

Taxon: Chiranthodendron pentadactylon Larreat.

Family: Malvaceae

Common Name(s): devil's hand tree
Mexican handplant
monkey hand tree

Synonym(s): Cheirostemon platanoides Humb. &

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 5 Dec 2016

WRA Score: -4.0

Designation: L

Rating: Low Risk

Keywords: Tropical Tree, Ornamental, Medicinal, Bat-Pollinated, Arillate Seeds

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	n
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	?
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	n
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	n
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
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		

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
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		
604	Self-compatible or apomictic		
605	Requires specialist pollinators		
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	>3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m ²)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
803	Well controlled by herbicides		
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)		

Supporting Data:

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Standley, P.C. (1920). Trees and Shrubs of Mexico, Volume 23. Smithsonian Institution, Washington, D.C.	[No evidence of domestication] "The hand-flower tree is one of the most celebrated of Mexican plants, and was well known to the early inhabitants. It is restricted in its distribution. and for a long time the only tree known to the residents of the Valley of Mexico was one growing at Toluca."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 4 Dec 2016]	"Native: Northern America Southern Mexico: Mexico - Oaxaca Southern America Central America: Guatemala"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 4 Dec 2016]	"Native: Northern America Southern Mexico: Mexico - Oaxaca Southern America Central America: Guatemala"

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	González-Espinosa, M., Meave, J.A., Lorea-Hernández, F.G., Ibarra-Manríquez, G. & Newton, A.C. (eds.). (2011). The Red List of Mexican Cloud Forest Trees. Fauna & Flora International, Cambridge, UK	"Elevational range: 1,830–2,740 m"

Qsn #	Question	Answer
	Dave's Garden. (2016). Monkey Hand Tree, Hand Plant, Devil's Hand, Mexican Hand Tree - <i>Chiranthodendron pentadactylon</i> . http://davesgarden.com/guides/pf/go/66985/ . [Accessed 4 Dec 2016]	"Hardiness: USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F)"
	Vivero, J. L. S., Gordon, M., & Magin, J. (2006). The Red List of Trees of Guatemala. Fauna & Flora International, Cambridge, UK	"Tree measuring 15-30 m growing in pine-oak forests and mesophyllic mountain forests at elevations of 2000-3000 m."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 4 Dec 2016]	"Native: Northern America Southern Mexico: Mexico - Oaxaca Southern America Central America: Guatemala"

205	Does the species have a history of repeated introductions outside its natural range?	?
	Source(s)	Notes
	Dave's Garden. (2016). Monkey Hand Tree, Hand Plant, Devil's Hand, Mexican Hand Tree - <i>Chiranthodendron pentadactylon</i> . http://davesgarden.com/guides/pf/go/66985/ . [Accessed 4 Dec 2016]	"Regional "This plant has been said to grow in the following regions: Green Valley, Arizona Fremont, California Hayward, California Los Angeles, California Orange, California San Diego, California San Leandro, California"
	Randall, R.P. 2007. The introduced flora of Australia and its weed status. CRC for Australian Weed Management, Glen Osmond, Australia	Cultivated

301	Naturalized beyond native range	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence
	Wagner, W.L., Herbst, D.R. & Lorence, D.H. 2016. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/ . [Accessed 4 Dec 2016]	No evidence to date

302	Garden/amenity/disturbance weed	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

305	Congeneric weed	n
	Source(s)	Notes
	Kubitzki, K. & Bayer, C. (eds.). 2003. The Families and genera of vascular plants. Volume V. Flowering Plants. Dicotyledons: Capparales, Malvales and Non-betalain Caryophyllales. Springer Verlag, Berlin, Heidelberg, New York	"A single species, <i>C. pentadactylon</i> Larreat. from Mexico and Guatemala"
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Kubitzki, K. & Bayer, C. (eds.). 2003. The Families and genera of vascular plants. Volume V. Flowering Plants. Dicotyledons: Capparales, Malvales and Non-betalain Caryophyllales. Springer Verlag, Berlin, Heidelberg, New York	[No evidence] "Tall tree. Leaves cordate, simple to slightly 5–7-lobed. Flowers leaf-opposed; sepals 5, dark reddish, fused for about a quarter, saccate at base, keeled, in bud with spreading tips, somewhat imbricate; petals absent; staminal tube unilaterally split, anthers 5, sessile on tube, long, dithecal, connective prolonged; ovary 5-locular, ovules numerous; style tapering, almost entire."

402	Allelopathic	n
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown

403	Parasitic	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Kubitzki, K. & Bayer, C. (eds.). 2003. The Families and genera of vascular plants. Volume V. Flowering Plants. Dicotyledons: Capparales, Malvales and Non-betalain Caryophyllales. Springer Verlag, Berlin, Heidelberg, New York	"Tall tree. Leaves cordate, simple to slightly 5-7-lobed." [Malvaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	Wiersema, J.H. & León, B. 1999. World Economic Plants: A Standard Reference. CRC Press, Boca Raton, FL	[Palatability unknown. This reference includes fodder as a potential use of plants, but does not list fodder among the uses of <i>Chiranthodendron pentadactylon</i>] "ECON: Medic. (folklore)"

405	Toxic to animals	n
	Source(s)	Notes
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Gibson, A. K., Mena-Ali, J. I., & Hood, M. E. (2010). Loss of pathogens in threatened plant species. <i>Oikos</i> , 119(12), 1919-1928	"Table 3. Details of survey of North American endangered plants . Listed are the 47 plant species with federal listing as endangered and phylogenetically-paired non-threatened species included in Wilcoxon signed-rank test analysis. Parenthetical values represent the numbers of fungal pathogens and the number of literature citations per species, respectively." [<i>Chiranthodendron pentadactylon</i> (2, 5). With two fungal pathogens not specified in this publication]
	WRA Specialist. 2016. Personal Communication	Unknown

Qsn #	Question	Answer
407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	González-Espinosa, M., Meave, J.A., Lorea-Hernández, F.G., Ibarra-Manríquez, G. & Newton, A.C. (eds.). (2011). The Red List of Mexican Cloud Forest Trees. Fauna & Flora International, Cambridge, UK	"Flowers used as a remedy for some heart diseases in folk medicine, bark used as rope and leaves used to wrap food. A tree with religious significance to pre-Columbian Aztec people."
	Vivero, J. L. S., Gordon, M., & Magin, J. (2006). The Red List of Trees of Guatemala. Fauna & Flora International, Cambridge, UK	"It is a very attractive mixed rainforest tree due to its abundant red flowers, which can be used medicinally to treat a variety of conditions."
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Used medicinally] "(Flowers antisecretory, antibacterial, antiprotozoal, astringent, to treat gastrointestinal disorders, diarrhea, dysentery. Flowers infusion sedative and cardiac tonic, used to treat high blood pressure."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. (1949). Flora of Guatemala. Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	[No evidence. Unlikely given habitat] "Abundant at many places in wet mixed forest high on the mountains; often growing also in fields from which forest has been cleared,"

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	SelecTree (2016). "Chiranthodendron pentadactylon Tree Record." 1995-2016. https://selecttree.calpoly.edu/tree-detail/chiranthodendron-pentadactylon . [Accessed 5 Dec 2016]	"Exposure Full Sun to Partial Shade"
	Dave's Garden. (2016). Monkey Hand Tree, Hand Plant, Devil's Hand, Mexican Hand Tree - Chiranthodendron pentadactylon. http://davesgarden.com/guides/pf/go/66985/ . [Accessed 5 Dec 2016]	"Sun Exposure: Full Sun"
	Strange Wonderful Things. (2016). Devil's Hand Tree - Chiranthodendron pentadactylon. www.strangewonderfulthings.com/170.htm	[Possibly] "It appreciates some humidity, and prefers full sun and well-draining soil. In warmer areas, some afternoon shade may be needed."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	Trade Winds Fruit. (2016). Mexican Hand Tree - Chiranthodendron pentadactylon. http://www.tradewindsfruit.com/content/mexican-hand-tree.htm . [Accessed 5 Dec 2016]	"Plant in well-drained soil."

Qsn #	Question	Answer
	Dave's Garden. (2016). Monkey Hand Tree, Hand Plant, Devil's Hand, Mexican Hand Tree - <i>Chiranthodendron pentadactylon</i> . http://davesgarden.com/guides/pf/go/66985/ . [Accessed 5 Dec 2016]	"Soil pH requirements: 7.6 to 7.8 (mildly alkaline)"

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Kubitzki, K. & Bayer, C. (eds.). 2003. The Families and genera of vascular plants. Volume V. Flowering Plants. Dicotyledons: Capparales, Malvales and Non-betain Caryophyllales. Springer Verlag, Berlin, Heidelberg, New York	"Tall tree. Leaves cordate, simple to slightly 5-7-lobed."

412	Forms dense thickets	n
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. (1949). Flora of Guatemala. Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	[Forms dense growth with a thick layer of understory vegetation. Not a monoculture] "On the Volcan de Agua and Volcan de Acatenango <i>Chiranthodendron</i> forms very dense forest belts that extend up to about 3,000 meters. This forest belt is dense and wet, with many fallen trunks and in some places a dense undergrowth of shrubs and coarse herbs."

501	Aquatic	n
	Source(s)	Notes
	González-Espinosa, M., Meave, J.A., Lorea-Hernández, F.G., Ibarra-Manríquez, G. & Newton, A.C. (eds.). (2011). The Red List of Mexican Cloud Forest Trees. Fauna & Flora International, Cambridge, UK	[Terrestrial] "Although it is a typical cloud forest tree, this species is not restricted to this vegetation type as it also occurs in oak and pine-oak forests. Specimens have been reported from a number of other states in central Mexico..."

502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 4 Dec 2016]	Family: Malvaceae Subfamily: Bombacoideae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 4 Dec 2016]	Family: Malvaceae Subfamily: Bombacoideae

Qsn #	Question	Answer
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Standley, P.C. (1920). Trees and Shrubs of Mexico, Volume 23. Smithsonian Institution, Washington, D.C.	"Tree, 12 to 15 meters high, the trunk often 40 cm. in diameter; leaves long-petiolate, 12 to 30 cm. long, acutish to acuminate, deeply cordate at base, irregularly and shallowly 3 to 7-lobate or nearly entire, glabrate above, stellate tomentose beneath; peduncles short, 1-flowered, opposite the leaves"

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	González-Espinosa, M., Meave, J.A., Lorea-Hernández, F.G., Ibarra-Manríquez, G. & Newton, A.C. (eds.). (2011). The Red List of Mexican Cloud Forest Trees. Fauna & Flora International, Cambridge, UK	"A large tree, up to 30 m tall and 200 cm in diameter. Although it is a typical cloud forest tree, this species is not restricted to this vegetation type as it also occurs in oak and pine-oak forests. Specimens have been reported from a number of other states in central Mexico but they are most probably from cultivated trees."
	Vivero, J. L. S., Gordon, M., & Magin, J. (2006). The Red List of Trees of Guatemala. Fauna & Flora International, Cambridge, UK	"Naturally restricted in distribution, direct exploitation of the species and logging of its habitat are contributing to its decline."

602	Produces viable seed	y
	Source(s)	Notes
	González-Espinosa, M., Meave, J.A., Lorea-Hernández, F.G., Ibarra-Manríquez, G. & Newton, A.C. (eds.). (2011). The Red List of Mexican Cloud Forest Trees. Fauna & Flora International, Cambridge, UK	"Seeds must be collected from slightly open fruits on the distal parts of the branches of the tree. The seeds may remain viable for up to seven months at 4°C and less than 12% relative humidity. Seedlings can be obtained from seeds placed on damp soil beds with a thin litter cover."
	Standley, P.C. & Steyermark, J.A. (1949). Flora of Guatemala. Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	"the seeds appear to germinate readily, since quantities of seedlings have been observed in some places."

603	Hybridizes naturally	
	Source(s)	Notes
	Kubitzki, K. & Bayer, C. (eds.). 2003. The Families and genera of vascular plants. Volume V. Flowering Plants. Dicotyledons: Capparales, Malvales and Non-betalain Caryophyllales. Springer Verlag, Berlin, Heidelberg, New York	"A single species, <i>C. pentadactylon</i> Larreat. from Mexico and Guatemala; can be crossed with <i>Fremontodendron</i> ."
	Kelman, W. (1991). A Revision of <i>Fremontodendron</i> (Sterculiaceae). Systematic Botany, 16(1), 3-20	"Natural hybridization has not been recorded."

Qsn #	Question	Answer
604	Self-compatible or apomictic	
	Source(s)	Notes
	Rocca, M. A., & Sazima, M. (2010). Beyond hummingbird-flowers: the other side of ornithophily in the Neotropics. <i>Oecologia Australis</i> , 14(1), 67-99	"Appendix 2. Features of plant species pollinated or co-pollinated (*) by perching birds in the Neotropics." [Breeding system for <i>Chiranthodendron pentadactylon</i> Unknown]

605	Requires specialist pollinators	
	Source(s)	Notes
	Fleming, T. H., Geiselman, C., & Kress, W. J. (2009). The evolution of bat pollination: a phylogenetic perspective. <i>Annals of Botany</i> , 104: 1017–1043	"APPENDIX 2 New World bat-pollinated species listed by plant family" [Includes <i>Chiranthodendron pentadactylon</i>]
	Kubitzki, K. & Bayer, C. (eds.). 2003. The Families and genera of vascular plants. Volume V. Flowering Plants. Dicotyledons: Capparales, Malvales and Non-betalain Caryophyllales. Springer Verlag, Berlin, Heidelberg, New York	"Flowers leaf-opposed; sepals 5, dark reddish, fused for about a quarter, saccate at base, keeled, in bud with spreading tips, somewhat imbricate; petals absent; staminal tube unilaterally split, anthers 5, sessile on tube, long, dithecal, connective prolonged; ovary 5-locular, ovules numerous; style tapering, almost entire."
	Strange Wonderful Things. (2016). Devil's Hand Tree - <i>Chiranthodendron pentadactylon</i> . www.strangewonderfulthings.com/170.htm	"Inside each cup-shaped blossom is a glossy, red & yellow interior that almost looks like a porcelain goblet. Water collects in the upward-facing blooms and birds like to sit and drink the nectar. In the wild, the tree is said to be pollinated by bats! " [Possibly requires specialized pollination]

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. (1949). <i>Flora of Guatemala</i> . Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	"Cut stumps of the tree often send up new shoots, and the seeds appear to germinate readily, since quantities of seedlings have been observed in some places." [Regenerates from stumps, but no evidence of vegetative spread]

607	Minimum generative time (years)	>3
	Source(s)	Notes
	Trade Winds Fruit. (2016). Mexican Hand Tree - <i>Chiranthodendron pentadactylon</i> . http://www.tradewindsfruit.com/content/mexican-hand-tree.htm . [Accessed 5 Dec 2016]	"A fairly fast-growing medium or large sized tree growing to 40ft."
	Chiltern Seeds. (2016). <i>Chiranthodendron pentadactylon</i> - Monkey's Hand Tree. http://www.chilternseeds.co.uk/item_336q_chiranthodendron_pentadactylon_seeds . [Accessed 5 Dec 2016]	"Although you will have to wait for five years or so for your first flowers, from then on it will bloom continuously from April to October."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes

Qsn #	Question	Answer
	Standley, P.C. & Steyermark, J.A. (1949). Flora of Guatemala. Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	[No evidence. Capsules & seeds lack means of external attachment] "capsule oblong-ellipsoid, very hard and woody, 10-15 cm. long, deeply 5-lobate, the angles narrow and blunt-edged; aril of the seeds orange." ... "The seeds are large and heavy, and not readily dispersed to much distance."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Strange Wonderful Things. (2016). Devil's Hand Tree - <i>Chiranthodendron pentadactylon</i> . www.strangewonderfulthings.com/170.htm	"This is a very hard to find plant, and fresh seeds are rarely seen for sale."
	Trade Winds Fruit. (2016). Mexican Hand Tree - <i>Chiranthodendron pentadactylon</i> . http://www.tradewindsfruit.com/content/mexican-hand-tree.htm . [Accessed]	"Uses Planted as an ornamental."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. (1949). Flora of Guatemala. Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	"A large tree, 12-30 meters" ... "The seeds are large and heavy, and not readily dispersed to much distance." [No evidence. Unlikely that a large tree with relatively large seeds would become an inadvertent seed contaminant]

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. (1949). Flora of Guatemala. Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	"The seeds are large and heavy, and not readily dispersed to much distance."

705	Propagules water dispersed	n
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. (1949). Flora of Guatemala. Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	"capsule oblong-ellipsoid, very hard and woody, 10-15 cm. long, deeply 5-lobate, the angles narrow and blunt-edged; aril of the seeds orange." ... "The seeds are large and heavy, and not readily dispersed to much distance." [No evidence. Distribution, fruit & seed type suggest seeds are not water-dispersed]

706	Propagules bird dispersed	
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. (1949). Flora of Guatemala. Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	"capsule oblong-ellipsoid, very hard and woody, 10-15 cm. long, deeply 5-lobate, the angles narrow and blunt-edged; aril of the seeds orange." [Arillate seeds may be bird or ant dispersed]

Qsn #	Question	Answer
	Kelman, W. (1991). A Revision of <i>Fremontodendron</i> (Sterculiaceae). <i>Systematic Botany</i> , 16(1), 3-20	[Related genus may be ant-dispersed] "With many populations of <i>Fremontodendron</i> separated by long distances, dispersal is an important consideration, but one for which little published information is available. Two of the species have carunculate seeds. The presence of caruncles has been associated with ant dispersal in <i>F. decumbens</i> (Boyd 1988) ..."

707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. (1949). <i>Flora of Guatemala</i> . Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	"capsule oblong-ellipsoid, very hard and woody, 10-15 cm. long, deeply 5-lobate, the angles narrow and blunt-edged; aril of the seeds orange." [Arillate seeds may be ant dispersed]
	Kelman, W. (1991). A Revision of <i>Fremontodendron</i> (Sterculiaceae). <i>Systematic Botany</i> , 16(1), 3-20	[Related genus may be ant-dispersed] "With many populations of <i>Fremontodendron</i> separated by long distances, dispersal is an important consideration, but one for which little published information is available. Two of the species have carunculate seeds. The presence of caruncles has been associated with ant dispersal in <i>F. decumbens</i> (Boyd 1988) ..."

708	Propagules survive passage through the gut	
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. (1949). <i>Flora of Guatemala</i> . Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	"capsule oblong-ellipsoid, very hard and woody, 10-15 cm. long, deeply 5-lobate, the angles narrow and blunt-edged; aril of the seeds orange." [Unknown. Possible that Arillate seeds may be ingested]

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. (1949). <i>Flora of Guatemala</i> . Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	"capsule oblong-ellipsoid, very hard and woody, 10-15 cm. long, deeply 5-lobate, the angles narrow and blunt-edged; aril of the seeds orange." ... "The seeds are large and heavy, and not readily dispersed to much distance." [Unlikely, but seed densities unknown]

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	Notes
	García-Franco, J. G., & Perales Rivera, H. R. (1990). Note on the propagation and loss of viability of seeds of <i>Chiranthodendron pentadactylon</i> Larr. <i>Boletín de la Sociedad Botánica de México</i> , 50, 157-159	"Abstract : A note on germination and storage experiments on seed from 5 trees in Chiapas, Mexico. Germination was 39% in soil and 74% in vermiculite. The seed lost viability rapidly during storage at 4°C and at ambient temperatures, and no germination at all was obtained after storage for >2 months."
	Trade Winds Fruit. (2016). Mexican Hand Tree - <i>Chiranthodendron pentadactylon</i> . http://www.tradewindsfruit.com/content/mexican-hand-tree.htm . [Accessed 5 Dec 2016]	"Propagation By seeds, which should be planted fairly soon after harvest. They generally take a minimum of 6-8 weeks for germination, but often longer. "
	Royal Botanic Gardens Kew. (2016) Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/ . [Accessed 5 Dec 2016]	"Storage Behaviour: Recalcitrant? Storage Conditions: Viability lost after 2 months storage at 4°C or at ambient temperatures (García-Franco & Rivera, 1990)"

Qsn #	Question	Answer
	González-Espinosa, M., Meave, J.A., Lorea-Hernández, F.G., Ibarra-Manríquez, G. & Newton, A.C. (eds.). (2011). The Red List of Mexican Cloud Forest Trees. Fauna & Flora International, Cambridge, UK	"The seeds may remain viable for up to seven months at 4°C and less than 12% relative humidity."

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Standley, P.C. & Steyermark, J.A. (1949). Flora of Guatemala. Volume 24. Part VI. Fieldiana, Botany Series. Chicago Natural History Museum Press	"Cut stumps of the tree often send up new shoots,"

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Thrives in tropical climates
- Forms dense (but not pure) stands in native range
- Reproduces by seeds & resprouts from cut stumps
- Arillate seeds may be dispersed by birds or ants (uncertain)
- Cut stumps of the tree often send up new shoots

Low Risk Traits

- No reports of invasiveness or naturalization, but limited evidence of widespread introduction outside native range
- Unarmed (no spines, thorns, or burrs)
- Non-toxic
- Ornamental
- Not reported to spread vegetatively
- May require specialized pollinators (bats and possibly birds)
- Reaches maturity in 5+ years
- Seeds lose viability in <12 months & are unlikely to produce a persistent seed bank