

Taxon: <i>Senegalia insuavis</i> (Lace) Pedley	Family: Fabaceae
Common Name(s): cha-om climbing wattle rau thoi	Synonym(s): <i>Acacia insuavis</i> Lace <i>Acacia pennata</i> subsp. <i>insuavis</i> (Lace) I.C.Nielsen <i>Senegalia pennata</i> subsp. <i>insuavis</i> (Lace) Maslin, Seigler & Ebinger

Assessor: Chuck Chimera	Status: Approved	End Date: 5 Oct 2023
WRA Score: 12.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Woody Climber, Naturalized Elsewhere, Prickly, Edible, Animal-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y = -3, n = 0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	0 = low, 1 = intermediate, 2 = high (see Appendix 2)	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	y = 1*multiplier (see Appendix 2), n = question 205	y
302	Garden/amenity/disturbance weed	y = 1*multiplier (see Appendix 2), n = 0	y
303	Agricultural/forestry/horticultural weed		
304	Environmental weed		
305	Congeneric weed		
401	Produces spines, thorns or burrs	y = 1, n = 0	y
402	Allelopathic		
403	Parasitic	y = 1, n = 0	n
404	Unpalatable to grazing animals	y = 1, n = -1	n
405	Toxic to animals		
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y = 1, n = 0	n
408	Creates a fire hazard in natural ecosystems		
409	Is a shade tolerant plant at some stage of its life cycle		

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y = 1, n = 0	y
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		
604	Self-compatible or apomictic	y = 1, n = -1	n
605	Requires specialist pollinators	y = -1, n = 0	n
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	1
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		
704	Propagules adapted to wind dispersal	y = 1, n = -1	y
705	Propagules water dispersed	y = 1, n = -1	y
706	Propagules bird dispersed		
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/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		
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
	Wuart, C. (2022). Medicinal Plants in the Asia Pacific for Zoonotic Pandemics, Volume 2: Family Zygophyllaceae to Salvadoraceae. CRC Press	[No evidence] "Botanical observation: This woody climber grows up to about 10 m long. The stems are hairy at apex. The bark is used in India for the making of soap."
102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2023). Personal Communication	NA
103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2023). 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
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. (2010). Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Acacia pennata] "Thin forests, thickets. Fujian, Guangdong, Guangxi, ?Guizhou, Hainan, Yunnan, ?Zhejiang [Bhutan, Cambodia, India, Laos, ?Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam]. Acacia pennata var. pennata occurs in India, Myanmar, Sri Lanka, and Thailand."
202	Quality of climate match data	High
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. (2010). Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Acacia pennata] "Thin forests, thickets. Fujian, Guangdong, Guangxi, ?Guizhou, Hainan, Yunnan, ?Zhejiang [Bhutan, Cambodia, India, Laos, ?Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam]. Acacia pennata var. pennata occurs in India, Myanmar, Sri Lanka, and Thailand."
203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2023). <i>Senegalia pennata</i> . https://tropical.theferns.info/viewtropical.php?id=Senegalia+pennata&redir=Acacia+pennata . [Accessed 4 Oct 2023]	"Forests, avoiding drier regions, chiefly along rivers and streams, and in ravines; at elevations up to 1,500 metres [146]."

Qsn #	Question	Answer
204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Gallaher, T.J., Brock, K., Kennedy, B.H., Imada, C.T., Imada, K., & Walvoord, N. (2023). Plants of Hawai'i. http://www.plantsofhawaii.org.. [Accessed 3 Oct 2023]	"Only found in cultivation"
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. (2010). Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Thin forests, thickets. Fujian, Guangdong, Guangxi, ?Guizhou, Hainan, Yunnan, ?Zhejiang [Bhutan, Cambodia, India, Laos, ? Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam]."

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Gallaher, T.J., Brock, K., Kennedy, B.H., Imada, C.T., Imada, K., & Walvoord, N. (2023). Plants of Hawai'i. http://www.plantsofhawaii.org.. [Accessed 4 Oct 2023]	"Only found in cultivation"
	USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 4 Oct 2023]	[<i>Senegalia insuavis</i> (Lace) Pedley] "Cultivated Asia-Tropical INDIAN SUBCONTINENT: India INDO-CHINA: Indochina, Cambodia, Laos, Thailand Naturalized Asia-Tropical INDIAN SUBCONTINENT: India INDO-CHINA: Thailand Australasia AUSTRALIA: Australia [Queensland (n.)]"

301	Naturalized beyond native range	y
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 4 Oct 2023]	"Naturalized Asia-Tropical INDIAN SUBCONTINENT: India INDO-CHINA: Thailand Australasia AUSTRALIA: Australia [Queensland (n.)]"
	Gallaher, T.J., Brock, K., Kennedy, B.H., Imada, C.T., Imada, K., & Walvoord, N. (2023). Plants of Hawai'i. http://www.plantsofhawaii.org.. [Accessed 4 Oct 2023]	"Only found in cultivation"
	Maslin, B. R. (2023). <i>Senegalia insuavis</i> , in P.G. Kodela (ed.), Flora of Australia. Australian Biological Resources Study, Department of Climate Change, Energy, the Environment and Water: Canberra. https://profiles.ala.org.au/opus/foa/profile/Senegalia%20insuavis. [Accessed 3 Oct 2023]	" <i>Senegalia insuavis</i> is introduced in Australia where it is occasionally grown and may be possibly naturalised in places, fide L. Pedley, <i>Austrobaileya</i> 9: 314 (2014). It occurs naturally (and is also sometimes cultivated) in Myanmar and southern China and is introduced also in Cambodia, Singapore, Thailand and U.S.A. (Florida); it is uncertain if it is native or introduced in Laos and India. Because this species is commonly cultivated for culinary purposes it is often difficult to know with certainty if specimen records represent natural or introduced occurrences."

302	Garden/amenity/disturbance weed	y
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2023). <i>Senegalia pennata</i> . https://tropical.theferns.info/viewtropical.php?id=Senegalia+pennata&redir=Acacia+pennata . [Accessed 4 Oct 2023]	"A very troublesome climber which should be cut whenever possible, as it climbs over the tallest trees, and its tough, wiry, strong, thorny branches damage them considerably [146]."

Qsn #	Question	Answer
	Biosecurity Queensland. (2023). Cha-om. Prohibited Invasive Plant. Look. Report. Protect. 13 25 23. https://www.daf.qld.gov.au/__data/assets/pdf_file/0005/1396472/cha-om.pdf . [Accessed 4 Oct 2023]	[An early detection weed targeted for eradication for its potential to invade pastures and natural areas] "Cha-om is a prohibited invasive plant under the Biosecurity Act 2014. Prohibited species must be reported immediately to Biosecurity Queensland in 13 25 23. Cha-om can invade pastures and outcompete with native vegetation. It forms prickly thickets, which can limit movement of people and animals."

303	Agricultural/forestry/horticultural weed	
	Source(s)	Notes
	Biosecurity Queensland. (2023). Cha-om. Prohibited Invasive Plant. Look. Report. Protect. 13 25 23. https://www.daf.qld.gov.au/__data/assets/pdf_file/0005/1396472/cha-om.pdf . [Accessed 4 Oct 2023]	[Potentially. Might invade pastures and impact livestock management] "Cha-om is a prohibited invasive plant under the Biosecurity Act 2014. Prohibited species must be reported immediately to Biosecurity Queensland in 13 25 23. Cha-om can invade pastures and outcompete with native vegetation. It forms prickly thickets, which can limit movement of people and animals."

304	Environmental weed	
	Source(s)	Notes
	Biosecurity Queensland. (2023). Cha-om. Prohibited Invasive Plant. Look. Report. Protect. 13 25 23. https://www.daf.qld.gov.au/__data/assets/pdf_file/0005/1396472/cha-om.pdf . [Accessed 3 Oct 2023]	"Cha-om is a prohibited invasive plant under the Biosecurity Act 2014. Prohibited species must be reported immediately to Biosecurity Queensland in 13 25 23. Cha-om can invade pastures and outcompete with native vegetation. It forms prickly thickets, which can limit movement of people and animals."
	Csurhes, S. (2018). Pushing 37 weed species towards extinction in Queensland. In 21st Australasian Weeds Conference, "Weed Biosecurity-Protecting our Future", Sydney, New South Wales, Australia, 9-13 September 2018 (pp. 115-118). Weed Society of New South Wales Inc.	"Table 1. List of weed species that have been or are currently being pursued for eradication in Queensland (1 = cultivated specimens believed eradicated, 2 = naturalised population believed eradicated, 3 = naturalised population declining and 'on track' for eradication, 4 = eradication being pursued but success highly uncertain, 5 = species no longer being eradicated and 6 = unassessed species) (*species continues to be regularly detected in cultivation)." [Senegalia insuavis included in list of target weed species. Classified as a category 4 weed, with eradication being pursued but success uncertain]
	Panetta, F., Csurhes, S., Markula, A., & Hannan-Jones, M. (2011). Predicting the cost of eradication for 41 Class 1 declared weeds in Queensland. Plant Protection Quarterly, 26(2), 42-46	[Possibly. Targeted for eradication] "The feasibility of state-wide eradication of 41 invasive plant taxa currently listed as 'Class 1 declared pests' under the Queensland Land Protection (Pest and Stock Route Management) Act 2002 was assessed using the predictive model 'WeedSearch'. Results indicated that all but one species (<i>Alternanthera philoxeroides</i>) could be eradicated, provided sufficient funding and labour were available." ... "Table 2. Estimated mean costs of eradication for 41 weed taxa. Species are listed in order of decreasing program cost." [Acacia pennata included as a Class 1 weed. Class 1 pests, listed under the Land Protection (Pest and Stock Route Management) Act 2002, qualify for listing if they pose a significant threat to Queensland but are either not yet naturalized or are potentially vulnerable to eradication.]

305	Congeneric weed	
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Possibly. Other species have been cited as weeds of unspecified or ambiguous impacts.
	WRA Specialist. (2023). Personal Communication	Previously classified as <i>Acacia pennata</i> subsp. <i>insuavis</i> . Several <i>Acacia</i> species are invasive weeds.

401	Produces spines, thorns or burrs	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. (2010). Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Climbers, with copious, scattered prickles. Branchlets and leaf rachis ferruginous pubescent."

402	Allelopathic	
	Source(s)	Notes
	Kyaw, E.H. and Kato-Noguchi, H. (2020). Allelopathic potential of <i>Acacia pennata</i> (L.) Willd. leaf extracts against the seedling growth of six test plants. <i>Notulae Botanicae Horti Agrobotanici Cluj-Napoca</i> , 48(3), 1534-1542	[Potentially Yes. Extracts demonstrate allelopathic effects] " <i>Acacia pennata</i> (L.) Willd (Mimosaceae), a woody climbing plant, is used as a traditional medicinal plant in the South and Southeast Asia regions and has been documented to have various pharmacological effects. However, the allelopathy of this plant still remains unclear. Thus, the allelopathic potential of <i>A. pennata</i> leaf extracts was examined against the seedling growth of dicot plants [alfalfa (<i>Medicago sativa</i> L.), cress (<i>Lepidium sativum</i> L.), and lettuce (<i>Lactuca sativa</i> L.)] and monocot plants [barnyard grass (<i>Echinochloa crus-galli</i> (L.) Beauv.), Italian ryegrass (<i>Lolium multiflorum</i> Lam.), and timothy (<i>Phleum pratense</i> L.)] at six different concentrations. The results showed that the <i>A. pennata</i> leaf extracts inhibited the seedling growth of all the test plant species at concentrations ≥ 3 mg dry weight (D.W.) equivalent extract mL ⁻¹ . The inhibitory activity of the extracts against both shoot and root growth varied with concentration and tested plants. The concentrations required for 50% inhibition of the test plant shoots and roots were 1.5-16.1 and 1.4-8.6 mg D.W. equivalent extract mL ⁻¹ , respectively. The root growth of all the test plant species was more sensitive to the extracts than their shoot growth, except alfalfa. The results of the present study indicate that the <i>A. pennata</i> leaf extracts may have allelopathic potential and may contain allelopathic substances. Therefore, further studies are required for isolation and identification of the growth inhibitory substances which are responsible for the allelopathic effect of <i>A. pennata</i> ."

403	Parasitic	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. (2010). Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Climbers, with copious, scattered prickles. Branchlets and leaf rachis ferruginous pubescent." [Fabaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Feed the Future Innovation Lab for Livestock Systems. (2018). Living Fences. https://livestocklab.ifas.ufl.edu/media/livestocklabifasufledu/pdf/-pdfs-by-country-pre2019/Living-Fence-Species---LSIL-Cambodia-Workshop-Handout-FINAL_v2.pdf . [Accessed 5 Oct 2023]	"Uses: Cattle fodder, livestock barrier, human food, medicine Benefits: Grows quickly; fixes nitrogen; can be used as a living fence to control cattle; produces high protein fodder"
	Sukumar, R. (1990). Ecology of the Asian elephant in southern India. II. Feeding habits and crop raiding patterns. <i>Journal of Tropical Ecology</i> , 6(1), 33-53	[Browsed by elephants, although thorns may deter other animals] "Elephants may select individuals within a species with the most fresh foliage, as was often observed when they fed on <i>Acacia pennata</i> . In the absence of leaves they still consume the twigs during the dry season. Thorn bearing shoots of many species of <i>Acacia</i> are consumed without any obvious discomfort."

405	Toxic to animals	

Qsn #	Question	Answer
	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	"Fish poison, fruit pulp, bark and stem; seeds pounded and used as fish poison; powdered stem bark as a fish poison."
	Tropical Plants Database, Ken Fern. (2023). <i>Senegalia pennata</i> . https://tropical.theferns.info/viewtropical.php?id=Senegalia+pennata&redir=Acacia+pennata . [Accessed 3 Oct 2023]	[Speculative] "In eastern Himalaya and north-eastern India, bark and pounded seeds are used as fish poison[317] Especially in times of drought, many <i>Acacia</i> species can concentrate high levels of the toxin Hydrogen cyanide in their foliage, making them dangerous for herbivores to eat."

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Duncan, K., Chompothong, N., & Burnette, R. (2012). Vegetable production throughout the rainy season. ECHO Asia Notes, 13, 1-14	[Climbing wattle - <i>Acacia pennata</i>] "Possible Pests: No major pests."
	WRA Specialist. (2023). Personal Communication	Unknown

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Duncan, K., Chompothong, N., & Burnette, R. (2012). Vegetable production throughout the rainy season. ECHO Asia Notes, 13, 1-14	"Edible Parts: Climbing wattle produces edible leaf shoots year round, especially during the rainy season. The shoots have a strong aroma and flavor, and are often deep-fried, added to omelets or blanched for use as a dipping vegetable"
	Tropical Plants Database, Ken Fern. (2023). <i>Senegalia pennata</i> . https://tropical.theferns.info/viewtropical.php?id=Senegalia+pennata&redir=Acacia+pennata . [Accessed 3 Oct 2023]	[No evidence] "Edible Uses The tender leaves and young stems are used as vegetable[317]. Medicinal A decoction of the leaves is used in the treatment of body pain, fevers and headaches [272]. The leaf juice, combined with milk, is given to infants suffering from indigestion [240, 272]. The leaves are chewed with cumin and sugar to treat bleeding gums [240, 272]. A poultice made from the fresh seeds is used as applied to burns [272]. The juice of the bark is used as an antidote in the treatment of snake poisoning[240]. A paste made from the bark is applied topically to treat conditions such as scabies, cuts and wounds [272]. The bark of all <i>Acacia</i> species contains greater or lesser quantities of tannins and are astringent. Astringents are often used medicinally - taken internally, for example. they are used in the treatment of diarrhoea and dysentery, and can also be helpful in cases of internal bleeding. Applied externally, often as a wash, they are used to treat wounds and other skin problems, haemorrhoids, perspiring feet, some eye problems, as a mouth wash etc [601, K]. Many <i>Acacia</i> trees also yield greater or lesser quantities of a gum from the trunk and stems. This is sometimes taken internally in the treatment of diarrhoea and haemorrhoids [601]."

Qsn #	Question	Answer
408	Creates a fire hazard in natural ecosystems	
	Source(s)	Notes
	Biosecurity Queensland. (2023). Cha-om. Prohibited Invasive Plant. Look. Report. Protect. 13 25 23. https://www.daf.qld.gov.au/__data/assets/pdf_file/0005/1396472/cha-om.pdf . [Accessed 4 Oct 2023]	"Cha-om (<i>Senegalia insuavis</i>) is a shrub up to 5 m high that has a tendency to climb like a vine among other vegetation." ... "It forms prickly thickets, which can limit movement of people and animals." [Flammability unknown, but as a climber, could serve as a fuel ladder, and thicket formation could contribute to heightened fire risk]
	Ray, T., Malasiya, D., Verma, S., Kumar, T., & Khan, M. L. (2023). Impact of forest fire frequency on tree biomass and carbon stocks in the tropical dry deciduous forest of Panna Tiger Reserve, Central India. <i>Tropical Ecology</i> , 64(2), 337-351	"Table 5 Species wise total biomass (TB, Mg/ha) and carbon stock (CS, Mg C/ha) of adult tree species in different fire frequency classes of Panna Tiger Reserve" [Acacia pennata occurs in areas with with 1-4 fires per year in the 20-year period from 1997 to 2017. Contribution to fuel load or flammability unknown]

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	Mazhar Botanic Garden. (2023). <i>Senegalia pennata</i> . https://mazharbotanicgarden.com/plants-collection/climbers/EGY-MBG-000863 . [Accessed 4 Oct 2023]	"Lights: Full Sun, Light Shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	Maslin, B. R., Ho, B. C., Sun, H., & Bai, L. (2019). Revision of <i>Senegalia</i> in China, and notes on introduced species of <i>Acacia</i> , <i>Acaciella</i> , <i>Senegalia</i> and <i>Vachellia</i> (Leguminosae: Mimosoideae). <i>Plant Diversity</i> , 41(6), 353-480	"Habitat. Recorded in China as growing in hilly or mountainous sandstone areas (alt. 330e1300 m), in open or mixed forests."
	Mazhar Botanic Garden. (2023). <i>Senegalia pennata</i> . https://mazharbotanicgarden.com/plants-collection/climbers/EGY-MBG-000863 . [Accessed 4 Oct 2023]	"pH: 6.0-7.5"
	WRA Specialist. (2023). Personal Communication	Unknown if restricted to specific soil types or substrates

411	Climbing or smothering growth habit	y
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. (2010). <i>Flora of China</i> . Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Climbers, with copious, scattered prickles. Branchlets and leaf rachis ferruginous pubescent."

412	Forms dense thickets	y
	Source(s)	Notes
	Biosecurity Queensland. (2023). Cha-om. Prohibited Invasive Plant. Look. Report. Protect. 13 25 23. https://www.daf.qld.gov.au/__data/assets/pdf_file/0005/1396472/cha-om.pdf . [Accessed 3 Oct 2023]	"Cha-om can invade pastures and outcompete with native vegetation. It forms prickly thickets, which can limit movement of people and animals."

Qsn #	Question	Answer
501	Aquatic	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. (2010). Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Terrestrial] "Thin forests, thickets."
502	Grass	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 2 Oct 2023]	"Family: Fabaceae (alt. Leguminosae) Subfamily: Caesalpinioideae Tribe: Acacieae"
503	Nitrogen fixing woody plant	y
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 2 Oct 2023]	"Family: Fabaceae (alt. Leguminosae) Subfamily: Caesalpinioideae Tribe: Acacieae"
	Bakhoum, N., Fall, D., Fall, F., Diouf, F., Hirsch, A. M., Balachandar, D., & Diouf, D. (2018). <i>Senegalia senegal</i> (synonym: <i>Acacia senegal</i>), its importance to sub-Saharan Africa, and its relationship with a wide range of symbiotic soil microorganisms. <i>South African Journal of Botany</i> , 119, 362-368	[Presumably yes. Related species fixes nitrogen] " <i>Senegalia senegal</i> is symbiotic with soil microorganisms, especially rhizobia and Arbuscular Mycorrhizal Fungi (AMF). Rhizobia contribute to the global nitrogen cycle (Sprent, 1994), and a number of different rhizobial taxa and strains establish nitrogen-fixing nodules on <i>S. senegal</i> roots (Bakhoum et al., 2014, de Lajudie et al., 1998, Fall et al., 2008, Nick et al., 1999, Njiti and Galiana, 1996, Odee et al., 1995, 1997)."
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Wiert, C. (2022). <i>Medicinal Plants in the Asia Pacific for Zoonotic Pandemics, Volume 2: Family Zygophyllaceae to Salvadoraceae</i> . CRC Press	"This woody climber grows up to about 10 m long. The stems are hairy at apex."
601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. (2010). Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Thin forests, thickets. Fujian, Guangdong, Guangxi, ?Guizhou, Hainan, Yunnan, ?Zhejiang [Bhutan, Cambodia, India, Laos, ? Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Vietnam]." [No evidence]
602	Produces viable seed	y
	Source(s)	Notes

Qsn #	Question	Answer
	Tropical Plants Database, Ken Fern. (2023). <i>Senegalia pennata</i> . https://tropical.theferns.info/viewtropical.php?id=Senegalia+pennata&redir=Acacia+pennata . [Accessed 4 Oct 2023]	"Propagation - The seed of most, if not all, members of this genus has a hard seedcoat and may benefit from scarification before sowing to speed up germination. This can usually be done by pouring a small amount of nearly boiling water on the seeds (being careful not to cook them!) and then soaking them for 12 - 24 hours in warm water. By this time they should have imbibed moisture and swollen - if they have not, then carefully make a nick in the seedcoat (being careful not to damage the embryo) and soak for a further 12 hours before sowing."
	Duncan, K., Chompothong, N., & Burnette, R. (2012). Vegetable production throughout the rainy season. <i>ECHO Asia Notes</i> , 13, 1-14	[Climbing wattle - <i>Acacia pennata</i>] "Planting Recommendations: Plants can be established from stem cuttings or from seed. Seedlings should be spaced at least 1 meter (3.3 ft.) apart."

603	Hybridizes naturally	
	Source(s)	Notes
	WRA Specialist. (2023). Personal Communication	Unknown. No evidence found

604	Self-compatible or apomictic	n
	Source(s)	Notes
	Duan, Y. W., Ren, H., Li, T., Wang, L. L., Zhang, Z. Q., Tu, Y. L., & Yang, Y. P. (2019). A century of pollination success revealed by herbarium specimens of seed pods. <i>New Phytologist</i> , 224(4), 1512-1517	"We identified 109 species that are obligate outcrossers, thus incapable of self-fertilization. This includes 4637 specimens collected across much of China for > 100 yr, with the three main subfamilies all well-represented (Fig. S1)." [Acacia pennata included among the species incapable of self-fertilization]
	Omondi, S. F. (2016). Reproductive biology and population ecology of <i>Senegalia senegal</i> (L.) Britton within Lake Baringo woodland ecosystem, Kenya. PhD Dissertation, University of Nairobi	[Other member of genus is self-incompatible] " <i>Senegalia senegal</i> is reported to be almost exclusively out-crossed and has been shown to be self-incompatible (Tandon et al., 2001). The species produces numerous flowers, which yield abundant pollen grouped into polyads of 16 pollen grains, however, the stigma only accommodates one polyad. Even though self-pollen grain can be deposited on the stigma, the self-incompatibility does not allow any fertilization (Obunga, 1995)."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Gao, J., He, T., & Li, Q. M. (2012). Traditional home-garden conserving genetic diversity: a case study of <i>Acacia pennata</i> in southwest China. <i>Conservation Genetics</i> , 13, 891-898	" <i>Acacia pennata</i> (Linn.) Willd (Fabaceae) is widely distributed in tropical and subtropical southeast Asia. This diploid species is a vine-like climbing tree, wind pollinated, and with seeds usually dispersed by wind, occasionally by birds (Graham et al. 2003)."
	Tropical Plants Database, Ken Fern. (2023). <i>Senegalia pennata</i> . https://tropical.theferns.info/viewtropical.php?id=Senegalia+pennata&redir=Acacia+pennata . [Accessed 4 Oct 2023]	"Pollinators Bees, Insects"

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	NSW WeedWise. (2023). Cha-om (<i>Senegalia pennata</i> subsp. <i>insuavis</i>). https://weeds.dpi.nsw.gov.au/Weeds/Chaom . [Accessed 5 Oct 2023]	"Cha-om reproduces via stem fragments and where branches come in contact with the ground. Stem fragments can be spread by moving water."

Qsn #	Question	Answer
	Feed the Future Innovation Lab for Livestock Systems. (2018). Living Fences. https://livestocklab.ifas.ufl.edu/media/livestocklabifasufledu/pdf/pdfs-by-country-pre2019/Living-Fence-Species---LSIL-Cambodia-Workshop-Handout-FINAL_v2.pdf . [Accessed 5 Oct 2023]	[Acacia pennata] "How to plant: Cuttings or seed propagation"

607	Minimum generative time (years)	1
	Source(s)	Notes
	NSW WeedWise. (2023). Cha-om (<i>Senegalia pennata</i> subsp. <i>insuavis</i>). https://weeds.dpi.nsw.gov.au/Weeds/Chaom . [Accessed 5 Oct 2023]	"Cha-om plants can produce seeds within a year."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Gao, J., He, T., & Li, Q. M. (2012). Traditional home-garden conserving genetic diversity: a case study of <i>Acacia pennata</i> in southwest China. <i>Conservation Genetics</i> , 13, 891-898	" <i>Acacia pennata</i> (Linn.) Willd (Fabaceae) is widely distributed in tropical and subtropical southeast Asia. This diploid species is a vine-like climbing tree, wind pollinated, and with seeds usually dispersed by wind, occasionally by birds (Graham et al. 2003)."
	Reddy, M. S., & Rao, B. R. P. (2007). Liana diversity in Eastern Ghats. In <i>Proceedings of National Seminar on Conservation of Eastern Ghats-2007</i> . Environment Protection Training and Research Institute, Hyderabad (pp. 70-76)	"Table 1. List of lianas, their climbing mechanism and dispersal mode of Eastern Ghats" [<i>Acacia pennata</i> - Dispersal mode = Autochorous] [Autochorous plants are equipped with an autonomous mechanism involved in seed dispersal.]
	Maslin, B. R., Ho, B. C., Sun, H., & Bai, L. (2019). Revision of <i>Senegalia</i> in China, and notes on introduced species of <i>Acacia</i> , <i>Acaciella</i> , <i>Senegalia</i> and <i>Vachellia</i> (Leguminosae: Mimosoideae). <i>Plant Diversity</i> , 41(6), 353-480	[No means of external attachment] "Pods oblong, 120e230 mm long, (15e) 20e25 (l30) mm wide, firmly chartaceous to thinly coriaceous, straight to very shallowly curved, scarcely or shallowly constricted between seeds, flat but slightly raised over seeds along midline, light brown, glabrous, sessile glands absent, obscurely transversely veined, marginal vein thickened, narrowed at apex, tapered at base into a terete stipe 5e10 mm long. Seeds (only one slightly immature seed seen, namely, Kerr 4805 from Thailand) transverse in pods, oblongelliptic, c. 9 mm long and c. 7 mm wide, flattened, dark brown; areole elliptic, open at hilar end, c. 5 mm long and c. 4 mm wide; funicle thickly filiform, exarillate."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Gallaher, T.J., Brock, K., Kennedy, B.H., Imada, C.T., Imada, K., & Walvoord, N. (2023). <i>Plants of Hawai'i</i> . http://www.plantsofhawaii.org . [Accessed 3 Oct 2023]	"Only found in cultivation"
	Hassan, R. A., & Hamdy, R. S. (2021). Synoptic overview of exotic <i>Acacia</i> , <i>Senegalia</i> and <i>Vachellia</i> (Caesalpinioideae, mimosoid clade, Fabaceae) in Egypt. <i>Plants</i> , 10(7), 1344	"Utilisation: The soft new shoots are commonly used in Asian cooking and as a hedgerow shrub in Thailand [26]. According to [103], the roots of this subspecies in Laos are used in local medicine to combat anemia. In Egypt, it is cultivated as an ornamental tree in some private gardens."

Qsn #	Question	Answer
703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	WRA Specialist. (2023). Personal Communication	Unknown, but cultivated as an edible food source, so potential exists to contaminate other produce

704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Gao, J., He, T., & Li, Q. M. (2012). Traditional home-garden conserving genetic diversity: a case study of <i>Acacia pennata</i> in southwest China. <i>Conservation Genetics</i> , 13, 891-898	" <i>Acacia pennata</i> (Linn.) Willd (Fabaceae) is widely distributed in tropical and subtropical southeast Asia. This diploid species is a vine-like climbing tree, wind pollinated, and with seeds usually dispersed by wind, occasionally by birds (Graham et al. 2003)."
	Reddy, M. S., & Rao, B. R. P. (2007). Liana diversity in Eastern Ghats. In <i>Proceedings of National Seminar on Conservation of Eastern Ghats-2007</i> . Environment Protection Training and Research Institute, Hyderabad (pp. 70-76)	"Table 1. List of lianas, their climbing mechanism and dispersal mode of Eastern Ghats" [<i>Acacia pennata</i> listed with Autochorous dispersal. Autochorous plants are equipped with an autonomous mechanism involved in seed dispersal. Wind may or likely facilitates dispersal of pods and seeds]
	Omondi, S. F. (2016). Reproductive biology and population ecology of <i>Senegalia senegal</i> (L.) britton within Lake Baringo woodland ecosystem, Kenya. PhD Dissertation, University of Nairobi	[Related species, <i>Senegalia senegal</i> , is wind-dispersed] "The species produces a papery pod that split open when dry to allow seed dispersal. The seeds are attached to the pod through a thin funicle (Stone et al., 1998). Some seeds usually detach themselves from the pods when the funicle dries while some seeds remain attached to the pod and are dispersed with it. Wind is the major seed dispersal agent, although ungulates are also known to disperse seeds (Tybirk, 1993)."

705	Propagules water dispersed	y
	Source(s)	Notes
	NSW WeedWise. (2023). Cha-om (<i>Senegalia pennata</i> subsp. <i>insuavis</i>). https://weeds.dpi.nsw.gov.au/Weeds/Chaom . [Accessed 5 Oct 2023]	How does it spread? By seeds Cha-om plants can produce seeds within a year. Pods are eaten by cattle and seeds are spread in their dung. Seeds could also be spread by moving water. By plant parts Cha-om reproduces via stem fragments and where branches come in contact with the ground. Stem fragments can be spread by moving water."

706	Propagules bird dispersed	
	Source(s)	Notes
	Omondi, S. F. (2016). Reproductive biology and population ecology of <i>Senegalia senegal</i> (L.) britton within Lake Baringo woodland ecosystem, Kenya. PhD Dissertation, University of Nairobi	[Related species wind and ungulate dispersed] "The species produces a papery pod that split open when dry to allow seed dispersal. The seeds are attached to the pod through a thin funicle (Stone et al., 1998). Some seeds usually detach themselves from the pods when the funicle dries while some seeds remain attached to the pod and are dispersed with it. Wind is the major seed dispersal agent, although ungulates are also known to disperse seeds (Tybirk, 1993)."
	Gao, J., He, T., & Li, Q. M. (2012). Traditional home-garden conserving genetic diversity: a case study of <i>Acacia pennata</i> in southwest China. <i>Conservation Genetics</i> , 13, 891-898	[Reported to be occasionally bird-dispersed, but unable to corroborate with other sources, which list the dispersal as autochorous] " <i>Acacia pennata</i> (Linn.) Willd (Fabaceae) is widely distributed in tropical and subtropical southeast Asia. This diploid species is a vine-like climbing tree, wind pollinated, and with seeds usually dispersed by wind, occasionally by birds (Graham et al. 2003)."

707	Propagules dispersed by other animals (externally)	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. (2010). Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Legume strap-shaped, 9-20 × 2-3.5 cm, glabrous or finely puberulent when young, sutures slightly sinuate. Seeds black, 8-12, narrowly elliptic, 6-10 × 4.5-7 mm, flat." [Unlikely for seeds or fruits to be dispersed externally by animals. No means of external attachment]

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	NSW WeedWise. (2023). Cha-om (<i>Senegalia pennata</i> subsp. <i>insuavis</i>). https://weeds.dpi.nsw.gov.au/Weeds/Chaom . [Accessed 5 Oct 2023]	"Cha-om plants can produce seeds within a year. Pods are eaten by cattle and seeds are spread in their dung. Seeds could also be spread by moving water."
	Gao, J., He, T., & Li, Q. M. (2012). Traditional home-garden conserving genetic diversity: a case study of <i>Acacia pennata</i> in southwest China. <i>Conservation Genetics</i> , 13, 891-898	[Possibly, if bird dispersed. No other sources list this species as dispersed by birds] " <i>Acacia pennata</i> (Linn.) Willd (Fabaceae) is widely distributed in tropical and subtropical southeast Asia. This diploid species is a vine-like climbing tree, wind pollinated, and with seeds usually dispersed by wind, occasionally by birds (Graham et al. 2003)."

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. (2010). Flora of China. Vol. 10 (Fabaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Legume strap-shaped, 9-20 × 2-3.5 cm, glabrous or finely puberulent when young, sutures slightly sinuate. Seeds black, 8-12, narrowly elliptic, 6-10 × 4.5-7 mm, flat." [Densities unknown]

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2023). <i>Senegalia pennata</i> . https://tropical.theferns.info/viewtropical.php?id=Senegalia+pennata&redir=Acacia+pennata . [Accessed 5 Oct 2023]	[Possibly. Generic description of long-lived seeds] "The seed of most, if not all, members of this genus has a hard seedcoat and may benefit from scarification before sowing to speed up germination. This can usually be done by pouring a small amount of nearly boiling water on the seeds (being careful not to cook them!) and then soaking them for 12 - 24 hours in warm water. By this time they should have imbibed moisture and swollen - if they have not, then carefully make a nick in the seedcoat (being careful not to damage the embryo) and soak for a further 12 hours before sowing. <i>Acacia</i> seeds that have matured fully on the bush and have been properly dried have a hard seed coat and can be stored in closed containers without deterioration for 5 - 10 years or more in dry conditions at ambient temperatures. It is best to remove the aril, which attracts weevils and can lead to moulds forming. The arils are easily removed by placing the seeds in water and rubbing them between the hands, then drying the seeds and winnowing them [1294]."

803	Well controlled by herbicides	y
	Source(s)	Notes

Qsn #	Question	Answer
	NSW WeedWise. (2023). Cha-om (<i>Senegalia pennata</i> subsp. <i>insuavis</i>). https://weeds.dpi.nsw.gov.au/Weeds/Chaom . [Accessed 5 Oct 2023]	"Chemical control Cut stump Cut the stump and apply herbicide to the remaining stump within 15 seconds. To reach the stump branches may need to be cut away to get access to the stump and avoid injury. Herbicide options WARNING - ALWAYS READ THE LABEL Users of agricultural or veterinary chemical products must always read the label and any permit, before using the product, and strictly comply with the directions on the label and the conditions of any permit. Users are not absolved from compliance with the directions on the label or the conditions of the permit by reason of any statement made or not made in this information. To view permits or product labels go to the Australian Pesticides and Veterinary Medicines Authority website www.apvma.gov.au See Using herbicides for more information. Picloram 44.7 g/L + Aminopyralid 4.47 g/L (Vigilant II ®) Rate: Undiluted Comments: Cut stump application: Apply a 3-5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm. Withholding period: Nil. Herbicide group: 4 (previously group I), Disruptors of plant cell growth (Auxin mimics) Resistance risk: Moderate"

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	NSW WeedWise. (2023). Cha-om (<i>Senegalia pennata</i> subsp. <i>insuavis</i>). https://weeds.dpi.nsw.gov.au/Weeds/Chaom . [Accessed 5 Oct 2023]	[Unknown, but may be able to resprout without herbicide application] "Physical Individual smaller plants can be dug out by hand. Chemical control Cut stump Cut the stump and apply herbicide to the remaining stump within 15 seconds. To reach the stump branches may need to be cut away to get access to the stump and avoid injury."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2023). Personal Communication	Unknown

Summary of Risk Traits:

Senegalia insuavis (cha-om, climbing wattle) is a woody climber, with copious, scattered prickles, native to South Asia and Southeast Asia. The soft new shoots are commonly used for culinary purposes in Asian cooking, and it is sometimes used as a hedge-row shrub. It is now reported to be naturalized in a number of locations where introduced, and is targeted for eradication in Australia for its ability to form dense thickets and potential to compete with native plants and desirable pasture vegetation. It has not been reported as naturalized in the Hawaiian Islands to date.

High Risk / Undesirable Traits

- Thrives and can spread in regions with tropical climates
- Broad elevation range (>1000 m)
- Reported to be naturalized in India, Thailand, and Australia, but not in the Hawaiian Islands to date
- A prevention and eradication target in Australia due to its potential to form dense thickets and outcompetes native plants and desirable pasture vegetation.
- Covered in numerous prickles.
- Potentially toxic to animals at certain stages of growth.
- Climbing and potentially smothering growth habit.
- Reported to form prickly thickets, which can limit the movement of people and animals.
- Nitrogen-fixing (can modify soil nutrient levels).
- Reproduces by seeds and vegetatively by stem fragments.
- Reported to produce seeds within one year.
- Seeds reported to be dispersed by cattle, water, wind, possibly birds, and through intentional cultivation
- Stem-fragments dispersed by water.
- Seeds may be long-lived and could form a persistent seed bank.

Low Risk Traits

- Palatable, and used as fodder (although prickles may discourage browsing)
- Valued for edible leaf shoots.
- Reported to be out-crossing and incapable of self-fertilization.
- Herbicides may provide effective control.

