed sites on Key Biscayne and elsewhere in South Florida. (6)."
301	2001. Sandlund, O.T./Schei, P.J./Viken, Å.. Invasive Species and Biodiversity Management. Kluwer, Dordrecht, The Netherlands	[Naturalized beyond native range? Yes] "Table 22.4 The 19 most invasive species on the Mascarene Islands." ... "Very invasive on Mauritius, invasive on Reunion and naturalised on Rodrigues"
301	2003. Wunderlin, R.P./Hansen, B.F.. Guide to the Vascular Plants of Florida. University Press of Florida, Gainesville, FL	[Naturalized beyond native range? Presumably Yes] "Disturbed sites. Rare...Escaped from cultivation"
301	2005. Flora of North America Editorial Committee. Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	[Naturalized beyond native range? Yes] "Flowering and fruiting year-round. Roadsides, grassy areas, hammock edges; 0-10 m; introduced; Fla." ... "Flacourtia indica has been cultivated in southern Florida for a century or more and has become naturalized there in Broward, Collier, Lee, Miami-Dade, and Monroe counties, the fruits being dispersed by birds (W. S. Judd 1997b)."
301	2007. McCormack, G.. Cook Islands Biodiversity Database, Version 2007.2.. Cook Islands Natural Heritage Trust, Rarotonga http://cookislands.bishopmuseum.org	[Naturalized beyond native range? Yes] "COOK ISLANDS STATUS: Introduced - Recent (~1920), Naturalised; Land, lowlands - mountains (++) (mid-elev.)"
301	2012. Lau, A./Frohlich, D.. New plant records from O'ahu for 2009. Bishop Museum Occasional Papers. 113: 7-26.	[Naturalized beyond native range? Oahu] "Flacourtia indica thrives in seasonally dry, sunny areas, in all soil types. This species was found on Oahu in the understory of a Casuarina-dominated lowland secondary forest in sandy soil." ... "Bellows AFB, around campsite near golf area, mauka side of Tinker Road. UTM 2363960, 633402. 15 or more individuals scattered in coastal lowland secondary forest dominated by Casuarina. 2 m tall shrub with reddish-brown lenticillate bark. New leaves pink tinged, new stems reddish. older plants with few noticeable spines, younger plants spiny. Fruits ripening red, 24 Sep 2009, OED 2009092401"
301	2012. Queensland Government. Weeds of Australia - Indian plum, Flacourtia jangomas [Accessed 07 Sep 2012]. http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Flacourtia_jangomas.htm	[Naturalized beyond native range? Yes] Indian plum (Flacourtia jangomas) is very similar to Governor's plum (Flacourtia indica). These two species are both naturalised in Australia, and can be distinguished by the following differences: "Indian plum (Flacourtia jangomas) has hairless (i.e. glabrous) leaves with long pointed tips (i.e. acuminate apices). Governor's plum (Flacourtia indica) has somewhat hairy (i.e. pubescent) leaves with rounded or short-pointed tips (i.e. obtuse or acute apices)."
302	1989. Parnell, J.A.N./Cronk, Q./Jackson, P.W./Strahm, W.. A Study of the Ecological History, Vegetation and Conservation Management of Ile aux Aigrettes, Mauritius. Journal of Tropical Ecology. 5(4): 355-374.	[Garden/amenity/disturbance weed? A disturbance adapted weed with negative environmental impacts] "F. indica thicket (group 6 above), is dense, almost impenetrable, probably derived from past forest clearance and covers a large part of the island (Figure 3). It is 2-3 m high, comprises mainly F. indica and some climbers (particularly Cassytha filiformis) and has occasional scattered relict natives emerging from its canopy. In these thickets few native trees except Scutia myrtina and G. mauritiana occur and only a few seedlings and young plants of Tarenna borbonica, Turraea casimiriana, May tenus pyria and Erythroxylon sideroxyloides together with scattered mature specimens of Dracaena concinna (Table 1)."
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	1989. Parnell, J.A.N./Cronk, Q./Jackson, P.W./Strahm, W.. A Study of the Ecological History, Vegetation and Conservation Management of Ile aux Aigrettes, Mauritius. Journal of Tropical Ecology. 5(4): 355-374.	[Environmental weed? Yes] "F. indica thicket (group 6 above), is dense, almost impenetrable, probably derived from past forest clearance and covers a large part of the island (Figure 3). It is 2-3 m high, comprises mainly F. indica and some climbers (particularly Cassytha filiformis) and has occasional scattered relict natives emerging from its canopy. In these thickets few native trees except Scutia myrtina and G. mauritiana occur and only a few seedlings and young plants of Tarenna borbonica, Turraea casimiriana, May tenus pyria and Erythroxylon sideroxyloides together with scattered mature specimens of Dracaena concinna"

304	2001. Safford, R.J.. Mauritius. Pp. 583–596 in L. D.C. Fishpool and M.I. Evans, eds. Important Bird Areas in Africa and associated islands: Priority sites for conservation. Pisces Publications and BirdLife International, Newbury and Cambridge, UK	[Environmental weed? Yes] "Mauritius ... Of at least 47 invasive plant species, the most damaging include, in humid areas, <i>Ligustrum robustum</i> , <i>Psidium cattleianum</i> , <i>Syzygium jambos</i> and <i>Ravenala madagascariensis</i> and, in drier areas, <i>Hiptage benghalensis</i> , <i>Lantana camara</i> , <i>Leucaena leucocephala</i> and <i>Flacourtia indica</i> ." ... "Ile aux Aigrettes ... Threats to native ecosystems are posed by exotic plants (especially <i>Leucaena leucocephala</i> , <i>Flacourtia indica</i> and <i>Litsea glutinosa</i>) and animals (especially shrews <i>Suncus murinus</i> , five species of reptiles including the snake <i>Lycodon aulicum</i> , and Giant Land-Snails <i>Achatina</i> spp.)." ... "Also known as Coin de Mire, this site is the closest to the mainland (8 km) of the five northern islets of Mauritius; some publications give its area as 76 ha. ... Problem weeds are <i>Flacourtia indica</i> , <i>Lantana camara</i> , <i>Cordia curassavica</i> and <i>Opuntia vulgaris</i> ."
304	2002. Hunsberger, A.G.B.. Invasive and Banned Plants of Miami-Dade County. University of Florida IFAS, Homestead, FL	[Environmental weed? Potentially Yes] "Prohibited Plants by Florida Department of Environmental Protection" [List includes <i>Flacourtia indica</i>]
304	2005. Hadden, K./Frank, K./Byrd, C.. Identification Guide For Invasive Exotic Plants of the Florida Keys 2005-2006. http://www.floridainvasives.org/Keys/Resources.html	[Environmental weed?] "Category III: Invasive Exotics that have not yet become a problem in the Florida Keys but are to be watched" [Includes <i>Flacourtia indica</i>]
304	2012. Florida Keys Invasive Species Task Force. Don't Plant A Weed! AlterNatives for landscaping in the Florida Keys [Accessed 07 Sep 2012]. http://www.floridainvasives.org/keys/AlterNatives%20Plant%20Guide.pdf	[Environmental weed? Potentially in Florida] "Highly invasive in South Florida. Animals spread the fruit." ... "Governor's Plum has been outlawed in Miami-Dade County because of its ability to displace natural communities."
305	2004. Kueffer, C./Mauremootoo, J.. Case studies on the status of invasive woody plant species in the Western Indian Ocean 3. Mauritius (islands of Mauritius and Rodrigues). Working Paper FBS/4-3E: .FAO of the United Nations Forestry Department, Rome	[Congeneric weed? Possibly] " <i>Litsea glutinosa</i> is widely naturalized, especially in the lowlands. <i>Flacourtia jangomas</i> is naturalized in forests." ... "The forests along rivers are protected by law, but these are all secondary forests and are dominated by exotic species. Although these forests protect watercourses and aid erosion control, native species that are better adapted to cyclones would probably do a better job. Nonetheless, because of the high degradation and the high edge:area ratio, restoration would be very difficult. Frequent exotic woody plant species are <i>Acacia concinna</i> , <i>Flacourtia indica</i> , <i>Flacourtia jangomas</i> ,..."
305	2012. Queensland Government. Weeds of Australia - Indian plum, <i>Flacourtia jangomas</i> [Accessed 07 Sep 2012]. http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Flacourtia_jangomas.htm	[Congeneric weed? Yes] "Indian plum (<i>Flacourtia jangomas</i>) is regarded as an environmental weed in Queensland. It is currently of most concern in far northern Queensland, where it is invading rainforests, forest margins and riparian areas in the wet tropics bioregion. This species is listed as a Category 1 priority environmental weed in the Far North Queensland Natural Resource Management region, and has been targeted for eradication in this area. Indian plum (<i>Flacourtia jangomas</i>) is still thought to be in the early stages of invasion, often being referred to as a "sleeping weed". It is a relatively slow-growing tree and small numbers of plants are thought to be present in naturalised populations. However, it is not very conspicuous and may be more widespread and common than currently thought. Its seeds are also spread by birds and other animals and new plants may come up at some distance from parent trees or in areas where they are not likely to be noticed. Though this species has not yet necessarily caused serious ecological damage, Indian plum (<i>Flacourtia jangomas</i>) is recognised as potentially adversely impacting upon high value natural ecosystems in northern Queensland (i.e. the Wet Tropics World Heritage Area). It has also begun to invade riparian zones in south-eastern Queensland (e.g. along Enoggera Creek in The Gap in suburban Brisbane) and is regarded as a moderately invasive species in the Cook Islands in the south Pacific. Other Impacts The spines on its stems may cause injury to humans and animals. If dense infestations eventually develop along riparian zones, they may restrict access to these areas."
401	1994. Warriar, P.K./Nambiar, V.P.K./Ramankutty, C.. Indian Medicinal Plants: A Compendium of 500 Species, Volume 3. Orient Longman.	[Produces spines, thorns or burrs? Yes] "A small deciduous thorny shrub; ..."
401	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	[Produces spines, thorns or burrs? Yes] "Trees or shrubs, dioecious or hermaphroditic, rarely polygamous, usually spiny." ... "Shrubs or small trees, 2–4 m tall, deciduous; bark gray yellow, fissured, flaky; old branches usually not spiny; young branches with axillary, simple spines; branchlets puberulous or subglabrous."
402	2012. WRA Specialist. Personal Communication.	[Allelopathic? Unknown]

403	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	[Parasitic? No] "Shrubs or small trees, 2–4 m tall, deciduous..." [Family: Salicaceae. Also placed in: Flacourtiaceae]
404	1988. Booth, F.E.M./Wickens, G.E.. Non-Timber Uses of Selected Arid Zone Trees and Shrubs in Africa. Volume 19 of FAO Conservation Guide. Food & Agriculture Org, Rome	[Unpalatable to grazing animals? No] "Forage. Browsed by game (Kucher 1981). Branches and leaves lopped for cattle fodder in India (Council of Scientific and Industrial Research 1956)."
404	2011. Lunt, N.. The Role of Small Antelope in Ecosystem Functioning in the Matobo Hills, Zimbabwe. PhD Dissertation. Rhodes University, Grahamstown, South Africa	[Unpalatable to grazing animals? No] "...one fifth of <i>F. indica</i> shoots were browsed, indicating that this species is highly palatable."
405	1988. Booth, F.E.M./Wickens, G.E.. Non-Timber Uses of Selected Arid Zone Trees and Shrubs in Africa. Volume 19 of FAO Conservation Guide. Food & Agriculture Org, Rome	[Toxic to animals? No] "Forage. Browsed by game (Kucher 1981). Branches and leaves lopped for cattle fodder in India (Council of Scientific and Industrial Research 1956)."
406	2005. CAB International. Forestry Compendium. CAB International, Wallingford, UK	[Host for recognized pests and pathogens?] "Pests recorded Insects: Anastrepha suspensa (caribbean fruit fly) Bactrocera correcta (guava fruit fly) Bactrocera dorsalis (Oriental fruit fly) Ceratitis capitata (mediterranean fruit fly) Pests recorded at the family level (Flacourtiaceae): Insects: Clostera restitura"
406	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/)	[Host for recognized pests and pathogens?] "Beetles and larvae of some insects are known to defoliate the tree, feed on the sap or damage dead wood. Agroforestry"
407	1994. Warriar, P.K./Nambiar, V.P.K./Ramankutty, C.. Indian Medicinal Plants: A Compendium of 500 Species, Volume 3. Orient Longman.	[Causes allergies or is otherwise toxic to humans? No evidence. Medicinal properties] "The leaves are useful in pruritus and scabies. The fruits are sweet, appetizer, digestive and diuretic, and are useful in strangury, jaundice, gastropathy and splenomegaly."
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	1989. Parnell, J.A.N./Cronk, Q./Jackson, P.W./Strahm, W.. A Study of the Ecological History, Vegetation and Conservation Management of Ile aux Aigrettes, Mauritius. Journal of Tropical Ecology. 5(4): 355-374.	[Creates a fire hazard in natural ecosystems? Unknown] " <i>F. indica</i> thicket (group 6 above), is dense, almost impenetrable, probably derived from past forest clearance and covers a large part of the island (Figure 3)." [Possible that thickets may increase fire risk]
408	2008. Janick, J./Paull, R.E.. The Encyclopedia of Fruit & Nuts. Cabi Publishing, Wallingford, UK	[Creates a fire hazard in natural ecosystems? Unknown] "The tree can be coppiced and grown as a hedge." ... "It does not tolerate fire and should be protected."
409	1988. Booth, F.E.M./Wickens, G.E.. Non-Timber Uses of Selected Arid Zone Trees and Shrubs in Africa. Volume 19 of FAO Conservation Guide. Food & Agriculture Org, Rome	[Is a shade tolerant plant at some stage of its life cycle? No] "As it is a light demander, the planting site should be cleared."
409	2008. Janick, J./Paull, R.E.. The Encyclopedia of Fruit & Nuts. Cabi Publishing, Wallingford, UK	[Is a shade tolerant plant at some stage of its life cycle? No] "The tree prefers a high water table and full sun."
410	1988. Booth, F.E.M./Wickens, G.E.. Non-Timber Uses of Selected Arid Zone Trees and Shrubs in Africa. Volume 19 of FAO Conservation Guide. Food & Agriculture Org, Rome	[Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)? Yes] "Soils. Variety of soils including limestone, clayey and sandy 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] "Shrubs or small trees, 2–4 m tall, deciduous..."
412	1988. Booth, F.E.M./Wickens, G.E.. Non-Timber Uses of Selected Arid Zone Trees and Shrubs in Africa. Volume 19 of FAO Conservation Guide. Food & Agriculture Org, Rome	[Forms dense thickets?] "When closely planted it forms a close impenetrable barrier which serves as a windbreak as well as hedge"

412	1989. Parnell, J.A.N./Cronk, Q./Jackson, P.W./Strahm, W.. A Study of the Ecological History, Vegetation and Conservation Management of Ile aux Aigrettes, Mauritius. <i>Journal of Tropical Ecology</i> . 5(4): 355-374.	[Forms dense thickets? Yes] "Flacourtia thicket Group 6: a 2-3 m tall community dominated by <i>Flacourtia indica</i> often with <i>Cassytha filiformis</i> (particularly near the coast), scattered <i>Tarenna borbonica</i> (E.G. & A. Henderson) Verdc. (often in seedling form) and <i>Phymatodes scolopendria</i> (Burm. fil.) Ching (Table 1)." ... " <i>Flacourtia indica</i> is uncommon in intact <i>D. egrettarum</i> forest but once the canopy has been broken by woodcutting it quickly invades. Canopy opening caused by felling quickly causes death of <i>P. scolopendria</i> which may re-establish itself when shade increases in the mature <i>F. indica</i> thicket" ... " <i>F. indica</i> thicket (group 6 above), is dense, almost impenetrable, probably derived from past forest clearance and covers a large part of the island (Figure 3). It is 2-3 m high, comprises mainly <i>F. indica</i> and some climbers (particularly <i>Cassytha filiformis</i>) and has occasional scattered relict natives emerging from its canopy. In these thickets few native trees except <i>Scutia myrtina</i> and <i>G. mauritiana</i> occur and only a few seedlings and young plants of <i>Tarenna borbonica</i> , <i>Turraea casimiriana</i> , <i>May tenus pyria</i> and <i>Erythroxylon sideroxyloides</i> together with scattered mature specimens of <i>Dracaena concinna</i> (Table 1)."
501	2008. Janick, J./Paull, R.E.. <i>The Encyclopedia of Fruit & Nuts</i> . Cabi Publishing, Wallingford, UK	[Aquatic? No] "This drought tolerant species is common in dry tropical deciduous forests and is also found in forests having dry seasons."
502	2012. USDA ARS National Genetic Resources Program. Germplasm Resources Information Network - (GRIN). http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl	[Grass? No] Family: Salicaceae. Also placed in: Flacourtiaceae
503	2012. 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] Family: Salicaceae. Also placed in: Flacourtiaceae
504	2007. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). <i>Flora of China</i> . 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] "Shrubs or small trees, 2–4 m tall, deciduous; bark gray yellow, fissured, flaky; old branches usually not spiny; young branches with axillary, simple spines; branchlets puberulous or subglabrous. Petiole red, short, 3–5 mm, puberulous; leaf blade greenish abaxially, deep green adaxially, rose red when young, obovate to oblong-obovate, 2–4 × 1.5–3 cm, thickly papery, abaxially glabrous or sparsely pubescent, hairs spreading and short, adaxially glabrous, midvein raised abaxially, flat adaxially, lateral veins 5–7 pairs, reticulate veins conspicuous, base mostly acute to obtuse, margin serrulate above middle, apex rounded, sometimes retuse."
601	2007. Wu, Z.Y./Raven, P.H./Hong, D.Y. (eds.). <i>Flora of China</i> . Vol. 13 (Clusiaceae through Araliaceae). Science Press and Missouri Botanical Garden Press, Beijing & St. Louis	[Evidence of substantial reproductive failure in native habitat? No evidence]
601	2008. Janick, J./Paull, R.E.. <i>The Encyclopedia of Fruit & Nuts</i> . Cabi Publishing, Wallingford, UK	[Evidence of substantial reproductive failure in native habitat? No evidence]
602	1988. Booth, F.E.M./Wickens, G.E.. <i>Non-Timber Uses of Selected Arid Zone Trees and Shrubs in Africa</i> . Volume 19 of <i>FAO Conservation Guide</i> . Food & Agriculture Org, Rome	[Produces viable seed? Yes] "Can be propagated from seed (Council of Scientific & Industrial Research 1956), but germination behavior of seed is poorly known."
603	2012. WRA Specialist. Personal Communication.	[Hybridizes naturally? Unknown]
604	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/)	[Self-compatible or apomictic?] "Flowers unisexual or occasionally bisexual (1 or several branches of a female specimen with perfect flowers, which, however, bear fewer stamens than the males). Male flowers in axillary racemes 0.5-2 cm long; pedicels slender, may be pubescent, up to 1 cm long, the basal bracts minute and caducous. Sepals (min. 4) 5-6 (max. 7), broadly ovate, apex acute to rounded, pubescent on both sides, 1.5 2.5 mm long and broad. Filaments 2-2.5 mm long; anthers 0.5 mm long. Disk lobulate. Female flowers in short racemes or solitary; pedicels up to 5 mm. Disk lobulate, clasping the base of the ovoid ovary; styles 4 8, central, connate at the base, spreading, up to 1.5 mm long; stigmas truncate."
604	2012. Top Tropicals. <i>Flacourtia indica</i> [Accessed 07 Sep 2012]. http://toptropicals.com/catalog/uid/Flacourtia_indica.htm	[Self-compatible or apomictic?] " The tree can be male or female...They seem to be self-fertile." [Possible that certain trees with perfect flowers are self-compatible]

605	2002. Siqueira de Castro, M.. Bee fauna of some tropical and exotic fruits: potencial pollinators and their conservation IN: Pollinating bees - the conservation link between agriculture and nature. Ministry of Environment/Brasilia, http://www.webbee.org	[Requires specialist pollinators? No] "TABLE 1: List of fruits and their potential pollinators (Bahia, Northeast - Brazil) (12°45' s ; 39°11' w)" [Flacourtia indica - Apis mellifera scutellata (40%) Dialictus (Chloralictus) sp (26.7%) Augochloropsis (A) prov. leucotricha (13.3%)]
605	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	[Requires specialist pollinators?] "Inflorescences axillary or terminating short lateral twigs, racemose, short; rachis 0.5–2 cm, puberulous. Pedicels 3–5 mm, puberulous, hairs spreading. Sepals 5 or 6, ovate, ca. 1.5 mm, outside glabrous or with a few scattered short hairs, inside sparsely to densely pubescent, margin white ciliate in dried material, apex obtuse. Staminate flowers: stamen filaments 2–2.5 mm, pubescent or less often glabrous. Pistillate flowers: ovary globose, placentas 5 or 6; styles 5 or 6, united only at base, radiating, 1–2 mm, slender."
606	1988. Booth, F.E.M./Wickens, G.E.. Non-Timber Uses of Selected Arid Zone Trees and Shrubs in Africa. Volume 19 of FAO Conservation Guide. Food & Agriculture Org, Rome	[Reproduction by vegetative fragmentation? Coppices, but does no evidence of vegetative spread] "Natural regeneration is by seed and vegetatively (FAO 1983)." ... "There have been no attempts at establishment from cuttings, but it coppices well."
606	1998. Simute, S./Phiri, C.L./Tengnäs, B.. Agroforestry Extension Manual for Eastern Zambia. Regional Land Management Unit (RELMA/Sida), Nairobi, Kenya	[Reproduction by vegetative fragmentation? No] "A wild fruit which is well liked. It regenerates naturally from seed and coppice.."
607	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/)	[Minimum generative time (years)? Probably 4+ years] "F. indica is a slow-growing tree. In Tamil Nadu, India, coppice shoots reached 3.4 m in height and 9.4 cm in girth in 15 years, corresponding to a mean annual increment of only 0.63 cm."
701	2005. Flora of North America Editorial Committee. Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Possibly moved along roadways, or may prefer roadside disturbance] "Flowering and fruiting year-round. Roadsides, grassy areas, hammock edges; 0 10 m; introduced; Fla."
702	2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Propagules dispersed intentionally by people? Yes] "Though not common in Hawaii today, governor's-plum has been planted as a barrier hedge and fruit tree at low elevations and it needs no special care." ... "F. indica has little to recommend it horticulturally, and because of its potential as a noxious arboreal weed it is perhaps best discouraged as an ornamental."
702	2008. Janick, J./Paull, R.E.. The Encyclopedia of Fruit & Nuts. Cabi Publishing, Wallingford, UK	[Propagules dispersed intentionally by people? Yes] "The tree is planted as an ornamental and living hedge."
702	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/)	[Propagules dispersed intentionally by people? Yes] "The glistening leaves of F. indica can be very attractive when the tree is planted as an ornamental."
703	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 disperse as a produce contaminant? No evidence. Bird-dispersed] "Fruit dull to blackish red, globose, 8–10 mm in diam., longitudinally 5- or 6-angled, styles persistent. Seeds 5 or 6."
704	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 adapted to wind dispersal? No] Genus - "Fruit a berrylike indehiscent drupe with pyrenes 2 × as many as styles, globose..." Species - "Fruit dull to blackish red, globose, 8–10 mm in diam., longitudinally 5- or 6-angled, styles persistent. Seeds 5 or 6."
705	2004. Kueffer, C./Mauremootoo, J.. Case studies on the status of invasive woody plant species in the Western Indian Ocean 3. Mauritius (islands of Mauritius and Rodrigues). Working Paper FBS/4-3E: .FAO of the United Nations Forestry Department, Rome	[Propagules water dispersed? Possibly. Frequently occurs along rivers] "The forests along rivers are protected by law, but these are all secondary forests and are dominated by exotic species. Although these forests protect watercourses and aid erosion control, native species that are better adapted to cyclones would probably do a better job. Nonetheless, because of the high degradation and the high edge: area ratio, restoration would be very difficult. Frequent exotic woody plant species are Acacia concinna, Flacourtia indica, Flacourtia jangomas, Hiptage benghalensis, Litsea monopetala, Livistona chinensis, Pongamia pinnata, Raphia farinifera, Ravenala madagascariensis, Rubus alceifolius, Schinus terebinthifolius, Syzygium jambos and Terminalia arjuna (J. Mauremootoo & J.-C. Sevathian, personal observations; Rouillard and Guého 1999; Blanchard 2000)."

705	2012. Queensland Government. Weeds of Australia - Indian plum, <i>Flacourtia jangomas</i> [Accessed 07 Sep 2012]. http://keyserver.lucidcentral.org/weeds/data/03030800-0b07-490a-8d04-0605030c0f01/media/Html/Flacourtia_jangomas.htm	[Propagules water dispersed? Related species dispersed by water] "Reproduction and Dispersal - This species reproduces only by seed. The seeds may be spread in floods, but are most commonly dispersed by animals that eat the fruit."
706	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 bird dispersed? Presumably Yes] Genus - "Fruit a berrylike indehiscent drupe with pyrenes 2 x as many as styles, globose..." Species - "Fruit dull to blackish red, globose, 8–10 mm in diam., longitudinally 5- or 6-angled, styles persistent. Seeds 5 or 6."
706	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/)	[Propagules bird dispersed? Yes] "The tree is usually leafless just before flowering. In India, the flowers appear from December to April together with the new leaves, which are a very beautiful fresh green colour. Fruits ripen from March to July. They are eaten by birds, thus the seeds are widely dispersed, accounting for the very wide distribution of the species."
707	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/)	[Propagules dispersed by other animals (externally)? No evidence. Adapted for internal dispersal] "Fruits ripen from March to July. They are eaten by birds..."
708	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 survive passage through the gut? Presumably Yes] Genus - "Fruit a berrylike indehiscent drupe with pyrenes 2 x as many as styles, globose..." Species - "Fruit dull to blackish red, globose, 8–10 mm in diam., longitudinally 5- or 6-angled, styles persistent. Seeds 5 or 6."
708	2008. Kunz, B.K./Linsenmair, K.E.. The role of the olive baboon (<i>Papio anubis</i> , Cercopithecidae) as seed disperser in a savannaforest mosaic of West Africa. <i>Journal of Tropical Ecology</i> . 24 (3): 235-246.	[Propagules survive passage through the gut? Yes] "Table 3. Woody plant species occurring in the Como' e National Park whose seeds were found in faecal samples of the olive baboon in Ghana and during previous studies in CNP, but not during the present study." [Includes <i>Flacourtia indica</i>]
708	2011. Kunz, T.H./Braun de Torrez, E./Bauer, D./Lobova, T./Fleming, T.H.. Ecosystem services provided by bats. <i>Annals of the New York Academy of Sciences</i> . 1223: 1-38.	[Propagules survive passage through the gut? Yes] "Table 4. Examples of economically and ecologically important plants that are either pollinated (P) or dispersed (D) by bats" [Includes <i>F. indica</i> dispersed by bats]
801	1998. Simute, S./Phiri, C.L./Tengnäs, B.. Agroforestry Extension Manual for Eastern Zambia. Regional Land Management Unit (RELMA/Sida), Nairobi, Kenya	[Prolific seed production (>1000/m ²)? Unknown] "A deciduous spiny shrub usually 3-5 m; spines on the trunk sometimes branched, up to 12 cm long. BARK: rough pale yellow grey, branches may have a yellowish powder, later dark grey. LEAVES: variable in size, oval to 12 cm, edge toothed, 4–7 pairs, veins clear on both surfaces, a stalk to 2 cm. FLOWERS: small, cream and fragrant; male flowers with very many stamens; female flowers with a divided, spreading style, October-December. FRUIT: red-purple-black, round and juicy but acid, to 2.5 cm across, persisting on the tree. They contain up to 10 small hard seeds; ripen May-July." ... "No. of seeds per kg: ±200,000. Germination is slow."
802	2008. Akinnifesi, F.K./Leakey, R.R.B./Ajayi, O./Sileshi, G./Tchoundjeu, Z./Matakala, P./Kwesiga, F.R.. <i>Indigenous Fruit Trees in the Tropics: Domestication, Utilization and Commercialization</i> . CABI, Wallingford, UK	[Evidence that a persistent propagule bank is formed (>1 yr)? Potentially] "Many other miombo fruit tree species have orthodox seeds. Orthodox seeds are seeds that can remain viable for long periods if processed and stored in the appropriate manner; normally seed should have a low moisture content and be kept at low temperature (Dawson and Were, 1997). For example, <i>Azanza garckeana</i> , <i>Flacourtia indica</i> , <i>Sclerocarya birrea</i> and <i>Parinari curatellifolia</i> have orthodox seeds, and their seed may store well for a year or more (Teichman et al., 1986; Msanga, 1998)."
802	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/)	[Evidence that a persistent propagule bank is formed (>1 yr)? Potentially] "Seed storage behaviour is orthodox; viability can be maintained for over 1 year in air-dry hermetic storage at 5 deg. C." [Unknown from field conditions]

803	2004. Kueffer, C./Mauremootoo, J.. Case studies on the status of invasive woody plant species in the Western Indian Ocean 3. Mauritius (islands of Mauritius and Rodrigues). Working Paper FBS/4-3E: .FAO of the United Nations Forestry Department, Rome	[Well controlled by herbicides? Yes] "The Mauritius Sugar Industry Research Institute (MSIRI) successfully applied two herbicides, Tordon 101 (picloram) and Roundup (glyphosate), in ten percent solutions brushed on cut stems against <i>Psidium cattleianum</i> and <i>Ligustrum robustum</i> subsp. <i>walkeri</i> in the Mondrain Nature Reserve (McIntyre 1997). The same method was used against <i>Flacourtia indica</i> and <i>Leucaena leucocephala</i> on Ile aux Aigrettes. Other herbicides used on Ile aux Aigrettes in this period were Garlon, Velpar (hexazinone) and Diester (2,4-D and 2,4,5-T) (Newfield et al. 2003). Picloram was found to be more effective than glyphosate against both species, although <i>L. leucocephala</i> proved to be more resistant than <i>F. indica</i> to both herbicides (McIntyre 1997). The ten percent Tordon solution worked best, but replication was very small (6–7 trees). In 1993, less successful, herbicide trials were conducted with Escort (metsulfuron) at one percent, Garlon at five percent and Velpar at five percent (Newfield et al. 2003). In 2002 the use of herbicides was increased for chemical maintenance weeding. All regenerating weeds are sprayed using five percent Roundup. A sprayguard over the sprayer nozzle is used to avoid spraying the foliage of newly planted native species. The chemical maintenance weeding procedure takes about eight percent of the time needed for manual weeding of the same area (A. Khadun, personal communication)."
804	1988. Booth, F.E.M./Wickens, G.E.. Non-Timber Uses of Selected Arid Zone Trees and Shrubs in Africa. Volume 19 of FAO Conservation Guide. Food & Agriculture Org, Rome	[Tolerates, or benefits from, mutilation, cultivation, or fire?] "it tolerates frequent trimming (Williams 1949; Howes 1946)." ... "There have been no attempts at establishment from cuttings, but it coppices well."
804	2004. Kueffer, C./Mauremootoo, J.. Case studies on the status of invasive woody plant species in the Western Indian Ocean 3. Mauritius (islands of Mauritius and Rodrigues). Working Paper FBS/4-3E: .FAO of the United Nations Forestry Department, Rome	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] " <i>Flacourtia indica</i> is difficult to hand weed because of its tenacious roots from which it readily sprouts."
804	2008. Janick, J./Paull, R.E.. The Encyclopedia of Fruit & Nuts. Cabi Publishing, Wallingford, UK	[Tolerates, or benefits from, mutilation, cultivation, or fire? Not fire] "The tree can be coppiced and grown as a hedge." ... "It does not tolerate fire and should be protected."
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

- Naturalized in Florida, Oahu, Mascarene Islands, Cook Islands, Australia and possibly elsewhere
- Thrives in tropical climates
- Broad climatic suitability and elevation range
- Environmental weed of Mauritius
- Congeneric Weeds
- Thorny
- Forms dense thickets
- Tolerates many soil conditions (and potentially able to exploit many different habitat types)
- Bird-dispersed seeds
- Coppices

Low Risk / Desirable Traits

- Fodder tree (palatable to browsing animals)
- Non-toxic
- Used medicinally
- Shade-intolerant
- Landscaping and ornamental value
- Edible fruit
- Herbicides provide effective control