

Family: *Anacardiaceae*

Taxon: *Spondias purpurea* 'Wild Type'

Synonym: *Spondias cirouella* Tussac

Common Name: Hog plum
Purple mombin
Red mombin
Spanish plum
Jocote

Questionnaire : current 20090513
Status: Assessor Approved

Assessor: Chuck Chimera
Data Entry Person: Chuck Chimera

Designation: EVALUATE

WRA Score 5

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)	n
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic	y=1, n=0	
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	n
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
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	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	y
604	Self-compatible or apomictic	y=1, n=-1	n
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	
702	Propagules dispersed intentionally by people	y=1, n=-1	
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	
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	
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 5

Supporting Data:

101	2005. Miller, A./Schaal, B.. Domestication of a Mesoamerican Cultivated Fruit Tree, <i>Spondias purpurea</i> . Proceedings of the National Academy of Sciences. 102(36): 12801-12806.	[Is the species highly domesticated? No] "Fruits of wild jocotes are usually bright red (A.M., personal observation). They are smaller and more acidic than the cultivated fruits, with considerably less flesh surrounding the seed. Unlike cultivated populations wild jocotes reproduce from seed and native populations are age-structured with a variety of juvenile and mature individuals present. The contrast in morphology and method of reproduction between wild and cultivated jocotes indicates that <i>S. purpurea</i> is a species that has been altered genetically during the course of domestication. During this process, humans have selected for trees that bear large, fleshy, sweet fruits, and that can be reproduced easily from cuttings." [This assessment is for the wild type of <i>S. purpurea</i> . The cultivated form is highly domesticated]
102	2012. WRA Specialist. Personal Communication.	NA
103	2012. WRA Specialist. Personal Communication.	NA
201	2005. Miller, A./Schaal, B.. Domestication of a Mesoamerican Cultivated Fruit Tree, <i>Spondias purpurea</i> . Proceedings of the National Academy of Sciences. 102(36): 12801-12806.	[Species suited to tropical or subtropical climate(s) 2-High] "Today, wild jocote populations are found in the fragmented tropical dry forests of Mexico and Central America (36)."
202	2005. Miller, A./Schaal, B.. Domestication of a Mesoamerican Cultivated Fruit Tree, <i>Spondias purpurea</i> . Proceedings of the National Academy of Sciences. 102(36): 12801-12806.	[Quality of climate match data? 2-High] "Today, wild jocote populations are found in the fragmented tropical dry forests of Mexico and Central America (36)."
203	2008. Janick, J./Paull, R.E.. The encyclopedia of fruit & nuts. Cabi Publishing, Wallingford, UK	[Broad climate suitability (environmental versatility)? Yes] "Natural populations of red mombin in Mexico and Central America are found in both dry and wet areas, including a wide range of semi-deciduous forests. It has been cultivated from 0 to 2000 m elevation with an average annual precipitation varying from 300 to 1800 mm." [Tolerates dry and wet areas, with a potential elevation range that exceeds 1000 m]
204	1987. Morton, J.F.. Fruits of warm climates. J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/index.html	[Native or naturalized in regions with tropical or subtropical climates? Yes] "The tree is tropical, ranging from sea-level to 5,500 or 6,000 ft (1,700-1,800 m) in Mexico and Central America; to 2,500 ft (760 m) in Jamaica, in either dry or humid regions. It flowers but does not fruit in Israel; is cold sensitive in Florida."
204	2003. Pimenta-Barrios, E./Ramírez-Hernández, B.C.. Phenology, Growth, and Response to Light of <i>Ciruela Mexicana</i> (<i>Spondias purpurea</i> L., Anacardiaceae). Economic Botany. 57(4): 481-490.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "The study was performed in a subtropical area of Paso de Guadalupe, municipality of Ixtlahuacan del Rio, Jalisco, Mexico, located at 40 km northeast of Guadalajara, Jalisco, Mexico at 103019'42"N2, 0750'29'W, elevation 819 m. This is one of the important cultivation regions of <i>S. purpurea</i> in Jalisco, where approximately 60 ha are under cultivation. Both wild and cultivated populations grow on rocky slopes in shallow, infertile soils (Castro 1977) classified as regosols, with a slightly alkaline pH (Galvan 1988; Rzedowski 1978)."
204	2005. Miller, A./Schaal, B.. Domestication of a Mesoamerican Cultivated Fruit Tree, <i>Spondias purpurea</i> . Proceedings of the National Academy of Sciences. 102(36): 12801-12806.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Today, wild jocote populations are found in the fragmented tropical dry forests of Mexico and Central America (36)."
205	1964. Little, Jr. E.L./Wadsworth, F.H.. Common trees of Puerto Rico and the Virgin Islands. Agriculture Handbook No. 249. USDA Forest Service, Washington, D.C	[Does the species have a history of repeated introductions outside its natural range? Yes] "Planted and naturalized throughout West Indies except Bahamas. Native of tropical continental America and widely distributed from central Mexico to Peru and Brazil, spread through cultivation. Planted in southern Florida. Also introduced into the Old World tropics."
205	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Does the species have a history of repeated introductions outside its natural range? Yes] "It is now cultivated pantropically for its edible fruit." [Likely refers to domesticated type]
301	1971. Wiggins, I.L./Porter, D.M./Anderson, E.F.. Flora of the Galápagos Islands. Stanford University Press, Stanford, CA	[Naturalized beyond native range? Yes] "in the Galapagos it is an escape from cultivation."
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] " <i>Spondias purpurea</i> L. Purple Mombin. Tropical America. Naturalized in disturbed sites, on shell mounds,"
301	2000. Liogier, A.H./ Martorell, L.F.. Flora of Puerto Rico and adjacent islands: a systematic synopsis. La Editorial, UPR, San Juan, Puerto Rico	[Naturalized beyond native range? Yes] "On hillsides and roadsides, often planted for its fruits and for shade, Puerto Rico; naturalized in the West Indies, a native to Mexico and Peru to Brazil, introduced into Florida and the Old World tropics."

301	2005. Wagner, W.L./Herbst, D.R./Lorence, D.H.. Flora of the Hawaiian Islands website. Smithsonian Inst., Washington, D.C. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm	[Naturalized beyond native range? No evidence in Hawaiian Islands]
301	2010. Nelson, G.. The Trees of Florida. 2nd Edition. Pineapple Press Inc, Sarasota, FL	[Naturalized beyond native range? Yes] "Naturalized in Florida in Collier County and the Keys."
301	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Naturalized beyond native range? Yes] "It has also naturalised in some countries, including the Philippines, Galapagos and Nigeria."
302	2007. Randall, R.P.. Global Compendium of Weeds - <i>Spondias purpurea</i> . http://www.hear.org/gcw/species/spondias_purpurea/	[Garden/amenity/disturbance weed? Possibly] Listed as a weed, but evidence of impacts was not found.
303	2012. WRA Specialist. Personal Communication.	[Agricultural/forestry/horticultural weed? No] No evidence
304	2012. WRA Specialist. Personal Communication.	[Environmental weed? No] No evidence
305	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	[Congeneric weed? Potentially] <i>Spondias cytherea</i> , <i>Spondias dulcis</i> , <i>Spondias mombin</i> , <i>Spondias pinnata</i> listed as naturalized or weeds.
401	2008. Janick, J./Paull, R.E.. The encyclopedia of fruit & nuts. Cabi Publishing, Wallingford, UK	[Produces spines, thorns or burrs? No] " <i>Spondias purpurea</i> is a small deciduous tree, 3-15 m high, with grey and usually smooth bark. A rather thick and transparent exudate exudes from cuts and bruises. The imparipinnate leaves are 6-28 cm long and 5-27-foliolate with a 15-20 cm rachis. The leaflets are usually 3-6 cm long and 1-2.5 cm wide, elliptic to oblanceolate. The axillary inflorescences are 1-10 cm long, few-flowered, usually produced at older and defoliate nodes. The petals are usually red to purple, 2.5-3.5 mm long at anthesis. The fruit is a drupe, which is oblong to obovoid or subglobose 1.5-4.5 cm long and 1-3.5 cm wide. When ripe, the fruit is usually red but sometimes yellowish or orange. The mesocarp is fleshy and juicy, and the endocarp is 1.5-3.5 cm long."
402	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/)	[Allelopathic? Unlikely] "Soil improver: A seasonal variation occurs in leaf litter composition. N, Calcium and Magnesium levels were adequate whereas P and K levels were below the optimal range."
402	2012. Morikawa, C.I.O./Miyaura, R./Tapia Y Figueroa, M.D.L./Rengifo Salgado, E.L./Fujii, Y.. Screening of 170 Peruvian plant species for allelopathic activity by using the Sandwich Method. Weed Biology and Management. 12: 1-11.	[Allelopathic? Unknown. Related <i>S. mombin</i> shows allelopathic potential] "Peru is one of the 20 botanically extremely diverse countries in the world, with >17 000 flowering plants, of which 30% are endemic. So far, no systematic research has been conducted on the screening of the allelopathic plants. In this study, the allelopathic activity of 170 species from 61 families of Peruvian plants that were collected from the three main regions of Peru – the Costa (Pacific coastline), the Sierra (Andean mountains), and the Selva (Amazonian rainforest) – was evaluated. The allelopathic activity was determined by the Sandwich Method, which can evaluate the activity of leaf leachates. The species that were found to be highly inhibitory in this screening, under the criterion of >90% inhibition of the radicle of lettuce (<i>Lactuca sativa</i>) seedlings, were <i>Aristeguetia ballii</i> and <i>Diplostephium foliosissimum</i> (Asteraceae) and <i>Spondias mombin</i> (Anacardiaceae). All of these species are native plants from Peru. This study gives a strong clue regarding the potential of isolating potent allelochemicals from these plants in the future."
403	2008. Janick, J./Paull, R.E.. The encyclopedia of fruit & nuts. Cabi Publishing, Wallingford, UK	[Parasitic? No] " <i>Spondias purpurea</i> is a small deciduous tree, 3-15 m high, with grey and usually smooth bark." [Anacardiaceae]
404	1987. Morton, J.F.. Fruits of warm climates. J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/index.html	[Unpalatable to grazing animals? No] "Leaves and fruits: The leaves are readily grazed by cattle and the fruits are fed to hogs."
404	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Unpalatable to grazing animals? No] "Cattle eat the leaves."
405	2008. Wagstaff, D.J.. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	[Toxic to animals? No] No evidence

405	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/)	[Toxic to animals? No] "Fodder: Shoot, leaf and seed are used as fattening feed for pigs and cattle."
405	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Toxic to animals? No] "Cattle eat the leaves." [No evidence]
406	2008. Janick, J./Paull, R.E.. The encyclopedia of fruit & nuts. Cabi Publishing, Wallingford, UK	[Host for recognized pests and pathogens? No] "Diseases, Pests and Weeds: No important diseases and pests have been recorded. Fruit flies may cause serious damage to ripe fruit."
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? No] "The mite <i>Brevipalpus salasi</i> produces an irregular yellowing of the leaves and a slight scaly appearance to fruits of this plant. Parasitizing fruit flies (<i>Anastrepha</i> spp.) dwell on <i>S. purpurea</i> . Agroforestry" [Insignificant pest]
407	1987. Morton, J.F.. Fruits of warm climates. J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/index.html	[Causes allergies or is otherwise toxic to humans? No] "In the Philippines, it is said that eating a large quantity of the fruits on an empty stomach may cause stomachache."
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] No evidence
408	2004. Heinrich, A./Hurka, H.. Species richness and composition during sylviginesis in a tropical dry forest in northwestern Costa Rica. <i>Tropical Ecology</i> . 45(1): 43-57.	[Creates a fire hazard in natural ecosystems? No] "In Central America most species of adult trees are fire intolerant and fire-created habitats are unnatural, though anthropogenic fires are a major blockage to secondary woody succession (Budowski 1966; Janzen 1988 a & b)." [No evidence that <i>Spondias purpurea</i> increases fire hazards]
408	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/)	[Creates a fire hazard in natural ecosystems? No] No evidence
409	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/)	[Is a shade tolerant plant at some stage of its life cycle? No] "Is a light demanding species in dry areas with shallow soils."
410	1987. Morton, J.F.. Fruits of warm climates. J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/index.html	[Tolerates a wide range of soil conditions? Yes] "The tree is found growing naturally on a great diversity of soils throughout Latin America sand, gravel, heavy clay loam, or limestone."
410	2008. Janick, J./Paull, R.E.. The encyclopedia of fruit & nuts. Cabi Publishing, Wallingford, UK	[Tolerates a wide range of soil conditions? Yes] "The tree is able to grow normally on rocky substrates, slopes or different soil types including those of little agricultural value due to a wide physiological and anatomical plasticity (Pimenta-Barrios and Ramirez-Hernandez 2003)."
410	2012. Lim, T.K.. Edible Medicinal and Non-Medicinal Plants. Volume 1, Fruits. Springer, New York	[Tolerates a wide range of soil conditions? Yes] "It is adaptable to a wide range of soils - from sand, gravel, heavy clay loam, loams to calcareous soils."
411	2003. Pimenta-Barrios, E./Ramírez-Hernández, B.C.. Phenology, Growth, and Response to Light of <i>Ciruela Mexicana</i> (<i>Spondias purpurea</i> L., Anacardiaceae). <i>Economic Botany</i> . 57(4): 481-490.	[Climbing or smothering growth habit? No] " <i>Spondias purpurea</i> is a small deciduous tree, growing to 3 m tall, with a welldefined trunk and numerous branches."
412	1964. Little, Jr. E.L./Wadsworth, F.H.. Common trees of Puerto Rico and the Virgin Islands. Agriculture Handbook No. 249. USDA Forest Service, Washington, D.C	[Forms dense thickets? No] "Planted and naturalized throughout West Indies except Bahamas. Native of tropical continental America and widely distributed from central Mexico to Peru and Brazil, spread through cultivation. Planted in southern Florida. Also introduced into the Old World tropics."
501	2008. Gargiullo, M.B./Magnuson, B.L./Kimball, L.D.. A field guide to plants of Costa Rica. Oxford University Press US, New York, NY	[Aquatic? No] "Tree or large shrub 4-15 m, often with multiple trunks..." ... "Habitat: Wet to seasonally dry forests." [Terrestrial]
502	2008. Gargiullo, M.B./Magnuson, B.L./Kimball, L.D.. A field guide to plants of Costa Rica. Oxford University Press US, New York, NY	[Grass? No] "Tree or large shrub 4-15 m, often with multiple trunks..." [Anacardiaceae]

503	2003. Pimenta-Barrios, E./Ramírez-Hernández, B.C.. Phenology, Growth, and Response to Light of Ciruela Mexicana (<i>Spondias purpurea</i> L., Anacardiaceae). <i>Economic Botany</i> . 57(4): 481-490.	[Nitrogen fixing woody plant? No] "Ciruela mexicana (<i>Spondias purpurea</i> L.) belongs to the family Anacardiaceae tribe Spondiadeae, which has approximately 17 genera"
504	2008. Gargiullo, M.B./Magnuson, B.L./Kimball, L.D.. A field guide to plants of Costa Rica. Oxford University Press US, New York, NY	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Tree or large shrub 4-15 m, often with multiple trunks..."
601	2005. Miller, A./Schaal, B.. Domestication of a Mesoamerican Cultivated Fruit Tree, <i>Spondias purpurea</i> . <i>Proceedings of the National Academy of Sciences</i> . 102(36): 12801-12806.	[Evidence of substantial reproductive failure in native habitat? No] "Fruits of wild jocotes are usually bright red (A.M., personal observation). They are smaller and more acidic than the cultivated fruits, with considerably less flesh surrounding the seed. Unlike cultivated populations, wild jocotes reproduce from seed and native populations are age-structured with a variety of juvenile and mature individuals present."
602	2005. Miller, A./Schaal, B.. Domestication of a Mesoamerican Cultivated Fruit Tree, <i>Spondias purpurea</i> . <i>Proceedings of the National Academy of Sciences</i> . 102(36): 12801-12806.	[Produces viable seed? Yes] "Fruits of wild jocotes are usually bright red (A.M., personal observation). They are smaller and more acidic than the cultivated fruits, with considerably less flesh surrounding the seed. Unlike cultivated populations, wild jocotes reproduce from seed and native populations are age-structured with a variety of juvenile and mature individuals present."
603	2008. Miller, A.J.. Characterization of a Domesticated Tree Lineage (<i>Spondias purpurea</i> , Anacardiaceae) Based on Nuclear and Chloroplast Sequence Data. <i>Journal of the Torrey Botanical Society</i> . 135(4): 463-474.	[Hybridizes naturally? Yes. Presumably] "In this study, data support southern Mesoamerica as a region where hybridization between <i>Spondias purpurea</i> and <i>S. mombin</i> may be occurring, and/or where lineage sorting is incomplete. Two lines of evidence suggest ongoing hybridization between <i>S. purpurea</i> and <i>S. mombin</i> in southern Mesoamerica: first, in this region, sympatric <i>Spondias purpurea</i> and <i>S. mombin</i> individuals share some of the same chloroplast and nuclear alleles." ... "Second, two <i>Spondias</i> individuals collected in southern Mesoamerica carry the nuclear sequence of <i>S. mombin</i> and the chloroplast sequence of <i>S. purpurea</i> "
604	1985. Bullock, S.H.. Breeding Systems in the Flora of a Tropical Deciduous Forest in Mexico. <i>Biotropica</i> 17(4): 287-301. 17(4): 287-301.	[Self-compatible or apomictic? No] "Appendix I. Floristic list with life form, floral sexuality, family, and species" [<i>Spondias purpurea</i> = d, dioecious"]
604	2006. Uribe-Mu', C.A./Quesada, M.. Preferences, patterns and consequences of branch removal on the dioecious tropical tree <i>Spondias purpurea</i> (Anacardiaceae) by the insect borer <i>Oncideres albomarginata</i> chamela (Cerambycidae). <i>Oikos</i> . 112: 691-697.	[Self-compatible or apomictic? No] "In Mexico, <i>S. purpurea</i> is a common dioecious tree of the tropical dry forest (Bullock 1992)."
605	1994. Bullock, S.H.. Wind Pollination of Neotropical Dioecious Trees. <i>Biotropica</i> . 26(2): 172-179.	[Requires specialist pollinators? No] "Lozano (1986) suggested that <i>Spondias mombin</i> L. is wind-pollinated on the basis of floral morphology; however, I consider the morphologically similar <i>Spondias purpurea</i> L. at Chamela to be entomophilous." [Floral morphology suggests insect pollination]
605	2011. Kubitzki, K. (ed.). The Families and Genera of Vascular Plants. Vol. X. Flowering Plants. Eudicots: Sapindales, Cucurbitales, Myrtaceae. Springer, New York	"Anacardiaceae are primarily entomophilous, but some exceptions are found." ... "Flowers pedicellate, articulate; calyx slightly imbricate or apert; (4)5-lobed; corolla valvate, (4)5(6) parted, cucullate; white, cream-colored, purple, or red; androecium diplostemonous, sometimes in two whorls of unequal length; filaments filiform or subulate; anthers dorsifixed; pistillodes and staminodes reduced; disk glabrous or papillose, annular and lobed; carpels (3-5); stylobia (3-5); stigmas capitate to spatulate; ovules apical." [Generic description of <i>Spondias</i>]
606	1964. Little, Jr. E.L./Wadsworth, F.H.. Common trees of Puerto Rico and the Virgin Islands. Agriculture Handbook No. 249. USDA Forest Service, Washington, D.C	[Reproduction by vegetative fragmentation? Yes] "Grown commonly as living fenceposts, tie trees are easily propagated from cuttings and seeds."
606	1987. Morton, J.F.. Fruits of warm climates. J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/index.html	[Reproduction by vegetative fragmentation? Probably Yes] "The purple mombin, including its yellow form, is grown very easily and quickly by setting large cuttings upright in the ground. It is one of the trees most used to create "living fences"."
607	1985. Janzen, D.H.. <i>Spondias mombin</i> is culturally deprived in mega-fauna-free forest. <i>Journal of Tropical Ecology</i> . 1(2): 131-155.	[Minimum generative time (years)? 4+] " <i>S. mombin</i> become fruit-bearing trees as young as 20 years of age, range from 5-30 m in height when fruit-bearing, and are most frequently noticed as pioneer members of primary and secondary succession in old fields and road-sides" [Specifics unknown for <i>S. purpurea</i> , but presumably will take at least 4 or more years to reach maturity]
701	1964. Little, Jr. E.L./Wadsworth, F.H.. Common trees of Puerto Rico and the Virgin Islands. Agriculture Handbook No. 249. USDA Forest Service, Washington, D.C	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Potentially] "In fence rows, along highways, and near homes in the coastal regions, commonest and largest and in a narrow strip along the base of the southern side of the Cordillera of Puerto Rico. Probably naturalized rather than native." [Although seeds are primarily adapted for vertebrate dispersal]

702	2005. Miller, A./Schaal, B.. Domestication of a Mesoamerican Cultivated Fruit Tree, <i>Spondias purpurea</i> . Proceedings of the National Academy of Sciences. 102(36): 12801-12806.	[Propagules dispersed intentionally by people? Possibly, but domesticated type intentionally dispersed] "Jocotes are cultivated throughout the tropics and subtropics or their fruits, which are eaten fresh, sold in local markets, and made into jams and beverages (34, 35). The majority of trees are found in backyard gardens and living fences, although some formal cultivation exists in orchards (39)." ... "Fruits of wild jocotes are usually bright red (A.M., personal observation). They are smaller and more acidic than the cultivated fruits, with considerably less flesh surrounding the seed. Unlike cultivated populations, wild jocotes reproduce from seed and native populations are age-structured with a variety of juvenile and mature individuals present. The contrast in morphology and method of reproduction between wild and cultivated jocotes indicates that <i>S. purpurea</i> is a species that has been altered genetically during the course of domestication. During this process, humans have selected for trees that bear large, fleshy, sweet fruits, and that can be reproduced easily from cuttings."
703	2009. Educational Concerns For Hunger Organization (ECHO). Fruiting Trees, Shrubs and Herbaceous Plants - M. http://www.echonet.org/content/fruitInformation/627	[Propagules likely to disperse as a produce contaminant? No] "This heavy producing tree has become a favorite at ECHO. The pleasant smell of the fruit can be noted many feet away. The 1- to 2 inch long oval or oblong fruits have a fairly large seed." [Unlikely, as fruit is harvested for food]
703	2012. WRA Specialist. Personal Communication.	[Propagules likely to disperse as a produce contaminant? No] No evidence
704	2005. Miller, A./Schaal, B.. Domestication of a Mesoamerican Cultivated Fruit Tree, <i>Spondias purpurea</i> . Proceedings of the National Academy of Sciences. 102(36): 12801-12806.	[Propagules adapted to wind dispersal? No] "Fruits of wild jocotes are usually bright red (A.M., personal observation)."
705	2011. Kubitzki, K. (ed.). The Families and Genera of Vascular Plants. Vol. X. Flowering Plants. Eudicots: Sapindales, Cucurbitales, Myrtaceae. Springer, New York	[Propagules water dispersed? Potentially] "Water dispersal has been reported or purported for species of three genera, <i>Mangifera</i> , <i>Poupartia</i> , and <i>Spondias</i> ." [Unknown for <i>S. purpurea</i>]
706	2002. Vozzo, J.A.. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	[Propagules bird dispersed? Yes] "Drupes and berries with bright color (red, pink, white, black, blue, purple, orange, yellow, or greenish yellow), membranaceous or slightly coriaceous exocarp, fleshy mesocarp, watery, rich in sugars, poor in lipids and proteins, and fast-rotting are highly appreciated by birds (Levey 1987, Moermond and Denslow 1985, Sorensen 1983, Van der Pijl 1972, Van Roosmalen 1985, White 1974). Examples include <i>Anacardiaceae</i> (<i>Spondias</i> , <i>Tapirira</i>),..."
706	2005. Miller, A./Schaal, B.. Domestication of a Mesoamerican Cultivated Fruit Tree, <i>Spondias purpurea</i> . Proceedings of the National Academy of Sciences. 102(36): 12801-12806.	[Propagules bird dispersed? Yes] "Fruits of wild jocotes are usually bright red (A.M., personal observation)."
707	2004. Wehncke, E.V./Numa Valdez, C./Domínguez, C.A.. Seed Dispersal and Defecation Patterns of <i>Cebus capucinus</i> and <i>Alouatta palliata</i> : Consequences for Seed Dispersal Effectiveness. <i>Journal of Tropical Ecology</i> . 20: 535-543.	[Propagules dispersed by other animals (externally)? Potentially] "Appendix I. Principal fruit species in the diet of <i>Cebus capucinus</i> and <i>Alouatta palliata</i> , during the study. Overlap in food plants by the two species of monkey = 30%." [<i>S. purpurea</i> seeds spat out by howlers and white-faced monkeys; could potentially be externally dispersed]
708	1997. Mandujano, S./Gallina, S./Sanchez-Rojas, G. et al.. Habitat Use by White-tailed Deer in a Tropical Forest. Pp 71-77 in James C. deVos, Jr., ed. Proc. of the 1997 Deer/Elk Workshop, Rio Rico, AZ. Arizona Game & Fish Department, Phoenix	[Propagules survive passage through the gut? Yes] "Fruits from the <i>S. purpurea</i> are an important source of water for the deer at the end of the dry season because there are few water sources." ... "Leaves and twigs were the most important plant parts in the annual diet, but in the dry season fruits and flowers, particularly fruits of red mombin (<i>Spondias purpurea</i>), constituted 30% of its diet."
708	2002. Vozzo, J.A.. Tropical Tree Seed Manual. USDA Forest Service, Washington, D.C.	[Propagules survive passage through the gut? Yes] "The following are fruits and seeds commonly consumed and dispersed by mammals: <i>Anacardiaceae</i> (<i>Spondias</i>),..."
708	2004. Godínez-Alvarez, H.. Pollination and seed dispersal by lizards: a review. <i>Revista Chilena de Historia Natural</i> . 77: 569-577.	[Propagules survive passage through the gut? Yes] "Quantity and quality components of seed dispersal by lizards. Quantity: (1) lizard abundance, (2) fruit removal and/or handling time, (3) number of seeds per scat, (-) not evaluated. Quality: (1) seed germination after gut passage and/or passage time through the digestive tract, (2) habitat use by lizards, (-) not evaluated" [<i>Spondias purpurea</i> dispersed by lizards]
708	2005. Miller, A./Schaal, B.. Domestication of a Mesoamerican Cultivated Fruit Tree, <i>Spondias purpurea</i> . Proceedings of the National Academy of Sciences. 102(36): 12801-12806.	[Propagules survive passage through the gut? Yes] "Fruits of wild jocotes are usually bright red (A.M., personal observation)." [Seeds are presumably adapted for internal dispersal]

708	2011. Kubitzki, K. (ed.). The Families and Genera of Vascular Plants. Vol. X. Flowering Plants. Eudicots: Sapindales, Cucurbitales, Myrtaceae. Springer, New York	[Propagules survive passage through the gut? Yes] "The major seed dispersers of fleshy-fruited species are birds (e.g., Metopium, Rhus, Schinus, Searsia, Toxicodendron), bats (e.g., Anacardium, Antrocaryon, Campnosperma, Mangifera, Spondias, Thyrsodium), and primates (e.g., Anacardium, Antrocaryon, Mangifera, Pseudospondias, Sclerocarya, Sorindeia, Spondias, Trichoscypha). In addition to these, there are also reports in the literature of the following animal dispersers: elephants and ruminants (e.g., Antrocaryon, Pseudospondias), deer (e.g., Anacardium, Rhus, Spondias), and coyotes, coatis, foxes, peccaries, reptiles, and tapirs (e.g., Spondias) (Gautier-Hion et al. 1985; Mitani et al. 1994; Fragoso 1997; Altrichter et al. 1999; Li et al. 1999; Birkinshaw 2001; Poulsen et al. 2001)."
801	2003. Pimenta-Barrios, E./Ramírez-Hernández, B.C.. Phenology, Growth, and Response to Light of Ciruela Mexicana (<i>Spondias purpurea</i> L., Anacardiaceae). <i>Economic Botany</i> . 57(4): 481-490.	[Prolific seed production (>1000/m ²)? Unlikely] "There is a single stony seed in each fruit, although the seed may be frequently empty because the fertilized embryo sac does not always develop (Avitia 1996)." [Unlikely given relatively large, single-seeded drupes]
802	1992. Rico-Gray, V./García-Franco, J.G.. Vegetation and Soil Seed Bank of Successional Stages in Tropical Lowland Deciduous Forest. <i>Journal of Vegetation Science</i> . 3(5): 617-624.	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown] "Table 1. Abundance values for woody plants with dbh > 1.0 cm. p = present; * = in seed bank" [<i>S. purpurea</i> not documented in seed bank]
803	2012. WRA Specialist. Personal Communication.	[Well controlled by herbicides? Unknown] No information on herbicide efficacy or chemical control of this species
804	1964. Little, Jr. E.L./Wadsworth, F.H.. Common trees of Puerto Rico and the Virgin Islands. Agriculture Handbook No. 249. USDA Forest Service, Washington, D.C	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] "Grown commonly as living fenceposts, the trees are easily propagated from cuttings and seeds."
804	1987. Morton, J.F.. Fruits of warm climates. J.F. Morton, Miami, FL http://www.hort.purdue.edu/newcrop/morton/index.html	[Tolerates, or benefits from, mutilation, cultivation, or fire? Yes] "The purple mombin, including its yellow form, is grown very easily and quickly by setting large cuttings upright in the ground. It is one of the trees most used to create "living fences"."
805	2012. WRA Specialist. Personal Communication.	[Effective natural enemies present locally (e.g. introduced biocontrol agents)? Unknown]