

<b>Taxon:</b> <i>Jubaea chilensis</i> (Molina) Baill.	<b>Family:</b> Arecaceae
<b>Common Name(s):</b> Chilean coco palm Chilean wine palm coquito palm honey palm little cokernut syrup palm	<b>Synonym(s):</b> <i>Cocos chilensis</i> (Molina) Molina <i>Jubaea spectabilis</i> Kunth <i>Micrococos chilensis</i> (Molina) Phil. <i>Palma chilensis</i> Molina

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 23 Sep 2020
<b>WRA Score:</b> -5.0	<b>Designation:</b> L	<b>Rating:</b> Low Risk

**Keywords:** Temperate Palm, Unarmed, Fire-Resistant, Slow-Growing, Gravity-Dispersed

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)	Intermediate
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	n
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	n
302	Garden/amenity/disturbance weed		
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	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		

Qsn #	Question	Answer Option	Answer
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		
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	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	>3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed		
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
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
	Quattrocchi, U. (2017). CRC World Dictionary of Palms: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[No evidence] "in dry scrubby woodland, low forests, coastal areas, threatened ... Human food. Sweet mesocarp, edible seeds, edible oil from the seeds; nuts eaten as a snack food. Sweet fruits, seeds and sap used in sweetmeats, candies and wine. Extraction of palm sap for traditional palm honey, sugar and wine, destructive harvesting, unsustainable palm tapping. Fibres from the leaves."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2020). 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"	Intermediate
	Source(s)	Notes
	Quattrocchi, U. (2017). CRC World Dictionary of Palms: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"adapted to Mediterranean climates and dry warm temperate regions, unsuitable for humid tropics."
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm <i>Jubaea chilensis</i> : Una revisión de la enorme palma chilena <i>Jubaea chilensis</i> . <i>Caldasia</i> , 39(2), 183-203	" <i>Jubaea chilensis</i> grows in dry areas, mainly with a Mediterranean climate with low-to-medium rainfall (Rodríguez et al. 1983, Henderson et al. 1995). The species is found in valleys, close to streams and hillsides from the Chilean coastal mountain range (Urban 1934) to 1,600 m above sea level (Rundel and Weisser 1975)."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 19 Sep 2020]	"Native Southern America SOUTHERN SOUTH AMERICA: Chile (32-36 deg. S)"

Qsn #	Question	Answer
202	Quality of climate match data	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 19 Sep 2020]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Riffle, R.L.& Craft, P. 2003. An Encyclopedia of Cultivated Palms. Timber Press, Portland, OR.	"It is hardy to cold and is adaptable to zones 9 through 11 in areas subject to wet freezes in winter, and to zones 8 through 11 in drier, Mediterranean climes. The Chilean wine palm is not recommended for hot, humid climates like those found in Florida and along the Gulf coast; although it is perfectly hardy in most parts of these areas, it grows slow, is never as large or beautiful, and tends to die out because of year-round high heat and humidity and because of the little difference between daytime and nighttime temperatures. In cooler climates like those of southern California, the Mediterranean, South Africa, and areas of Australia, it is often the most magnificent palm grown."
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm <i>Jubaea chilensis</i> : Una revisión de la enorme palma chilena <i>Jubaea chilensis</i> . <i>Caldasia</i> , 39(2), 183-203	" <i>Jubaea chilensis</i> grows in dry areas, mainly with a Mediterranean climate with low-to medium rainfall (Rodríguez et al. 1983, Henderson et al. 1995). The species is found in valleys, close to streams and hillsides from the Chilean coastal mountain range (Urban 1934) to 1,600 m above sea level (Rundel and Weisser 1975). Moreover, it is among the few pinnate-leaved palm species that can survive temperatures from -10 to -12°C, withstanding temperatures as low as -22°C, like in Perpignan, France, in the year 1956 (Del Cañizo 2011). Its natural distribution, including areas with extreme temperatures, indicates that <i>J. chilensis</i> is tolerant to cold, a marked difference from many tropical palm species. This feature has enabled the Chilean palm to grow successfully in some places quite far south in Chile like Frutillar (Region of Lagos, 41° 7' S, 73° 3' W), with a mean temperature of 7.5 °C in the coldest month and a minimum extreme temperature of 4.1 °C (CLIMATE-DATA.ORG 2015) and other places in the world as described in the section "Uses around the world". Within its natural range, the species withstands a mean temperature range of 8.8 °C to 20.2 °C (Santibáñez et al. 1990, 1993)"

204	Native or naturalized in regions with tropical or subtropical climates	n
	Source(s)	Notes
	Quattrocchi, U. (2017). CRC World Dictionary of Palms: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"adapted to Mediterranean climates and dry warm temperate regions, unsuitable for humid tropics."

Qsn #	Question	Answer
	Janick, J.& Paull, R.E. 2008. The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"Jubaea chilensis is adapted to a Mediterranean climate with wet winters and dry summers, and performs best in similar climates elsewhere in the world. As a rule, it does grow very well in humid subtropical and tropical climates."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 19 Sep 2020]	"Native Southern America SOUTHERN SOUTH AMERICA: Chile (32-36 deg. S)"
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Zona, S. (2011). The Travels of Jubaea. Pacific Horticulture 72(1): 14-19	"Jubaea chilensis continues to be a popular palm around the world in regions with mediterranean climates, and the aesthetic attributes recognized by horticulturists in the nineteenth century continue to attract devotees to this marvelous palm in the twenty-first."
	Dave's Garden. (2020). Jubaea chilensis. <a href="https://davesgarden.com/guides/pf/go/57181/">https://davesgarden.com/guides/pf/go/57181/</a> . [Accessed 21 Sep 2020]	"Regional "This plant is said to grow outdoors in the following regions: Anniston, Alabama Berkeley, California Brentwood, California Encino, California Fresno, California Newark, California Oceanside, California Orland, California Rancho Cucamonga, California San Diego, California(3 reports) San Jose, California San Leandro, California Santa Barbara, California Santa Cruz, California Saratoga, California Union City, California Vista, California(9 reports) Willits, California Chicago, Illinois Centreville, Maryland Edmond, Oklahoma Galveston, Texas Victoria, Texas Belfair, Washington Kent, Washington Shoreline Washington"

301	Naturalized beyond native range	n
	Source(s)	Notes
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

Qsn #	Question	Answer
303	<b>Agricultural/forestry/horticultural weed</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	<b>Environmental weed</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

305	<b>Congeneric weed</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	"Only one sp., f. chilensis (Molina) Baill., Central Chile."

401	<b>Produces spines, thorns or burrs</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	[No evidence] "Solitary, massive tree. Petiole unarmed; leaflets single-fold, tips acute or hooked. Inflorescence branched to 1 order; peduncular bract, smooth. Staminate flowers stalked, asymmetrical; sepals 3, basally connate; petals 3, distinct; stamens 18, filaments inflexed, anthers rectangular, medifixed, latrorse; pollen sulcate, exine tectate, foveolate. Staminal ring forming a low collar. Fruit 1-seeded, beaked; epicarp smooth, endocarp smooth, thick, with 3 low crests, pores lateral below equator."

402	<b>Allelopathic</b>	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. (2020). Personal Communication	Unknown. No evidence found

403	<b>Parasitic</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	"Solitary, massive tree." [Arecaceae. No evidence]

404	<b>Unpalatable to grazing animals</b>	n
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	González, L., Navarro, R. M., Bustamante Araya, R., Herrera, M. Á., & Toral Ibáñez, M. (2009). Ecology and management of the Chilean Palm ( <i>Jubaea chilensis</i> ): history, current situation and perspectives. <i>Palms</i> 53(2): 68–74	"Also, seedlings are actively consumed by exotic rabbits, which is thus an additional limitation for regeneration (Marcelo 2007)." [Seedlings palatable to rabbits, and potentially other browsing animals]
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm <i>Jubaea chilensis</i> : Una revisión de la enorme palma chilena <i>Jubaea chilensis</i> . <i>Caldasia</i> , 39(2), 183-203	"The European rabbit ( <i>Oryctolagus cuniculus</i> Linnaeus, 1785) is a non-native species that feeds on Chilean palm seedlings (Rubinstein 1969, Marcelo et al. 2006). There is also the presence of grazing cattle (González 1992)."

405	Toxic to animals	n
	Source(s)	Notes
	Plants for a Future. (2020). <i>Jubaea chilensis</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 21 Sep 2020]	"Known Hazards - None known"
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm <i>Jubaea chilensis</i> : Una revisión de la enorme palma chilena <i>Jubaea chilensis</i> . <i>Caldasia</i> , 39(2), 183-203	"Another threat are diseases, but with a minor impact. At the national level, some fungi attacks have been described in the leaves of <i>J. chilensis</i> (Baldini and Pancel 2002). At the international level, several pests have been described as affecting the Chilean palm. In France, <i>J. chilensis</i> can be affected by the caterpillars of the moth <i>Paysandisia archon</i> Burmeister, 1880 (Peltier 2007) and in Italy, the palm is sensitive to coleopteran <i>Rhynchophorus ferrugineus</i> Olivier, 1790 (Raciti et al. 2013)."
	CABI. (2020). <i>Jubaea chilensis</i> . In: <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	"Minor host of: <i>Rhynchophorus ferrugineus</i> (red palm weevil)"
	Zona, S. (2011). The Travels of <i>Jubaea</i> . <i>Pacific Horticulture</i> 72(1): 14-19	"Once established, they are drought-tolerant and untroubled by pests"

Qsn #	Question	Answer
407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Plants for a Future. (2020). <i>Jubaea chilensis</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 21 Sep 2020]	"Known Hazards - None known"
	Janick, J.& Paull, R.E. 2008. The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	[No evidence] "The sweet, fleshy mesocarp of the fruit is eaten fresh, and the nuts (endocarp and endosperm) are either eaten fresh or used to make various confections. The main traditional use for the palm was the tapping of the stem for sap collection as a sugar source (and fermented as a source of palm wine). The palm is decapitated for this purpose."
	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

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm <i>Jubaea chilensis</i> : Una revisión de la enorme palma chilena <i>Jubaea chilensis</i> . <i>Caldasia</i> , 39(2), 183-203	[Affected by fires, but unlikely to contribute to fire risk or fuel load] "Fires affect both associated vegetation and palm seedlings (Rubinstein 1969). Fires do not greatly affect adult palm trees because their trunks are resistant to fire. Nevertheless, Chilean palm trees regularly regenerate themselves after fires provided they are not located on bare ground (Quintanilla and Reyes 1999), and there are enough seeds available and low levels of herbivorous feeding."

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes
	Plants for a Future. (2020). <i>Jubaea chilensis</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 23 Sep 2020]	"It cannot grow in the shade."
	Dave's Garden. (2020). <i>Jubaea chilensis</i> . <a href="https://davesgarden.com/guides/pf/go/57181/">https://davesgarden.com/guides/pf/go/57181/</a> . [Accessed 23 Sep 2020]	"Sun Exposure: Full Sun"
	Palmpedia. (2020). <i>Jubaea chilensis</i> . <a href="https://www.palmpedia.net/wiki/Jubaea_chilensis">https://www.palmpedia.net/wiki/Jubaea_chilensis</a> . [Accessed 23 Sep 2020]	"Sun Requirements: Full sun to light shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Riffle, R.L.& Craft, P. 2003. An Encyclopedia of Cultivated Palms. Timber Press, Portland, OR.	"It is not particular about soil type as long as it is fast draining, and it needs as much sun as possible."
	Plants for a Future. (2020). <i>Jubaea chilensis</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 21 Sep 2020]	"Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: acid, neutral and basic (alkaline) soils. It cannot grow in the shade. It prefers moist soil."

411	Climbing or smothering growth habit	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	"Solitary, massive tree."

412	Forms dense thickets	
	<b>Source(s)</b>	<b>Notes</b>
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm <i>Jubaea chilensis</i> : Una revisión de la enorme palma chilena <i>Jubaea chilensis</i> . <i>Caldasia</i> , 39(2), 183-203	[Dense stands of these trees occurred naturally prior to harvesting and land change. The slow growth, and long time to maturity, suggest that any formation of dense stands outside the native range are unlikely to occur] "In 1853 the famous French naturalist Claude Gay (1800 – 1873) pointed out that the Chilean palms formed rather dense stands that unfortunately were rapidly diminishing as a result of their indiscriminate harvesting for the extraction of palm honey or sap." ... "In The History of the Kingdom of Chile, the Jesuit priest Alonso De Ovalle stated that these palm trees grow so densely in mountains and ravines that from afar they appear placed there by magic (De Ovalle 1646). This enabled the species to have a continuous population throughout its natural distribution. Nowadays, the Chilean palm population is drastically reduced to approximately 123000 trees (Alvarado 2009, González et al. 2009)."

501	Aquatic	n
	<b>Source(s)</b>	<b>Notes</b>
	Janick, J. & Paull, R.E. 2008. The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	[Terrestrial] "The habitat of the Chilean wine palm is dry river courses or sparsely vegetated Andean foothills of western Chile between 32° and 35°S latitude at low elevation, but the range is now much more restricted."

502	Grass	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 21 Sep 2020]	Family: Arecaceae Subfamily: Arecoideae Tribe: Cocoseae Subtribe: Attaleinae

503	Nitrogen fixing woody plant	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 21 Sep 2020]	Family: Arecaceae Subfamily: Arecoideae Tribe: Cocoseae Subtribe: Attaleinae

Qsn #	Question	Answer
504	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	"Solitary, massive tree."

601	<b>Evidence of substantial reproductive failure in native habitat</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	González, L., Navarro, R. M., Bustamante Araya, R., Herrera, M. Á., & Toral Ibáñez, M. (2009). Ecology and management of the Chilean Palm ( <i>Jubaea chilensis</i> ): history, current situation and perspectives. <i>Palms</i> 53(2): 68–74	[Population reduced to overharvesting] "The Chilean palm, <i>Jubaea chilensis</i> (Front Cover), one of the most emblematic tree species of the Chilean flora, has suffered a gradual reduction of its population numbers in the last 150 years, with the estimated 120,000 palms that exist today being no more than 2.5% of the existing population found at the beginning of the 19th Century. From an economic point of view, this plant has been one of the most prized species in the central zone of Chile due to its two valuable products – its sap, the basis of the traditional palm honey industry, and its seeds (mini-coconuts), which are also an important product for the food industry. Along with a history of extensive use, there has been a drastic reduction of the accompanying native vegetation due to anthropogenic activities, thus reducing the appropriate habitats for the natural regeneration of this species."

602	<b>Produces viable seed</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm <i>Jubaea chilensis</i> : Una revisión de la enorme palma chilena <i>Jubaea chilensis</i> . <i>Caldasia</i> , 39(2), 183-203	"Inside the fruit there is a smooth spherical seed 2 cm in diameter and weighing approximately 2.6 g" ... "An individual produces 10,000 fruits in a good year (Urban 1934)."
	Ellison, D. & Ellison, A. 2001. <i>Cultivated Palms of the World</i> . UNSW Press, Sydney, Australia	"The ripe fruit is brown to yellow and the hard seeds should be fresh for germination, which is very erratic and can take over a year."

603	<b>Hybridizes naturally</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm <i>Jubaea chilensis</i> : Una revisión de la enorme palma chilena <i>Jubaea chilensis</i> . <i>Caldasia</i> , 39(2), 183-203	[Unknown. Artificial hybrid possible] "Because of its size and great ornamental value, the Chilean palm is currently raised in nurseries, including for exportation, and even adult palms are transplanted for landscaping. As well, <i>J. chilensis</i> and <i>Butia odorata</i> have been used as parent plants to obtain the interspecific hybrid <i>Jubautia</i> and the species <i>Jubautia splendens</i> Hodel (Hodel 2011)."

604	<b>Self-compatible or apomictic</b>	

Qsn #	Question	Answer
	Source(s)	Notes
	Quattrocchi, U. (2017). CRC World Dictionary of Palms: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Unknown, but possible] "protandrous, pleoanthic, monoecious, open fibrous leaf sheaths, no crownshaft, flattened old leaf scars, leaf bases abscissing, dense crown of large grey-green coarse pinnate leaves stiffly spreading, petiole margins smooth and/or with fibers, lack of spines on the petioles, leaflets reduplicate, pinnae in groups of 2–5, large solitary pendulous inflorescences borne among the leaves and branching to 1 order, smooth or striate woody peduncular bract covered with brown feltlike indumentum, unisexual flowers, staminate flowers borne on a short stalk, more than six stamens, staminate flowers with connate sepals"
	González, L., Navarro, R. M., Bustamante Araya, R., Herrera, M. Á., & Toral Ibáñez, M. (2009). Ecology and management of the Chilean Palm ( <i>Jubaea chilensis</i> ): history, current situation and perspectives. <i>Palms</i> 53(2): 68–74	[Unknown] "In spite of the interest generated by <i>J. chilensis</i> in our country, scientific knowledge of this species in key aspects of its biology, such as reproduction, population regeneration or the biological interactions in which it is involved (pollination, frugivory and herbivory), are surprisingly scarce. Nothing is known about the population genetics of this species or of its reproduction systems. This lack of information is serious since this knowledge is essential to elucidate how to assure the persistence of this species under natural conditions."

605	Requires specialist pollinators	n
	Source(s)	Notes
	González, L., Navarro, R. M., Bustamante Araya, R., Herrera, M. Á., & Toral Ibáñez, M. (2009). Ecology and management of the Chilean Palm ( <i>Jubaea chilensis</i> ): history, current situation and perspectives. <i>Palms</i> 53(2): 68–74	[Although specific pollinators have not been identified, there is no evidence to suggest that this species is adapted for specialized pollination] "In spite of the interest generated by <i>J. chilensis</i> in our country, scientific knowledge of this species in key aspects of its biology, such as reproduction, population regeneration or the biological interactions in which it is involved (pollination, frugivory and herbivory), are surprisingly scarce. Nothing is known about the population genetics of this species or of its reproduction systems."
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	[Family description] "Pollination. It is only relatively recently (Uhl and Moore 1977) that the myth (Delpino 1870) that palms are wind-pollinated has been dispelled. During the past decade, it has been shown that many palms are insect-pollinated (Henderson 1986), or, even if primarily anemophilous, that entomophily occurs, as in <i>Aiphanes</i> (Listabarth 1992). True anemophily does indeed occur (e.g., in <i>Thrinax</i> ) but even the date palm, <i>Phoenix dactylifera</i> , may in fact be secondarily anemophilous. Large quantities of pollen, a feature of the syndrome of wind pollination, seem, at least in some palms, to be an adaptation to predation by insects. Different pollination syndromes have been observed for many insects including flies, bees, ants, and beetles (Henderson 1986 and others). The large incidence of beetle pollination is noteworthy. In some cases, exine sculpturing appears correlated with pollination syndromes. <i>Iriartea</i> , shown by Henderson (1985) to be beepollinated, has a finely reticulate exine whereas beetle-pollinated <i>Socratea</i> has spiny pollen grains (Harley 1996)."

606	Reproduction by vegetative fragmentation	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Zona, S. (2011). The Travels of Jubaea. Pacific Horticulture 72(1): 14-19	"They are propagated exclusively by seeds, which are difficult and slow to germinate. Seedling palms are relatively slow growing and slow to build their massive trunks."

607	Minimum generative time (years)	>3
	<b>Source(s)</b>	<b>Notes</b>
	Zona, S. (2011). The Travels of Jubaea. Pacific Horticulture 72(1): 14-19	"Cobo described the general appearance of the palm and that of the fruits, its place of origin, and the protracted juvenile period. He noted that a forty-year-old palm cultivated in Lima had not yet flowered."
	Janick, J. & Paull, R.E. 2008. The Encyclopedia of Fruit and Nuts. CABI Publishing, Wallingford, UK	"REPRODUCTIVE BIOLOGY AND FRUIT DEVELOPMENT Flowering is from November to December in habitat (May to June in the northern hemisphere), with fruit that ripen starting in January (July in the northern hemisphere). Individual palms may require as much as 60 years before they flower and fruit."
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm <i>Jubaea chilensis</i> : Una revisión de la enorme palma chilena <i>Jubaea chilensis</i> . <i>Caldasia</i> , 39(2), 183-203	[40+ years] "The thinnest part in mature individuals (Fig. 3d) is explained as a physiological variation produced after the first flowering and fruiting, which generates a loss of vegetative vigor and a reduction in meristematic activity in the apex (Rubinstein 1969, Senerman 1970). Consequently, the height at which the thinnest portion of the trunk begins indicates when the first flowering occurred, when the plant changed from the mature vegetative to mature reproductive stage. This happens when the plant is 10 to 13 m high and circa 40 years old (Rubinstein 1969)."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	<b>Source(s)</b>	<b>Notes</b>
	Miranda, A., Hernández, H. J., Bustamante, R., DÍAZ, E., González, L. A., & Altamirano, A. (2016). Natural regeneration and spatial distribution patterns of Chilean palm <i>Jubaea chilensis</i> (Molina) Baillon in Mediterranean forests of Central Chile. <i>Gayana. Botánica</i> , 73(1), 54-63	"debido al mecanismo de dispersión de semillas por gravedad," [Translation from Spanish: "due to the seed dispersal mechanism by gravity"]
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm <i>Jubaea chilensis</i> : Una revisión de la enorme palma chilena <i>Jubaea chilensis</i> . <i>Caldasia</i> , 39(2), 183-203	[No evidence. No means of external attachment] "The fruits are drupes with fibrous and smooth 2.2-cm-long spherical exocarpe and a green-yellow skin towards yellow-orange (Figs. 5c– f) (Urban 1934, Muñoz 1971, Camilo 2008). The mesocarpe is fleshy and eatable. Inside the fruit there is a smooth spherical seed 2 cm in diameter and weighing approximately 2.6 g (Rodríguez et al. 1983, Camilo 2008)."

Qsn #	Question	Answer
702	<b>Propagules dispersed intentionally by people</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Zona, S. (2011). The Travels of Jubaea. Pacific Horticulture 72(1): 14-19	"Jubaea chilensis continues to be a popular palm around the world in regions with mediterranean climates, and the aesthetic attributes recognized by horticulturists in the nineteenth century continue to attract devotees to this marvelous palm in the twenty-first."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm Jubaea chilensis: Una revisión de la enorme palma chilena Jubaea chilensis. <i>Caldasia</i> , 39(2), 183-203	[No evidence. Large fruit and seed size and long time to maturity suggest this vector of dispersal is highly improbable] "The fruits are drupes with fibrous and smooth 2.2-cm-long spherical exocarpe and a green-yellow skin towards yellow-orange (Figs. 5c– f) (Urban 1934, Muñoz 1971, Camilo 2008). The mesocarpe is fleshy and eatable. Inside the fruit there is a smooth spherical seed 2 cm in diameter and weighing approximately 2.6 g (Rodríguez et al. 1983, Camilo 2008)."

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm Jubaea chilensis: Una revisión de la enorme palma chilena Jubaea chilensis. <i>Caldasia</i> , 39(2), 183-203	"The fruits are drupes with fibrous and smooth 2.2-cm-long spherical exocarpe and a green-yellow skin towards yellow-orange (Figs. 5c– f) (Urban 1934, Muñoz 1971, Camilo 2008). The mesocarpe is fleshy and eatable. Inside the fruit there is a smooth spherical seed 2 cm in diameter and weighing approximately 2.6 g (Rodríguez et al. 1983, Camilo 2008)."

705	Propagules water dispersed	
	Source(s)	Notes
	Miranda, A., Hernández, H. J., Bustamante, R., DÍAZ, E., González, L. A., & Altamirano, A. (2016). Natural regeneration and spatial distribution patterns of Chilean palm <i>Jubaea chilensis</i> (Molina) Baillon in Mediterranean forests of Central Chile. <i>Gayana. Botánica</i> , 73(1), 54-63	"debido al mecanismo de dispersión de semillas por gravedad," [Translation from Spanish: "due to the seed dispersal mechanism by gravity"]
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm Jubaea chilensis: Una revisión de la enorme palma chilena Jubaea chilensis. <i>Caldasia</i> , 39(2), 183-203	[Although direct evidence is lacking, proximity to streams suggest seeds could be moved by water] "The species is found in valleys, close to streams and hillsides from the Chilean coastal mountain range (Urban 1934) to 1,600 m above sea level (Rundel and Weisser 1975)."

706	Propagules bird dispersed	
	Source(s)	Notes

Qsn #	Question	Answer
	Miranda, A., Hernández, H. J., Bustamante, R., DÍAZ, E., González, L. A., & Altamirano, A. (2016). Natural regeneration and spatial distribution patterns of Chilean palm <i>Jubaea chilensis</i> (Molina) Baillon in Mediterranean forests of Central Chile. <i>Gayana. Botánica</i> , 73(1), 54-63	"debido al mecanismo de dispersión de semillas por gravedad," [Translation from Spanish: "due to the seed dispersal mechanism by gravity"]
	Hoffmann, A. J., & Armesto, J. J. (1995). Modes of seed dispersal in the Mediterranean regions in Chile, California, and Australia. In <i>Ecology and biogeography of Mediterranean ecosystems in Chile, California, and Australia</i> (pp. 289-310). Springer, New York, NY	"Rodents may feed on fruit and seeds but we know no evidence of scatter-hoarding behavior that may contribute to dispersal. Native and introduced rodents consume the fruit of the Chilean palm ( <i>Jubaea chilensis</i> ), probably without hoarding. Today, however, less than 5% of the fruit crop of this species falls to the ground because of harvesting for human consumption (L. Yates, pers. comm.)."
	WRA Specialist. (2020). Personal Communication	Fleshy fruit could possibly be dispersed by birds, but direct evidence is lacking. In addition, the lack of large, flighted frugivorous birds in the Hawaiian Islands would limit long distance dispersal by this means.

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	González, L., Navarro, R. M., Bustamante Araya, R., Herrera, M. Á., & Toral Ibáñez, M. (2009). Ecology and management of the Chilean Palm ( <i>Jubaea chilensis</i> ): history, current situation and perspectives. <i>Palms</i> 53(2): 68–74	[Rodents may disperse seeds by carrying them away from trees, but primarily serve as seed predators. Fruit and seeds otherwise lack means of external attachment] "On the other hand, the seeds of the Chilean palm are actively consumed by native (e.g., <i>Octodon degus</i> ; Zunino et al. 1992, Yates et al. 1994) and introduced rodents, an important mortality factor that requires evaluation."

708	Propagules survive passage through the gut	
	Source(s)	Notes
	Hoffmann, A. J., & Armesto, J. J. (1995). Modes of seed dispersal in the Mediterranean regions in Chile, California, and Australia. In <i>Ecology and biogeography of Mediterranean ecosystems in Chile, California, and Australia</i> (pp. 289-310). Springer, New York, NY	[Unknown. Seed predators consume and destroy seeds] "Rodents may feed on fruit and seeds but we know no evidence of scatter-hoarding behavior that may contribute to dispersal. Native and introduced rodents consume the fruit of the Chilean palm ( <i>Jubaea chilensis</i> ), probably without hoarding. Today, however, less than 5% of the fruit crop of this species falls to the ground because of harvesting for human consumption (L. Yates, pers. comm.)."

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm <i>Jubaea chilensis</i> : Una revisión de la enorme palma chilena <i>Jubaea chilensis</i> . <i>Caldasia</i> , 39(2), 183-203	[Possibly, after decades of growth] "Inside the fruit there is a smooth spherical seed 2 cm in diameter and weighing approximately 2.6 g" ... "An individual produces 10,000 fruits in a good year (Urban 1934)." [Each 2 cm seed occupies a potential space of 3.14 cm <sup>2</sup> . One m <sup>2</sup> consists of 10000 cm <sup>2</sup> . If all 10,000 seeds were produced in a good year, and their distribution was condensed to a small area, seed densities could hypothetically reach a density of 3,185/m <sup>2</sup> . A large stand of trees could therefore hypothetically reach such high densities, although this scenario is highly improbable.]

Qsn #	Question	Answer
802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Royal Botanic Gardens Kew. (2020) Seed Information Database (SID). Version 7.1. Available from: <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a> . [Accessed 23 Sep 2020]	"Storage Behaviour: Uncertain Storage Conditions: Leon (1961) classified this genus in the long-lived seed class."
	Ellison, D. & Ellison, A. 2001. Cultivated Palms of the World. UNSW Press, Sydney, Australia	"The ripe fruit is brown to yellow and the hard seeds should be fresh for germination, which is very erratic and can take over a year."

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	Guzmán, E., Alcalde, J., Contreras, S., & Fernández, M. (2017). A review of the massive Chilean palm <i>Jubaea chilensis</i> : Una revisión de la enorme palma chilena <i>Jubaea chilensis</i> . <i>Caldasia</i> , 39(2), 183-203	[Adult plants tolerate fire, but seedlings are killed. Felling of adult trees resulted in a dramatic reduction in palm numbers in the past] "Fires affect both associated vegetation and palm seedlings (Rubinstein 1969). Fires do not greatly affect adult palm trees because their trunks are resistant to fire. Nevertheless, Chilean palm trees regularly regenerate themselves after fires provided they are not located on bare ground (Quintanilla and Reyes 1999), and there are enough seeds available and low levels of herbivorous feeding."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	Unknown if other palm pests or pathogens in the Hawaiian Islands would be limiting factors for this species

**Summary of Risk Traits:**

High Risk / Undesirable Traits

- Broad elevation and temperature range, but primarily a palm of temperate and Mediterranean climates
- Tolerates many soil types
- Formed dense stands within native range (but exploitation has reduced current numbers)
- Reproduces by seeds
- Seeds dispersed by gravity, people and possibly frugivorous animals (although direct evidence is lacking)
- Potentially prolific seed production (up to 10,000 per tree)
- Adult trees are resistant to fire (but seedlings are killed)

Low Risk Traits

- No reports of invasiveness or naturalization
- Unarmed (no spines, thorns, or burrs)
- Seedlings palatable to browsing animals
- Non-toxic
- Requires full sun, or high light levels
- Slow growth rate and long time to reproductive maturity (40-60 years)
- Not reported to spread vegetatively
- Relatively large fruit and seeds, and long time to maturity, make accidental dispersal highly unlikely