

Taxon: <i>Buxus microphylla</i> Siebold & Zucc.	Family: Buxaceae
Common Name(s): Japanese box littleleaf boxwood	Synonym(s): <i>Buxus microphylla</i> var. <i>japonica</i> <i>Buxus microphylla</i> var. <i>microphylla</i> <i>Buxus microphylla</i> var. <i>tarokoensis</i>

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 12 Nov 2020
WRA Score: 1.0	Designation: L	Rating: Low Risk

Keywords: Small Shrub, Casual Escape, Unpalatable, Toxic, Autochorous

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)	Low
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	n
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		
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		
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	y
405	Toxic to animals	y=1, n=0	y
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans		
408	Creates a fire hazard in natural ecosystems		
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
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	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	>3
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		
705	Propagules water dispersed		
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		
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
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. (2007). The Families and Genera of Vascular Plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	[Used as a source of cultivars, but no evidence of domestication] "The genus <i>Buxus</i> has yielded more than 150 registered cultivars, mainly of <i>B. sempervirens</i> and <i>B. microphylla</i> (Batdorf 1995), which are used for edging, as hedges suitable for pruning and topiary work."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2020). 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"	Low
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 9 Nov 2020]	"Native Asia-Temperate EASTERN ASIA: Japan [Honshu, Kyushu, Shikoku]"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 9 Nov 2020]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes

Qsn #	Question	Answer
	Dave's Garden. (2020). <i>Buxus microphylla</i> . https://davesgarden.com/guides/pf/go/1625/ . [Accessed 11 Nov 2020]	"Hardiness: USDA Zone 4a: to -34.4 °C (-30 °F) USDA Zone 4b: to -31.6 °C (-25 °F) USDA Zone 5a: to -28.8 °C (-20 °F) USDA Zone 5b: to -26.1 °C (-15 °F) USDA Zone 6a: to -23.3 °C (-10 °F) USDA Zone 6b: to -20.5 °C (-5 °F) USDA Zone 7a: to -17.7 °C (0 °F) USDA Zone 7b: to -14.9 °C (5 °F) USDA Zone 8a: to -12.2 °C (10 °F) USDA Zone 8b: to -9.4 °C (15 °F) USDA Zone 9a: to -6.6 °C (20 °F) USDA Zone 9b: to -3.8 °C (25 °F)"
	Gilman, E. F. (1999). <i>Buxus microphylla</i> . Fact Sheet FPS-79. University of Florida IFAS Extension, Gainesville, FL. http://edis.ifas.ufl.edu . [Accessed 10 Nov 2020]	"USDA hardiness zones: 6 through 10A" [5 hardiness zones]

204	Native or naturalized in regions with tropical or subtropical climates	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 9 Nov 2020]	"Native Asia-Temperate EASTERN ASIA: Japan [Honshu, Kyushu, Shikoku] Cultivated (also cult.)"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Preferred Climate/s: Mediterranean Origin: E Asia Major Pathway/s: Herbal, Ornamental Dispersed by: Humans References: Chile-I-1872, Mexico-NI-1881, New Zealand-U-2048, Armenia-W-1977, Chile-W-1977."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

Qsn #	Question	Answer
205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Imada, C.T., Staples, G.W. & Herbst, D.R. 2005. Annotated Checklist of Cultivated Plants of Hawai'i. http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/ . [Accessed 11 Nov 2020]	" <i>Buxus microphylla</i> Siebold & Zuccarini var. <i>japonica</i> (Müller Argoviensis) Rehder & E. H. Wilson Synonyms: Syn. <i>Buxus japonica</i> Müller Argoviensis Common Names: Japanese box; Japanese: Tsuge, Asama-tsuge Locations: Waimea Arboretum & Botanical Garden"
	Dave's Garden. (2020). <i>Buxus microphylla</i> . https://davesgarden.com/guides/pf/go/1625/ . [Accessed 11 Nov 2020]	"This plant is said to grow outdoors in the following regions: Fairburn, Georgia Roslindale, Massachusetts"
	Gilman, E. F. (1999). <i>Buxus microphylla</i> . Fact Sheet FPS-79. University of Florida IFAS Extension, Gainesville, FL. http://edis.ifas.ufl.edu . [Accessed]	[Florida] "Littleleaf Boxwood is a fine-textured evergreen that tolerates shearing exceptionally well and is commonly used as a border or hedge"

301	Naturalized beyond native range	
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"References: Chile-I-1872, Mexico-NI-1881, New Zealand-U-2048, Armenia-W-1977, Chile-W-1977." [A casual alien in New Zealand, and reported to be naturalized in Mexico, but a search of the cited website could not corroborate this claim]
	Widrechner, M. P., Thompson, J. R., Kapler, E. J., Kordecki, K., Dixon, P. M., & Gates, G. (2009). A test of four models to predict the risk of naturalization of non-native woody plants in the Chicago region. <i>Journal of Environmental Horticulture</i> , 27(4), 241-250	"Table 1. Study area and naturalization status of species in Chicago datasets." [<i>Buxus microphylla</i> used in Chicago, but not naturalized]
	Widrechner, M. P., & Iles, J. K. (2002). A geographic assessment of the risk of naturalization of non-native woody plants in Iowa. <i>Journal of Environmental Horticulture</i> , 20(1), 47-56	"Table 2. List of 72 non-native, woody plants cultivated in Iowa, but not known to naturalize." [Includes Littleleaf Box (<i>Buxus microphylla</i> Siebold & Zucc.)]
	Heenan, P. B., de Lange, P. J., Cameron, E. K., Ogle, C. C., & Champion, P. D. 2004. Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 2001–2003. <i>New Zealand Journal of Botany</i> , 42(5): 797-814	[Showing signs of naturalizing] "Buxus microphylla subsp. <i>sinica</i> (Rehder & E.H. Wilson) Hatus. NEW RECORD: CHR 567240, D. Barwick & P. B. Heenan, 21 Jul 2003, Canterbury, Christchurch, Christchurch Botanic Garden. NOTES: A sapling established in a bark garden near the parent plant."
	Howell, C. J., & Sawyer, J. W. (2006). New Zealand naturalised vascular plant checklist. New Zealand Plant Conservation Network, Wellington, NZ	<i>Buxus microphylla</i> subsp. <i>sinica</i> - Naturalised plant status = Casual

Qsn #	Question	Answer
302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	Gilman, E. F. (1999). <i>Buxus microphylla</i> . Fact Sheet FPS-79. University of Florida IFAS Extension, Gainesville, FL. http://edis.ifas.ufl.edu . [Accessed 11 Nov 2020]	"Invasive potential: not known to be invasive"
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	[Cited as a weed. Unable to verify impacts] "References: Chile-I-1872, Mexico-NI-1881, New Zealand-U-2048, Armenia-W-1977, Chile-W-1977."

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

304	Environmental weed	n
	Source(s)	Notes
	Gilman, E. F. (1999). <i>Buxus microphylla</i> . Fact Sheet FPS-79. University of Florida IFAS Extension, Gainesville, FL. http://edis.ifas.ufl.edu . [Accessed 10 Nov 2020]	"Invasive potential: not known to be invasive"
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

305	Congeneric weed	
	Source(s)	Notes
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	Other species listed as naturalized and/or weeds, but unable to corroborate weed status or verify negative impacts

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. (2007). <i>The Families and Genera of Vascular Plants: Volume IX. Flowering Plants. Eudicots</i> . Springer-Verlag, Berlin, Heidelberg, New York	[No evidence in genus] "Shrubs or trees with tetragonal branchlets, leaves decussate. Inflorescences lax to glomerate botryoids of male flowers with a terminal female. Male flowers 4-merous, tepals decussate, stamens antetepalous, inserted around a pistillode. Female flowers with 4–6 tepals, ovary 3-carpellate, with divergent stylodia, stigmas 2-lobed, decurrent along the ventral fold. Fruit a 3-horned capsule, loculicidally dehiscent into 2-horned valves, ejecting trigonal black seeds."
	Viertel, A. T. (1970). <i>Trees, Shrubs, and Vines: A Pictorial Guide to the Ornamental Woody Plants of the Northeastern United States Exclusive of Conifers</i> . Syracuse University Press, Syracuse, NY	[No evidence] "A small, compact, slow-growing shrub."

Qsn #	Question	Answer
402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. (2007). The Families and Genera of Vascular Plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"Shrubs or trees with tetragonal branchlets, leaves decussate." [Genus description. No evidence]

404	Unpalatable to grazing animals	y
	Source(s)	Notes
	NC State Extension. (2020). <i>Buxus microphylla</i> var. <i>japonica</i> . https://plants.ces.ncsu.edu/plants/buxus-microphylla-var-japonica/ . [Accessed 11 Nov 2020]	"Drought, deer, rabbit, and nematode resistant."
	Thurn, M., Lamb, E. & Eshenaur, B. (2018). Disease and Insect Resistant Ornamental Plants. Cornell University and the New York State IPM Program, Cornell, NY. hdl.handle.net/1813/56366	"Known for their dense growth habit and resistance to deer-browsing, boxwoods are often grown as hedges."

405	Toxic to animals	y
	Source(s)	Notes
	Knight, A. 2007. A Guide to Poisonous House and Garden Plants. CRC Press, Boca Raton, FL	"Boxwoods are commonly planted for their attractive evergreen foliage and are often grown as hedges. Although of relatively low risk to household pets, boxwoods have caused poisoning in livestock, and have the potential to cause poisoning in dogs and cats. Clinical Signs Excessive salivation, vomiting, abdominal pain, profuse diarrhea, and tenesmus are typical of the irritating effects of the alkaloids present in boxwoods. Severe dehydration may result from the diarrhea. Seldom is poisoning fatal, and treatment should be directed and providing intestinal protections and fluid therapy as necessary."
	Spoerke, D.G. & Smolinske, S.C. (1990). Toxicity of Houseplants. CRC Press, Boca Raton, FL	"The leaves of <i>Buxus</i> species have been found to contain over 135 steroidal alkaloids." ... "Ingestion-No cases of human toxicity could be found. Animals grazing on the leaves have been anecdotally reported to develop nausea, vomiting, diarrhea, convulsions, vertigo, and death due to respiratory failure." ... "The leaves of this plant are extremely hazardous to livestock, and presumably to humans. An estimated ingestion of 1.5 lb of green leaves has produced fatalities in horses."

406	Host for recognized pests and pathogens	
	Source(s)	Notes

Qsn #	Question	Answer
	CABI. (2020). <i>Buxus microphylla</i> (little-leaf box). In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Major host of: <i>Calonectria pseudonaviculata</i> (Buxus blight); <i>Cydalima perspectalis</i> (box tree moth) Minor host of: <i>Pratylenchus penetrans</i> (nematode, northern root lesion); <i>Puccinia buxi</i> Wild host of: <i>Ceroplastes rubens</i> (red wax scale)"
	Gilman, E. F. (1999). <i>Buxus microphylla</i> . Fact Sheet FPS-79. University of Florida IFAS Extension, Gainesville, FL. http://edis.ifas.ufl.edu . [Accessed 10 Nov 2020]	"Pest resistance: long-term health usually not affected by pests"

407	Causes allergies or is otherwise toxic to humans	
	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	[<i>Buxus microphylla</i>] "Low toxicity if eaten; contact with cell sap may cause skin irritation."
	Spoerke, D.G. & Smolinske, S.C. (1990). Toxicity of Houseplants. CRC Press, Boca Raton, FL	[Potentially Yes] "The leaves of <i>Buxus</i> species have been found to contain over 135 steroidal alkaloids." ... "Ingestion-No cases of human toxicity could be found. Animals grazing on the leaves have been anecdotally reported to develop nausea, vomiting, diarrhea, convulsions, vertigo, and death due to respiratory failure." ... "The leaves of this plant are extremely hazardous to livestock, and presumably to humans. An estimated ingestion of 1.5 lb of green leaves has produced fatalities in horses. Allergic dermatitis is not frequently reported and is unlikely to occur when used as a houseplant."

408	Creates a fire hazard in natural ecosystems	
	Source(s)	Notes
	Virginia Cooperative Extension. (2009). Virginia Firescapes: Firewise Landscaping for Woodland Homes. Virginia Polytechnic Institute and State University, Blacksburg, VA. pubs.ext.vt.edu/430/430-300/430-300_pdf .	[Unknown in natural settings. High flammability may increase fire risk] " <i>Buxus microphylla</i> - Flammability Rating = High"

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Gilman, E. F. (1999). <i>Buxus microphylla</i> . Fact Sheet FPS-79. University of Florida IFAS Extension, Gainesville, FL. http://edis.ifas.ufl.edu . [Accessed 10 Nov 2020]	"Light requirement: plant grows in part shade/part sun"
	NC State Extension. (2020). <i>Buxus microphylla</i> var. <i>japonica</i> . https://plants.ces.ncsu.edu/plants/buxus-microphylla-var-japonica/ . [Accessed 11 Nov 2020]	"Prefers well-drained soil with slight acidity to slight alkalinity in dappled to partial shade. It can grown in full shade but will become leggy and sparsely foliated. It is a slow growing shrub and sensitive to over-fertilization."
	Dave's Garden. (2020). <i>Buxus microphylla</i> . https://davesgarden.com/guides/pf/go/1625/ . [Accessed 11 Nov 2020]	"Sun Exposure: Sun to Partial Shade"

Qsn #	Question	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	NC State Extension. (2020). <i>Buxus microphylla</i> var. <i>japonica</i> . https://plants.ces.ncsu.edu/plants/buxus-microphylla-var-japonica/ . [Accessed 12 Nov 2020]	"Soil Texture: Clay Loam (Silt) Sand Soil pH: Acid (<6.0) Alkaline (>8.0) Neutral (6.0-8.0) Soil Drainage: Good Drainage Moist"
	Gilman, E. F. (1999). <i>Buxus microphylla</i> . Fact Sheet FPS-79. University of Florida IFAS Extension, Gainesville, FL. http://edis.ifas.ufl.edu . [Accessed 10 Nov 2020]	"Soil tolerances: slightly alkaline; clay; sand; acidic; loam"
	Online Garden Design. (2020). <i>Buxus microphylla</i> – Japanese Box. https://www.onlinegardendesign.com.au/landscaping-articles/plant-profiles/buxus-microphylla-japanese-box/ . [Accessed 12 Nov 2020]	"Soil Type: <i>Buxus</i> can tolerate a range of soils, but the soil must be free draining. If hedging, the soil must be well dug and heavily enriched with organic matter to ensure the plants thrive. <i>Buxus</i> like a PH of 6.5 to 7.5 PH. They don't like acidic soil."
	Thompson, D. (2020). <i>Buxus Microphylla</i> Propagation From Seeds. https://homeguides.sfgate.com/buxus-microphylla-propagation-seeds-27202.html . [Accessed 11 Nov 2020]	"Test your soil before planting to ensure that it has a pH between 5.5 and 7.5. If your soil pH is below 5.5, adding lime will increase the pH. If your soil pH is above 7.5, apply sulfur to lower it to an acceptable level."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Viertel, A. T. (1970). <i>Trees, Shrubs, and Vines: A Pictorial Guide to the Ornamental Woody Plants of the Northeastern United States Exclusive of Conifers</i> . Syracuse University Press, Syracuse, NY	"A small, compact, slow-growing shrub."

412	Forms dense thickets	n
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	No evidence found in native or introduced ranges

501	Aquatic	n
	Source(s)	Notes
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	[Terrestrial] "Evergreen shrubs, small opposite simple leaves, small flowers in axillary clusters"

502	Grass	n
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Qsn #	Question	Answer
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 9 Nov 2020]	Family: Buxaceae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 9 Nov 2020]	Family: Buxaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Viertel, A. T. (1970). Trees, Shrubs, and Vines: A Pictorial Guide to the Ornamental Woody Plants of the Northeastern United States Exclusive of Conifers. Syracuse University Press, Syracuse, NY	"A small, compact, slow-growing shrub."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 12 Nov 2020]	[No evidence] "Native Asia-Temperate EASTERN ASIA: Japan [Honshu, Kyushu, Shikoku] Cultivated (also cult.)"

Qsn #	Question	Answer
602	Produces viable seed	y
	Source(s)	Notes
	Thompson, D. (2020). Buxus Microphylla Propagation From Seeds. https://homeguides.sfgate.com/buxus-microphylla-propagation-seeds-27202.html . [Accessed 11 Nov 2020]	"Boxwood flowers in late spring and produces small black seeds inside brown capsules during the summer. Collect the brown seed pods during the summer and remove the black seeds from within. Boxwood seeds remain dormant until they are exposed to cold for two to three months. Place the seeds in a sealed plastic bag with a handful of moistened sand or peat moss and store them in your refrigerator. Keep the seeds refrigerated but not freezing for approximately 12 weeks to break their dormancy period. After the seed's internal dormancy period is broken, they are ready to plant."
	NC State Extension. (2020). Buxus microphylla var. japonica. https://plants.ces.ncsu.edu/plants/buxus-microphylla-var-japonica/ . [Accessed 11 Nov 2020]	"Propagate by stem cutting or the plant will self-seed in optimum growing conditions."

603	Hybridizes naturally	
	Source(s)	Notes
	Van Laere, K., Hermans, D., Leus, L., & Van Huylenbroeck, J. (2015). Interspecific hybridisation within Buxus spp. <i>Scientia Horticulturae</i> , 185, 139-144	[Unknown. Artificial hybrids possible] "Conclusion: To our knowledge, this study is the first to provide an in-depth exploration of the possibilities of interspecific hybridization in Buxus. To date, only interspecific crosses between B. sempervirens and B. microphylla var. koreana are reported (Van Trier and Hermans, 2005). We have demonstrated that within Buxaceae no prezygotic barriers exist. However, postzygotic barriers, mainly lack of germination of the seeds and unilateral incongruity, do occur. Existing ploidy differences in Buxus species did not hinder the creation of F1 hybrids. Hybrid status of the seedlings could be confirmed by flow cytometry or AFLP analysis. The seedling populations are now being grown on the field for phenotypic evaluations and selections. Wide phenotypic variation (growth habit, disease tolerance, leaf morphology) is observed within the populations. These results illustrate that interspecific hybridisation might be a valuable tool to create new Buxus cultivars with traits of interest."

604	Self-compatible or apomictic	
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. (2007). The Families and Genera of Vascular Plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	[Unknown, but protogynous flowers may minimize selfing] "In male flowers of Buxus, Sarcococca and Pachysandra and, perhaps, also of Notobuxus, rudiments of a pistil are present but the flowers are functionally unisexual. In female flowers, no rudiments of stamens are found. The mixed inflorescences of Buxus, Sarcococca and Pachysandra are protogynous. Self-fertility is reported for Pachysandra procumbens by Robbins (1962)."

Qsn #	Question	Answer
	Van Laere, K., Hermans, D., Leus, L., & Van Huylenbroeck, J. (2015). Interspecific hybridisation within <i>Buxus</i> spp. <i>Scientia Horticulturae</i> , 185, 139-144	[Unknown. Possibly No] "Most seedlings resulting after interploidy 2x × 4x crosses were triploid, proving their hybrid nature. However, some were tetraploid instead of triploid, most probably the result of a self pollination of the tetraploid seed parent. This proves the strong need for a good emasculation procedure preceding the interspecific crosses. Flowers of <i>Buxus</i> are unisexual, arranged in spikes composed of lateral male flowers and a terminal female flower (von Balthazar and Endress, 2002a, 2002b). In most species that are used in our study the male flower is ripe before the female flower, thus the timing of emasculation is very important."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. (2007). <i>The Families and Genera of Vascular Plants: Volume IX. Flowering Plants. Eudicots.</i> Springer-Verlag, Berlin, Heidelberg, New York	"The flowers in many <i>Buxus</i> attract bees and flies by a faint scent, and nectar is produced by the pistillode in male flowers or on nectariferous structures between the carpels in the female flowers" ... "Inflorescences lax to glomerate botryoids of male flowers with a terminal female. Male flowers 4-merous, tepals decussate, stamens antetepalous, inserted around a pistillode. Female flowers with 4–6 tepals, ovary 3-carpellate, with divergent stylopedia, stigmas 2-lobed, decurrent along the ventral fold."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Plants for a Future. (2020). <i>Buxus microphylla</i> . https://pfaf.org . [Accessed]	"Propagation. Seed - stratification is not necessary but can lead to more regular germination[113]. The seed is best sown in a cold frame as soon as it is ripe[138]. Sow stored seed as early in the year as possible in a cold frame. It usually germinates in 1 - 3 months at 15°C but stored seed can take longer[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of short side shoots with a heel, September in a frame[200]. High percentage[78]. Rather slow to root [K]. Nodal cuttings in spring in a frame. Fairly easy[200]."
	Alpine Treemovals. (2020). <i>Buxus microphylla</i> var <i>japonica</i> (ball) - Japanese Box. http://www.treemovals.com.au/product_info.php?products_id=51 . [Accessed 12 Nov 2020]	[Suckers following pruning, but no evidence of natural vegetative spread] "Pruning: <i>Buxus</i> make excellent hedges, tip prune regularly from a young age. Old neglected plants can be cut back hard to encourage dense suckering regrowth, which can be tip pruned to make a new dense habit."

607	Minimum generative time (years)	>3
	Source(s)	Notes
	Gilman, E. F. (1999). <i>Buxus microphylla</i> . Fact Sheet FPS-79. University of Florida IFAS Extension, Gainesville, FL. http://edis.ifas.ufl.edu . [Accessed 10 Nov 2020]	"Growth rate: slow"

Qsn #	Question	Answer
	Alpine Treemovals. (2020). <i>Buxus microphylla</i> var japonica (ball) - Japanese Box. http://www.treemovals.com.au/product_info.php?products_id=51 . [Accessed 12 Nov 2020]	"Vigour / Longevity: Slow growing, long lived"
	Talhok S.N. , Fabian M., Dagher R. 2015. Landscape Plant Database. Department of Landscape Design & Ecosystem Management, American University of Beirut. http://landscapeplant.aub.edu.lb . [Accessed 12 Nov 2020]	[<i>Buxus microphylla</i> . Presumably takes >3 years to reach maturity] "Growth Rate: Slow Tree Shape: Round Canopy Symmetry: Symmetrical Canopy Density: Dense Canopy Texture: Fine Height at Maturity: 1 to 1.5 m Spread at Maturity: 1 to 1.5 meters Time to Ultimate Height: More than 50 Years"

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. (2007). The Families and Genera of Vascular Plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"The ejection mechanism of <i>Buxus</i> and <i>Notobuxus</i> may suffice for localized seed dispersal; abiotic agents such as rain or flowing water may account for dispersal over larger distances." ... "Fruit a 3-horned capsule, loculicidally dehiscent into 2-horned valves, ejecting trigonal black seeds." [No evidence]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Gilman, E. F. (1999). <i>Buxus microphylla</i> . Fact Sheet FPS-79. University of Florida IFAS Extension, Gainesville, FL. http://edis.ifas.ufl.edu . [Accessed 10 Nov 2020]	"Littleleaf Boxwood is a fine-textured evergreen that tolerates shearing exceptionally well and is commonly used as a border or hedge"

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. (2007). The Families and Genera of Vascular Plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"The ejection mechanism of <i>Buxus</i> and <i>Notobuxus</i> may suffice for localized seed dispersal; abiotic agents such as rain or flowing water may account for dispersal over larger distances." ... "Fruit a 3-horned capsule, loculicidally dehiscent into 2-horned valves, ejecting trigonal black seeds." [No evidence, although seeds could potentially be dispersed accidentally]

704	Propagules adapted to wind dispersal	
	Source(s)	Notes
	Knörr, U. C., Kovar-Eder, J., Mazouch, P., & Roth-Nebelsick, A. (2012). Fruit dispersal ecology of woody taxa in temperate to tropical forests of China and Japan. <i>Palaios</i> , 27(8), 523-540	"In the mixed mesophytic to broad-leaved evergreen forests on Yakushima Island, autochorous taxa are <i>Buxus microphylla</i> var. japonica (<i>Buxaceae</i>)" [autochory - Self dispersal of seeds, the physical and often explosive discharge of seeds from the fruit]

Qsn #	Question	Answer
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. (2007). The Families and Genera of Vascular Plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	[Wind may influence distance and direction of ejected seeds] "The ejection mechanism of Buxus and Notobuxus may suffice for localized seed dispersal; abiotic agents such as rain or flowing water may account for dispersal over larger distances." ... "Fruit a 3-horned capsule, loculicidally dehiscent into 2-horned valves, ejecting trigonal black seeds."

705	Propagules water dispersed	
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. (2007). The Families and Genera of Vascular Plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	[Possibly Yes] "The ejection mechanism of Buxus and Notobuxus may suffice for localized seed dispersal; abiotic agents such as rain or flowing water may account for dispersal over larger distances." ... "Fruit a 3-horned capsule, loculicidally dehiscent into 2-horned valves, ejecting trigonal black seeds."

706	Propagules bird dispersed	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. (2007). The Families and Genera of Vascular Plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"The ejection mechanism of Buxus and Notobuxus may suffice for localized seed dispersal; abiotic agents such as rain or flowing water may account for dispersal over larger distances." ... "Fruit a 3-horned capsule, loculicidally dehiscent into 2-horned valves, ejecting trigonal black seeds."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. (2007). The Families and Genera of Vascular Plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	[Possible that seeds could be ejected into potted plants or other commercial products and dispersed accidentally, but no direct evidence exists] "The ejection mechanism of Buxus and Notobuxus may suffice for localized seed dispersal; abiotic agents such as rain or flowing water may account for dispersal over larger distances." ... "Fruit a 3-horned capsule, loculicidally dehiscent into 2-horned valves, ejecting trigonal black seeds."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. (2007). The Families and Genera of Vascular Plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	[No evidence of consumption or internal dispersal] "The ejection mechanism of Buxus and Notobuxus may suffice for localized seed dispersal; abiotic agents such as rain or flowing water may account for dispersal over larger distances." ... "Fruit a 3-horned capsule, loculicidally dehiscent into 2-horned valves, ejecting trigonal black seeds."

801	Prolific seed production (>1000/m2)	

Qsn #	Question	Answer
	Source(s)	Notes
	Kubitzki, K., Bayer, C. 7 Stevens, P.F. (2007). The Families and Genera of Vascular Plants: Volume IX. Flowering Plants. Eudicots. Springer-Verlag, Berlin, Heidelberg, New York	"Fruit a 3-horned capsule, loculicidally dehiscent into 2-horned valves, ejecting trigonal black seeds." [Unknown. Generic description]

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Thompson, D. (2020). Buxus Microphylla Propagation From Seeds. https://homeguides.sfgate.com/buxus-microphylla-propagation-seeds-27202.html . [Accessed 11 Nov 2020]	"Boxwood seeds remain dormant until they are exposed to cold for two to three months. Place the seeds in a sealed plastic bag with a handful of moistened sand or peat moss and store them in your refrigerator. Keep the seeds refrigerated but not freezing for approximately 12 weeks to break their dormancy period. After the seed's internal dormancy period is broken, they are ready to plant."

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	NC State Extension. (2020). Buxus microphylla var. japonica. https://plants.ces.ncsu.edu/plants/buxus-microphylla-var-japonica/ . [Accessed 11 Nov 2020]	"It is very tolerant of pruning and sheering but do not prune before the last spring frost date or new growth will be damaged."
	Alpine Treemovals. (2020). Buxus microphylla var japonica (ball) - Japanese Box. http://www.treemovals.com.au/product_info.php?products_id=51 . [Accessed 12 Nov 2020]	"Pruning: Buxus make excellent hedges, tip prune regularly from a young age. Old neglected plants can be cut back hard to encourage dense suckering regrowth, which can be tip pruned to make a new dense habit."
	Online Garden Design. (2020). Buxus microphylla – Japanese Box. https://www.onlinegardendesign.com.au/landscaping-articles/plant-profiles/buxus-microphylla-japanese-box/ . [Accessed 12 Nov 2020]	[Tolerates repeated pruning] "Pruning and shaping may need to be done several times during the growing season (spring/summer)."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Broad climate suitability
- Reported to be a casual escape in New Zealand
- Unverified reports of weediness elsewhere
- Unpalatable to animals
- Toxic to animals and people if ingested
- Reported to be highly flammable
- Tolerates full shade (but does best in full sun to partial shade)
- Tolerates many soil types
- Reproduces by seeds and cuttings
- Seeds dispersed by dehiscent capsules, possibly aided by wind or water and intentionally cultivated by people
- Tolerates and resprouts after repeated pruning and cutting

Low Risk Traits

- A primarily temperate species, unlikely to thrive in tropical climate zones of the Hawaiian Islands
- No reports of negative impacts outside native range
- No reports of naturalization in the Hawaiian Islands
- Unarmed (no spines, thorns, or burrs)
- Not reported to spread vegetatively
- Slow growth rate

Second Screening Results for Herbs or Low Stature Shrubby Life Forms

(A) Reported as a weed of cultivated lands? No
Outcome = Accept (Low Risk)