Taxon: Salvia guaranitica A. St.-Hil. ex Benth. **Family:** Lamiaceae

Common Name(s): 'black and blue' **Synonym(s):**

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 26 May 2017

WRA Score: 9.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Herbaceous Perennial, Garden Weed, Ornamental, Bird-Pollinated, Spreads Vegetatively

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	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
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		
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	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle		
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat		
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	y
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)		
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	n
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	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**
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	[No evidence that cultivar is highly domesticated] "'Black and Blue' is a cultivar that features deep cobalt blue flowers with black calyces. Flowers appear on spikes to 15" long over a long mid-summer to fall bloom."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. 2017. 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**
	Clebsch, B. 2013. The New Book of Salvias: Sages for Every Garden. Timber Press, Portland, OR	"From a wide geographical region in South America, including Brazil, Paraguay, Uruguay, and Argentina, comes the exceedingly long-blooming herbaceous perennial Salvia guaranitica."
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	"Salvia guaranitica is native to Brazil, Paraguay and northern Argentina."

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	Clebsch, B. 2013. The New Book of Salvias: Sages for Every Garden. Timber Press, Portland, OR	

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	**y**
	Source(s)	**Notes**
	Clebsch, B. 2013. The New Book of Salvias: Sages for Every Garden. Timber Press, Portland, OR	"Anise-scented sage has proved hardy to 10°F (-12°C) when given the protection of pine boughs, but it will be completely dormant in a cold climate."
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	"Zone: 8 to 10" ... "Winter hardy to USDA Zones 8-10. In St. Louis, it should be grown as an annual in average, evenly moist, well-drained soils in full sun to part shade."
	Tropicos.org. 2017. Tropicos [Online Database]. Missouri Botanical Garden. http://www.tropicos.org/. [Accessed 25 May 2017]	Collected at 180 m elevation to 2230 m elevation

204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	"Salvia guaranitica is native to Brazil, Paraguay and northern Argentina."

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	Clebsch, B. 2013. The New Book of Salvias: Sages for Every Garden. Timber Press, Portland, OR	"Described and named in 1833, it has long been favored by gardeners in the United States and elsewhere because of its adaptability and brilliant, almost true-blue flowers."

301	**Naturalized beyond native range**	
	Source(s)	**Notes**
	Howell, C. J., & Sawyer, J. W. (2006). New Zealand naturalised vascular plant checklist. New Zealand Plant Conservation Network, Wellington, NZ	"Salvia guarantica ... Casual" [Casual is the name given to taxa that are: passively regenerating only in the immediate vicinity of the cultivated parent plant, or more widespread but only known as isolated or few individuals; garden escapes persisting only 2–3 years; or garden discards persisting vegetatively but not spreading sexually or asexually]
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[Reported as naturalized in New Zealand & Chile] "Salvia guaranitica A.St.-Hil. ex Benth. Lamiaceae Total N° of Refs: 7 Habit: perennial Herb Preferred Climate/s: Mediterranean Origin: S Am Major Pathway/s: Ornamental Dispersed by: Humans References: Chile-N-300, New Zealand- UW-280, New Zealand-N-823, New Zealand-U-919, Chile-N-1348, New Zealand-U-2048, Chile-W-1977."

Qsn #	Question	Answer
302	Garden/amenity/disturbance weed	y
	Source(s)	**Notes**
	Dave's Garden. 2017. Salvia, Blue Anise Sage, Brazilian Sage 'Black and Blue'. Salvia guaranitica. http://davesgarden.com/guides/pf/go/54031/. [Accessed 25 May 2017]	[Aggressive garden weed in Texas] "On Apr 29, 2006, crowellli from Houston, TX (Zone 9a) wrote:" ... "BEWARE INVASIVE: This thing is as invasive as mint and spreads by underground runners. It has completely taken over the bed it's in and has choked out every other plant there. It now covers an area about 4' x 10' and I am unable to eradicate it. I pull a ton of it out every morning and it's still spreading. I may have to move!" ... "On Jul 18, 2008, slrob from Fort Worth, TX wrote: ... Beautiful dark blue flowers that hummingbirds love. Unfortunately, it tried to take over my flower bed. Extremely aggressive, I've pulled the original 3 plants and the remaining roots are still popping up new plants 4 months later, even through the landscaping fabric!! Had I known it was so aggressive, I wouldn't have planted it. Replaced it with a salvia greggii." ... "On Jun 12, 2008, khasdorff from Victoria, TX (Zone 9a) wrote: ... As already stated, a beautiful plant, gorgeous color and hummers love it, but....it has become a real thug in my garden. Completely died to the ground over winter, but came back with a vengeance and has overtaken and choked out everything around. Trying to eradicate it is challenging, to say the least. Just when I think I have pulled up every little underground runner...up pops a bright green leaf! I would only recommend this for out of the way areas or in a container. I'm not sure even a container could control it!"

303	Agricultural/forestry/horticultural weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

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

305	Congeneric weed	y
	Source(s)	**Notes**
	DiTomaso, J. M., Kyser, G. B., Oneto, et al. 2013. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California, Davis, CA	"Salvia aethiopis ... Impacts: Mediterranean sage has spread over 1.3 million acres in the western United States with new infestations occurring each year. It is unpalatable to livestock, but is not considered toxic. It can spread rapidly in degraded big sagebrush communities. Wind-blown plants can lodge in large masses along fencerows. Western states listed as Noxious Weed: California, Colorado, Nevada, Oregon, Washington"

401	Produces spines, thorns or burrs	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	[No evidence] "It is a tender perennial or subshrub that exhibits a bushy, somewhat open habit with upright, branching, square, dark green stems typically growing 3-5' tall. When grown as an annual, plant height is shorter, more often in the 2.5-3' area. Two-lipped, tubular, deep blue flowers (to 2" long) with purple-blue calyxes bloom in axillary and terminal spikes (to 10" long) from mid summer into fall. Ovate, wrinkled, pointed, lightly-toothed, dark green leaves (2-5" long) are pale green below. "

402	Allelopathic	
	Source(s)	**Notes**
	Qasem, J. R., & Abu-Irmaileh, B. E. (1985). Allelopathic effect of Salvia syriaca L.(Syrian sage) in wheat. Weed Research, 25(1), 47-52	[Unknown. Allelopathy documented in genus] "The allelopathic effect of Salvia syriaca L. (Syrian sage) was examined against wheat in glasshouse and laboratory experiments. The germination of wheat grains was delayed, and the development of wheat seedlings was decreased in laboratory experiments by both shoot and rhizome extract. The inhibitory effect of both extracts was most pronounced at 20°C compared with 10 or 15°C. Shoot extracts had more drastic effects than the rhizome extract on germination percentage, shoot and root lengths. In glasshouse experiments fresh and dried shoot of S. syriaca added to soil drastically decreased germination and development of wheat."

403	Parasitic	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 25 May 2017]	[No evidence] "Family: Lamiaceae; Subfamily: Nepetoideae; Tribe: Mentheae; Subtribe: Salviinae "

404	Unpalatable to grazing animals	
	Source(s)	**Notes**
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	"Tolerate: Deer" [Possibly unpalatable]
	Flowers by the Sea. 2017. Sage Words About Wildlife: Do Deer Devour Salvia? http://www.fbts.com/do-deer-devour-salvia.html. [Accessed 25 May 2017]	[Flowers may be palatable] "Visit any online garden forum and you may discover widely varying experiences. While one gardener from Mississippi plants lots of Black and Blue Anise-Scented Sage (Salvia guaranitica), because the local herd doesn't like it, another in New Jersey finds that deer devour all the flowers on her S. guaranitica."

405	Toxic to animals	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	"Problems No serious insect or disease problems. Susceptible to downy and powdery mildew."
	Kameniecki, M., Wright, E. R., & Rivera, M. C. (2013). Identification of Alternaria spp. as Pathogenic on the Native Species Terminalia australis and Salvia guaranitica. American Journal of Plant Sciences, 4(06), 36-41	"This work is the result of activities included in the cooperative project between Asociación Ribera Norte (ARN) and the Department of Plant Pathology, School of Agronomy, University of Buenos Aires. ARN is a non-governmental organi- zation created in 1993 mainly for the management of the Reserva Ecológica Municipal Ribera Norte, a preservation area located in San Isidro (North of Buenos Aires), within the Provincia Paranaense region. The aims were to identify diseases in native plant species growing there. Light brown leaf spots with thin brown margins and narrow yellow halos were observed on Terminalia australis (mean disease severity: 25%). The pathogen was isolated, inoculated on healthy plants, reisolated from infected leaves and identified as Alternaria tenuissima. Similarly, another leaf-spot disease was observed on Salvia guaranitica, characterized by reddish brown large spots developed from the apexes and margins towards the centre of the leaves, reaching the veins in some cases (mean severity: 20%). Pathogen isolation, inoculation and reisolation led to the identification of A. alternata as the causal agent of the disease. Unusual heavy rain is analyzed as disease conductive."

407	Causes allergies or is otherwise toxic to humans	n
	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	No evidence
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	**Notes**
	Sun City Texas Firewise Group. 2015. Firewise Plant Guide. https://www.sctexas.org/Files/Library/26668/FIREWISEPLANTLIST.PDF.. [Accessed 25 May 2017]	"Salvia guaranitica ... flammability hazard = low"

Qsn #	Question	Answer
409	**Is a shade tolerant plant at some stage of its life cycle**	
	Source(s)	**Notes**
	San Marcos Growers. 2017. Salvia guaranitica 'Black & Blue' - Brazilian Blue Sage. http://www.smgrowers.com/. [Accessed 25 May 2017]	"Exposure: Cool Sun/Light Shade"
	Dave's Garden. 2017. Salvia, Blue Anise Sage, Brazilian Sage 'Black and Blue'. Salvia guaranitica. http://davesgarden.com/guides/pf/go/54031/. [Accessed 25 May 2017]	"Sun Exposure: Sun to Partial Shade"
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	"Sun: Full sun to part shade"

410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**y**
	Source(s)	**Notes**
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	"It prefers organically rich loams. If grown in too much shade, plant stems tend to elongate and fall over."
	Landscape of Us. 2017. Salvia guaranitica: Hummingbird Central. http://www.landscapeofus.com/garden/salvia-guaranitica-black-and-blue-hummingbird-central/. [Accessed 25 May 2017]	"Not particularly choosy of soil types, although plunking it down in stingy hardpan will do no favors…good, solid garden loam is preferred."
	Dave's Garden. 2017. Salvia, Blue Anise Sage, Brazilian Sage 'Black and Blue'. Salvia guaranitica. http://davesgarden.com/guides/pf/go/54031/. [Accessed 25 May 2017]	"Soil pH requirements: 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral) 7.6 to 7.8 (mildly alkaline)"

411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	"It is a tender perennial or subshrub that exhibits a bushy, somewhat open habit with upright, branching, square, dark green stems typically growing 3-5’ tall."

412	**Forms dense thickets**	
	Source(s)	**Notes**
	Dave's Garden. 2017. Salvia, Blue Anise Sage, Brazilian Sage 'Black and Blue'. Salvia guaranitica. http://davesgarden.com/guides/pf/go/54031/. [Accessed 25 May 2017]	[Unknown from natural habitat] "On Apr 29, 2006, crowellli from Houston, TX (Zone 9a) wrote:" ... "BEWARE INVASIVE: This thing is as invasive as mint and spreads by underground runners. It has completely taken over the bed it's in and has choked out every other plant there. It now covers an area about 4' x 10' and I am unable to eradicate it. I pull a ton of it out every morning and it's still spreading. I may have to move!"

501	**Aquatic**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	[Terrestrial] "Salvia guaranitica is native to Brazil, Paraguay and northern Argentina. It is a tender perennial or subshrub that exhibits a bushy, somewhat open habit with upright, branching, square, dark green stems typically growing 3-5' tall. "

502	Grass	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 24 May 2017]	Family: Lamiaceae Subfamily: Nepetoideae Tribe: Mentheae Subtribe: Salviinae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 24 May 2017]	Family: Lamiaceae Subfamily: Nepetoideae Tribe: Mentheae Subtribe: Salviinae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Clebsch, B. 2013. The New Book of Salvias: Sages for Every Garden. Timber Press, Portland, OR	"Salvia guaranitica will reach 4-5 ft (1.3-1.5 m) in height in a season and become a large patch in a few years because of its running rootstock. Its roots sport little nodules that look like miniature cigars."

601	Evidence of substantial reproductive failure in native habitat	
	Source(s)	**Notes**
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	"Salvia guaranitica is native to Brazil, Paraguay and northern Argentina." [Unknown]

602	Produces viable seed	y
	Source(s)	**Notes**
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	"Although species plants may be grown from seed started indoors before last spring frost date, this cultivar should be propagated from cuttings."
	Clebsch, B. 2013. The New Book of Salvias: Sages for Every Garden. Timber Press, Portland, OR	"The rootstock is quite easy to divide, though propagation can be by seed and cuttings."

603	Hybridizes naturally	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Kintzios, S.E. 2000. Sage: the genus Salvia. Harwood Academic Publishers, Amsterdam	[Unknown] "Although there is a few data on the interspecific hybridisation of Salvia species, the application of interspecific crossing might have much more importance in the future based on the outstanding results of the first attempts. Until now, mainly wild growing species have been crossed with S. officinalis and S. sclarea in order to bring useful characteristics into the cultivated species."

604	Self-compatible or apomictic	
	Source(s)	**Notes**
	Claßen-Bockhoff, R., Wester, P., & Tweraser, E. (2003). The staminal lever mechanism in Salvia L.(Lamiaceae)-a review. Plant Biology, 5(01), 33-41	[Unknown for S. guaranitica] "Due to the specialization for a particular pollinating animal group, the development of the lever mechanism and the various special structures serving pollination, a high degree of outcrossing is expected (Gams, 1927; Huck, 1992). On the other hand, self pollination (autogamy or geitogamy) is also possible (Haque and hosal, 1981) ..."

605	Requires specialist pollinators	y
	Source(s)	**Notes**
	Wester, P., & Claßen-Bockhoff, R. (2007). Floral diversity and pollen transfer mechanisms in bird-pollinated Salvia species. Annals of Botany, 100(2), 401-421	[Bird-pollinated] "Costa's Hummingbirds Calypte costae visited cultivated plants of S. guaranitica in California" ... "The birds were observed to hover, except in S. guaranitica where they also perched on branches or hover-clasped, even on flowers or leaves." ... "At S. guaranitica, the birds glided along the thecae and got pollen either smeared on their head or precisely deposited at one spot (Fig. 3N). When approaching from the side, the birds pulled the flowers to themselves. When flying from below into hanging flowers the birds lifted them up." ... "Nectar robbers were observed at S. sessei (butterflies), S. leucantha (a large bee and a honeybee), S. guaranitica and S. grewiifolia (bees) and S. orbignaei (bees including Xylocopa sp.)."

606	Reproduction by vegetative fragmentation	y
	Source(s)	**Notes**
	Dave's Garden. 2017. Salvia, Blue Anise Sage, Brazilian Sage 'Black and Blue'. Salvia guaranitica. http://davesgarden.com/guides/pf/go/54031/. [Accessed 25 May 2017]	"On Apr 14, 2004, yayaqueen from Harker Heights, TX wrote: ... no one mentioned anything at all about how it would spread by underground roots (I suppose). Last year it grew nearly 4 feet tall and wide and was almost stunning against my white board fence. This year I was surprised to find that I have the original plant and 4 of its offspring...they're growing within 3 or 4 feet of the mother plant. While I think they're attractive to look at...especially right now with the black stems and chartreuse leaves...I didn't particularly want them to completely invade my side yard and 1 came up on the other side of my fence in my neighbor's yard. If it continues to spread like this, I may have to completely relocate it to the wilder back perimeter of our property. Be warned...no one warned me."

Qsn #	Question	Answer
	Clebsch, B. 2013. The New Book of Salvias: Sages for Every Garden. Timber Press, Portland, OR	"Salvia guaranitica will reach 4-5 ft (1.3-1.5 m) in height in a season and become a large patch in a few years because of its running rootstock. Its roots sport little nodules that look like miniature cigars. The rootstock is quite easy to divide, though propagation can be by seed and cuttings."

607	Minimum generative time (years)	1
	Source(s)	**Notes**
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	[Annual] "Winter hardy to USDA Zones 8-10. In St. Louis, it should be grown as an annual in average, evenly moist, well-drained soils in full sun to part shade."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Dispersal mechanisms unknown

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Clebsch, B. 2013. The New Book of Salvias: Sages for Every Garden. Timber Press, Portland, OR	"Described and named in 1833, it has long been favored by gardeners in the United States and elsewhere because of its adaptability and brilliant, almost true-blue flowers."

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown. Cultivated as an ornamental, but no evidence of contamination of other ornamentals, or spontaneous recruitment of this plant in pots or soil of other plants.

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Kubitzki, K. & Kadereit, J.W. (eds.). (2004). The families and genera of vascular plants: Volume VII. Flowering plants, Dicotyledons. Lamiales (except Acanthaceae including Avicenniaceae). Springer-Verlag, Berlin, Heidelberg, New York	[Generic description. No evidence] "nutlets trigonous, ovoid or suborbicular, abscission-scar small, mucilaginous or not."
	Baskin, C.C. & Baskin, J.M. 2014. Seeds Ecology, Biogeography, and Evolution of Dormancy and Germination. Second Edition. Academic Press, San Francisco, CA	[Some Salvia species are ejected, but not wind-dispersed] "Rain may splash seeds from opened containers (Brodie, 1955) or raindrops may strike a 'lever mechanism' such as the dried calyx of Salvia, causing seeds to be ejected (Brodie, 1955)."

705	Propagules water dispersed	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Baskin, C.C. & Baskin, J.M. 2014. Seeds Ecology, Biogeography, and Evolution of Dormancy and Germination. Second Edition. Academic Press, San Francisco, CA	Unknown for Salvia guaranitica. Salvia horminum described as being dispersed by rain

706	Propagules bird dispersed	n
	Source(s)	**Notes**
	Kubitzki, K. & Kadereit, J.W. (eds.). (2004). The families and genera of vascular plants: Volume VII. Flowering plants, Dicotyledons. Lamiales (except Acanthaceae including Avicenniaceae). Springer-Verlag, Berlin, Heidelberg, New York	"nutlets trigonous, ovoid or suborbicular, abscission-scar small, mucilaginous or not." [Generic description. No evidence]

707	Propagules dispersed by other animals (externally)	
	Source(s)	**Notes**
	Kubitzki, K. & Kadereit, J.W. (eds.). (2004). The families and genera of vascular plants: Volume VII. Flowering plants, Dicotyledons. Lamiales (except Acanthaceae including Avicenniaceae). Springer-Verlag, Berlin, Heidelberg, New York	"nutlets trigonous, ovoid or suborbicular, abscission-scar small, mucilaginous or not." [Unknown. Mucilage could allow for adherence]

708	Propagules survive passage through the gut	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown if seeds would be consumed or would survive gut passage

801	Prolific seed production (>1000/m2)	
	Source(s)	**Notes**
	Dave's Garden. 2017. Salvia, Blue Anise Sage, Brazilian Sage 'Black and Blue'. Salvia guaranitica. http://davesgarden.com/guides/pf/go/54031/. [Accessed 25 May 2017]	[Densities unknown] "On Apr 14, 2013, May_Z from Grass Valley, CA (Zone 9a) wrote: ... However, these plants came back for me---and spread like crazy already, so early in spring. Not only that, but they seeded, I have seeds up everywhere."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown. Salvia species exhibit a range of dormancy mechanisms

803	Well controlled by herbicides	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Roberts, G. N., & Gibb, D. (1998). Herbicide control of mintweed (Salvia reflexa) in cotton production systems. In Proceedings of the 9" Australian Agronomy Conference. (Wagga Wagga) (pp. 597-598)	[Unknown. Other Salvia species effectively controlled by herbicides] "The control of mintweed with herbicides in cotton was evaluated over two sites and seasons. Where mintweed plant numbers exceeded 5 plants/m2, metolachlor mixed with cotton broadleaf herbicides proved the most effective pre-emergent form of control. Post-emergent applications of glyphosate, bromoxynil and glufosinate-ammonium provided excellent control and may be valuable options if transgenic cotton varieties tolerant to the herbicides are released. Rotating cotton fields to sorghum and using atrazine would also be highly desirable in fields heavily infested with mintweed."

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**
	Missouri Botanical Garden. 2017. Salvia guaranitica 'Black and Blue'. http://www.missouribotanicalgarden.org. [Accessed 25 May 2017]	"Plant height can be reduced by cutting back stems in late spring."
	Clebsch, B. 2013. The New Book of Salvias: Sages for Every Garden. Timber Press, Portland, OR	"Prune plants to the ground in late winter and divide clumps every three years or so."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Native elevation range exceeds 1000 m, demonstrating environmental versatility
• Able to grow in tropical climates
• Possibly naturalized in New Zealand and Chile (confirmation needed)
• Regarded as an aggressive garden weed in some locations
• Other Salvia species are invasive
• Possibly unpalatable to browsing/grazing animals (may increase competitive ability in natural environment)
• Tolerates many soil types
• Reproduces by seeds and vegetatively running rootstock
• Able to reach maturity in 1 year
• Seeds dispersed by gravity & intentionally by people
• Able resprout after cutting

Low Risk Traits
• Unarmed (no spines, thorns, or burrs)
• Provides fodder for livestock (palatable despite reports of toxicity
• Ornamental
• Bird-pollinated (may limit seed set in environments lacking appropriate pollinators)