Family: ***Fabaceae***

Taxon: ***Acacia cochliacantha***

Synonym: *Acacia cymbispina Sprague & L. Riley*

Common Name Boat Thorn Acacia
huinolo
espino
güinole

Questionaire : current 20090513 **Assessor:** Chuck Chimera **Designation:** H(HPWRA)

Status: Assessor Approved **Data Entry Person:** Chuck Chimera **WRA Score** 10

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

411	**Climbing or smothering growth habit**	**y=1, n=0**	**n**
412	**Forms dense thickets**	**y=1, n=0**	**y**
501	**Aquatic**	**y=5, n=0**	**n**
502	**Grass**	**y=1, n=0**	**n**
503	**Nitrogen fixing woody plant**	**y=1, n=0**	**y**
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**	
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**	**2**
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**	**n**
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**	**y=1, n=-1**	
707	**Propagules dispersed by other animals (externally)**	**y=1, n=-1**	**n**
708	**Propagules survive passage through the gut**	**y=1, n=-1**	**y**
801	**Prolific seed production (>1000/m2)**	**y=1, n=-1**	
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	**y=1, n=-1**	**y**
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: H(HPWRA) **WRA Score** **10**

Supporting Data:

101	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	No evidence
102	2011. WRA Specialist. Personal Communication.	NA
103	2011. WRA Specialist. Personal Communication.	NA
201	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	"Distribution. Disturbed, relatively dry sites from sea level to about 1800 m in western and southern Mexico"
202	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	"Distribution. Disturbed, relatively dry sites from sea level to about 1800 m in western and southern Mexico"
203	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	"Distribution. Disturbed, relatively dry sites from sea level to about 1800 m in western and southern Mexico" [elevation range exceeds 1000 m; displays potential environmental versatility]
204	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	"Distribution. Disturbed, relatively dry sites from sea level to about 1800 m in western and southern Mexico"
205	2011. WRA Specialist. Personal Communication.	No evidence
301	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	No evidence
302	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	No evidence
303	2002. Yetman, D./Van Devender, T.R.. Mayo ethnobotany: land, history, and traditional knowledge in northwest Mexico. University of California Press, Berkeley and Los Angeles, CA	"It is one of the few plants able to compete successfully with buffelgrass in fields cleared of tropical deciduous forest. Once the plants attain sufficient size to shade buffelgrass, chirajo can win the contest. Aggressive invader of overgrazed pastures, its numbers are on the increase, and it is much condemned by ranchers." [native agricultural pest]
304	2007. Randall, R.P.. Global Compendium of Weeds - Index [Online Database]. http://www.hear.org/gcw/	No evidence
305	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	Acacia baileyana, A. cyclops, A. dealbata, A. longifolia, A. mearnsii, A. melanoxylon, A. nilotica, A. pyracantha, and A. saligna listed as significant environmental weeds of natural areas.
401	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	"Shrub or small tree to 6 m tall; young twigs glabrous to lightly pubescent; mature twigs usually glabrous. Spines flattened, becoming spoon-shaped with age, to 60 mm long and 40 mm wide, glabrous...Leaves bipinnately compound, to 140 mm long, 15-45 mm wide, with 10-28 pairs of pinnae; petioles glabrous to lightly pubescent, less than 10 mm long; rachis glabrous to lightly pubescent; petiolar glands solitary, stalked, the apex 0.3-0.8 mm across. Leaflets 0.8 2.4 mm long, 0.3-0.6 mm wide, glabrous. Inflorescence a dense globose cluster 5- 8 mm across, solitary to a few (rarely 8) in the axils of the leaves; peduncles glabrous to lightly pubescent, 6-15 mm long; receptacles glabrous."
402	2002. Camargo-Ricalde, S.L./Dhillion, S.S./Grether, R.. Community Structure of Endemic Mimosa Species and Environmental Heterogeneity in a Semi-Arid Mexican Valley. Journal of Vegetation Science. 13(5): 697-704.	No evidence of allelopathy
402	2002. Yetman, D.. The Guarijíos of the Sierra Madre: hidden people of northwestern Mexico. University of New Mexico Press, Albuquerque, NM	"In areas with disturbed soil, sinala occurs in pure stands of thousands of individuals. It is often considered a nuisance…Few other tree species in the region manage to become established in such extensive pure stands. Natives believe the chirahui affect the soil, preventing other trees from becoming established." [potentially allelopathic]

402	2008. Flores-Martínez, A./Manzanero M, G.I.,/Rojas-Aréchiga, M./Mandujano, M.C./Golubov, J.. Seed Age Germination Responses and Seedling Survival of an Endangered Cactus That Inhabits Cliffs. Natural Areas Journal. 28(1): 51-57.	"Individual plants of M. huitzilopochtli have been found under different microenvironmental conditions (Flores-Martínez and Manzanero 2005); in some populations, individuals can be found either in bare areas or under the canopies of nurse plants such as: Opuntia spp., Bursera morelensis, Plumeria rubra, Cercidium praecox, Acacia cochliacantha, A. farnesiana, Amphypteringium adstringens, and Cnidosculus multilobus (Flores-Martínez and Manzanero 2005)." [acts as a nurse tree for an endangered cactus, no evidence of allelopathy]
403	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	"Shrub or small tree to 6 m tall" [no evidence that A. cochliacantha is parasitic]
404	2002. Yetman, D.. The Guarijíos of the Sierra Madre: hidden people of northwestern Mexico. University of New Mexico Press, Albuquerque, NM	"The pechitas (pods) are good livestock fodder. In times of drought burrs tear off and consume long strips of bark. Their depredations may even kill most of the aboveground part of the trees, although new shoot will usually appear from the base."
404	2002. Yetman, D./Van Devender, T.R.. Mayo ethnobotany: land, history, and traditional knowledge in northwest Mexico. University of California Press, Berkeley and Los Angeles, CA	"Livestock: In times of scarcity burros strop long sections of bark from the tree and apparently consume it to their benefit. Most larger chirajo trees in the vicinity of homes bear heavy scars." [bark somewhat palatable, but spines likely deter browsing]
405	1987. Seigler, D.S./Ebinger, J.E.. Cyanogenic Glycosides in Ant-Acacias of Mexico and Central America. The Southwestern Naturalist. 32(4): 499-503.	"Many plants synthesize compounds that liberate hydrogen cyanide upon hydrolysis. This phenomenon, known as cyanogenesis, has been recognized for centuries, and cyanogenic glycosides are now known to occur in at least 2,050 species of plants representing about 110 families (Seigler, 1981)...Cyanogenesis is common among species of Acacia L. (Fabaceae: Mimosoideae). Nearly 50 species of Acacia from South Africa and Australia have been shown to contain cyanogenic glycosides...The principal cyanogenic glycoside of Acacia atramentaria Benth., Acacia chiapensis Safford, Acacia cochliacantha Humb. & Bonpl. ex Willd., Acacia constricta A. Gray, Acacia hindsii Benth., Acacia macracantha Humb. & Bonpl. ex Willd., Acacia tortuosa (L.) Willd., and two varieties of Acacia schaffneri (S. Wats.) F. J. Herm. Is proacacipetalin (Seigler et al., 1976; Seigler et al., 1978)."
405	2002. Yetman, D./Van Devender, T.R.. Mayo ethnobotany: land, history, and traditional knowledge in northwest Mexico. University of California Press, Berkeley and Los Angeles, CA	No evidence of toxicity to animals
406	2011. WRA Specialist. Personal Communication.	Unknown
407	2002. Yetman, D.. The Guarijíos of the Sierra Madre: hidden people of northwestern Mexico. University of New Mexico Press, Albuquerque, NM	"Food: Feliciano Armenta reports that the seeds in tender green pods are edible and often are eaten right off the tree by travelers. Gentry (1963:93) found that Guarijios ground the seeds into powder for making atol or tortiallas." [tree with uses as food & medicine, with no evidence of acture or accidental toxicity]
408	2011. Cantarello, E./Newton, A.C./Hill, R.A. et al.. Simulating the potential for ecological restoration of dryland forests in Mexico under different disturbance regimes. Ecological Modelling. 222: 1112–1128.	"Among anthropogenic disturbances, fire and grazing by livestock have caused the most serious degradation of TDF in Mexico. For example, Maass (1995) reported that cattle ranching has expanded rapidly during the past 50 years, and is now considered to be the main cause of TDF degradation. Roman Cuesta et al. (2007) reported that in recent decades fire has become one of the most important threats to the conservation of TDF. In 1998, Mexico experienced fires which burned the largest area of forest ever affected in a single season… [ability to form dense thickets (see 4.12) & ability to resprout following fires (see 8.04) likely increases fire hazard in natural ecosystems]
409	2011. Cantarello, E./Newton, A.C./Hill, R.A. et al.. Simulating the potential for ecological restoration of dryland forests in Mexico under different disturbance regimes. Ecological Modelling. 222: 1112–1128.	"Table 2...Acacia cochliacantha...ShT = 1...ShT, shade tolerance class (1–5, with 1 for the most shade intolerant and 5 for the most shade tolerant)" [listed as shade intolerant]
410	2004. Blanckaert, I./Swennen, R.L./Paredes Flores, M. et al.. Floristic composition, plant uses & management practices in homegardens of San Rafael Coxcatlan, Valley of Tehuaclan-Cuicatlan, Mexico. Journal of Arid Environments 57: 39–62. 57: 39–62.	"The dominant vegetation in the region is a thorn scrub forest with species like Bursera morelensis Ramirez, B. optera Ram!ırez, Pachycereus weberi (J. Coulter) Backeb, Opuntia puberula Pfeiffer, Ceiba parvifolia Rose and Acacia cochliacantha Humb. & Bonpl. ex Willd (Rzedowski,1978 ; Casas et al.,2001). The soils in the region are poorly developed, and can be divided into regosols, predominated by calcaric and eutric regosols,and xerosols,predomi nated by haplic xerosols."
410	2011. WRA Specialist. Personal Communication.	Soil tolerances unknown

411	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	"Shrub or small tree to 6 m tall" [not climbing or smothering]
412	2001. Felger, R.S./Johnson, M.B./Wilson, M.F.. The trees of Sonora, Mexico. Oxford University Press US, New York, NY	"…often forming impenetrable spiny thickets."
412	2002. Yetman, D.. The Guarijíos of the Sierra Madre: hidden people of northwestern Mexico. University of New Mexico Press, Albuquerque, NM	"In areas with disturbed soil, sinala occurs in pure stands of thousands of individuals. It is often considered a nuisance…Few other tree species in the region manage to become established in such extensive pure stands. Natives believe the chirahui affect the soil, preventing other trees from becoming established."
412	2011. Sánchez, S.. Trees found on the grounds of El Pedregal, Alamos. http://www.elpedregalmexico.com/uploads/pdf%20files/El%20Pedregal%20Tree%20List.pdf	"This is the most common tree on El Pedregal. When land is cleared it is the first tree to sprout up and will grow in pure stands. After a couple of decades, other trees will appear. The large thorns resemble snail shells. The new thorns are reddish, turning to gray with age. Family: Fabaceae."
501	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	"Climbing or smothering growth habit" [terrestrial]
502	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	Fabaceae
503	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	Fabaceae [Nitrogen fixing woody plant]
504	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	"Shrub or small tree to 6 m tall" [not a geophyte]
601	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	"Fruit a straight to slightly curved legume, 50-140 mm long, 7-12 mm wide, 3-6 mm thick, usually glabrous, with a stipe to 15 mm long." [no evidence of substantial reproductive failure in native habitat]
602	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	"Fruit a straight to slightly curved legume, 50-140 mm long, 7-12 mm wide, 3-6 mm thick, usually glabrous, with a stipe to 15 mm long."
602	1996. Cervantes, V./Carabias, J./Vazquez-Yanes, C.. Seed germination of woody legumes from deciduous tropical forest of southern Mexico. Forest Ecology and Management. 82: 171-184.	"Seed germination experiments were conducted on six woody leguminous species which are widely used by rural inhabitants of a mountainous tropical subhumid region in southern Mexico...Acacia species (A. cochliacantha, A. farnesiana and A. pennatula) had optimum germination with scarification treatments for all storage durations…"
603	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	"Acacia cochliacantha is divided into two largely sympatric forms; A. cochliacantha forma houghii is a new combination. It is postulated that these two subgroups are of hybrid origin involving A. macracantha...a. Some plants of A. pennatula or A. cochliacantha, and A. macracantha from areas of sympatry are intermediate in character and seem to be F1 hybrids and/or backcrosses. With PCA, these putative hybrids are placed in positions intermediate to the other taxa"
603	1992. Ebinger, J.E./Seigler, D.S.. Ant-Acacia Hybrids of Mexico and Central America. The Southwestern Naturalist 37(4): 408-414. 37(4): 408-414.	"Past studies indicate that at least four antacacia species hybridize with various species of the A. macracantha complex, including A. macracantha, Acacia cochliacantha Humb. et Bonpl. Ex Willd., and Acacia pennatula (Schldl. Et Cham.) Benth. In addition to the hybrids mentioned in the following paragraphs, Janzen (1974) suggests that the ant-acacia Acacia globulifera rarely may hybridize with non-ant-acacias but does not list the non-ant-acacia parent."
604	1985. Bullock, S.H.. Breeding Systems in the Flora of a Tropical Deciduous Forest in Mexico. Biotropica 17(4): 287-301. 17(4): 287-301.	"Appendix I. Acacia cochliacantha…Sexuality = h, monostylous hermaphrodite] [but self-compatibility unknown]
605	1988. Seigler, D.S./Ebinger, J.E.. Acacia macracantha, A. pennatula, and A. cochliacantha (Fabaceae: Mimosoideae) Species Complexes in Mexico. Systematic Botany. 13(1): 7-15.	"Flowers small; calyx 5-lobed, 0.8-1.1 mm long, glabrous to lightly pubescent; corolla 5 lobed, 1.5-2.0 mm long, lobes glabrous to lightly pubescent; floral bracts 0.6-1.2 mm long, spatulate, usually ciliate at the apex." [flowers unspecialized]

606	2011. Cantarello, E./Newton, A.C./Hill, R.A. et al.. Simulating the potential for ecological restoration of dryland forests in Mexico under different disturbance regimes. Ecological Modelling. 222: 1112–1128.	No evidence
606	2011. WRA Specialist. Personal Communication.	Able to spread by seeds (see 6.02) & resprout after fire (see 8.04) , but no evidence of reproduction by vegetative fragmentation.
607	2011. Cantarello, E./Newton, A.C./Hill, R.A. et al.. Simulating the potential for ecological restoration of dryland forests in Mexico under different disturbance regimes. Ecological Modelling. 222: 1112–1128.	"Table 2 Details of the species characteristics in Central Veracruz…. Acacia cochliacantha ...age of maturity (years) = 2"
701	2009. Ceccon, E./Hernández, P.. Seed rain dynamics following disturbance exclusion in a secondary tropical dry forest in Morelos, Mexico. Revista de Biologia Tropical. 57 (1-2): 257-269.	"Dispersal Syndrome … B/Z … Z= zoochory and B= barochory"
702	2009. Ceccon, E./Hernández, P.. Seed rain dynamics following disturbance exclusion in a secondary tropical dry forest in Morelos, Mexico. Revista de Biologia Tropical. 57 (1-2): 257-269.	"Dispersal Syndrome … B/Z … Z= zoochory and B = barochory"
702	2011. WRA Specialist. Personal Communication.	Species used for many purposes within native range, but no evidence of intentional dispersal by people.
703	2009. Ceccon, E./Hernández, P.. Seed rain dynamics following disturbance exclusion in a secondary tropical dry forest in Morelos, Mexico. Revista de Biologia Tropical. 57 (1-2): 257-269.	"Dispersal Syndrome … B/Z … Z= zoochory and B= barochory" [no evidence that tree is cultivated with produce]
704	2009. Ceccon, E./Hernández, P.. Seed rain dynamics following disturbance exclusion in a secondary tropical dry forest in Morelos, Mexico. Revista de Biologia Tropical. 57 (1-2): 257-269.	"Table 1: Dispersal syndrome, seed weight, total seed density and relative importance value index (RIVI) of species at the exclusion (E) site and the site without exclusion (WE) in the seed rain of AZX...Acacia cochliacantha … Dispersal Syndrome … B/Z … Z= zoochory and B= barochory" [Unassisted (Barochory)]
705	2009. Ceccon, E./Hernández, P.. Seed rain dynamics following disturbance exclusion in a secondary tropical dry forest in Morelos, Mexico. Revista de Biologia Tropical. 57 (1-2): 257-269.	Dispersal Syndrome … B/Z … Z= zoochory and B= barochory" [no evidence of water dispersal]
706	1964. Shreve, F./Wiggins, I.L.. Vegetation and Flora of the Sonoran Desert, Volume 1. Stanford University Press, Stanford, CA	"pods linear-oblong, flattened, 8-12 mm. wide, 4-14 cm. long, acute or obtuse' cuneately narrowed to a stipe 1-1.5 cm. long, smooth and shining, dark red-brown, tardily dehiscent; seeds ovoid-lenticular, 5-6 mm. long, embedded in fleshy pulp."
706	2004. Johnson, C.D./Romero, J.. A review of evolution of oviposition guilds in the Bruchidae (Coleoptera). Revista Brasileira de Entomologia. 48(3): 401-408.	"B. Indehiscent fruits. Species in this group are all trees or shrubs (e.g., Acacia cochliacantha Humb. & Bonpl. ex Willd., 1806 (=A. cymbispina), A. farnesiana (L.) Willd., 1806, Enterolobium cyclocarpum (Jacq.) Griseb., 1860. Fruits of these species are sometimes considered to be tardily dehiscent but it may be several months before they open enough to expose the seeds. Often they fall to the substrate where the mostly woody fruits deteriorate to expose the seeds. Seeds in this group are probably dispersed when birds or large, native or introduced mammals eat the woody fruits, digest the pulp, and pass the seeds through the digestive tract intact."
706	2009. Ceccon, E./Hernández, P.. Seed rain dynamics following disturbance exclusion in a secondary tropical dry forest in Morelos, Mexico. Revista de Biologia Tropical. 57 (1-2): 257-269.	"Dispersal Syndrome … B/Z … Z= zoochory and B= barochory"
707	2009. Ceccon, E./Hernández, P.. Seed rain dynamics following disturbance exclusion in a secondary tropical dry forest in Morelos, Mexico. Revista de Biologia Tropical. 57 (1-2): 257-269.	"Dispersal Syndrome … B/Z … Z= zoochory and B= barochory" [internally dispersed. See 7.08, but no evidence of external dispersal by animals & no means of attachment]
708	1982. Janzen, D.H./Martin, P.S.. Neotropical Anachronisms: The Fruits the Gomphotheres Ate. Science 215(4528): 19-27. 15(4528): 19-27.	"Certain species listed in Table 2 have instructive exceptions to the traits listed above. Although Acacia farnesiana has no sweet flavor or other attractant easily perceptible to humans in the mesocarp of its dry, pulpy, and indehiscent fruit, cattle and horses seek out and eat the fruits (13), just as do African big game animals with African Acacia (14). Prosopis juliflora (mesquite) is especially interesting in this context. In the arid southwestern United States, horses and cattle are known to have aided in the dispersal of mesquite seeds and the ripe pods of various Prosopis species are often sweet and pleasant tasting to people." [A. cochliacantha with similarly adapted seed pods]

708	2001. Felger, R.S./Johnson, M.B./Wilson, M.F.. The trees of Sonora, Mexico. Oxford University Press US, New York, NY	"Pods 7.5-17 cm x 8-11 mm, dark red-brown, thick and mo0derately compressed, straight to slightly curved, indehiscent with pulpy mesocarp…The highest elevation records are along highways; probably also spread by cattle…" [that presumably eat the pods & pass viable seeds]
708	2008. Baraza, E./Valiente-Banuet, A.. Seed dispersal by domestic goats in a semiarid thornscrub of Mexico. Journal of Arid Environments. 72: 1973– 1976.	"Two hundred and nine seeds were found in 1267 domestic goat feces (299.305 g) analyzed. Identified seeds were found to be of three species of cactus and two species of legumes: 92 Echinocactus platyacanthus f. grandis (Rose) Bravo, 21 Ferocactus robustus (Link & Otto) Britton & Rose, 52 Ferocactus latispinus (Haw.) Britt. & Rose var. spiralis (Karw. ex Pfeiff.) N.P. Taylor, 14 Acacia cochliacantha Willd., and 8 Prosopis laevigata Humb. et Bonpl. Ex Willd. In addition, 22 unidentified seeds were found, 14 seeds were classified into morphotype one and 8 into 6 different morphotypes. Seeds appear dispersed in feces from different transects and zones; between 9 transect at the three zones for E. platyacanthus to two transect at one zone for F. robustus. Moreover, no aggregation pattern was evident since maximum densities per transect were: 1.1 seeds per gram of feces (s/g) for E. platyacanthus; 0.56 s/g for F. robustus; 0.71 s/g for F. latispinus, 0.15 s/g for A. cochliacantha; 0.13 s/g for P. laevigata and 0.17 s/g for Morphotype 1. Cactus seeds from the feces displayed greater proportional germination than did the legumes: 75% E. platyacanthus, 65% F. robustus and 80.8% F. latispinus var. spiralis, contrasting with 28.6%; A. cochliacantha and 62.5% P. laevigata."
801	2011. WRA Specialist. Personal Communication.	Seed production unknown
802	2002. Cervantes, M.A.. Propagation Of Dry Tropical Forest Trees In Mexico. In: Dumroese, R. K. et al., tech. coordinators. Nat. Proc.: Forest & Conservation Nursery Associations-1999,2000, & 2001. Proceedings RMRS-P-24. USDA Forest Service, Ogden, UT	"Duration of Seed Viability under Storage In Natural Conditions. Guamuchil and brasil: one year; tehuistle and tepehuaje: 2 years; tepemezquite and palo dulce: 3 to 4 years; cubata, chapulixtle and cuachalalate: more than 5 years; and cuahulote: more than 8 years." [cubata = A. cochliacantha]
802	2008. Royal Botanic Gardens Kew. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/	"Storage Behaviour: Orthodox"
803	2011. WRA Specialist. Personal Communication.	Unknown
804	2002. Yetman, D.. The Guarijíos of the Sierra Madre: hidden people of northwestern Mexico. University of New Mexico Press, Albuquerque, NM	"In times of drought burrs tear off and consume long strips of bark. Their depredations may even kill most of the aboveground part of the trees, although new shoot will usually appear from the base." [tolerates what is essentially a form of girdling by burros]
804	2011. Cantarello, E./Newton, A.C./Hill, R.A. et al.. Simulating the potential for ecological restoration of dryland forests in Mexico under different disturbance regimes. Ecological Modelling. 222: 1112–1128.	"Table 2...FiT, fire tolerance class (1–5, with 1 for the least tolerant and 5 for the most tolerant)...P-FiR, post-fire regeneration (form of reproduction that the species adopts after fire events)" [A. cochliacantha listed as the most fire tolerant; FiT = 5…listed as able to resprout following fires]
805	2011. Cantarello, E./Newton, A.C./Hill, R.A. et al.. Simulating the potential for ecological restoration of dryland forests in Mexico under different disturbance regimes. Ecological Modelling. 222: 1112–1128.	Unknown