Taxon: Rosa rugosa Thunb.

Family: Rosaceae

Common Name(s): Japanese rose
rugosa rose
rugose rose
Turkestan rose

Synonym(s): Rosa rugosa var. chamissoniana
Rosa rugosa var. rugosa

Assessor: Chuck Chimera

Status: Approved

End Date: 19 Jul 2023

WRA Score: 10.0

Designation: H(HPWRA)

Rating: High Risk

Keywords: Prickly Shrub, Environmental Weed, Dense Thickets, Spreads Vegetatively, Bird-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)	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	y = 1*multiplier (see Appendix 2), n = question 205	y
302	Garden/amenity/disturbance weed	y = 1*multiplier (see Appendix 2), n = 0	n
303	Agricultural/forestry/horticultural weed	y = 2*multiplier (see Appendix 2), n = 0	n
304	Environmental weed	y = 2*multiplier (see Appendix 2), n = 0	y
305	Congeneric weed	y = 1*multiplier (see Appendix 2), n = 0	y
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	y = 1, n = 0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans		
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		

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	y
501	Aquatic	y = 5, n = 0	n
502	Grass	y = 1, n = 0	n
503	Nitrogen fixing woody plant	y = 1, n = 0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y = 1, n = 0	n
601	Evidence of substantial reproductive failure in native habitat		
602	Produces viable seed	y = 1, n = -1	y
603	Hybridizes naturally	y = 1, n = -1	y
604	Self-compatible or apomictic		
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	3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
702	Propagules dispersed intentionally by people	y = 1, n = -1	y
703	Propagules likely to disperse as a produce contaminant	y = 1, n = -1	n
704	Propagules adapted to wind dispersal	y = 1, n = -1	n
705	Propagules water dispersed	y = 1, n = -1	y
706	Propagules bird dispersed	y = 1, n = -1	y
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y = 1, n = -1	y
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides	y = -1, n = 1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y = 1, n = -1	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
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Assessment of wild type. No evidence of domestication] "This species has many horticultural forms widely cultivated in China. According to Fu (China Plant Red Data Book 1: 558559. 1992), it is endangered as a wild plant by picking and uprooting."

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"	Low
	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 19 Jul 2023]	"Native Asia-Temperate RUSSIAN FAR EAST: Russian Federation [Primorye, Kamčatskij kraj, Sakhalin] CHINA: China [Jilin Sheng (e.), Liaoning Sheng, Shandong Sheng (n.e.)] EASTERN ASIA: Korea, Japan [Hokkaidô, Honshu]"

202	Quality of climate match data	High
	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 19 Jul 2023]	

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	**y**
	Source(s)	**Notes**
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Coastal hillsides, sandy soils on sea shores, offshore islands; below 100 m."
	Flora of North America Editorial Committee. (2014). Flora of North America: North of Mexico, Volume 9. Magnoliophyta: Picramniaceae to Rosaceae. Oxford University Press, New York and Oxford	"Disturbed areas, roadsides, fields, maritime dunes and bluffs, shores, riparian sites; 0–1000 m; introduced"
	Missouri Botanical Garden. (2023). Rosa rugosa. http://www.missouribotanicalgarden.org. [Accessed 23 Apr 2019]	"Zone: 2 to 7" [A temperate species able to grow in 6 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. (2023). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 19 Jul 2023]	"Native Asia-Temperate RUSSIAN FAR EAST: Russian Federation [Primorye, Kamčatskij kraj, Sakhalin] CHINA: China [Jilin Sheng (e.), Liaoning Sheng, Shandong Sheng (n.e.)] EASTERN ASIA: Korea, Japan [Hokkaidô, Honshu]"
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"R. rugosa is a cold climate species."
	Murphy, M. (2023). BIISC Plant Pono Specialist - Invasive Plant Prevention. personal communication. 10 July	"We found about 30 fruiting adults and 15 juveniles along 100 ft of road in Kaloka Mauka. The overstory was Ohia and Koa, the understory of Holcus lantanus. A quick Google search lets me know it's invasive in North America. That's scary considering the temperate climate of Kaloka Mauka, even more so because it's near a high-value native forest. This is a state record."

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Native in E Jilin (Hunchun Xian), Liaoning, NE Shandong (Yantai Shi); widely cultivated elsewhere in China [Japan, Korea, Russia (Far East)]."
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"Rosa rugosa has been recorded as an established garden escape in 16 European countries between the latitudes c . 46 ° and 68 ° N, and is naturalized in parts of northern, western and central Europe (Fl. Eur. 2) (Fig. 3). It is considered an invasive species along the coasts of the Northern Atlantic, the North Sea and the Baltic Sea, including the Netherlands (Christenhusz & van Uffelen 2001), Germany (Hegi Fl. ed. 3, 4 , p. 50), Denmark (Pedersen 1965; Andersen 1995), Norway (Fremstad 1997), Sweden (Nilsson 1967; Milberg 1998), and Lithuania (Eringis & Apalia 1976; Gudinskas 2000). In North America R. rugosa is reported from 19 states in the USA, from New England to Missouri and in Washington (USDA, NRCS 2002), and from six provinces in Canada, from Ontario to Newfoundland (Darbyshire 2003)."

301	**Naturalized beyond native range**	**y**

Qsn #	Question	Answer
	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 19 Jul 2023]	"Naturalized Australasia NEW ZEALAND: New Zealand Europe NORTHERN EUROPE: Denmark, Finland, United Kingdom, Ireland, Norway, Sweden MIDDLE EUROPE: Austria, Germany, Hungary, Netherlands SOUTHEASTERN EUROPE: Romania SOUTHWESTERN EUROPE: France Northern America REGION: Canada, United States"
	Flora of North America Editorial Committee. (2014). Flora of North America: North of Mexico, Volume 9. Magnoliophyta: Picramniaceae to Rosaceae. Oxford University Press, New York and Oxford	"Rosa rugosa is possibly indigenous to the western Aleutian Islands, Alaska; such nativity requires further study. Elsewhere in Alaska and other northern habitats, particularly near coastal estuaries and dunes, the species is widely naturalized in North America. It is readily identified by its rugose, leathery leaflets with deep veins, distal branches that are densely tomentose, and flowers 6-9 cm diam., consisting of mostly purplish pink double petals. It can be weedy and is invasive in eastern parts of the United States and Canada, especially along coastlines and waterways."
	Murphy, M. (2023). BIISC Plant Pono Specialist - Invasive Plant Prevention. personal communication. 10 July	[Hawaii Island. New Record] "We found about 30 fruiting adults and 15 juveniles along 100 ft of road in Kaloka Mauka. The overstory was Ohia and Koa, the understory of Holcus lantanus. A quick Google search lets me know it's invasive in North America. That's scary considering the temperate climate of Kaloka Mauka, even more so because it's near a high-value native forest. This is a state record."

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	[Primarily an environmental weed] "R. rugosa can outcompete native flora, thereby threatening biological diversity. It has been deemed a noxious weed in the United States."

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	[Primarily invasive in natural environments] "Rosa rugosa seems to be excluded from pastures. However, once established its armoured branches render it highly resistant to grazing. Thus, probably only the seedling and juvenile stages are sensitive to grazing and browsing. In relation to herbaceous plant species, such as species typical of grasslands and dunes, R. rugosa is highly competitive. Where thickets establish, few other plant species can persist. Even the native dune shrub species Rosa pimpinellifolia and Salix repens ssp. arenaria are competitively inferior to R. rugosa (Türk 1995; Schepker 1998)."

304	Environmental weed	y
	Source(s)	Notes
	Kaufman, S.R. & Kaufman, W. 2012. Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species. Second Edition, Revised and Updated. Stackpole Books, Mechanicsburg, PA	"Plants seem to spread slowly into new places but once established, dense stands form from root suckers. On sand dunes they provide some erosion control but displace native dune vegetation. Rugosa rose hybridize· wi.th the native Rosa blanda."

Qsn #	Question	Answer
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"R. rugosa can outcompete native flora, thereby threatening biological diversity. It has been deemed a noxious weed in the United States."
	Bruun, H. H. (2006). Prospects for biocontrol of invasive Rosa rugosa. BioControl, 51(2), 141-181	"some alien species invade natural habitats, e.g. Rosa rugosa Thunb. which invades natural dry coastal ecosystems in Northwestern Europe and North-eastern North America. Invaded habitats include active and fixed dunes, shingle beaches and coastal grasslands, which are important habitats to many native organisms and of great conservation value. Rosa rugosa is highly competitive in these habitats, changing them from ecosystems dominated by lichens or by grasses and forbs into monospecific rose thickets. From a conservation point of view, R. rugosa is the most threatening invasive species on the coasts of the Baltic Sea, North Sea and Atlantic Sea between 50° and 68° N in Europe and between 40° and 50° in North America. It is so widely naturalized that the public in general perceives it as a native part of the flora. However, it suppresses the native vegetation by shading, ultimately displacing it completely."
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"The shrub is a serious invader of coastal dune systems in Europe and more recently also in Canada (Weidema, 2006; Hill et al., 2010). Thickets of Japanese rose strongly reduce native pant and animal diversity. The displacement of beach vegetation affects a number of native dune plants, e.g. Arenaria serpyliifolia or Empetrum nigrum. The number of butterfly species drops in invaded areas because host plants become scarce (Isermann, 2008a, 2008b)."
	Murphy, M. (2023). BIISC Plant Pono Specialist - Invasive Plant Prevention. personal communication. 10 July	[Naturalized on Hawaii Island. Potential threat to native forest] "We found about 30 fruiting adults and 15 juveniles along 100 ft of road in Kaloka Mauka. The overstory was Ohia and Koa, the understory of Holcus lantanus. A quick Google search lets me know it's invasive in North America. That's scary considering the temperate climate of Kaloka Mauka, even more so because it's near a high-value native forest. This is a state record."

305	Congeneric weed	y
	Source(s)	**Notes**
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Rosa canina … Where invasive the shrub forms dense thickets within a short period of time, crowding out other plant species and impeding wildlife movement (Muyt, 2001). Briar rose is one of a few invasive plant species found in Australia's alpine and subalpine vegetation (State of Queensland 2014). In New Zealand the plant invades montane short-tussock grassland (Sage et al. 2009). The shrub is increasingly found in Patagonia and Argentina (Zimmermann et al., 2010). Here, fires promote the spread of the weed by providing competition-free spaces (Cavallero and Raffaele, 2010). "

401	Produces spines, thorns or burrs	y
	Source(s)	**Notes**
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Shrubs erect, to 2 m tall. Stems fasciculate, robust; branchlets tomentose; prickles dense, yellowish, terete, straight, greatly variable in size and intermixed, to 5 mm, fine, evenly tapering to base, lower parts tomentose, intermixed with glandular bristles."

402	Allelopathic	
	Source(s)	**Notes**
	WRA Specialist. (2023). Personal Communication	Unknown

Qsn #	Question	Answer
403	Parasitic	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Shrubs erect, to 2 m tall." [Rosaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Heavy grazing by goats may weaken the plant, light grazing encourages resprouting from rhizomes (Weidema, 2006)."
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	[Dependent on life stage] "Rosa rugosa seems to be excluded from pastures. However, once established its armoured branches render it highly resistant to grazing. Thus, probably only the seedling and juvenile stages are sensitive to grazing and browsing."

405	Toxic to animals	n
	Source(s)	Notes
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Heavy grazing by goats may weaken the plant, light grazing encourages resprouting from rhizomes (Weidema, 2006)." [No evidence]
	Gardenersworld.com (2023). Rosa rugosa. https://www.gardenersworld.com/plants/rosa-rugosa/. [Accessed 19 Jul 2023]	"Rosa rugosa has no toxic effects reported."
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"Rosa rugosa seems to be excluded from pastures. However, once established its armoured branches render it highly resistant to grazing. Thus, probably only the seedling and juvenile stages are sensitive to grazing and browsing." [No evidence]
	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

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"A whole coterie of more or less specialized herbivorous insects is associated with the genus Rosa (Hegi Fl. ed. 1, 4; Johnson & Lyon 1988). Rosa rugosa confirms that picture, although it seems to be more resistant to attacks of many insects than most other wild species, and certainly most cultivars. Few, if any, insect species are strictly monophagous on R. rugosa, even in its native range (H. H. Bruun, unpubl. data)." … "Rosa rugosa is highly resistant to powdery mildew and blackspot, at least compared to most cultivated roses (Svejda 1986). Many of the records presented in Table 5 represent occasional attacks by generalist parasitic fungi. Certainly some of the records originate from garden conditions, but often entomological and mycological literature sources are very economical with information on wild or cultivated status."

Qsn #	Question	Answer
	Nielsen, A. L., & Hamilton, G. C. (2009). Life history of the invasive species Halyomorpha halys (Hemiptera: Pentatomidae) in northeastern United States. Annals of the Entomological Society of America, 102(4), 608-616	"Halyomorpha halys (Stål) (Hemiptera: Pentatomidae) is an introduced species native to Japan, China, and Korea (Hoebeke and Carter 2003). In its native range, it is considered an occasional pest of fruit trees and soybean, Glycine max (L.) Merr. (Fabales: Fabaceae), as well as a nuisance pest during the winter (Takahashi 1930, Hoffman 1931, Saito et al. 1964, Kobayashi and Kimura 1969, Chung et al. 1995, Funayama 1996, Watanabe 1996, Choi et al. 2000, Tada et al. 2001, Funayama 2002)." … "Nymphal population densities were consistent with host phenology, with V. opulus variety americanum and R. rugosa being preferred hosts in mid- and late season, respectively."
	Weidema, I. (2006). NOBANIS – Invasive Alien Species Fact Sheet –Rosa rugosa. – From: Online Database of the European Network on Invasive Alien Species – NOBANIS, www.nobanis.org	"Rosa rugosa in Canada is a new host for the introduced leaf galler Diploleppis polita, which normally occurs only on Rosa acicularis (Shorthouse 1994). Rosa rugosa may thereby act as a reservoir for a potential pest species. Rosa acicularis is a native species of Finland and Sweden but this potential new interaction has not been investigated."
	Missouri Botanical Garden. (2023). Rosa rugosa. http://www.missouribotanicalgarden.org. [Accessed 19 Jul 2023]	"Roses are susceptible to a large number of diseases, the most common of which are black spot, powdery mildew, rust and rose rosette. Although good cultural practices are the first line of defense in disease control, regular preventative fungicide applications throughout the growing season are usually required, particularly in humid climates with regular summer rainfall such as the St. Louis area. Potential insect problems include aphids, beetles, borers, scale, thrips, rose midges, leafhoppers and spider mites. Local rose associations and extension services are usually able to offer specific recommendations and advice for selecting and growing roses. Rosa rugosa, however, is noted for having excellent disease resistance."

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	**Notes**
	Weidema, I. (2006). NOBANIS – Invasive Alien Species Fact Sheet –Rosa rugosa. – From: Online Database of the European Network on Invasive Alien Species – NOBANIS, www.nobanis.org	"No negative effects on human health have been recorded, although allergies towards the pollen or fragrance of roses may occur for hypersensitive individuals."
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	[Possibly allergenic pollen] "Demir et al. (2002) reported that villagers in the lake region, Turkey, reported asthma/allergy symptoms outside the rose season (17.6 %), during the rose season (6.2 %) and both during the rose season and outside the rose season (whole year) (17.6 %). Atopy and specifi c IgE against Rosa rugosa were detected in 12 (19 %) and 8 (19.5 %) of the 41 villagers tested. Villagers who had symptoms the whole year reported more frequently wheezing than those who reported symptoms only outside the rose season (41.2 % vs. 11.1 %)."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	**Notes**
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"R. rugosa is a cold climate species. It grows on sandy or gravely beaches as well as in sandy dune grassland communities in its native range. It can form dense thickets. It is tolerant of poor soil conditions and to high-salt conditions of seasides and road edges." [Unlikely. Not prevalent in fire prone habitats]
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"The shrub is a serious invader of coastal dune systems in Europe and more recently also in Canada" [Fire risk not listed among impacts]

409	Is a shade tolerant plant at some stage of its life cycle	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Missouri Botanical Garden. (2023). Rosa rugosa. http://www.missouribotanicalgarden.org. [Accessed 19 Jul 2023]	"Best grown in moist, slightly acidic, well-drained garden loams in full sun to part shade, but this rose is also very adaptable to somewhat poor soils, including sandy, clay or gravelly ones. Best flowering and disease resistance generally occur in full sun. "
	The Morton Arboretum. (2023). Rugosa rose. https://mortonarb.org/plant-and-protect/trees-and-plants/rugosa-rose/. [Accessed 19 Jul 2023]	"Light Exposure: Full sun (6 hrs direct light daily)"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Missouri Botanical Garden. (2023). Rosa rugosa. http://www.missouribotanicalgarden.org. [Accessed 19 Jul 2023]	"Best grown in moist, slightly acidic, well-drained garden loams in full sun to part shade, but this rose is also very adaptable to somewhat poor soils, including sandy, clay or gravelly ones."
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"R. rugosa is a cold climate species. It grows on sandy or gravely beaches as well as in sandy dune grassland communities in its native range. It can form dense thickets. It is tolerant of poor soil conditions and to high-salt conditions of seasides and road edges."
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"Rosa rugosa most often occurs in sandy or gravelly soils, occasionally on other well-drained substrates. It appears to be absent from highly acid soils, but otherwise has little specificity with regard to soil acidity. In Denmark, it occurs on soil with pH from 4.7 to 7.7 (Table 1). In Japan, Yamane (1990) found that the pH of the topsoil in natural stands of R. rugosa varied between 5.1 and 7.6 (median 6.4) and that the pH of a deeper soil horizon (45–50 cm below surface) varied between 5.4 and 8.5 (median 6.9)."
	The Morton Arboretum. (2023). Rugosa rose. https://mortonarb.org/plant-and-protect/trees-and-plants/rugosa-rose/. [Accessed 19 Jul 2023]	"Soil Preference: Acid soil, Moist, well-drained soil, Sandy soil Tolerances: Dry sites, Occasional flooding, Alkaline soil, Clay soil, Road salt" "Rosa rugosa is adaptable to many different soil types; including temporary wet, but avoid extremely wet conditions. "

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Shrubs erect, to 2 m tall. Stems fasciculate, robust; branchlets tomentose; prickles dense, yellowish, terete, straight, greatly variable in size and intermixed, to 5 mm, fine, evenly tapering to base, lower parts tomentose, intermixed with glandular bristles."

412	Forms dense thickets	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"Rhizomatous multi-stemmed erect deciduous shrub, strongly suckering, mature clones forming impenetrable thickets." … "In Hokkaido, thickets of R. rugosa are widespread along the coast line. Under natural conditions these thickets occupy only a narrow fringe between the sandy beach and the dune forest, but under conventional forest use and grazing thickets expand at the expense of Quercus forest (Ishizuka 1974; Miyawaki & Suzuki 1993)." … "Where thickets establish, few other plant species can persist. Even the native dune shrub species Rosa pimpinellifolia and Salix repens ssp. arenaria are competitively inferior to R. rugosa (Türk 1995; Schepker 1998)." ... "Rosa rugosa often forms dense stands due to its creeping rhizomes from which suckers arise. In natural stands in its native habitat a shoot density of c. 10 m−2 has been reported (Tsuda et al. 1999), but much denser stands occur both in its native and exotic ranges. Dense thickets can cover several hectares (Nezhevenko 1967; Didriksen 1999), but probably originate from several coalescent clones."
	Flora of North America Editorial Committee. (2014). Flora of North America: North of Mexico, Volume 9. Magnoliophyta: Picramniaceae to Rosaceae. Oxford University Press, New York and Oxford	"Shrubs, forming thickets."

501	Aquatic	n
	Source(s)	**Notes**
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Terrestrial] "Shrubs erect, to 2 m tall." … "Coastal hillsides, sandy soils on sea shores, offshore islands; below 100 m."

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 19 Jul 2023]	Family: Rosaceae Subfamily: Rosoideae Tribe: Roseae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	de Bruijn, F. J. (ed.). (2015). Biological Nitrogen Fixation. John Wiley & Sons, Hoboken, NJ	[Rosa not a N-fixing genus in the Rosaceae] "The ability to fix nitrogen is far from universally present in these families. For instance, of 122 genera in the Rosaceae, only 4 genera are capable of fixing nitrogen." … "On the basis of 16S rRNA sequencing, four clusters of Frankia strains have been recognized: … those present in nodules of members of the Rosaceae (Cercocarpus, Chamaebatia, Dryas, Purshia),"
	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 19 Jul 2023]	Family: Rosaceae Subfamily: Rosoideae Tribe: Roseae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Shrubs erect, to 2 m tall."

601	Evidence of substantial reproductive failure in native habitat	
	Source(s)	**Notes**
	Wu, Z. Y., P. H. Raven & D. Y. Hong, eds. 2003. Flora of China. Vol. 9 (Pittosporaceae through Connaraceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Overharvesting from wild may result in endangerment] "This species has many horticultural forms widely cultivated in China. According to Fu (China Plant Red Data Book 1: 558559. 1992), it is endangered as a wild plant by picking and uprooting."

602	Produces viable seed	y
	Source(s)	**Notes**
	Flora of North America Editorial Committee. (2014). Flora of North America: North of Mexico, Volume 9. Magnoliophyta: Picramniaceae to Rosaceae. Oxford University Press, New York and Oxford	"Hips scarlet, depressed-globose, 18–20 × 20–25 mm, leathery, glabrous, sometimes setose, eglandular, rarely glandular, neck 1–2 × 4–5 mm; sepals persistent, erect. Achenes basiparietal, 40, tan, 4–6 × 2–4.5 mm."
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"Most achenes in a hip are usually filled and viable (Fagerlind 1948), with viability ranging from 84% to 94% (Svejda & Poapst 1972). However, Junttila (1974) found that achenes with a mass below a threshold of 4.5–5.0 mg, which is significantly below average, exhibited much reduced germination (7%)."

603	Hybridizes naturally	y
	Source(s)	**Notes**
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"Formation of spontaneous hybrids has been reported to occur with three polyploid species in the British Isles, viz. R. canina L. (= R. × praegeri Wolley-Dod), R. mollis Sm. (= R. × mangii (Eigner & Wissemann 1999)) and R. caesia Sm. (Stace 1997). In its native range it hybridizes with R. davurica Pall. (syn. R. amblyotis C.A. Meyer) (Pimenov & Schroeter 1964 Ohwi 1965), with R. marretii Lév., which is its closest relative (Wu et al. 2000, 2001), with R. acicularis Lindl. (Charkewicz 1996), and with R. multiflora Thunb. (= R. × iwara Sieber ex Regel, syn. R. × yesoensis (Fr. & Sav.)Makino). The hybrid with R. davurica, often called R. × kamtchatica Vent., probably arose spontaneously in southern Kamchatka, where R. rugosa occurs on the coast and R. davurica in the central highlands (Hultén 1927–30). In North America, spontaneous hybrids with the native rose species R. carolina L. (= R. × koehneana Rehder) and R. palustris Marsh. (= R. × spaethiana Graebner) have been reported; however, only the former has been verified (Charles- Guzman 1997). In cultivation, R. rugosa forms hybrids with numerous other Rosa species. It may potentially form hybrids with all diploid species and polyploid species with regular meiosis. The fertility of the hybrid offspring is, however, highly variable (Fagerlind 1943)."
	Flora of North America Editorial Committee. (2014). Flora of North America: North of Mexico, Volume 9. Magnoliophyta: Picramniaceae to Rosaceae. Oxford University Press, New York and Oxford	"Some Rosa rugosa hybrids are recognized by their reticulated, deeply veined, rugose, and dark green leaves. The most widespread naturalized hybrid is R. ×hollandica Persoon ex Steudel (Dutch rose), found throughout central and northern Europe, where it has been widely used as rootstock for grafting and budding. In 2010, A. V. Gilman discovered and identified the hybrid in five Vermont localities and, together with D. Werier, also found robust shrubs in an open pasture in Schuyler County, New York."

Qsn #	Question	Answer
604	Self-compatible or apomictic	
	Source(s)	Notes
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	[Possibly apomictic, or with low levels of self-compatibility] "Rosa rugosa has repeatedly been reported to be completely self-incompatible (Fagerlind 1944; Jicínská 1976; Ueda et al. 1996). However, Ueda & Akimoto (2001) found that 13% of self-pollinated R. rugosa f. alba flowers produced hips with an average of 35% seed set. Dobson et al. (1999) found that flowers bagged before opening produced small hips with few (2.2 ± 6.7) normal achenes. Furthermore, they found that bagged flowers from which anthers were carefully removed before opening produced hips of similar size and containing a similar number of achenes (1.5 ± 6.1). Thus, R. rugosa either can reproduce by apomixis, or the stigma is receptive while the flowerbud is still closed (Spethmann & Feuerhahn 2003). Moreover, no germination trials were done by Dobson et al. (1999) to demonstrate the germinability of the achenes produced."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	[Pollinated by bees, and potentially capable of self-pollination with lower seed set] "Dobson et al. (1999) found that flowers bagged before opening produced small hips with few (2.2 ± 6.7) normal achenes. Furthermore, they found that bagged flowers from which anthers were carefully removed before opening produced hips of similar size and containing a similar number of achenes (1.5 ± 6.1)." … "Flowers are hermaphroditic and nectarless, but they produce abundant, strongly scented pollen as reward to pollinators. The flower fragrance is associated with different floral parts (see Biochemical Data). Individual flowers bloom for 2 days, and pollinator activity is highest on the first day (Dobson et al. 1999)." … "From Sweden, Dobson et al. (1999) reported Bombus terrestris to be the principal flower visitor, with infrequent visits of other bumblebees and bees of Andrenidae, Halictidae, and Megachilidae. In its native range R. rugosa is pollinated by halictine bees and bumblebees. From the Kuril Islands, Krivolutskaya (1973) and Lelej & Kupianskaya (2000) reported flower visitation by Bombus florilegus, B. lucorum albocinctus, B. beaticola shikotanensis, B. oceanicus and B. schrencki konakovi. From Hokkaido, Japan, Sakagami & Tadauchi (1995a, b) reported flower visitation by the halictine bees Lasioglossum zunaga, L. longifacies, L. pumilum and L. nipponicola."

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"Rosa rugosa often forms dense stands due to its creeping rhizomes from which suckers arise. In natural stands in its native habitat a shoot density of c. 10 m−2 has been reported (Tsuda et al. 1999), but much denser stands occur both in its native and exotic ranges. Dense thickets can cover several hectares (Nezhevenko 1967; Didriksen 1999), but probably originate from several coalescent clones." … "Vegetative spread by root-borne and stolon-borne suckers is the main form of propagation."

607	Minimum generative time (years)	3
	Source(s)	Notes

Qsn #	Question	Answer
	Xing, W., Wang, Z., Wang, X., Bao, M., & Ning, G. (2014). Over-expression of an FT homolog from Prunus mume reduces juvenile phase and induces early flowering in rugosa rose. Scientia Horticulturae, 172, 68-72	"Oil bearing rose (Rosa rugosa 'Bao White') is a perennial shrub and has a juvenile period of over 3 years before flowering."
	Houzz. (2017). rosa rugosa not flowering? https://www.houzz.com/discussions/4776743/rosa-rugosa-not-flowering. [Accessed 19 Jul 2023]	"Patty W. zone 5a Illinois: joey here is a link from a previous post. Three years seem to be average for seed to flower as long as the seeds were positively from a rose."

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	
	Source(s)	**Notes**
	Jørgensen, R. H., & Kollmann, J. (2009). Invasion of coastal dunes by the alien shrub Rosa rugosa is associated with roads, tracks and houses. Flora-Morphology, Distribution, Functional Ecology of Plants, 204 (4), 289-297	"The higher R. rugosa abundance close to roads, paths and houses suggests the importance of human influence as a promoting vector for plant invasions." [May be benefiting from human-caused disturbance. Fruit (hips) and seeds lack means of external attachment, but could possibly be dispersed by human movement of soil or equipment]

702	**Propagules dispersed intentionally by people**	**y**
	Source(s)	**Notes**
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 8, Flowers. Springer, Dordrecht	"R. rugosa is a widely planted medicinal plant in China, Korea and Japan and also ornamental plant in its native range and elsewhere."
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"Rosa rugosa has been recorded as an established garden escape in 16 European countries between the latitudes c . 46 ° and 68 ° N, and is naturalized in parts of northern, western and central Europe (Fl. Eur. 2) (Fig. 3). It is considered an invasive species along the coasts of the Northern Atlantic, the North Sea and the Baltic Sea, including the Netherlands (Christenhusz & van Uffelen 2001), Germany (Hegi Fl. ed. 3, 4 , p. 50), Denmark (Pedersen 1965; Andersen 1995), Norway (Fremstad 1997), Sweden (Nilsson 1967; Milberg 1998), and Lithuania (Eringis & Apalia 1976; Gudinskas 2000). In North America R. rugosa is reported from 19 states in the USA, from New England to Missouri and in Washington (USDA, NRCS 2002), and from six provinces in Canada, from Ontario to Newfoundland (Darbyshire 2003)."

703	**Propagules likely to disperse as a produce contaminant**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Major Pathway/s: Crop, Forestry, Herbal, Ornamental Dispersed by: Humans, Animals, Flyers, Escapee"
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"The seeds of R. rugosa are dispersed by several vectors, with seawater and birds being the most important."

704	**Propagules adapted to wind dispersal**	**n**
	Source(s)	**Notes**
	Flora of North America Editorial Committee. (2014). Flora of North America: North of Mexico, Volume 9. Magnoliophyta: Picramniaceae to Rosaceae. Oxford University Press, New York and Oxford	"Hips scarlet, depressed-globose, 18–20 × 20–25 mm, leathery, glabrous, sometimes setose, eglandular, rarely glandular, neck 1–2 × 4–5 mm; sepals persistent, erect. Achenes basiparietal, 40, tan, 4–6 × 2–4.5 mm."
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"The seeds of R. rugosa are dispersed by several vectors, with seawater and birds being the most important."

705	**Propagules water dispersed**	**y**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Fruits of Japanese rose are buoyant and can float for up to 40 weeks in both fresh and seawater, seeds are buoyant as well. Both contribute to long-distance dispersal of the shrub. Rhizomes are long and break off in exposed situations. Rhizome fragments may be carried by sea currents to new sites."
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"The seeds of R. rugosa are dispersed by several vectors, with seawater and birds being the most important. Several pieces of anecdotal evidence suggest a strong capacity for dispersal by sea currents. Rosa rugosa is thought to have first arrived on the coast of Norway by means of seed dispersal with sea currents, and furthermore dispersed by the same means from southernmost Norway to Lofoten in northern Norway (c. 1300 km) within only 40 years (Fremstad 1997). Both entire hips and individual achenes can float for several weeks. Jessen (1958) conducted a series of buoyancy experiments on both hips and achenes of R. rugosa and other species, using fresh and salt (24‰ salinity) water, regularly stirred, and kept at room temperature. All hips were able to float initially. A maximal floating time (time until the last hip sank) of 26, 40 and 42 weeks was obtained with over-ripe hips from three coastal populations. By this time hips had started to disintegrate or had been reduced to a thin membrane around the achenes."

706	**Propagules bird dispersed**	**y**
	Source(s)	**Notes**
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"Birds either feed on achenes, entire hips or hip flesh. Bird species feeding on entire hips may ingest achenes, and these are likely either to be regurgitated or to pass the intestines unharmed."
	Weidema, I. (2006). NOBANIS – Invasive Alien Species Fact Sheet –Rosa rugosa. – From: Online Database of the European Network on Invasive Alien Species – NOBANIS, www.nobanis.org	"Instances of seed dispersal of Rosa rugosa by birds have been reported from several countries (Fremstad 1997, Bruun 2005). Seeds dispersed by resident birds may not be transported far from the seed source, but this mode of dispersal could be important in explaining local transport. In Finland the fruits ripen just at the time when most of the migratory birds start moving southwards. E.g. thrushes (genus Turdus), green finch (Carduelis chloris) and bohemian waxwing (Bombycilla garrulus) eat the fruits in coastal areas and most probably carry the seeds to distant islands where they rest before flying over the sea (Terhi Ryttari, pers. comm.)."

707	**Propagules dispersed by other animals (externally)**	
	Source(s)	**Notes**
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	[Introduced rodents could potentially disperse seeds in a similar manner as reported elsewhere] "Occasional short-distance seed dispersal is probably effected by microtine rodents harvesting and caching hips, and later eating the hip flesh, e.g. grey-sided vole (Clethrionomys rufocanus) (Ota & Jameson 1961). Other mammals reported to feed on rose hips and potentially disperse seeds are hare (Lepus europaeus), yellow-necked mouse (Apodemus flavicollis), bank vole (Clethrionomys glareolus), and red fox (Vulpes vulpes) (Levina 1957; Turcek 1964)."

708	**Propagules survive passage through the gut**	**y**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	"Birds either feed on achenes, entire hips or hip flesh. Bird species feeding on entire hips may ingest achenes, and these are likely either to be regurgitated or to pass the intestines unharmed." … "It has been suggested that passage through the digestive tracts of birds or mammals may relieve mechanical (testa or pericarp induced) dormancy in seeds/fruits and enhance germination (see Traveset 1998). Krefting & Roe (1949) found that cold-stratified Rosa achenes germinated better after passage through grouse and pheasant guts."

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Flora of North America Editorial Committee. (2014). Flora of North America: North of Mexico, Volume 9. Magnoliophyta: Picramniaceae to Rosaceae. Oxford University Press, New York and Oxford	[Seed densities in thickets unknown] "Shrubs, forming thickets." … "Hips scarlet, depressed-globose, 18–20 × 20–25 mm, leathery, glabrous, sometimes setose, eglandular, rarely glandular, neck 1–2 × 4–5 mm; sepals persistent, erect. Achenes basiparietal, 40, tan, 4–6 × 2–4.5 mm."
	Kollmann, J., Frederiksen, L., Vestergaard, P., & Bruun, H. H. (2007). Limiting factors for seedling emergence and establishment of the invasive non-native Rosa rugosa in a coastal dune system. Biological Invasions, 9(1), 31-42	[Seeds a limiting factor in this study] "Our experiment demonstrated that the invasive nonnative R. rugosa is able to establish in all dune habitats once seeds have arrived. Consequently, the microhabitat limitation found for the dune habitats examined, except Empetrum dune, is not strong enough to prevent establishment. Given the strong seed limitation in the dune habitats, seed dispersal and seed predation are important factors controlling future spread of the species."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	SER, INSR, RBGK, (2023). Seed Information Database (SID). https://ser-sid.org/. [Accessed 19 Jul 2023]	"Storage Behaviour: Orthodox p Conditions: Viability maintained for 2-4 years in hermetic air-dry storage at 2°C to 4°C (Gill & Pogge, 1974g)"
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	[Physical dormancy might contribute to formation of a persistent seed bank] "The pericarp seems to exert a mechanical inhibition on germination of the embryo, in addition to the physiological inhibition described above. Although the pericarp is somewhat water-permeable, it severely restricts the penetration of water into the embryo."

Qsn #	Question	Answer
803	Well controlled by herbicides	y
	Source(s)	**Notes**
	Weidema, I. (2006). NOBANIS – Invasive Alien Species Fact Sheet –Rosa rugosa. – From: Online Database of the European Network on Invasive Alien Species – NOBANIS, www.nobanis.org	"Digging up the plants can also be combined with application of herbicides (such as Glyphosate) if local conditions and legislation permit this approach. The herbicide should be applied specifically and only to Rosa rugosa. This can be achieved with some kind of “weeper” (a device with one or more wicks). For small areas a paintbrush can be used, for large areas hand carried or tractor driven devices are needed. The important issue is to avoid affecting other plant species. Education of the technical staff is often necessary (Didriksen 1999)."
	Kaufman, S.R. & Kaufman, W. 2012. Invasive Plants: A Guide to Identification and the Impacts and Control of Common North American Species. Second Edition, Revised and Updated. Stackpole Books, Mechanicsburg, PA	"Small plants can be pulled out, but all roots must be removed to prevent resprouting. Cut canes can also be painted with glyphosate or triclopyr. In fields, rugosa rose can be mowed repeatedly during the growing season with a brush mower. Glyphosate can be sprayed on foliage after flower buds form for effective control."
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	[May be tolerant of some herbicides] "Similar results were obtained in a study of chemical control of the species (Didriksen 1999). Even when all above-ground tissue was destroyed, vigorous shoot growth appeared the year after. However, glyphosate applied in August appeared to damage rhizomes and roots as well."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	**Notes**
	Bruun, H. H. (2005). Rosa rugosa Thunb. ex Murray. Journal of Ecology, 93(2), 441-470	[Tolerates fire, some herbicide treatment, and mowing] "The general tolerance of R. rugosa to destruction of its above-ground tissue renders it tolerant to burning. Tsuda et al. (1999) investigated the effect of prescribed autumn burning of thickets of R. rugosa in its native habitat – fixed dunes in Hokkaido, Japan. They found that the number of shoots per m2 increased from 8.9 before burning to 23.3 in the second growing season after the fire, and then gradually decreased again. At the same time, the average height of the shoots first decreased from 32 cm to 24 cm, and then increased linearly. In the fifth growing season after the fire, shoots were both higher and stood more densely than before (Fig. 5). Similar results were obtained in a study of chemical control of the species (Didriksen 1999). Even when all above-ground tissue was destroyed, vigorous shoot growth appeared the year after. However, glyphosate applied in August appeared to damage rhizomes and roots as well. Mowing of R. rugosa stands twice or three times a year for two years appeared to reduce plant vitality, but only in the short term (Eigner 1992), whereas a larger-scale use of excavator and riddles to remove all rhizomes from the soil is very drastic and costly, and still requires subsequent digging of resprouts from root fragments (Kowarik 2003)."

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

Qsn #	Question	Answer
	Bruun, H. H. (2006). Prospects for biocontrol of invasive Rosa rugosa. BioControl, 51(2), 141-181	"Abstract. The biota of herbivorous arthropods and pathogenic microorganisms associated with Rosa rugosa in its native and exotic ranges is reviewed. This is done as an initial step towards the identification of potential agents for biological control of this plant species invasive in Europe and North America. It is shown that more insect (but apparently not fungal) species attack R. rugosa in its native range than in its exotic range, and that most of the specialized insect and fungal enemies are confined to its native range. Among the close relatives of R. rugosa in its exotic ranges are many native species, as well as economically important crop plants. Few organisms appear to be narrowly specialized to R. rugosa, but true host specificity can only be identified through experimental testing. Based on the literature, the most promising candidates for biocontrol seem to be the aphids Myzus japonensis and Amphorophora amurensis, the leaf hopper Empoasca ussurica, the tortricid moth Notocelia longispina, the cynipid gall-wasp Diplolepis fukudae, and the rust fungi Phragmidium rosae-rugosae and P. yezoense. A screening programme is suggested, investigating the impact of these organisms on R. rugosa performance, their host specificity and the risk of undesired indirect effects in the ecosystem where agents are released. In addition, demographic studies of the target plant should be integrated to provide guidance for the stage in the life cycle most sensitive to control and, thus, enable selection of the most efficient and safe biocontrol agents."
	WRA Specialist. (2023). Personal Communication	Unknown. Reported cultivated in the Hawaiian Islands, but no information on natural pests or pathogens is available.

Summary of Risk Traits:

Rosa rugosa, commonly known as the rugosa rose or Japanese rose, is a species of flowering shrub in the family Rosaceae. It is native to eastern Asia, including Japan, Korea, and China. Rosa rugosa is well-known for its attractive and fragrant flowers, as well as its hardiness and ability to tolerate a wide range of environmental conditions. It is reported to be naturalized in several locations worldwide, including in the Kaloko Mauka region of Hawaii Island. It is also regarded as a serious environmental weed, capable of being spread by birds, water and vegetatively by creeping rhizomes. Over time, it can form dense thickets that exclude other vegetation and reduce biodiversity.

High Risk / Undesirable Traits
• Broad climate suitability (but primarily temperate)
• Naturalized in New Zealand, Europe and North America, and recently reported as naturalized in Kaloka Mauka, Hawaii island
• An environmental weed, especially of coastal dune ecosystems
• Other Rosa species are invasive
• Covered in dense prickles
• Prickles may deter browsing by most animals
• May host pests of other Rosa species
• Pollen may be allergenic to susceptible individuals
• Tolerates many soil types
• Forms dense, impenetrable thickets
• Reproduces by seeds and vegetatively by suckers
• Hybridizes with other Rosa species
• May be self-fertile with low seed set
• Reaches maturity in 3 years
• Seeds dispersed by birds, other frugivorous animals, water and intentionally by people
• Rhizomes fragments also spread by water
• Tolerates fire and mowing

Low Risk Traits
• A cold climate, temperate species that may only threaten higher elevation tropical islands
• Palatable to goats and possibly other livestock (especially when young)
• Non-toxic to animals, and edible to people
• Herbicides may provide effective control