

Taxon: Rubus fruticosus	Family: Rosaceae
Common Name(s): European blackberry	Synonym(s):

Assessor: Assessor	Status: Assessor Approved	End Date: 11 Dec 2014
WRA Score: 19.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Agricultural Weed, Environmental Weed, Thorny, Suckering, 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)	Intermediate
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		
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	y
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	y
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	y
402	Allelopathic		
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	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	y
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y
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	y
412	Forms dense thickets	y=1, n=0	y
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	y
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	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	2
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	y
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)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)	y=1, n=-1	y
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
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Assessment is of the invasive type. Apparently less weedy genotypes exist]"European blackberry species comprise a few diploid sexual species, e.g. <i>R. idaeus</i> , <i>R. ulmifolius</i> , <i>R. bollei</i> , <i>R. canescens</i> , <i>R. incanescens</i> , <i>R. moschus</i> (Weber, 1995) and a large number of (allo-)polyploid agamospecies (Evans et al., 1998). Chromosome numbers form a polyploid series with the basic number of $x=7$: $2n=14, 21, 28, 35, 42, 49,$ and 56 (Weber, 1995). According to McGregor (1998), genotypes of blackberry grown commercially do not have weedy characteristics. For the differentiation into the two different sections 'Ursini' and 'Moriferi', refer to Jennings (1988) and McGregor (1998)."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2014. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2014. 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
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	" <i>R. fruticosus</i> is generally a temperate species preferring a range of soil conditions and rainfall regimes. In Australia, it is restricted to temperate climates with an annual rainfall of at least 700 mm, and occurs at any altitude (Bruzese, 1998), and <i>R. fruticosus</i> can grow up to elevations of 1600 m in the USA (Ertter, 1993)."

202	Quality of climate match data	Intermediate
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Seed requires stratification and germinates in spring." [For the special case of a temperate species whose seeds have been reported to require cold-stratification for germination, the answer to question 2.01 is 0 (low) and the answer to question 2.02 is 1 (intermediate)]

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

Qsn #	Question	Answer
	Plants for a Future. 2014. <i>Rubus fruticosus</i> . http://pfaf.org/user/Plant.aspx?LatinName=Rubus+fruticosus . [Accessed 11 Dec 2014]	[Able to grow in 5 hardiness zones] "USDA hardiness zone : 5-9"
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Elevation range exceeds 1000 m] "... <i>R. fruticosus</i> can grow up to elevations of 1600 m in the USA (Ertter, 1993)."

204	Native or naturalized in regions with tropical or subtropical climates	n
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	" <i>R. fruticosus</i> is generally a temperate species preferring a range of soil conditions and rainfall regimes. In Australia, it is restricted to temperate climates with an annual rainfall of at least 700 mm, and occurs at any altitude (Bruzzese, 1998), and <i>R. fruticosus</i> can grow up to elevations of 1600 m in the USA (Ertter, 1993)."

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. 2001. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"All the species referred to in this aggregate are European in origin and have become established in many temperate parts of the world. The European blackberry ... is an important weed on the east and west coasts of North America and in the north west coast of the United States in particular...It also occurs in Indonesia, India, Sri Lanka and New Zealand, where, by 1925, it was recognized as the country's most troublesome weed."

301	Naturalized beyond native range	y
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. 2001. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"All the species referred to in this aggregate are European in origin and have become established in many temperate parts of the world."
	Wagner, W.L., Herbst, D.R. & Lorence, D.H. 2014. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm . [Accessed 11 Dec 2014]	No evidence in the Hawaiian Islands to date

302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. 2001. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	[Invades disturbed habitats, impacting agriculture and natural areas] "Blackberry rarely invades virgin bushland but establishes most readily on disturbed sites which are subsequently neglected, such as cut-over forests, cleared roadsides and creekbanks, and along fence lines."

Qsn #	Question	Answer
303	Agricultural/forestry/horticultural weed	y
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Large infestations threaten both agricultural and natural ecosystems resulting in the reduction of productivity of land for forestry, agriculture or horticulture. <i>R. fruticosus</i> rarely invades well managed pastures, established tree plantations or intact native vegetation, but in disturbed sites it can quickly become the dominant species. It has, however, become a serious weed of young plantations and poorly managed grasslands, in orchards and some natural woodlands." ... "Though the pest status of blackberry has declined in New Zealand because of improved pasture management techniques and potent new herbicides, it is still ranked as the country's fourth most serious weed. The estimated economic impact to New Zealand's plantation forestry is \$NZ10 million a year, and to its farmland \$NZ10.5 million a year (Pennycook, 1998). The total estimated loss of \$NZ20.5 million, is still much larger than the national annual value of the small but expanding <i>Rubus</i> fruit industry, estimated to be worth about \$NZ12.5 million to the economy (Pennycook, 1998). In Australia, production loss by impacts of blackberry was estimated at \$A42 million (Field and Bruzzese, 1984), whereas the economic benefit per year was estimated at only \$A660,000 from fruit production and increases in honey production (Field and Bruzzese, 1984). Thus in these two countries, the economic costs outweigh the benefits, by over 50 times in the case of Australia"

304	Environmental weed	y
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	" <i>R. fruticosus</i> can degrade the natural environment by altering habitats as a result of crowding out and suppressing the growth of native vegetation. Blackberry thickets provide habitats for introduced birds and animals such as foxes and rabbits in Australia (Groves et al., 1998)." ... " <i>R. fruticosus</i> can threaten populations of certain native plant species that are already rare or endangered (Briggs, 1998; Davies 1998). Williams and Timmins (1990) listed blackberry as a significant problem weed of protected natural areas, which can permanently alter the structure, successional processes, and composition of organisms present in native communities. However, dense blackberry thickets can provide nesting and sheltering sites for birds and mammals."

Qsn #	Question	Answer
305	Congeneric weed	y
	Source(s)	Notes
	Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	" <i>Rubus argutus</i> ... forms impenetrable thickets ... <i>Rubus cuneifolius</i> ... plant coppices vigorously and forms dense thickets ... <i>Rubus ellipticus</i> ... shrub forms impenetrable thickets that displace native vegetation and affect wildlife by impeding movement and reducing habitats ... <i>Rubus niveus</i> ... displaces native vegetation, impedes regeneration of native shrubs and trees and affect wildlife habitats... <i>Rubus ulmifolius</i> ... grows in dense patches that displace native vegetation ..."

401	Produces spines, thorns or burrs	y
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	" <i>R. fruticosus</i> is a very prickly, scrambling, woody shrub with a perennial root system and biennial canes. It grows up to 2 m or more tall and is extremely variable in leaf shape and plant form. Stems are variable, semi-erect canes, which grow up to 8 or 10 m long. The canes may be green, purplish, or red and have generally backward pointing thorns, and are moderately hairy, round or angled, sometimes bearing small, stalked glands. They are arching, entangling, and woody."

402	Allelopathic	
	Source(s)	Notes
	Shinwari, M.I., Shinwari, M.I. & Fujii, Y. 2013. Allelopathic evaluation of shared invasive plants and weeds of Pakistan and Japan for environmental risk assessment. <i>Pak. J. Bot.</i> , 45: 467-474	"Table 2. Three dimensional assessment by calculation of percentage growth inhibition of radicals of shared invasive plants and weeds of Pakistan & Japan through Sandwich (SW), Dish Pack (DP) and Plant Box (PB) methods." [<i>Rubus fruticosus</i> extracts demonstrated to have allelopathic properties. Unknown under field conditions]

403	Parasitic	n
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	" <i>R. fruticosus</i> is a very prickly, scrambling, woody shrub with a perennial root system and biennial canes."

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. 2001. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Blackberry is not readily eaten by sheep and cattle but is consumed by goats and deer. Sheep can become entangled in thickets and die of thirst and hunger."
	Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Grazing by goats proved to be effective as well."

Qsn #	Question	Answer
405	Toxic to animals	n
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. 2001. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	[No evidence of toxicity] "Blackberry is not readily eaten by sheep and cattle but is consumed by goats and deer. "
	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
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Could potentially affect native <i>Rubus</i> species in the Hawaiian Islands] "Pennycook (1998) lists twenty-one insects, five phytophagous or predatory mites and one nematode species recorded on <i>Rubus</i> in New Zealand. Most of these invertebrates feed on different plant species, and those specific to <i>Rubus</i> have a wide host range within this genus. In addition, nineteen fungal pathogens are listed, causing wilts, blights, root rots, cane spots and leaf spots. Most of them cause only insignificant symptoms on <i>R. fruticosus</i> and/or affect also a range of other hosts. Bruzzese (1980) states that though more than 40 phytophagous species occur on <i>R. fruticosus</i> , it appears that they have only little effect in suppressing populations of this species. Viruses found infecting <i>R. fruticosus</i> to various degrees, amongst a range of other host species are the aphid-vectored Raspberry leaf curl virus (Stace-Smith, 1991a) and Black raspberry necrosis virus (Stace-Smith, 1991b), and the nematode-vectored Strawberry latent ringspot virus (Cooper, 1986). According to EPPO (2003), <i>R. fruticosus</i> is a minor host of the following quarantine pests: <i>Anthonomus signatus</i> , Apple mosaic ilarvirus, Arabis mosaic virus, Black raspberry latent virus, Cherry leafroll virus, <i>Melcosoma americanum</i> , <i>Naupactus leucoloma</i> , <i>Quadraspidiotus perniciosus</i> , Strawberry latent ringspot virus, Thrips <i>imagnis</i> , Tomato black ring virus, Tomato ringspot virus; and an incidental host for: Tobacco ringspot virus, <i>Anthonomus bisignifer</i> , <i>Cacoecimorpha pronubana</i> , and Raspberry ringspot virus."

Qsn #	Question	Answer
407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[No evidence] "R. fruticosus presents a food source for honey bees, goats, deer (Bruzzese, 1998) and other wild animals as well as for humans. Fruits are highly palatable with a high vitamin C content and can be eaten raw, or made into drinks, jams, syrups or various preserves (Bown, 1997). Leaves are used in the preparation of herbal teas and the root bark and leaves are used medicinally, being strongly astringent, depurative, diuretic, and vulnerary. Fruits provide a blue dye and a fibre can be obtained from the stems to make string. Blackberry bushes can prevent soil erosion on infertile, disturbed sites (van Dersal, 1938). "
	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	y
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Due to its biennial growth habit, the majority of biomass in a blackberry thicket is dead material from previous years, resulting in the exacerbation of fire hazards in larger infestations (Bruzzese, 1998)."
	Parsons, W.T. & Cuthbertson, E.G. 2001. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Large clumps of blackberry are a considerable fire hazard, particularly around farm buildings and along fence lines."

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"When established, R. fruticosus can grow in full shade in deep woodland, semi-shade in light woodland, or no shade situations, but in full shade fruit production is reduced and fruits will ripen later."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"R. fruticosus is generally a temperate species preferring a range of soil conditions and rainfall regimes."

Qsn #	Question	Answer
411	Climbing or smothering growth habit	y
	Source(s)	Notes
	New Zealand Plant Conservation Network. 2010. Flora Details - <i>Rubus fruticosus</i> agg. http://www.nzpcn.org.nz/flora_details.aspx?ID=2973 . [Accessed 11 Dec 2014]	[Scrambling, and may climb over and smother other vegetation] "Scrambling shrub, suckering, usu. semi-erect with stems arching and entangling, sometimes semi prostrate or almost erect"

412	Forms dense thickets	y
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Blackberry thickets can also have negative economic impacts by forming dense barriers restricting the movement of livestock, and the thorny stems cause injury to animals and contaminate wool."
	Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"It forms extensive and dense impenetrable thickets, shading out all other vegetation, displacing it and affecting wildlife habitats. The plant can completely dominate invaded areas within a short time, as individual clumps expand laterally due to root suckering and stem rooting."
	Australian Weeds Committee. 2012, Blackberry (<i>Rubus fruticosus</i> L. agg.) strategic plan 2012–17, Weeds of National Significance, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra	"Large, dense thickets formed by blackberry can make access to infestations difficult."

501	Aquatic	n
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"It occurs on wasteland, cemeteries, hedgerows, fence lines, roadsides, steep banks, hillsides, scrubby hillsides, forest, plantations, scrub margins, clearings, fen land, swamps, damp places, creeks, streamsides, river banks, river flats, river terraces, pasture, damp and neglected pasture (Webb et al., 1988)."

502	Grass	n
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/ . [Accessed 11 Dec 2014]	Rosaceae

Qsn #	Question	Answer
503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/ . [Accessed 11 Dec 2014]	Rosaceae [No evidence in the genus <i>Rubus</i>]

Qsn #	Question	Answer
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	" <i>R. fruticosus</i> is a very prickly, scrambling, woody shrub with a perennial root system and biennial canes. It grows up to 2 m or more tall and is extremely variable in leaf shape and plant form. Stems are variable, semi-erect canes, which grow up to 8 or 10 m long. The canes may be green, purplish, or red and have generally backward pointing thorns, and are moderately hairy, round or angled, sometimes bearing small, stalked glands. They are arching, entangling, and woody. Stems can root at the tips to form new plants and new stems grow from the base each year. Roots are stout, branched, creeping underground, growing vertically to a maximum depth of 1.5 m depending on soil type, from a woody crown up to 20 cm in diameter. Secondary roots grow horizontally from the crown for 30-60 cm, and then grow down vertically. Many thin roots grow in all directions from the secondary roots (Weber, 1995; Bruzzese 1998; Roy et al. 1998; Anon., 2001). The alternate leaves are divided into 3 or 5 serrated, shortly stalked, oval leaflets, which are arranged palmately, coloured dark green on top and pale beneath. Some taxa have the underside of leaves covered in pale hairs. Stalks and mid-ribs are prickly."

Qsn #	Question	Answer
601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

Qsn #	Question	Answer
602	Produces viable seed	y
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Seed requires stratification and germinates in spring. Seedlings are poor competitors, but this is compensated by the large amount of seed produced annually. Shading and competition affect seedling survival negatively and most seedlings die in early establishment; Amor (1971) found that only 15% of seedlings at one study site survived the first year. Those which succeed in establishing can grow up to four canes, with a length of up to 1 m, producing daughter plants in their first autumn."

603	Hybridizes naturally	y
	Source(s)	Notes
	Bruzzese, E., Mahr, F., Faithfull, I. & Turnbull, K. 2000. Best Practice Management Guide For Environmental Weeds 5. Blackberry, <i>Rubus fruticosus</i> aggregate. CRC for Weed Management Systems, Glen Osmond, AU. www.dpi.nsw.gov.a	"Occasionally, sexual reproduction occurs between two blackberry taxa, one parent usually being the sexually reproducing <i>R. ulmifolius</i> . The resulting hybrids reproduce asexually and breed true to type."
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"The extensive hybridization within the group further complicates the genus, as most hybrids of blackberries are between species in the <i>R. fruticosus</i> aggregate (Department of the Environment, 1994; Weber, 1995)."

604	Self-compatible or apomictic	y
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"It produces large quantities of fleshy fruits apomictically but also sexually by pollination via insects. "

605	Requires specialist pollinators	n
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"It produces large quantities of fleshy fruits apomictically but also sexually by pollination via insects."
	Bruzzese, E., Mahr, F., Faithfull, I. & Turnbull, K. 2000. Best Practice Management Guide For Environmental Weeds 5. Blackberry, <i>Rubus fruticosus</i> aggregate. CRC for Weed Management Systems, Glen Osmond, AU. www.dpi.nsw.gov.a	"The introduced honeybee may be the main pollinator."

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Australian Weeds Committee. 2012, Blackberry (<i>Rubus fruticosus</i> L. agg.) strategic plan 2012–17, Weeds of National Significance, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra	"It can reproduce and spread both vegetatively (by propagating from cane tips) and by seed (spread by fruit-eating birds and mammals, and via water)."

Qsn #	Question	Answer
	Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"The shrub suckers from roots, and stems touching the soil become rooted at the tips, forming daughter plants."

607	Minimum generative time (years)	2
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. 2001. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	[2-3+ years] "Seeds germinate in spring, and occasionally at other times ... " ... "Early growth is slow and, after 1 year, plants may be no more than 5 cm high. After several years, thickets are usually 1 to 2.5 metres high but occasionally much higher. Canes live for only 2 or 3 years and are replaced by new canes from the perennial woody crown which may be up to 15 cm in diameter."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"As stem fragments can root and produce new plants, there exists the possibility that plant parts may be spread by agricultural and cutting machinery to new areas. "
	Parsons, W.T. & Cuthbertson, E.G. 2001. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Pieces of cut root are moved by cultivation equipment but this is not of great importance because most infested areas are not suitable for cultivation."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Lau, A. 2014. Oahu Early Detection Botanist. Pers. Comm. 04 December	"Danielle and I recently came across a <i>Rubus</i> for sale at a City Mill, labeled as <i>Rubus fruticosus</i> ."
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Yes, despite regulation and well-documented history of invasiveness] "It is still a widely grown commercial fruit species and as such, further imports of plant material is likely. In New Zealand, it is on a list of 110 species of National Surveillance Plant Pests, prohibited from propagation, sale, distribution, and commercial display throughout the country (Pennycook, 1998). <i>R. fruticosus</i> is listed as a 'weed of national significance' in Australia (Anon., 2001) and presently occupies about 9 million hectares of land (Evans K, Tasmania Institute of Agricultural Research, Australia, personal communication, 2004). In the USA, it is included in the federal noxious weed list (USDA-APHIS, 2002). In South Africa, <i>R. fruticosus</i> is legally recognized as an invasive plant and is listed as a Category 2 Invader Plant under the Conservation Of Agricultural Resources Act, i.e. species with commercial or utility value, which may only be grown with a permit under controlled circumstances (Wildy E, Alien Invader Plants Project, South Africa, personal communication, 2004)." ... " <i>R. fruticosus</i> is still traded as a fruit crop, and sold by nurseries, garden centres, by mail order and via the Internet and as such is also likely to spread intentionally."

703	Propagules likely to disperse as a produce contaminant	n
-----	--	---

Qsn #	Question	Answer
	Source(s)	Notes
	Bruzzese, E., Mahr, F., Faithfull, I. & Turnbull, K. 2000. Best Practice Management Guide For Environmental Weeds 5. Blackberry, <i>Rubus fruticosus</i> aggregate. CRC for Weed Management Systems, Glen Osmond, AU. www.dpi.nsw.gov.a	"Vectors and dispersal mechanisms: The fruits are eaten and spread kilometres by birds and pest animals especially foxes. Blackberry and foxes are believed to have a mutually beneficial relationship. The fox spreads the plants while gaining food and shelter. Blackberry-eating bushwalkers and recreationists can also spread seeds. The movement of contaminated soil is another means of spread. Blackberry roots can be spread by cultivation to clean areas. Otherwise blackberry plants its own daughter plants at the stem tips."

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"The fruit is an aggregated berry, 10-20 mm long, changing colour from green to red to black as it ripens, made up of approximately twenty to fifty single-seeded drupelets. Seeds are deeply and irregularly pitted, oval, coloured light to dark brown, and 2.6-3.7 mm long and 1.6-2.5 mm wide." ... "Seed can be dispersed along watercourses, but the principal means of dispersal is by animals after feeding on the fruit."

705	Propagules water dispersed	y
	Source(s)	Notes
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Seed can be dispersed along watercourses, but the principal means of dispersal is by animals after feeding on the fruit. "

706	Propagules bird dispersed	y
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. 2001. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Blackberry seed is spread for some distance by creeks and rivers. More important, however, are birds (including emus) and foxes which relish the succulent fruit and can distribute seeds over a wide area. This is most noticeable where blackberries are growing near neglected orchards because hundreds of seedlings will be found beneath trees where birds have rested." ... "At fruiting time, it is an important food for introduced birds such as starlings and blackbirds and may help to increase the population of these undesirable species."
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Small mammals and livestock, also humans may assist in dispersal, but the main dispersal agents are undoubtedly birds."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes

Qsn #	Question	Answer
	Bruzzese, E., Mahr, F., Faithfull, I. & Turnbull, K. 2000. Best Practice Management Guide For Environmental Weeds 5. Blackberry, <i>Rubus fruticosus</i> aggregate. CRC for Weed Management Systems, Glen Osmond, AU. www.dpi.nsw.gov.a	"Vectors and dispersal mechanisms: The fruits are eaten and spread kilometres by birds and pest animals especially foxes. Blackberry and foxes are believed to have a mutually beneficial relationship. The fox spreads the plants while gaining food and shelter. Blackberry-eating bushwalkers and recreationists can also spread seeds. The movement of contaminated soil is another means of spread. Blackberry roots can be spread by cultivation to clean areas. Otherwise blackberry plants its own daughter plants at the stem tips."

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. 2001. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"In one study, an average of 570 seeds were recovered from fox droppings and 2460 from emu droppings."

801	Prolific seed production (>1000/m2)	y
	Source(s)	Notes
	Bruzzese, E., Mahr, F., Faithfull, I. & Turnbull, K. 2000. Best Practice Management Guide For Environmental Weeds 5. Blackberry, <i>Rubus fruticosus</i> aggregate. CRC for Weed Management Systems, Glen Osmond, AU. www.dpi.nsw.gov.a	"Persistence: Blackberry will persist indefinitely in an area unless treated. Plants that die are replaced by seedlings or daughter plants produced by adjacent individuals. There may be up to 13,000 seeds per square metre."
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Seed requires stratification and germinates in spring. Seedlings are poor competitors, but this is compensated by the large amount of seed produced annually."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Davies, A., & Waite, S. 1998. The persistence of calcareous grassland species in the soil seed bank under developing and established scrub. <i>Plant Ecology</i> , 136(1): 27-39	"The presence of the shade tolerant <i>Rubus fruticosus</i> (Fitter 1978), is of note. It occurs regularly in both field layer and seed bank and appears to be a shade tolerant species able to maintain a persistent soil seed bank."
	New Zealand Plant Conservation Network. 2010. Flora Details - <i>Rubus fruticosus</i> agg. http://www.nzpcn.org.nz/flora_details.aspx?ID=2973 . [Accessed 11 Dec 2014]	"Viability of the seed in the seed bank is unknown (Wotherspoon 1996)."

803	Well controlled by herbicides	y
	Source(s)	Notes

Qsn #	Question	Answer
	Bruzzese, E., Mahr, F., Faithfull, I. & Turnbull, K. 2000. Best Practice Management Guide For Environmental Weeds 5. Blackberry, <i>Rubus fruticosus</i> aggregate. CRC for Weed Management Systems, Glen Osmond, AU. www.dpi.nsw.gov.a	"A number of herbicides are registered for use on blackberry. Most are taken up by the leaves and transported to all parts of the plant, especially to the woody crown and roots, where they start to act. Use of these herbicides is intended to ensure that the active constituent is carried inside the plant to the roots and crowns, where it can kill these parts of the plant. Herbicides can be applied by spraying, by painting foliage and cut stems, and as granules. 'Cut and paint' or 'slash and paint' methods are time consuming but are often used near water courses to avoid herbicide runoff. An effective approach is to cut all canes about 30cm above ground level, remove all the cut canes and then cut the stems at ground level and immediately paint on herbicide."
	CABI. 2014. <i>Rubus fruticosus</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Several herbicides have been found to be effective, applied by knapsack or mistblower for smaller infestations, handgun and hose units for larger infestations. These include triclopyr alone or in mixture with picloram (Milne and Dellow, 1998), metasulfuron, amitrole, glyphosate and hexazinone (Anon., 2004). Often inaccessibility, excessively large infestations and the risk of damage to native vegetation make control by herbicides difficult or impossible (Bruzzese and Lane, 1996; Amor et al., 1998)."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Weber, E. 2003. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Cutting and burning is used but does not prevent regrowth. If individual plants are grubbed, the crowns and much of the roots must be removed."
	Australian Weeds Committee. 2012, Blackberry (<i>Rubus fruticosus</i> L. agg.) strategic plan 2012–17, Weeds of National Significance, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra	"Regrowth of blackberry post-control is common because it takes time to effectively kill or remove the root and crown (blackberry has a perennial root system that can produce new canes, and produce root suckers from a depth of at least 45 centimetres). Follow-up treatments are essential to achieving success. This means that control of blackberry is a long-term process—it cannot be achieved with a one-off effort."
	New Zealand Plant Conservation Network. 2010. Flora Details - <i>Rubus fruticosus</i> agg. http://www.nzpcn.org.nz/flora_details.aspx?ID=2973 . [Accessed 11 Dec 2014]	"The plant resprouts as a result of physical damage and grazing."

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

Qsn #	Question	Answer
	<p>CABI. 2014. <i>Rubus fruticosus</i>. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc</p>	<p>[The presence of two native <i>Rubus</i> species in the Hawaiian Islands would complicate the search for and potential introduction of biocontrol agents] "A problem for finding a suitable biological control agent is that almost all the invertebrate pests and diseases present on blackberry may cause collateral damage to commercial crops. In the 1980s, the blackberry leaf rust fungus <i>Phragmidium violaceum</i> was identified in Europe as a possible biological control agent. While it was being assessed it was also discovered in Victoria, Australia in 1984, assumed to be from an illegal introduction. Though spreading quickly, it was not as damaging as strains selected during the European work, one of which was introduced into Australia in 1991 (Bruzzese and Lane, 1996; Amor et al., 1998). In New Zealand, <i>P. violaceum</i> was first observed in 1990 and is now widely established but has not been recorded from cultivated <i>Rubus</i>. On the other hand, its long-term impact there on invasive blackberry has been minor and localized (Pennycook, 1998). As the susceptibility of different <i>Rubus</i> taxa to individual strains of <i>P. violaceum</i> varies (Bruzzese and Hasan, 1986), a better knowledge of blackberry taxonomy and accurate taxonomic keys are necessary to find suitable strains for the different species within the aggregate. Research in Australia on the taxonomy and genotypes of the aggregate has led to the identification of at least 40 different genotypes, some of which appear resistant to this rust fungus (Evans et al., 1998; Evans et al., 1999). The effects depend on climate conditions, for example if rainfall is high it can be very effective but it does not perform well in less humid climates (Mahr and Bruzzese, 1998). A research programme organized by the CRC for Weed Management Systems with funding from the CRC, Agriculture Western Australia and CSIRO Entomology began in 1999 to identify rust strains in Europe which are virulent on the genotypes of <i>Rubus</i> characterized as resistant in Australia. With an improved identification of <i>R. fruticosus</i> in Australia, a more detailed search for effective strains of <i>P. violaceum</i> is now possible. A strain has been selected for further study from surveys in Portugal and a trap garden of Australian clones of blackberry was established in France with cultures of trapped rusts being studied for their relative effectiveness against <i>R. fruticosus</i> (Scott et al., 2002)."</p>

Summary of Risk Traits:

High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Widely naturalized in regions with temperate climates
- An agricultural weed, causing serious economic losses
- An environmental weed, impacting native ecosystems
- Several *Rubus* species are highly invasive
- Prickly & thorny
- Potentially allelopathic
- Biomass (dead canes) increases fire risk
- Shade tolerant
- Tolerates many soil types
- Scrambling & able to climb over and potentially smother other vegetation
- Forms dense, impenetrable thickets
- Produces viable seed both sexually and apomictically
- Hybridizes with other *Rubus* species
- Able to spread vegetatively
- Seeds dispersed by birds, frugivorous animals, water & intentionally by people
- Prolific seed production (potentially 1000s per square meter)
- Able to coppice & resprout after cutting and fires

Low Risk Traits

- Seeds require cold stratification, and as a temperate species, may only be a threat at higher elevations in tropical & subtropical islands
- Edible fruit
- Palatable to goats and deer
- Herbicides may provide effective control