Taxon: Calea ternifolia Kunth **Family:** Asteraceae

Common Name(s): bitter grass
dog grass
dream herb
Mexican calea
Mexican dream herb

Synonym(s): Calea zacatechichi Schltdl.

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 15 Aug 2022

WRA Score: 2.0 **Designation:** L **Rating:** Low Risk

Keywords: Medicinal Shrub, Unarmed, Self-Fertile, Wind-Dispersed, Low Seed Viability

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	y
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	y
301	Naturalized beyond native range		
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	y
303	Agricultural/forestry/horticultural weed		
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed		
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		
407	Causes allergies or is otherwise toxic to humans		

Qsn #	Question	Answer Option	Answer
408	Creates a fire hazard in natural ecosystems		
409	Is a shade tolerant plant at some stage of its life cycle		
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	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation		
607	Minimum generative time (years)		
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
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	y
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
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	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**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3),241–267	[No evidence] "Calea ternifolia occurs from northeastern Mexico to northern Costa Rica. It grows mainly along roadsides, in pastures, and in open forests and has virtually the same distribution and habitat preferences as C. urticifolia. Within this species there is an extreme amount of variability in shape, size, and pubescence of leaves as well as in other morphological features. Many specific and varietal names have been ascribed to the extreme forms in this complex. We recognize two varieties within this species. The size, shape, and texture of the involucral bracts are diagnostic traits."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2022). 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**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3),241–267	"Calea ternifolia occurs from northeastern Mexico to northern Costa Rica."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 5 Aug 2022]	"Native Northern America NORTHERN MEXICO: Mexico [Nuevo León, San Luis Potosí, Tamaulipas, Zacatecas] SOUTHERN MEXICO: Mexico [Aguascalientes, Chiapas, Colima, Guanajuato, Guerrero, Hidalgo, Jalisco, México, Michoacán de Ocampo, Morelos, Oaxaca, Puebla, Querétaro, Veracruz de Ignacio de la Llave, Yucatán] Southern America CENTRAL AMERICA: Belize, Costa Rica, Guatemala, Honduras, Nicaragua, El Salvador"

Qsn #	Question	Answer
202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3),241–267	"Calea ternifolia occurs from northeastern Mexico to northern Costa Rica."

203	**Broad climate suitability (environmental versatility)**	**y**
	Source(s)	**Notes**
	Nelson, A. (2022). The Complete Guide to Calea Z. — The Herb For Lucid Dreaming, Meditation , and Deep Dream Work. https://corespirit.com/articles/the-complete-guide-to-calea-z-herb-for-lucid-dreaming-meditation-and-deep-dream-work. [Accessed]	"It shows a wide climatic tolerance, being found in tropical and temperate environments from semideciduous or deciduous tropical forests to temperate forests of pine, pine–oak, or cloud forests."
	Tropicos.org. (2022). Tropicos v3.3.2. Missouri Botanical Garden. http://www.tropicos.org/. [Accessed 9 Aug 2022]	[Collected and distributed over broad elevation range] 0 - 5 m, 15°53'N to 2420 m, 18°53'N

204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3),241–267	"Calea ternifolia occurs from northeastern Mexico to northern Costa Rica."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 5 Aug 2022]	"Native Northern America NORTHERN MEXICO: Mexico [Nuevo León, San Luis Potosí, Tamaulipas, Zacatecas] SOUTHERN MEXICO: Mexico [Aguascalientes, Chiapas, Colima, Guanajuato, Guerrero, Hidalgo, Jalisco, México, Michoacán de Ocampo, Morelos, Oaxaca, Puebla, Querétaro, Veracruz de Ignacio de la Llave, Yucatán] Southern America CENTRAL AMERICA: Belize, Costa Rica, Guatemala, Honduras, Nicaragua, El Salvador"
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence in the Hawaiian Islands
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. (2022). Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. https://naturalhistory2.si.edu/botany/hawaiianflora/. [Accessed 5 Aug 2022]	No evidence in the Hawaiian Islands

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Dave's Garden. (2022). Dream Herb, Leaf of God - Calea zacatechichi. https://davesgarden.com/guides/pf/go/104306/. [Accessed 9 Aug 2022]	"This plant is said to grow outdoors in the following regions: Ceres, California Gainesville, Florida Trujillo Alto, Puerto Rico"

301	Naturalized beyond native range	
	Source(s)	**Notes**
	Nelson, A. (2022). The Complete Guide to Calea Z. — The Herb For Lucid Dreaming, Meditation , and Deep Dream Work. https://corespirit.com/articles/the-complete-guide-to-calea-z-herb-for-lucid-dreaming-meditation-and-deep-dream-work. [Accessed 9 Aug 2022]	"Calea zacatechichi is native to Mexico, Central America and is naturalized in some part of southern US." [Unable to corroborate in peer reviewed literature or other sources]
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence in the Hawaiian Islands
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. (2022). Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. https://naturalhistory2.si.edu/botany/hawaiianflora/. [Accessed 5 Aug 2022]	No evidence in the Hawaiian Islands

302	Garden/amenity/disturbance weed	y
	Source(s)	**Notes**
	Wussow, J. R. (1981). A systematic study of the Mexican, Central American, and Jamaican species of the genus Calea. PhD Dissertation. Louisiana State University, Baton Rouge, LA	[Calea ternifolia var. ternifolia] "weedy vacant lots in Guatemala City,"
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	[Distribution suggests C. ternifolia may a pioneer or disturbance-adapted weed. Impacts not described in this publication] "Calea urticifolia, C. ternifolia, and C. jamaicensis are widespread and weedy" ... "Calea ternifolia occurs from northeastern Mexico to northern Costa Rica. It grows mainly along roadsides, in pastures, and in open forests and has virtually the same distribution and habitat preferences as C. urticifolia."

303	Agricultural/forestry/horticultural weed	
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	[Reported as weedy, and occurring in pastures. No specific impacts documented] "Calea urticifolia, C. ternifolia, and C. jamaicensis are widespread and weedy" ... "Calea ternifolia occurs from northeastern Mexico to northern Costa Rica. It grows mainly along roadsides, in pastures, and in open forests and has virtually the same distribution and habitat preferences as C. urticifolia."

304	Environmental weed	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

305	Congeneric weed	
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3),241–267	"Calea urticifolia is a weedy, morphologically variable, shrubby species that ranges from Sinaloa, Mexico, to central Panama. It is locally abundant in pastures, thickets, pine-oak forests, and along roadsides."
	Wussow, J. R. (1981). A systematic study of the Mexican, Central American, and Jamaican species of the genus Calea. PhD Dissertation. Louisiana State University, Baton Rouge, LA	[Calea urticifolia var. urticifolia] "weedy roadside about 11 km north of San Ramon" ... "weedy pasture about 13 miles northeast of Paraiso," ... "weedy roadside banks 2 km southeast of Cinco Esquinas towards Heredia," [Calea prunifolia var. prunifolia] "thickets and weedy roadside on the road to El Valle de Anton on the outer rim of the crater about 18 km of Pan Amer. Hwy"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Calea jamaicensis is listed as an agriculutural weed, and Calea urticifolia is listed as a weed. Cited references do not specify impacts.

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3),241–267	[No evidence] "Shrubs 0.5-3 m tall; stems erect to lax and spreading, glabrous to pilose-tomentose; leaf blades broadly ovate to lance-ovate or elliptic, 0.5-12 cm long, 0.5-7 cm wide, basally rounded or obtuse to acute, apically obtuse to acuminate, abaxially matted tomentose to essentially glabrous, usually resin-dotted, adaxially scabrous to glabrous, sometimes resin-dotted, usually dark green, triple-nerved, the margins coarsely crenate to serrate (subentire); petioles 0-10 mm long, glabrous to densely pubescent and resin-dotted"

402	Allelopathic	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Amaral, A. P., et al. (2017). The genus Calea L.: A review of isolated compounds and biological activities. Journal of Medicinal Plants Research, 11(33), 518-537	[Allelopathic properties suspected, but unverified in genus] "About 256 different compounds have been isolated and identified from Calea species with the aerial parts most thoroughly investigated. Of 257 compounds isolated from species of Calea, 116 are sesquiterpene lactones, 18 derived from p-hydroxyacetophenone, 14 phenolic compounds, 10 chromenes, 8 flavonoids, 7 benzofurans, and 5 chromanones. In this review, the inclusion of compounds has been based on chemical diversity." ... "Sesquiterpenoids are compounds containing 15 carbons, formed biosynthetically from three five-carbon isoprene units or may be synthesized industrially from monoterpenoid building blocks (Bauer et al., 1997). These secondary metabolites have significant roles in plants as deterrents against herbivores (Picman, 1986) and as anti-fungal and anti-bacterial allelopathic agents. Although the biological activities of these metabolites have not been completely elucidated as yet, anthelmintic, antibiotic, cytotoxic (Anke et al., 1989) and antiparasitic activities are known."

403	Parasitic	n
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	"Shrubs 0.5-3 m tall; stems erect to lax and spreading" [Asteraceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	Mandujano, S., Barrera-Salazar, A., & Vergara-Castrejón, A. (2019). Similarity in plant species consumed by goat flocks in the tropical dry forest of the Cañada, Oaxaca. Revista Mexicana de Ciencias Pecuarias, 10(2), 490-505	"Table 1: List of plant species consumed by goats during the rainy and dry seasons at La Cañada, Oaxaca" [Includes Calea zacatechichi. No adverse effects reported]
	Dechnik-Vázquez, Y. A., García-Barrios, L., Ramírez-Marcial, N., van Noordwijk, M., & Alayón-Gamboa, A. (2019). Assessment of browsed plants in a sub-tropical forest frontier by means of fuzzy inference. Journal of Environmental Management, 236, 163-181	[Browsed by cattle] "The 4633 individual plants that we sampled belonged to 78 families and 268 morphospecies. Cattle had browsed 1521 of the plants, from 47 (65%) of the families and 161 (60%) of the morphospecies. The mostabundant species was Calea ternifolia (414 individuals recorded), which was dominant in the understory of OAK sites, followed by Malpighia hintonii (136 registers) and Siphonoglossa sessilis (134 registers), both of them abundant in TDF sites." ... "The most-browsed species with abundance>50 were Siphonoglossa sessilis (69%), Calea ternifolia (59%) and Acalypha leptopoda (55%)." ... "Heavy browsing appears to affect small, non-woody plants, while dense, multi-stemmed, woody shrubs like Calea ternifolia, found in OAK sites, seem more resistant."

405	Toxic to animals	n
	Source(s)	**Notes**
	Mandujano, S., Barrera-Salazar, A., & Vergara-Castrejón, A. (2019). Similarity in plant species consumed by goat flocks in the tropical dry forest of the Cañada, Oaxaca. Revista Mexicana de Ciencias Pecuarias, 10(2), 490-505	"Table 1: List of plant species consumed by goats during the rainy and dry seasons at La Cañada, Oaxaca" [Includes Calea zacatechichi. No adverse effects reported]

Qsn #	Question	Answer
	Dechnik-Vázquez, Y. A., García-Barrios, L., Ramírez-Marcial, N., van Noordwijk, M., & Alayón-Gamboa, A. (2019). Assessment of browsed plants in a sub-tropical forest frontier by means of fuzzy inference. Journal of Environmental Management, 236, 163-181	[Browsed by cattle with no adverse effects reported] "The 4633 individual plants that we sampled belonged to 78 families and 268 morphospecies. Cattle had browsed 1521 of the plants, from 47 (65%) of the families and 161 (60%) of the morphospecies. The mostabundant species was Calea ternifolia (414 individuals recorded), which was dominant in the understory of OAK sites, followed by Malpighia hintonii (136 registers) and Siphonoglossa sessilis (134 registers), both of them abundant in TDF sites." ... "The most-browsed species with abundance>50 were Siphonoglossa sessilis (69%), Calea ternifolia (59%) and Acalypha leptopoda (55%)." ... "Heavy browsing appears to affect small, non-woody plants, while dense, multi-stemmed, woody shrubs like Calea ternifolia, found in OAK sites, seem more resistant."

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	Unknown

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	**Notes**
	Duke, J.A. (2008). Duke's Handbook of Medicinal Plants of Latin America. CRC Press, Boca Raton, FL	"Downsides: "Listed as a narcotic hallucinogen (mostly visual)" (CRC). As of July 2007, the FDA Poisonous Plant Database listed six titles alluding to toxicity of this species."
	WebMD. (2022). Calea Zacatechichi - Uses, Side Effects, and More. https://www.webmd.com/vitamins/ai/ingredientmono-1270/calea-zacatechichi. [Accessed 15 Aug 2022]	"When taken by mouth: Calea zacatechichi is possibly unsafe. Its safety hasn't been studied, but there have been reports of hallucinations, nausea, and vomiting. When inhaled: Calea zacatechichi is possibly unsafe. Its safety hasn't been studied, but there have been reports of hallucinations, nausea, and vomiting. Pregnancy and breast-feeding: There isn't enough reliable information to know if Calea zacatechichi is safe to use when pregnant or breast-feeding. Stay on the safe side and avoid use. Allergies to ragweed or related plants: Calea zacatechichi might cause an allergic reaction in people who are sensitive to the Asteraceae/Compositae family of plants. Members of this family include ragweed, chrysanthemums, marigolds, daisies, and many other herbs."
	Fuller, T.C. & McClintock, E.M. (1986). Poisonous plants of California: Issue 53 of California natural history guides. University of California Press, Berkeley and Los Angeles, CA	[Uncertain. Used medicinally] "Calea zacatechichi, Asteraceae, is a shrub occurring from Oaxaca, Mexico, to Costa Rica. The Chontal Indians of Oaxaca, who call the plant Zacatechichi, use the leaves as a hallucinogen. Because this use was not reported until 1968, few chemical studies have been made on the plant. "Its use in a tea has been reported in California."

Qsn #	Question	Answer
	Mata, R., Contreras-Rosales, A. J., Gutiérrez-González, J. A., Villaseñor, J. L., & Pérez-Vásquez, A. (2022). Calea ternifolia Kunth, the Mexican “dream herb”, a concise review. Botany, 100(2), 261-274	[Unknown. Plants may contain toxic compounds, but traditional preparations do not exhibit toxicity] "Toxicological effects have also been reported including cytotoxicity, mitochondrial toxicity, inhibition of CYP3A, and eryptosis in vitro. Besides, biomarkers related to nephron and liver toxicity were observed in other studies; however, when tested by the Lorke method, the traditional preparations were nontoxic. These studies have been performed with plant species collected in Mexico, Central America, or attained commercially, raising the possibility of geographical variations or plant substitution. The oneirogenic active principles, as well as the toxic compounds, have not been established, meaning further in-depth investigations are required."

408	Creates a fire hazard in natural ecosystems	
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	[Unknown. No information on fire ecology] "Calea ternifolia occurs from northeastern Mexico to northern Costa Rica. It grows mainly along roadsides, in pastures, and in open forests and has virtually the same distribution and habitat preferences as C. urticifolia."

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	**Notes**
	Dave's Garden. (2022). Dream Herb, Leaf of God - Calea zacatechichi. https://davesgarden.com/guides/pf/go/104306/. [Accessed 15 Aug 2022]	"Sun Exposure: Full Sun Sun to Partial Shade"
	Magic Garden Seeds. (2022). Dream Herb (Calea zacatechichi). https://www.magicgardenseeds.com/The-Good-To-Know/Dream-Herb-(Calea-zacatechichi)-A.CAL022-. [Accessed 15 Aug 2022]	"sunlight: full sun"
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	[Occurs in open, presumably high light environments] "Calea ternifolia occurs from northeastern Mexico to northern Costa Rica. It grows mainly along roadsides, in pastures, and in open forests"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	**Notes**
	World Seed Supply. (2022). How to Grow Calea Zacatechichi from Seeds and Cuttings. https://www.worldseedsupply.com/how-to-grow-calea-zacatechichi-from-seeds-and-cuttings/. [Accessed 15 Aug 2022]	"Calea will grow in most commercially available soils from seed starter soil to potting soil to compost to cactus soil. Calea zacatechichi has a very low nutrient requirement. "
	GardeningOn. (2022). Dream herb (Calea zacatechichi). https://www.jardineriaon.com/en/calea-zacatechichi.html. [Accessed 15 Aug 2022]	"Garden: grows in acidic, fertile soils with good drainage."

411	Climbing or smothering growth habit	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	"Shrubs 0.5-3 m tall; stems erect to lax and spreading"

412	Forms dense thickets	n
	Source(s)	**Notes**
	Clewell, A. F. (1973). Floristic Composition of a Stand of Pinus oocarpa in Honduras. Biotropica, 5(3), 175–182	"Table 3. Dry weight, density, and frequency of the non-arboreal plants." [No evidence. Calea zacatechichi - Density per m2 = 2.9]
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	[No evidence] "Calea ternifolia occurs from northeastern Mexico to northern Costa Rica. It grows mainly along roadsides, in pastures, and in open forests and has virtually the same distribution and habitat preferences as C. urticifolia."

501	Aquatic	n
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	[Terrestrial] "Calea ternifolia occurs from northeastern Mexico to northern Costa Rica. It grows mainly along roadsides, in pastures, and in open forests"

502	Grass	n
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 5 Aug 2022]	Family: Asteraceae (alt. Compositae) Subfamily: Asteroideae Tribe: Neurolaeneae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 5 Aug 2022]	Family: Asteraceae (alt. Compositae) Subfamily: Asteroideae Tribe: Neurolaeneae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	"Shrubs 0.5-3 m tall; stems erect to lax and spreading"

Qsn #	Question	Answer
601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 11 Aug 2022]	[No evidence] "Native Northern America NORTHERN MEXICO: Mexico [Nuevo León, San Luis Potosí, Tamaulipas, Zacatecas] SOUTHERN MEXICO: Mexico [Aguascalientes, Chiapas, Colima, Guanajuato, Guerrero, Hidalgo, Jalisco, México, Michoacán de Ocampo, Morelos, Oaxaca, Puebla, Querétaro, Veracruz de Ignacio de la Llave, Yucatán] Southern America CENTRAL AMERICA: Belize, Costa Rica, Guatemala, Honduras, Nicaragua, El Salvador"

602	**Produces viable seed**	**y**
	Source(s)	**Notes**
	Mata, R., Contreras-Rosales, A. J., Gutiérrez-González, J. A., Villaseñor, J. L., & Pérez-Vásquez, A. (2022). Calea ternifolia Kunth, the Mexican “dream herb”, a concise review. Botany, 100(2), 261-274	"achenes (ray and disc similar) cylindric to somewhat prismatic, 2–3.5 mm long, glabrous to hirsute; lightcolored carpopodium present; pappus of 8–12(–16) generally oblanceolate to occasionally lanceolate or oblong, stramineous squamellae, (0.5–)1–1.5(–2) mm long, apically rounded to acute, sometimes purplish at the base or throughout, the margins minutely laciniate; n = 19 (Fig. 2). The species flowers almost all year round, but its flowering peak is reached between June and January."
	World Seed Supply. (2022). How to Grow Calea Zacatechichi from Seeds and Cuttings. https://www.worldseedsupply.com/how-to-grow-calea-zacatechichi-from-seeds-and-cuttings/. [Accessed 11 Aug 2022]	"Calea is one of the easiest plants to grow once established. But many times it does not produce seeds. Seeds are not readily available for sale, and many of them are non-viable or have poor viability."
	World Seed Supply. (2022). Calea zacatechichi (Dream Herb) seed pods. https://www.worldseedsupply.com/product/calea-zacatechichi-non-bitter-variety-dream-herb-seed-pods/. [Accessed 11 Aug 2022]	"These are closed pods. You have to break open the pods to reveal the thin sliverlike seeds. The number of seeds per pod can vary, but we estimate an average of 10-20 seeds per pod, so estimate for seed counts will be based on this estimate. So 100O seeds will be at least 50 pods, and 10,000 seeds will be at least 500 seed pods."

603	**Hybridizes naturally**	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3),241–267	"Natural hybridization is suspected between C. ternifolia and C. urticifolia." ... "Natural hybridization apparently is rare among the species studied. To have the potential for hybridization, species must grow together, flower at the same time, and possess mechanisms that promote outcrossing. On the first two counts, C. urticifolia and C. ternifolia and, to a lesser degree, C. urticifolia and C. jamaicensis, qualify." ... "During the present study, only three suspected cases of hybridization between C. urticifolia and C. ternifolia were detected by morphological analysis, even though these two species grow together throughout much of their ranges and overlap in their flowering times. In two of these cases formal names had been given to the putative hybrids: C. acuminata var. xanthactis and C. zacatechichi var. xanthina. Since our data are inconclusive, we are placing these taxa in C. ternifolia."

604	Self-compatible or apomictic	y
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3),241–267	"When isolated in an insect-free environment, C. ternifolia was determined to be self-compatible but protogynous in that the rays became pollen receptive before the disc florets."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3),241–267	"All species were observed to attract a variety of Diptera that could serve as pollen vectors."

606	Reproduction by vegetative fragmentation	
	Source(s)	**Notes**
	World Seed Supply. (2022). How to Grow Calea Zacatechichi from Seeds and Cuttings. https://www.worldseedsupply.com/how-to-grow-calea-zacatechichi-from-seeds-and-cuttings/. [Accessed 15 Aug 2022]	"Calea is one of the easiest plants to grow once established. But many times it does not produce seeds. Seeds are not readily available for sale, and many of them are non-viable or have poor viability. On the other hand, cuttings are very easy to root. So that explains why cuttings are the most popular choice for reproduction. But again, this habitual cloning limits the genetic pool." [Easily propagated from cuttings. Unknown if this contributes to natural vegetative spread]

607	Minimum generative time (years)	
	Source(s)	**Notes**

Qsn #	Question	Answer
	World Seed Supply. (2022). How to Grow Calea Zacatechichi from Seeds and Cuttings. https://www.worldseedsupply.com/how-to-grow-calea-zacatechichi-from-seeds-and-cuttings/. [Accessed 15 Aug 2022]	[Unknown. A perennial shrub, so probably between 1-2 years] "Calea zacatechichi seeds can take several weeks before they begin sprouting, and they will germinate irregularly. You can end up with new sprouts several weeks after your first sprouts have popped up. The young calea seedlings are extremely small because of the thin seed they come from. This makes them extremely vulnerable until they mature. To help them grow up quickly, good fresh air exchange will give you an advantage. Be sure to air out your humidity tent as much as possible. Once your calea seedlings are about ¼", you can take the tent off and begin blowing them lightly with a fan. This will also help strengthen the stems of an otherwise fragile plant."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	"Calea ternifolia occurs from northeastern Mexico to northern Costa Rica. It grows mainly along roadsides, in pastures, and in open forests and has virtually the same distribution and habitat preferences as C. urticifolia." [Unknown. Common along roads in native range, but viable seed may be rare in cultivation. Seeds, when produced, adapted for wind dispersal]

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	World Seed Supply. (2022). Calea zacatechichi (Dream Herb) seed pods. https://www.worldseedsupply.com/product/calea-zacatechichi-non-bitter-variety-dream-herb-seed-pods/. [Accessed 11 Aug 2022]	"We offer dream herb seed pods for Oaxaca, Mexiico. This is the so-called bitter variety." [Sold online]

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	World Seed Supply. (2022). How to Grow Calea Zacatechichi from Seeds and Cuttings. https://www.worldseedsupply.com/how-to-grow-calea-zacatechichi-from-seeds-and-cuttings/. [Accessed 15 Aug 2022]	"Although growing calea from cuttings is easier and quicker, growing calea from seed is rewarding. Calea seeds are not widely offered, and many seeds are not viable or have very poor viability. Even "good" calea seed will usually have a low viability rate compared to most seeds of other species. Ideally, you want to procure your calea seeds while they are still in the in the pod. There are about 20 seeds per pod on average. In the pod, your calea seeds will be better protected from the air. They should also be stored in the fridge until use to help maximize preservation." [No evidence. Seeds may be difficult to acquire and unlikely to become a produce contaminant]
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

704	Propagules adapted to wind dispersal	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	"achenes (ray and disc similar) cylindric to somewhat prismatic, 2-3.5 mm long, shining glabrous to densely antrorsely hirsute; light-colored carpopodium present; pappus of 8-12(-16) generally oblanceolate to occasionally lanceolate or oblong, stramineous squamellae, (0.5-)1-1.5(-2) mm long, apically rounded to acute, sometimes purplish at the base or throughout, the margins minutely laciniate" [The pappus functions as a wind-dispersal mechanism for the achenes."
	Jurado, E., & Estrada, E. (2001). Characterizing plant attributes with particular emphasis on seeds in Tamaulipan thornscrub in semi-arid Mexico. Journal of Arid Environments, 48(3), 309-321	"Appendix 1. Species list and attributes for Tamaulipan thornscrub in north-eastern Mexico." [Calea ternifolia - Dispersal = wind]
	World Seed Supply. (2022). How to Grow Calea Zacatechichi from Seeds and Cuttings. https://www.worldseedsupply.com/how-to-grow-calea-zacatechichi-from-seeds-and-cuttings/. [Accessed 15 Aug 2022]	"Calea seeds should be germinated on the surface of the soil either on their sides or with the points of the seeds facing down into the soil, which is how they would end up if they were carried away by the wind after being released from the seed pods."

705	Propagules water dispersed	n
	Source(s)	**Notes**
	Jurado, E., & Estrada, E. (2001). Characterizing plant attributes with particular emphasis on seeds in Tamaulipan thornscrub in semi-arid Mexico. Journal of Arid Environments, 48(3), 309-321	"Appendix 1. Species list and attributes for Tamaulipan thornscrub in north-eastern Mexico." [Calea ternifolia - Dispersal = wind]
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	"Calea ternifolia occurs from northeastern Mexico to northern Costa Rica. It grows mainly along roadsides, in pastures, and in open forests" [No evidence. Not a riparian species]

706	Propagules bird dispersed	n
	Source(s)	**Notes**
	Jurado, E., & Estrada, E. (2001). Characterizing plant attributes with particular emphasis on seeds in Tamaulipan thornscrub in semi-arid Mexico. Journal of Arid Environments, 48(3), 309-321	"Appendix 1. Species list and attributes for Tamaulipan thornscrub in north-eastern Mexico." [Calea ternifolia - Dispersal = wind]
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	[Adapted for wind dispersal] "Achenes. Ray and disc achenes are similar among the species examined in being black, obconic to cylindric, and somewhat prismatic." ... "Calea longipedicellata and some C. ternifolia have essentially glabrous achenes" ... "Calea ternifolia has relatively broad, blunttipped pappus scales that are approximately one-half the length of the achene;"

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	"achenes (ray and disc similar) cylindric to somewhat prismatic, 2-3.5 mm long, shining glabrous to densely antrorsely hirsute; light-colored carpopodium present; pappus of 8-12(-16) generally oblanceolate to occasionally lanceolate or oblong, stramineous squamellae, (0.5-)1-1.5(-2) mm long, apically rounded to acute, sometimes purplish at the base or throughout, the margins minutely laciniate" [Pappus might aid in attachment, but adaptation is for wind dispersal]
	Jurado, E., & Estrada, E. (2001). Characterizing plant attributes with particular emphasis on seeds in Tamaulipan thornscrub in semi-arid Mexico. Journal of Arid Environments, 48(3), 309-321	"Appendix 1. Species list and attributes for Tamaulipan thornscrub in north-eastern Mexico." [Calea ternifolia - Dispersal = wind]

708	Propagules survive passage through the gut	n
	Source(s)	**Notes**
	Jurado, E., & Estrada, E. (2001). Characterizing plant attributes with particular emphasis on seeds in Tamaulipan thornscrub in semi-arid Mexico. Journal of Arid Environments, 48(3), 309-321	"Appendix 1. Species list and attributes for Tamaulipan thornscrub in north-eastern Mexico." [Calea ternifolia - Dispersal = wind]
	Wussow, J. R., Urbatsch, L. E., & Sullivan, G. A. (1985). Calea (Asteraceae) in Mexico, Central America, and Jamaica. Systematic Botany, 10(3), 241–267	[No evidence that achenes are adapted for internal dispersal] "achenes (ray and disc similar) cylindric to somewhat prismatic, 2-3.5 mm long, shining glabrous to densely antrorsely hirsute; light-colored carpopodium present; pappus of 8-12(-16) generally oblanceolate to occasionally lanceolate or oblong, stramineous squamellae, (0.5-)1-1.5(-2) mm long, apically rounded to acute, sometimes purplish at the base or throughout, the margins minutely laciniate"

801	Prolific seed production (>1000/m2)	n
	Source(s)	**Notes**
	World Seed Supply. (2022). How to Grow Calea Zacatechichi from Seeds and Cuttings. https://www.worldseedsupply.com/how-to-grow-calea-zacatechichi-from-seeds-and-cuttings/. [Accessed 11 Aug 2022]	"Calea is one of the easiest plants to grow once established. But many times it does not produce seeds. Seeds are not readily available for sale, and many of them are non-viable or have poor viability."

Qsn #	Question	Answer
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	World Seed Supply. (2022). How to Grow Calea Zacatechichi from Seeds and Cuttings. https://www.worldseedsupply.com/how-to-grow-calea-zacatechichi-from-seeds-and-cuttings/. [Accessed 15 Aug 2022]	"Although growing calea from cuttings is easier and quicker, growing calea from seed is rewarding. Calea seeds are not widely offered, and many seeds are not viable or have very poor viability. Even "good" calea seed will usually have a low viability rate compared to most seeds of other species. Ideally, you want to procure your calea seeds while they are still in the in the pod. There are about 20 seeds per pod on average. In the pod, your calea seeds will be better protected from the air. They should also be stored in the fridge until use to help maximize preservation." [Longevity unknown, but viability low]

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. (2022). 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**
	Wussow, J. R. (1981). A systematic study of the Mexican, Central American, and Jamaican species of the genus Calea. PhD Dissertation. Louisiana State University, Baton Rouge, LA	"Young plants or new shoots from older plants that have been cut or grazed often will exhibit quite vigorous and spindley growth with abnormally large, less pubescent leaves, having more coarsely serrate margins." [Generic description]

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Broad climate suitability and elevation range
• Thrives in tropical climates
• Unconfirmed reports of naturalization in SE USA
• Described as a weedy plant of vacant lots and disturbed sites
• Medicinal uses, with potential toxic properties
• Reproduces by seeds
• Self-compatible but protogynous
• Seeds dispersed by wind and through intentional cultivation
• Resprouts after cutting and grazing
• Gaps in biological and ecological information may reduce accuracy or risk prediction

Low Risk Traits
• Unarmed (no spines, thorns, or burrs)
• Palatable, and readily browsed, by cattle and goats
• Thrives in high light environments (dense shade may limit ability to spread)
• Seed set and viability of seeds reported to be low in cultivation
• Limited seed production and reduced seed viability may lower risk of long distance or accidental dispersal

Second Screening Results for Herbs or Low Stature Shrubby Life Forms

(A) Reported as a weed of cultivated lands? Questionably yes. A weedy plant of disturbed sites and pastures.
(B) Unpalatable to grazers or known to form dense stands? No. Palatable, and not reported to form dense stands.
Outcome = Accept (Low Risk)