

Taxon: <i>Agave americana</i> L.	Family: Asparagaceae
Common Name(s): American agave American century plant centuryplant Maguey americano	Synonym(s): <i>Agave expansa</i> Jacobi <i>Agave picta</i> Salm-Dyck <i>Agave rasconensis</i> Trel. ex Standl. <i>Agave zonata</i> Trel.

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 25 Feb 2021
WRA Score: 13.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Naturalized, Environmental Weed, Spiny, Succulent, Suckers

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

Qsn #	Question	Answer Option	Answer
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)	y=1, n=0	y
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	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	y
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators		
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	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	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	y
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/m ²)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	n
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
	Riffle, R.L. (1998). The Tropical Look - An Encyclopedia of Dramatic Landscape Plants. Timber Press, Portland, OR	Several cultivars exist [No evidence of serious loss of competitive ability]

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2021). 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
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"The natural distribution of <i>A. americana</i> is difficult to discern, but evidence suggests that the species originated in northeastern Mexico. It is often cultivated elsewhere in Mexico and in arid regions throughout the tropics, including the Mediterranean, Australia, Asia, and the islands of the Atlantic."

202	Quality of climate match data	High
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"The natural distribution of <i>A. americana</i> is difficult to discern, but evidence suggests that the species originated in northeastern Mexico. It is often cultivated elsewhere in Mexico and in arid regions throughout the tropics, including the Mediterranean, Australia, Asia, and the islands of the Atlantic."

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Riffle, R.L. (1998). The Tropical Look - An Encyclopedia of Dramatic Landscape Plants. Timber Press, Portland, OR	"hardy in zones 9 through 11 and marginal in zone 8a."

Qsn #	Question	Answer
204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"The natural distribution of <i>A. americana</i> is difficult to discern, but evidence suggests that the species originated in northeastern Mexico. It is often cultivated elsewhere in Mexico and in arid regions throughout the tropics, including the Mediterranean, Australia, Asia, and the islands of the Atlantic."

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"The natural distribution of <i>A. americana</i> is difficult to discern, but evidence suggests that the species originated in northeastern Mexico. It is often cultivated elsewhere in Mexico and in arid regions throughout the tropics, including the Mediterranean, Australia, Asia, and the islands of the Atlantic. "

301	Naturalized beyond native range	y
	Source(s)	Notes
	Smith, G. F., Walters, M., & Figueiredo, E. (2008). Naturalised species of <i>Agave</i> L.(Agavaceae) in the Eastern Cape Province of South Africa. <i>Bradleya</i> , 26: 33-40	"Abstract: In alpha-taxonomic terms the Eastern Cape Province of South Africa, which includes the entire Albany Centre of Endemism, is one of the richest succulent plant regions in the world. The mild climate of the region is also suitable for the cultivation of a number of exotic succulents, several of which have escaped into the natural flora, subsequently becoming naturalised. The five species of <i>Agave</i> L. recorded for the Eastern Cape are here described and illustrated as part of compiling a Flora for the region. The species are <i>Agave angustifolia</i> Haw. var. <i>angustifolia</i> , <i>A. americana</i> L. var. <i>americana</i> , <i>A. sisalana</i> Perrine, <i>A. vivipara</i> L. var. <i>vivipara</i> and <i>A. wercklei</i> F.A.C.Weber ex Wercklé. A key is provided to assist with the identification of the five species. "
	Smith, G. F., & Figueiredo, E. 2007. Naturalized species of <i>Agave</i> L (Agavaceae) on the southeastern coast of Portugal. <i>Haseltonia</i> , 13: 52-60	"Abstract: A number of large-growing species of <i>Agave</i> L. (Agavaceae) have become firmly established as part of the introduced flora of parts of the Algarve, southern Portugal, particularly close to human settlements. Two species, which include at least four taxa, <i>Agave americana</i> L. ssp <i>americana</i> , <i>A. americana</i> var <i>marginata</i> Trel., <i>A. salmiana</i> Otto ex Salm-Dyck var <i>salmiana</i> and <i>A. salmiana</i> var <i>ferox</i> (K. Koch) Gentry, recorded in southeastern Portugal are briefly discussed here, their residence status is determined, and a key to aid in their identification and that of other cultivated forms of <i>Agave americana</i> is provided. In addition, a putative hybrid between <i>A. americana</i> ssp <i>americana</i> and <i>A. salmiana</i> var <i>salmiana</i> is recorded here for the first time. The nomenclature of the naturalized species of <i>Agave</i> is updated to reflect current usage. The four naturalized <i>Agave</i> taxa are compared to <i>A. franzosinii</i> Baker, which is widely cultivated along the Mediterranean coast of Europe. "

Qsn #	Question	Answer
	Nokes, J. (2001). How to Grow Native Plants of Texas and the Southwest. University of Texas Press, Austin, TX	"Native in Texas only on gravelly hills in extreme south Texas, but naturalized elsewhere in the state and in warm regions throughout the world."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Weber, E. (2003). Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[An environmental weed adapted to disturbed sites] "Coastal bluffs and cliffs, dunes, rocky places, savanna, disturbed sites"

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Environmental weed. See 3.04

304	Environmental weed	y
	Source(s)	Notes
	Henderson, L. (2007). Invasive, naturalized and casual alien plants in southern Africa: a summary based on the Southern African Plant Invaders Atlas (SAPIA). <i>Bothalia</i> , 37 (2): 215–248	"Fourteen species were the most prominent invaders in the Nama-Karoo Biome (Appendix 3). <i>Prosopis</i> spp. (<i>P. glandulosa</i> var. <i>torreyana</i> , <i>P. velutina</i> and their hybrids) were the most prominent species with a prominence value of 60.6, followed by <i>Atriplex inflata</i> (sponge-fruit saltbush) and <i>Opuntia ficus-indica</i> with values of 21 and 14 respectively. The remaining top ten prominent invaders were, in order, <i>Salsola kali/tragus</i> (Russian tumbleweed), <i>Azolla filiculoides</i> (red water fern), <i>Nicotiana glauca</i> (wild tobacco), <i>Atriplex nummularia</i> (old man saltbush), <i>Schinus molle</i> (pepper tree), <i>Agave americana</i> (American agave) and <i>Solanum elaeagnifolium</i> (silverleaf bitter-apple)."

Qsn #	Question	Answer
	<p>Arévalo, J. R., Fernández-Lugo, S., Mellado, M., & de la Concepción, T. (2015). Experimental management control of <i>Opuntia dillenii</i> Haw. and <i>Agave americana</i> L. in Teno Rural Park, Canary Islands. <i>Plant Species Biology</i>, 30(2), 137-146</p>	<p>"Invasion biology is an important element of global environmental change and represents one of the main threats to biodiversity. American species were introduced to Tenerife after the Spanish conquest during the eighteenth century, as is the case for <i>Agave americana</i> and <i>Opuntia dillenii</i>. The long period of naturalization and adaptation of these species has led them to become two of the most dispersed introduced species of the archipelago. We analyzed several eradication management processes in an area intensively invaded by both <i>O. dillenii</i> and <i>A. americana</i>. Three treatments were randomly applied: mechanical removal, use of herbicide (glyphosate at 10% volume), and mechanical and herbicide applied together. Both the effectiveness of the treatments to remove the target exotic species biovolume and the impact of the eradication methods on species richness and species composition of the area were analyzed. We found that the treatments had an impact on species composition but not on species richness. Species composition was mainly affected by mechanical treatment. The effect caused by the mechanical removal of the exotic target species in species composition is minor after 4 years, and is related to a higher dominance of shrub species typical of coastal shrubland and of annual or pioneer species. The control of <i>O. dillenii</i> and <i>A. americana</i> is evident from insignificant recovery 4 years after treatment application. A mechanical and herbicide treatment together, allowed not only the immediate removal of large individuals but also the herbicidal control of smaller ones."</p>
	<p>Badano, E. I., & Pugnaire, F. I. (2004). Invasion of <i>Agave</i> species (Agavaceae) in south-east Spain: invader demographic parameters and impacts on native species. <i>Diversity and Distributions</i>, 10(5-6): 493-500</p>	<p>"Punta Entinas-Sabinar is a dune field where <i>Agave americana</i> is spreading, interfering with the dominant native species, <i>Juniperus phoenicea</i> (Cupressaceae), and <i>H. soechas</i>. Dunes are 7– 8 m tall and the valleys in between are highly saline. At the valley bottoms clumps of <i>Pistacea lentiscus</i> (Plantaginaceae) and other halophytes like <i>Limonium</i> spp. (Plumbaginaceae) or <i>Inula crithmoides</i> (Asteraceae) are present, but no agaves are found. There are no records of the history of <i>A. americana</i> at this site, but it probably was introduced for sand dune stabilization."</p>
	<p>Weber, E. (2017). <i>Invasive Plant Species of the World</i>, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK</p>	<p>"The thick succulent leaves form dense and impenetrable thickets that eliminate native vegetation by shading and may hinder wildlife movement. It replaces vulnerable dune species and causes accumulation of sand in coastal areas, which substantially alters habitats (ISSG, 2014)."</p>

Qsn #	Question	Answer
305	Congeneric weed	y
	Source(s)	Notes
	Weber, E. (2003). <i>Invasive Plant Species of the World. A Reference Guide to Environmental Weeds.</i> CABI Publishing, Wallingford, UK	" <i>Agave sisalana</i> . The weedy behavior is due to vegetative growth, allowing the species to colonize large areas and replace the native vegetation with its rosettes. "
	Weber, E. (2017). <i>Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds.</i> CABI Publishing, Wallingford, UK	"The weedy behaviour is due to vegetative growth, allowing the species to colonize large areas and replace the native vegetation with its dense growth of rosettes (Ortiz and van der Meerz, 2006). <i>Agave sisalana</i> persists for long periods even after abandonment of plantations. The plant easily escapes from plantations by rhizome fragments and bulbils, and becomes established in adjacent natural areas (Badano and Pugnaire, 2004; Acevedo-Rodríguez and Strong, 2005)."

401	Produces spines, thorns or burrs	y
	Source(s)	Notes
	Whistler, W.A. (2000). <i>Tropical Ornamentals: A Guide.</i> Timber Press, Portland, OR	"Succulent, large, stemless, subwoody, to 2 m high before flowering. Leaves simple, spirally arranged in a basal rosette, blade lanceolate, 100 200 x 12-25 cm, margins with black prickles 7-10 mm long and a black terminal spine 3-5 cm long, surface waxy white, in cultivars often variegated with cream stripes....best kept away from foot traffic because of the spiny leaf margins. The sharp tip may be clipped to prevent injury."

402	Allelopathic	n
	Source(s)	Notes
	Nokes, J. (2001). <i>How to Grow Native Plants of Texas and the Southwest.</i> University of Texas Press, Austin, TX	"when the plant dies after flowering, it returns valuable organic matter to infertile soils" [No evidence of allelopathy]

403	Parasitic	n
	Source(s)	Notes
	Weber, E. (2003). <i>Invasive Plant Species of the World. A Reference Guide to Environmental Weeds.</i> CABI Publishing, Wallingford, UK	No evidence

404	Unpalatable to grazing animals	n
	Source(s)	Notes

Qsn #	Question	Answer
	De Kock, G.C. 1980. Drought resistant fodder shrub crops in South Africa. Pp. 399-408 in H.N. Le Houerou (ed.). Browse in Africa. The Current State of Knowledge. International Livestock Centre for Africa, Addis Ababa, Ethiopia	"American aloe leaves alone are not sufficient for a maintenance ration. Although American aloe is palatable and can form a portion of the daily ration, it must be supplemented by sufficient Lucerne hay, meal, etc. to prevent paralysis, which can be experienced if American aloe leaves alone are fed continuously. It has however been shown that American aloe leaves can, to a large extent, take the place of silage, mangels etc, as the succulent portion of the ration. For fodder the leaves are chopped against the stem so that as much as possible of the thick fleshy portion is used, as this is the most palatable part. The fibrous points and edges of the leaves are removed and the leaves are chaffed in pieces not larger than 50 × 100 mm. A hand chaff cutter or chopping knives are suitable for this purpose. Leaves are usually harvested from 4 - to 6 -year old plants. A yield of from 120 tons of leaves per hectare can be expected annually from America alone and that on relatively poor soils."
	Plants for a Future. (2021). <i>Agave Americana</i> . https://pfaf.org/user/Plant.aspx?LatinName=Agave+americana . [Accessed 25 Feb 2021]	"Members of this genus are rarely if ever troubled by browsing deer [233]"
	Nokes, J. (2001). How to Grow Native Plants of Texas and the Southwest. University of Texas Press, Austin, TX	"The ferocious cluster of basal leaves protects...from browsing animals "

405	Toxic to animals	y
	Source(s)	Notes
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Plant said to be toxic to livestock. Fresh juice very irritant, capable of producing irritative contact dermatitis, conjunctivitis, burning sensation."
	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	"Plants of this species have been suspected of poisoning stock in the field. Experimentally the plant has been lethal to a sheep and a rabbit."
	The Nature Conservation Corporation. (2006). Invasive Alien Vegetation Management Manual. Cape Town, South Africa	[Palatable, but potentially toxic] "Poisonous if a quantity are fed to ruminants."

406	Host for recognized pests and pathogens	n
	Source(s)	Notes
	Gilman, E.F. (1999). <i>Agave americana</i> 'Marginata'. Fact Sheet FPS 20. IFAS, University of Florida, Gainesville. http://edis.ifas.ufl.edu . [Accessed 25 Feb 2021]	"Pest resistance: no serious pests are normally seen on the plant"

Qsn #	Question	Answer
	<p>Kelly, J. and Olsen, M. 2011. Problems and Pests of Agave, Aloe, Cactus and Yucca. Cooperative Extension College of Agriculture and Life Sciences The University of Arizona Tucson, Arizona</p>	<p>[other than <i>Agave</i> spp, which are not native to Hawaii, and not economically important, not an alternate host of important pests or pathogens] "<i>Agave</i> Snout Weevil (<i>Scyphophorus acupunctatus</i>) The adult weevil attacks many species of agave. The very large <i>Agave americana</i> or century plant is more susceptible to weevil damage than the smaller species. The adult weevil is about ½ inch (12 mm) in length, is brownish-black and has a dull body (Fig. 16). The adult female enters the base of the plant to lay eggs. Decay microbes also enter through this injury and as the tissue rots, the plant has a wilted appearance. Infested plants soon collapse and die (Fig. 17). The larvae (grubs) develop in the dying plant and infect other hosts nearby. <i>Agave</i> snout weevil also infests the canes of several <i>Yucca</i> species. Control of the <i>agave</i> snout weevil is difficult. Selecting species that are less susceptible and typically smaller than the century plant is helpful, especially in areas where the problem has occurred previously. With rare or special specimens, chemical prevention using a broad-spectrum insecticide applied in spring is often effective in reducing damage. "</p>

407	Causes allergies or is otherwise toxic to humans	y
	Source(s)	Notes
	<p>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</p>	<p>"<i>Agave americana</i> has been known to cause a burning rash and itching welts. Hemorrhagic dermatitis appeared several hours after the juice from the agave splattered on those who cut the plant with a power saw."</p>
	<p>The Nature Conservation Corporation. (2006). Invasive Alien Vegetation Management Manual. Cape Town, South Africa</p>	<p>"It is a skin irritant, so care must be taken when working with this species."</p>
	<p>Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL</p>	<p>"Plant said to be toxic to livestock. Fresh juice very irritant, capable of producing irritative contact dermatitis, conjunctivitis, burning sensation."</p>
	<p>Spoerke, D.G. & Smolinske, S.C. (1990). Toxicity of Houseplants. CRC Press, Boca Raton, FL</p>	<p>"The sap from the leaves contains calcium oxalate raphides, which may cause oral mucosal irritation when ingested. The toxic agent responsible for contact urticarial has not been identified. An acrid volatile oil contained in the leaves and seeds is a potent larvicidal compound."</p>

Qsn #	Question	Answer
	Plants for a Future. (2021). <i>Agave Americana</i> . https://pfaf.org/user/Plant.aspx?LatinName=Agave+americana . [Accessed 25 Feb 2021]	[In m cases, people would not be allergic to plant] dermatitis in sensitive people...The heart of the plant is very rich in saccharine matter and can be eaten when baked[2, 92, 183]. Sweet and nutritious, but rather fibrous[213]. It is partly below ground[85]. Seed - ground into a flour and used as a thickener in soups or used with cereal flours when making bread[92]. Flower stalk - roasted[92, 95]. Used like asparagus[183]. Sap from the cut flowering stems is used as a syrup[177] or fermented into pulque or mescal[183]. The sap can also be tapped by boring a hole into the middle of the plant at the base of the flowering stem[213]...The sap of agaves has long been used in Central America as a binding agent for various powders used as poultices on wound [254]. The sap can also be taken internally in the treatment of diarrhoea, dysentery etc[254]. The sap is antiseptic, diaphoretic, diuretic and laxative[21, 218, 240]. An infusion of the chopped leaf is purgative and the juice of the leaves is applied to bruises[218]. The plant is used internally in the treatment of indigestion, flatulence, constipation, jaundice and dysenter [238]. The sap has disinfectant properties and can be taken internally to check the growth of putrefactive bacteria in the stomach and intestines[21]. Water in which agave fibre has been soaked for a day can be used as a scalp disinfectant and tonic in cases of falling hair [21]. Steroid drug precursors are obtained from the leaves[238]. A gum from the root and leaf is used in the treatment of toothache [218]. The root is diaphoretic and diuretic[240]. It is used in the treatment of syphilis[218, 240]. All parts of the plant can be harvested for use as required, they can also be dried for later use. The dried leaves and roots store well[238]."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	USDA Natural Resources Conservation Service. (2021). Conservation Plant Characteristics - <i>Agave Americana</i> . http://plants.usda.gov/java/charProfile?symbol=AGAM . [Accessed 25 Feb 2021]	"Fire Resistant - Yes"
	Fosdick, D. (2007). Fire-Resistant Plants Protect Your Home. http://www.wral.com/lifestyles/house_and_home/story/2004351/ . [Accessed 25 Feb 2021]	"Here are some attractive succulents capable of serving as firebreaks: -- <i>Agave americana</i> (Century Plant). "A big, blue, thug-like plant that grows anywhere, with no care at all," Baldwin said. "Here in the Southwest, it's the plant most people think of when they hear the word 'agave,' but there are many small agaves better suited to residential gardens."
	Zimmer, H., Cheal, D.& Cross, E. (2012). Post-fire Weeds Triage Manual: Black Saturday Victoria 2009– Natural values fire recovery program. Department of Sustainability and Environment, Heidelberg, Victoria	"Post-fire response: Likely to be unaffected/ unburnt by low to medium intensity fire"

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"Century plants prefer dry situations in full sun."

Qsn #	Question	Answer
	Gilman, E.F. (1999). <i>Agave americana</i> 'Marginata'. Fact Sheet FPS 20. IFAS, University of Florida, Gainesville. http://edis.ifas.ufl.edu . [Accessed 25 Feb 2021]	"Light requirement: plant grows in part shade/part sun"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Weber, E. (2003). <i>Invasive Plant Species of the World. A Reference Guide to Environmental Weeds</i> . CABI Publishing, Wallingford, UK	"The species is drought resistant and shows a broad tolerance to different soil types."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Whistler, W.A. (2000). <i>Tropical Ornamentals: A Guide</i> . Timber Press, Portland, OR	"Succulent, large, stemless, subwoody, to 2 m high before flowering. Leaves simple, spirally arranged in a basal rosette, blade lanceolate, 100 200 x 12-25 cm, margins with black prickles 7-10 mm long and a black terminal spine 3-5 cm long, surface waxy white, in cultivars often variegated with cream stripes."

412	Forms dense thickets	y
	Source(s)	Notes
	Weber, E. (2003). <i>Invasive Plant Species of the World. A Reference Guide to Environmental Weeds</i> . CABI Publishing, Wallingford, UK	"A single individual can form dense, impenetrable stands that eliminate native vegetation."

501	Aquatic	n
	Source(s)	Notes
	Weber, E. (2003). <i>Invasive Plant Species of the World. A Reference Guide to Environmental Weeds</i> . CABI Publishing, Wallingford, UK	Terrestrial

502	Grass	n
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. 2014. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/ . [Accessed 5 Nov 2014]	"Family: Asparagaceae subfamily: Agavoideae. Also placed in: Agavaceae "
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 25 Feb 2021]	"Family: Asparagaceae Subfamily: Agavoideae"

503	Nitrogen fixing woody plant	n
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Qsn #	Question	Answer
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. 2014. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/ . [Accessed 5 Nov 2014]	"Family: Asparagaceae subfamily: Agavoideae. Also placed in: Agavaceae "

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Weber, E. (2003). Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Not a true geophyte] "Where invasive, the plant persists and spreads by abundant suckering from the root crown"

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Weber, E. (2003). Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	No evidence

602	Produces viable seed	y
	Source(s)	Notes
	Weber, E. (2003). Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Fruits are oblong short-beaked capsules of 4-5 cm length. Seeds are brown or shiny black, 7-8 mm long and 5-6 mm wide."
	Plants for a Future. (2021). <i>Agave Americana</i> . https://pfaf.org/user/Plant.aspx?LatinName=Agave+americana . [Accessed 25 Feb 2021]	"Propagation Seed - surface sow in a light position, April in a warm greenhouse. The seed usually germinates in 1 - 3 months at 20°C [133]. Prick out the seedlings into individual pots of well-drained soil when they are large enough to handle and grow them on in a sunny position in the greenhouse until they are at least 20cm tall. Plant out in late spring or early summer, after the last expected frosts, and give some protection from the cold for at least their first few winters[K]. Offsets can be potted up at any time they are available. Keep in a warm greenhouse until they are well established[200]."

603	Hybridizes naturally	y
	Source(s)	Notes

Qsn #	Question	Answer
	Smith, G. F., & Figueiredo, E. 2007. Naturalized species of <i>Agave</i> L (Agavaceae) on the southeastern coast of Portugal. <i>Haseltonia</i> , 13: 52-60	"The hybrid between <i>Agave americana</i> and <i>Agave salmiana</i> is commonly encountered in southeastern Portugal. It produces numerous offsets by means of underground runners to form small, impenetrable thickets...It is noteworthy that extensive natural (Gentry 1967) and artificial (Trager 2006) hybridization between species of <i>Agave</i> have been documented...The hybrid between <i>A. americana</i> and <i>A. salmiana</i> is an interesting case, as it is possible that these hybrid plants that are currently found in Portugal, originated there, rather than having been introduced as aliens from Mexico. It is furthermore unlikely that the hybrid came about in Portugal as a result of a deliberate crossing event performed by humans. Both parents flower freely in Portugal, and spontaneous hybridization as a result of casual visits by pollination vectors would be imminently possible. Also, at least in Mexico, the flowering times of the two species overlap substantially (Gentry 1982). Since the hybrid is also known from Mexico (Gentry 1982), where the parents are indigenous, it essentially does not lack a "native" region (Pyšek and others 2004). It may therefore be appropriate to also regard this hybrid simply as a naturalized plant."

604	Self-compatible or apomictic	y
	Source(s)	Notes
	Escobar-Guzman, R. E., Hernandez, F. Z., Vega, K. G., & Simpson, J. (2008). Seed production and gametophyte formation in <i>Agave tequilana</i> and <i>Agave americana</i> . <i>Canadian Journal of Botany</i> , 8 (11): 1343-1353	"self-pollinated At5 and Aa (<i>Agave americana</i>) plants produced bery few fruits and seeds." [low seed production in self-pollinated plants, but still able to produce some seeds]

605	Requires specialist pollinators	
	Source(s)	Notes
	Rodríguez, B., Siverio, F., Siverio, M., Barone, R., & Rodríguez, A. (2015). Nectar and pollen of the invasive century plant <i>Agave americana</i> as a food resource for endemic birds. <i>Bird Study</i> , 62(2), 232-242	"According to their behaviour and their way of obtaining nectar, the majority of bird species visiting the century plant flowers cannot be considered as true pollinators for it, given that many of them may not transport pollen (Herrera & Pellmyr 2002). The best foraging technique in favour of pollen transport is perching on flowers because bird bellies are usually in direct contact with anthers and stigmas (see Fig. 1). Two species, the Common Raven and Atlantic Canary, are the more likely candidates to be true pollinators, i.e. able to transport pollen grains from anthers to stigmas of the century plant because of their main foraging techniques (Fig. 2). However, only the Atlantic Canary is a common and widespread bird on the island, and so it alone may play an important role in plant reproduction."
	Plants for a Future. (2021). <i>Agave Americana</i> . https://pfaf.org/user/Plant.aspx?LatinName=Agave+americana . [Accessed 25 Feb 2021]	"The flowers are hermaphrodite (have both male and female organs) and are pollinated by Lepidoptera (Moths & Butterflies), bats."
	Willmer, P. (2011). <i>Pollination and Floral Ecology</i> . Princeton University Press, Princeton, NJ	[Adapted for bats, but apparently also visited by moths] "The night-flowering bat-visited <i>Agave americana</i> produces pollen with a remarkable 43% protein content."

Qsn #	Question	Answer
606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	The Nature Conservation Corporation. (2006). Invasive Alien Vegetation Management Manual. Cape Town, South Africa	"A. americana, is a succulent shrub with a basal rosette of thick, heavy leaves . It suckers from the base."
	Weber, E. (2003). Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Where invasive, the plant persists and spreads by abundant suckering from the root crown."

607	Minimum generative time (years)	2
	Source(s)	Notes
	Whistler, W.A. (2000). Tropical Ornamentals: A Guide. Timber Press, Portland, OR	"Flowers infrequently, after 15 to 30 years of growth, not a century as the name would imply" [but see Weber (2003)]
	Weber, E. (2003). Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Where invasive, the plant persists and spreads by abundant suckering from the root crown". [although species does not sexually reproduce for a long time, it is able to reproduce vegetatively after 1 year]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Weber, E. (2003). Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[no means of external attachment] "Fruits are oblong short-beaked capsules of 4-5 cm length. Seeds are brown or shiny black, 7-8 mm long and 5-6 mm wide"

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Whistler, W.A. (2000). Tropical Ornamentals: A Guide. Timber Press, Portland, OR	"native to Mexico but is widely cultivated for its attractive foliage and as a novelty."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Weber, E. (2003). Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Fruits are oblong short-beaked capsules of 4-5 cm length. Seeds are brown or shiny black, 7-8 mm long and 5-6 mm wide" [no evidence, & infrequent fruiting would make this highly unlikely]

Qsn #	Question	Answer
704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Rogers, G. K. (2000). A taxonomic revision of the genus <i>Agave</i> (Agavaceae) in the Lesser Antilles, with an ethnobotanical hypothesis. <i>Brittonia</i> , 52(3): 218-233	"Flotation of bulbils or fruits is possible. Trelease (1913) reported this for cultivated <i>Agave americana</i> L. Also possible is wind dispersal of the wafer-thin seeds. <i>Agave</i> seedlings apparently from wind-borne seeds colonize coral stone ruins in Antigua. Beyond wind and waves, circumstantial evidence points to human-mediated dispersal as discussed below."
705	Propagules water dispersed	y
	Source(s)	Notes
	Rogers, G. K. (2000). A taxonomic revision of the genus <i>Agave</i> (Agavaceae) in the Lesser Antilles, with an ethnobotanical hypothesis. <i>Brittonia</i> , 52(3): 218-233	"Flotation of bulbils or fruits is possible. Trelease (1913) reported this for cultivated <i>Agave americana</i> L. Also possible is wind dispersal of the wafer-thin seeds. <i>Agave</i> seedlings apparently from wind-borne seeds colonize coral stone ruins in Antigua. Beyond wind and waves, circumstantial evidence points to human-mediated dispersal as discussed below."
706	Propagules bird dispersed	n
	Source(s)	Notes
	Weber, E. (2003). <i>Invasive Plant Species of the World. A Reference Guide to Environmental Weeds.</i> CABI Publishing, Wallingford, UK	"Fruits are oblong short-beaked capsules of 4-5 cm length. Seeds are brown or shiny black, 7-8 mm long and 5-6 mm wide" [not fleshy-fruited]
707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Weber, E. (2003). <i>Invasive Plant Species of the World. A Reference Guide to Environmental Weeds.</i> CABI Publishing, Wallingford, UK	"Fruits are oblong short-beaked capsules of 4-5 cm length. Seeds are brown or shiny black, 7-8 mm long and 5-6 mm wide" [no means of external attachment]
708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Weber, E. (2003). <i>Invasive Plant Species of the World. A Reference Guide to Environmental Weeds.</i> CABI Publishing, Wallingford, UK	"Fruits are oblong short-beaked capsules of 4-5 cm length. Seeds are brown or shiny black, 7-8 mm long and 5-6 mm wide" [no evidence of ingestion]
801	Prolific seed production (>1000/m ²)	
	Source(s)	Notes
	Escobar-Guzman, R. E., Hernandez, F. Z., Vega, K. G., & Simpson, J. (2008). Seed production and gametophyte formation in <i>Agave tequilana</i> and <i>Agave americana</i> . <i>Canadian Journal of Botany</i> , 8 (11): 1343-1353	"26936 (16744-37128) black seeds per plant" [Clusters of plants could potentially reach high seed densities]

Qsn #	Question	Answer
802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Royal Botanic Gardens Kew. (2021) Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/ . [Accessed 25 Feb 2021]	"Storage Behaviour: Orthodox" [Field seed bank longevity unknown]
	Escobar-Guzman, R. E., Hernandez, F. Z., Vega, K. G., & Simpson, J. (2008). Seed production and gametophyte formation in <i>Agave tequilana</i> and <i>Agave americana</i> . <i>Canadian Journal of Botany</i> , 8 (11): 1343-1353	"Wounding of the seed coat greatly increased germination efficiency for both <i>A. tequilana</i> and <i>A. americana</i> . Peña-Valdivia et al. (2006) previously reported accelerated germination in scarified <i>A. salmiana</i> seeds; however, a biological basis for the need for scarification under natural conditions is unclear. Seeds from most <i>Agave</i> species are normally distributed by the wind as capsules open to release them and not by birds or other animals. Mechanical damage however could occur once they have reached the ground owing to the movement of animals or the activities of insects." [Scarification requirements may lead to creation of a persistent seed bank]

803	Well controlled by herbicides	y
	Source(s)	Notes
	The Nature Conservation Corporation. (2006). <i>Invasive Alien Vegetation Management Manual</i> . Cape Town, South Africa	"Herbicide control - Most cost effective way of dealing with this species. Saplings/Mature plants Inject 2ml of MSMA (MSMA 720g/l) into the bole of the plant - 2l per 1000 plants. It is recommended that stout gloves be worn whilst working with this species as the "teeth" can cut & the sap irritates the skin."
	Tunison, J.T. & Zimmer, N.G. (1992). Success in controlling local alien plants in Hawaii Volcanoes National Park. Pp 506-524 in Stone, C.P., Smith, C.W. & Tunison, J.T. (eds.): <i>Alien Plant Invasions in Native Ecosystems of Hawaii: Management & Research</i> . Coop. Nat. Park Res. Studies Unit, Univ. of Hawaii, Honolulu, HI	"Table 2. Changes in target alien plant populations with treatment; most effective treatments used in Hawai'i Volcanoes National Park... <i>Agave americana</i> ...Most Effective Treatment Used...Herbicide...5% Garlon 4"

804	Tolerates, or benefits from, mutilation, cultivation, or fire	n
	Source(s)	Notes
	Ecoscope (Australia) Pty Ltd. (2006). <i>North Cottesloe Coastal Management Plan 2005-2010</i> . https://www.cottesloecoastcare.org . [Accessed 25 Feb 2021]	"The most effective means of control is removal of the entire plant, including roots, by hand. At present these infestations largely consist of small plants and the removal of all plants is achievable with relatively little investment of labour." [does not benefit from cutting, but does spread vegetatively]
	Zimmer, H., Cheal, D. & Cross, E. (2012). <i>Post-fire Weeds Triage Manual: Black Saturday Victoria 2009– Natural values fire recovery program</i> . Department of Sustainability and Environment, Heidelberg, Victoria	"When burnt, recovery relatively weak or slow" [but relatively fire resistant]

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes

Qsn #	Question	Answer
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"One pest, locally called the agave snout beetle, causes serious damage or death to plants by burrowing inside the crown where the mealy grubs feed. Growers try to expel them by forcing a stream of water into the burrows or applying a contact insecticide to the exit holes, where it can trickle inside."

Summary of Risk Traits:

High Risk / Undesirable Traits

- Thrives in tropical climates
- Naturalized elsewhere (but not reported in the Hawaiian Islands)
- Regarded as an environmental weed in the Canary Islands, South Africa and possibly elsewhere
- Other Agave species have become invasive
- Leaves with marginal prickles and terminal spine
- Sap may be an irritant or toxic to both animals & people
- Tolerates many soil types
- Forms dense stands that can exclude other vegetation and people
- Seeds dispersed by wind, water & intentionally by people
- Hybridizes with other Agave species
- Self-compatible
- Suckers from the base (able to spread vegetatively)

Low Risk Traits

- Provides fodder for livestock (palatable despite reports of toxicity)
- Ornamental
- May not be able to invade shadier areas
- Reaches sexual maturity after decades of growth (but able to spread vegetatively at an earlier age)
- Herbicides provide effective control
- Mechanical removal & hot fires may also control plants