

<b>Taxon:</b> Toxicodendron succedaneum (L.) Kuntze	<b>Family:</b> Anacardiaceae
<b>Common Name(s):</b> Japanese waxtree red lac scarlet rhus	<b>Synonym(s):</b> Rhus erosus Radlk. Rhus succedanea var. japonica Engl. Toxicodendron succedaneum var.

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> In Progress	<b>End Date:</b> 24 Mar 2021
<b>WRA Score:</b> 12.0	<b>Designation:</b> H(HPWRA)	<b>Rating:</b> High Risk

**Keywords:** Dioecious Tree, Naturalized, Suckers, Toxic Sap, 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)	High
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	y
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	y
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed		
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals		
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	y
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	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic	y=1, n=-1	n
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	3
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	n
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)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
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., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	No evidence

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 23 Mar 2021]	"Native Asia-Temperate CHINA: China [Anhui Sheng, Zhejiang Sheng, Fujian Sheng, Henan Sheng, Hebei Sheng, Hunan Sheng, Hubei Sheng, Gansu Sheng, Jiangxi Sheng, Jiangsu Sheng, Guangdong Sheng, Guizhou Sheng, Shanxi Sheng, Shandong Sheng, Shaanxi Sheng, Sichuan Sheng, Qinghai Sheng, Yunnan Sheng, Guangxi Zhuangzu Zizhiqu, Ningxia Huizi Zizhiqu, Xizang Zizhiqu (s.e.), Hainan Sheng] EASTERN ASIA: Korea, Japan [Honshu, Kyushu, Ryukyu Islands, Shikoku], Taiwan Asia-Tropical INDIAN SUBCONTINENT: Bangladesh, Bhutan, India [Sikkim, Himachal Pradesh, Jammu and Kashmir, Manipur, Meghalaya, Nagaland, Uttar Pradesh, West Bengal, Mizoram, Arunachal Pradesh], Nepal, Pakistan (n.) INDO-CHINA: Cambodia, Laos, Myanmar, Thailand, Vietnam MALESIA: Indonesia [Sumatera (n.)]"

Qsn #	Question	Answer
202	Quality of climate match data	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 23 Mar 2021]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Plants for a Future. (2021). <i>Toxicodendron succedaneum</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 23 Mar 2021]	[Can be grown in >5 hardiness zones] "USDA hardiness: 4-9"
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). <i>Flora of China</i> . Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Occurs in both temperate & subtropical regions, and elevation range exceeds 1000 m, demonstrating environmental versatility] 'Lowland and hill forests; (100–)300–1500(–2500) m. Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, SE Xizang, Yunnan, Zhejiang [Cambodia, India, Japan, Korea, Laos, Thailand, Vietnam]."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Queensland Government. (2021). <i>Weeds of Australia</i> . <i>Toxicodendron succedaneum</i> . <a href="https://keyserver.lucidcentral.org">https://keyserver.lucidcentral.org</a> . [Accessed 23 Mar 2021]	"Native to the Indian Sub-continent (i.e. Bhutan, Nepal, northern India and northern Pakistan) and eastern Asia (i.e. China, Japan, Taiwan, Cambodia, Laos, Myanmar, Thailand, Vietnam and western Indonesia)." ... "A potential weed of disturbed sites, forests, open woodlands, urban bushland, roadsides, gardens and waste areas in temperate and sub-tropical regions."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 23 Mar 2021]	"Native Asia-Temperate CHINA: China [Anhui Sheng, Zhejiang Sheng, Fujian Sheng, Henan Sheng, Hebei Sheng, Hunan Sheng, Hubei Sheng, Gansu Sheng, Jiangxi Sheng, Jiangsu Sheng, Guangdong Sheng, Guizhou Sheng, Shanxi Sheng, Shandong Sheng, Shaanxi Sheng, Sichuan Sheng, Qinghai Sheng, Yunnan Sheng, Guangxi Zhuangzu Zizhiqu, Ningxia Huizi Zizhiqu, Xizang Zizhiqu (s.e.), Hainan Sheng] EASTERN ASIA: Korea, Japan [Honshu, Kyushu, Ryukyu Islands, Shikoku], Taiwan Asia-Tropical INDIAN SUBCONTINENT: Bangladesh, Bhutan, India [Sikkim, Himachal Pradesh, Jammu and Kashmir, Manipur, Meghalaya, Nagaland, Uttar Pradesh, West Bengal, Mizoram, Arunachal Pradesh], Nepal, Pakistan (n.) INDO-CHINA: Cambodia, Laos, Myanmar, Thailand, Vietnam MALESIA: Indonesia [Sumatera (n.)]"

Qsn #	Question	Answer
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	"A native of Japan, China and the Himalayan region, rhus has spread as an ornamental to most warm-temperate parts of the world. It is widely cultivated in southern Australia, especially in Melbourne and Sydney, and now occurs spontaneously in some areas around Sydney."

301	Naturalized beyond native range	y
	Source(s)	Notes
	Kubitzki, K. (ed.). (2011). The Families and Genera of Vascular Plants. Vol. X. Flowering Plants. Eudicots: Sapindales, Cucurbitales, Myrtaceae. Springer, New York	"A few agricultural and horticultural species have escaped cultivation and become invasive in their non-native areas. Japanese wax tree, <i>Toxicodendron succedaneum</i> , is an Asian species that was originally cultivated in Brazil but escaped after introduction, and is now invasive."
	Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"A native of Japan, China and the Himalayan region, rhus has spread as an ornamental to most warm-temperate parts of the world. It is widely cultivated in southern Australia, especially in Melbourne and Sydney, and now occurs spontaneously in some areas around Sydney."
	Webb, C. J., Sykes, W. R., & Garnock-Jones, P. J. (1988). Flora of New Zealand Volume IV. Botany Division, DSIR, Christchurch, New Zealand	"Japanese wax-tree, is commonly cultivated in warmer parts of the country and has been collected wild 3 times, in open coastal forest on Middle Id (Mercury Group, Coromandel), as a weed in an Auckland garden, and from waste ground in Havelock North. Although the last specimen has somewhat hairy leaflets, it probably belongs to this sp. <i>R. succedanea</i> is very easily distinguished from <i>R. typhina</i> as indicated in the key and belongs to a different group of <i>Rhus</i> (sect. <i>Toxicodendron</i> Gray). Members of this sect. are notorious for producing a severe dermatitis in many people and <i>R. succedanea</i> has caused a number of people in N.Z. to be so poisoned. (Himalaya to Japan, 1988) "
	Queensland Government. (2021). Weeds of Australia. <i>Toxicodendron succedaneum</i> . <a href="https://keyserver.lucidcentral.org">https://keyserver.lucidcentral.org</a> . [Accessed 23 Mar 2021]	"Locally naturalised in the coastal districts of central New South Wales and sparingly naturalised in south-eastern Queensland."
	Heenan, P. B., de Lange, P. J., Cameron, E. K., & Parris, B. S. (2008). Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 2004–06. <i>New Zealand Journal of Botany</i> , 46(2): 257-283	"Widely cultivated in the warmer parts of the North Island for its scarlet autumn foliage. most occurrences are of seedlings or saplings established well away from parent plants."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence in the Hawaiian Islands at time of publication

302	Garden/amenity/disturbance weed	y
	Source(s)	Notes

Qsn #	Question	Answer
	Sydney Weeds Committees. (2012). Rhus - Toxicodendron succedaneum. <a href="https://sydneyweeds.org.au/wp-content/uploads/2016/12/Weed-Fact-Sheet-Rhus.pdf">https://sydneyweeds.org.au/wp-content/uploads/2016/12/Weed-Fact-Sheet-Rhus.pdf</a> . [Accessed 23 Mar 2021]	[Considered a weed due to adverse effects on human health] "This weed is declared noxious in many local councils across Sydney." ... "The most severe impacts of rhus are the painful allergic reactions caused to people who come into contact with plant material, its sap, and even smoke made by burning the plant material. The sap is highly toxic and causes the worst reaction; however, contact with any part of the tree can result in the development of symptoms. All parts of the plant are poisonous and in highly sensitive people merely standing under a tree may be sufficient to produce a reaction."
	Queensland Government. (2021). Weeds of Australia. Toxicodendron succedaneum. <a href="https://keyserver.lucidcentral.org">https://keyserver.lucidcentral.org</a> . [Accessed 23 Mar 2021]	[Toxic properties could make this a nuisance of landscaping and around human habitation. Possibly also an environmental weed] "A potential weed of disturbed sites, forests, open woodlands, urban bushland, roadsides, gardens and waste areas in temperate and sub-tropical regions."

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	[A human health hazard and a potential environmental weed] "...usually in disturbed areas in woodlands, roadsides and waste places, now a common garden plant in parts of southern Australia, sometimes spreading into urban bushland as a weed."

304	Environmental weed	
	Source(s)	Notes
	Queensland Government. (2021). Weeds of Australia. Toxicodendron succedaneum. <a href="https://keyserver.lucidcentral.org">https://keyserver.lucidcentral.org</a> . [Accessed 23 Mar 2021]	"Impacts - Rhus tree ( <i>Toxicodendron succedaneum</i> ) is regarded as an environmental weed in New South Wales." "Legislation :This species is declared under legislation in the following states and territories: ACT: C1 - notifiable pest plant (a pest plant whose presence must be notified), and C4 - prohibited - a pest plant whose supply is prohibited in the ACT. New South Wales: Class 4 - a locally controlled weed. The growth and spread of this species must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed (throughout the entire state). South Australia: 1# - the presence of this species must be notified and the plant must be destroyed (throughout the entire state). Western Australia: Prohibited - on the prohibited species list and not permitted entry into the state."
	NSW WeedWise. (2021). Rhus ( <i>Toxicodendron succedaneum</i> ). <a href="https://weeds.dpi.nsw.gov.au/Weeds/Details/115">https://weeds.dpi.nsw.gov.au/Weeds/Details/115</a> . [Accessed 6 Aug 2014]	"Scattered plants still occur in domestic gardens and rhus also has invasive characteristics. Birds eat the fruit and spread the seed in their droppings, and many thousands of seedlings germinate in home gardens, public areas and urban bushland. Fortunately, noxious weed programs and public education have resulted in a considerable reduction of rhus in most environments. Nurseries no longer sell rhus."

Qsn #	Question	Answer
	WRA Specialist. (2021). Personal Communication	Most impacts deal with adverse effects on people who come into contact with the sap. Evidence for adverse environmental impacts is not specified at this time. Until evidence is found, this tree will be classified as a weed under Question 3.02, but could be reclassified as an environmental weed as more evidence is found.

<b>305</b>	<b>Congeneric weed</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Chace, T.D. (2013). How to Eradicate Invasive Plants. Timber Press, Portland, OR	" <i>Toxicodendron radicans</i> and <i>T. pubescens</i> " ... "Rampant growth outcompetes or shades out native and desirable plants in open and marginal areas."

<b>401</b>	<b>Produces spines, thorns or burrs</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Trees; buds glabrous or subglabrous. Leaf rachis terete; leaflets 9–15; leaflet petiolule 2–5 mm; leaflet blade 5–16 × 1–5.5 cm, glabrous on both surfaces."

<b>402</b>	<b>Allelopathic</b>	
	<b>Source(s)</b>	<b>Notes</b>
	NSW WeedWise. (2021). Rhus ( <i>Toxicodendron succedaneum</i> ). <a href="https://weeds.dpi.nsw.gov.au/Weeds/Details/115">https://weeds.dpi.nsw.gov.au/Weeds/Details/115</a> . [Accessed 23 Mar 2021]	[Unknown, but may possess allelopathic properties] "Rhus branches should not be mulched or chipped for garden use. The toxic resin remains active for many months, even after weathering. Contact your local council for advice on disposal of rhus debris. Do not burn any part of the plant as the smoke from burning is also toxic."

<b>403</b>	<b>Parasitic</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	" <i>Toxicodendron succedaneum</i> " ... "Trees or shrubs, 1–2(–10) m tall; branchlets glabrous to pubescent, terminal buds glabrous to tomentose." ... " <i>Toxicodendron succedaneum</i> var. <i>succedaneum</i> " ... "Trees; buds glabrous or subglabrous. Leaf rachis terete; leaflets 9–15; leaflet petiolule 2–5 mm; leaflet blade 5–16 × 1–5.5 cm, glabrous on both surfaces." [Anacardiaceae]

Qsn #	Question	Answer
404	<b>Unpalatable to grazing animals</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Rosa García, R., Celaya, R., García, U., & Osoro, K. (2012). Goat grazing, its interactions with other herbivores and biodiversity conservation issues. <i>Small Ruminant Research</i> , 107(2): 49-64	"Table 2 Summary of plant species considered weeds and which are palatable to goats." [Toxicodendron succedaneum included in list of palatable plants]
	Simmonds, H., Holst, P. & Bourke, C. (2000). The palatability, and potential toxicity of Australian weeds to goats. Rural Industries Research and Development Corporation, Barton, Australia	[Moderately palatable to goats] "The palatability* of weeds (not necessarily endemic to Australia) to goats when the weeds are grown in Australia. H = high; M = moderate; L = low; N = not known to be eaten." [Toxicodendron succedaneum = M = moderate]

405	<b>Toxic to animals</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Parsons, W.T. & Cuthbertson, E.G. (2001). <i>Noxious Weeds of Australia</i> . Second Edition. CSIRO Publishing, Collingwood, Australia	[Fruits not toxic to animals. Toxicity of sap to animals unknown] "Spread into public areas and urban bushland is the result of birds and animals eating the fruit and shedding seed in their droppings." ... "Like poison ivy (see page 162), rhus is an allergenic plant, its sap causing severe dermatitis. Although the epidermis must be broken to release the sap, all parts of the plant are dangerous. Thus, since young leaves bruise easily, rhus-caused dermatitis is more prevalent in spring than at other times of the year. The symptoms of poisoning are redness, severe itching, swelling and blistering of the skin..."
	Simmonds, H., Holst, P. & Bourke, C. (2000). The palatability, and potential toxicity of Australian weeds to goats. Rural Industries Research and Development Corporation, Barton, Australia	[No evidence for goats] "The potential toxicity of weeds to goats. ++ + high risk; ++ moderate risk; + low risk; ☐ no known risk." [Toxicodendron succedaneum = ☐ no known risk]

406	<b>Host for recognized pests and pathogens</b>	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. (2021). Personal Communication	Unknown

407	<b>Causes allergies or is otherwise toxic to humans</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	NSW WeedWise. (2021). Rhus (Toxicodendron succedaneum). <a href="https://weeds.dpi.nsw.gov.au/Weeds/Details/115">https://weeds.dpi.nsw.gov.au/Weeds/Details/115</a> . [Accessed 23 Mar 2021]	"Rhus (Toxicodendron succedaneum, previously Rhus succedanea) is a highly toxic, allergy causing tree. It causes severe dermatitis beginning with a rash, redness, itching and blisters wherever skin comes into contact with the plant or its sap. The rash is often accompanied by localised swelling of the face, arms and legs. Rhus was once commonly planted in Australian gardens because of its brilliant autumn foliage. It became problematic in the Sydney region in the 1980s, and is now declared a Noxious Weed across New South Wales (NSW)."
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). <i>Flora of China</i> . Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"The hardened resin produced in the phloem of Toxicodendron succedaneum (Japanese lacquer tree) and T. vernicifluum (varnish tree) is used for decoration of traditional handicrafts. The resinous effluvia are poisonous and may cause severe dermatitis in sensitized persons."



Qsn #	Question	Answer
	Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Toxicodendron succedaneum" ... "Like poison ivy (see page 162), rhus is an allergenic plant, its sap causing severe dermatitis. Although the epidermis must be broken to release the sap, all parts of the plant are dangerous. Thus, since young leaves bruise easily, rhus-caused dermatitis is more prevalent in spring than at other times of the year. The symptoms of poisoning are redness, severe itching, swelling and blistering of the skin. These symptoms usually appear within 1 to 7 days of contact with the plant and last for 10 to 14 days, sometimes longer."
	Kubitzki, K. (ed.). (2011). The Families and Genera of Vascular Plants. Vol. X. Flowering Plants. Eudicots: Sapindales, Cucurbitales, Myrtaceae. Springer, New York	[Genus Description] "Polygamodioecious shrubs, trees, or lianas with contact dermatitis-causing, white exudate turning black with exposure to air."

<b>408</b>	<b>Creates a fire hazard in natural ecosystems</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	[No evidence, and fire risk not listed among the impacts of this plant]

<b>409</b>	<b>Is a shade tolerant plant at some stage of its life cycle</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Heenan, P. B., de Lange, P. J., Cameron, E. K., & Parris, B. S. (2008). Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 2004–06. New Zealand Journal of Botany, 46(2): 257-283	"Seedlings and saplings are shade tolerant and, because of this, Japanese wax-tree has the potential to become a major woody weed in indigenous forest remnants of northern New Zealand."

<b>410</b>	<b>Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Habitat: Temperate regions, on a wide range of soils, usually in disturbed areas in woodlands, roadsides and waste places, now a common garden plant in parts of southern Australia, sometimes spreading into urban bushland as a weed."
	NSW WeedWise. (2021). Rhus ( <i>Toxicodendron succedaneum</i> ). <a href="https://weeds.dpi.nsw.gov.au/Weeds/Details/115">https://weeds.dpi.nsw.gov.au/Weeds/Details/115</a> . [Accessed 23 Mar 2021]	"Rhus will grow in temperate regions on a wide range of soil types. It is invasive in disturbed areas of woodland and roadsides, and will also spread from domestic gardens into surrounding urban bushland."

Qsn #	Question	Answer
411	<b>Climbing or smothering growth habit</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Toxicodendron succedaneum" ... "Trees or shrubs, 1–2(–10) m tall; branchlets glabrous to pubescent, terminal buds glabrous to tomentose." ... "Toxicodendron succedaneum var. succedaneum" ... "Trees; buds glabrous or subglabrous. Leaf rachis terete; leaflets 9–15; leaflet petiolule 2–5 mm; leaflet blade 5–16 × 1–5.5 cm, glabrous on both surfaces." [Anacardiaceae]

412	<b>Forms dense thickets</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	[Unknown. No evidence to date, but ability to produce large numbers of seedlings suggests dense stands may form at a future date in the absence of control measures] "Habitat: Temperate regions, on a wide range of soils, usually in disturbed areas in woodlands, roadsides and waste places, now a common garden plant in parts of southern Australia, sometimes spreading into urban bushland as a weed." ... "Fresh seeds require a short period of after-ripening before germination is possible. Germination capacity is very high and large numbers of seedlings are found wherever the plant occurs. Such fecundity indicates a potential for extremely rapid spread under appropriate environmental conditions."
	Heenan, P. B., de Lange, P. J., Cameron, E. K., & Parris, B. S. (2008). Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 2004–06. New Zealand Journal of Botany, 46(2): 257-283	[Unknown. No evidence to date] "Most occurrences are of seedlings or saplings established well away from parent plants."

501	<b>Aquatic</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Terrestrial trees] "Lowland and hill forests; (100–)300–1500(–2500) m."

502	<b>Grass</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	Anacardiaceae

Qsn #	Question	Answer
503	<b>Nitrogen fixing woody plant</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	Anacardiaceae

Qsn #	Question	Answer
504	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Webb, C. J., Sykes, W. R., & Garnock-Jones, P. J. (1988). Flora of New Zealand Volume IV. Botany Division, DSIR, Christchurch, New Zealand	"Trees or shrubs, sometimes climbing, usually dioecious, usually deciduous, sometimes evergreen but not in N.Z. Sap resinous or milky. Lvs usually imparipinnate, sometimes 3-foliolate or simple. Panicles terminal or axillary, bracteate. Calyx 5-partite; segments imbricate, sometimes unequal. Petals 5, ± imbricate, inconspicuous. ♂ fls with 5 stamens and rudimentary pistil. ♀ fls 1-celled; styles 3; stigmas ± capitate. Drupe globose or compressed; exocarp thin, glabrous or hairy; mesocarp resinous; endocarp ± bony; stigmas often persistent. "

Qsn #	Question	Answer
601	<b>Evidence of substantial reproductive failure in native habitat</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	No evidence

Qsn #	Question	Answer
602	<b>Produces viable seed</b>	y
	<b>Source(s)</b>	<b>Notes</b>
	Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"A large woody deciduous shrub or small tree, 5 to 8 m high, with brilliantly coloured autumn foliage, reproducing by seed and suckers."

Qsn #	Question	Answer
603	<b>Hybridizes naturally</b>	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. (2021). Personal Communication	Unknown. No evidence found

Qsn #	Question	Answer
604	<b>Self-compatible or apomictic</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Heenan, P. B., de Lange, P. J., Cameron, E. K., & Parris, B. S. (2008). Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 2004–06. New Zealand Journal of Botany, 46(2): 257-283	"Dioecious, deciduous, sometimes suckering small tree, up to 5(-8) m tall, single erect trunk, smooth except for lenticels."

Qsn #	Question	Answer
	Plants for a Future. (2021). <i>Toxicodendron succedaneum</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 23 Mar 2021]	"The flowers are dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required) and are pollinated by Bees. The plant is not self-fertile. "

605	Requires specialist pollinators	n
	Source(s)	Notes
	Kubitzki, K. (ed.). (2011). <i>The Families and Genera of Vascular Plants. Vol. X. Flowering Plants. Eudicots: Sapindales, Cucurbitales, Myrtaceae.</i> Springer, New York	[Family Description. No species identified have highly specialized pollinator syndromes] "Anacardiaceae are primarily entomophilous, but some exceptions are found." ... "Flowers with petals, insect-pollinated; stylopedia not plumose" ... [Genus Description] "Inflorescences axillary panicles. Flowers pedicellate, non-articulate; perianth (4)5(6)-parted; calyx fused at base; corolla imbricate; white to greenish; androecium haplostemonous; anthers dorsifixed; pistillode reduced, styloidium 1; staminodes reduced; disk glabrous, annular and lobed; carpels 3; stylopedia 3, short; stigmas capitate; ovule basal."
	Nakamura, S., Yamamoto, S., Sawamura, N., Nikkeshi, A., Kishi, S., & Kamo, T. (2020). Pollination effectiveness of European honeybee, <i>Apis mellifera</i> (Hymenoptera: Apidae), in an Oriental persimmon, <i>Diospyros kaki</i> (Ericales: Ebenaceae), orchard. <i>Applied Entomology and Zoology</i> , 55(4), 405-412	[Presumably visited and pollinated by honeybees] "the colony seemed to depend mainly on clovers ( <i>T. pratense</i> and <i>T. repens</i> ) and <i>Toxicodendron</i> for pollen. Although there were no large patches of <i>T. pratense</i> or <i>T. repens</i> within the orchard, <i>A. mellifera</i> often flies further from the hive to forage for highly rewarding flowers (Beekman and Ratnieks 2000). Trees of <i>Toxicodendron succedaneum</i> (L.) Kuntze (Sapindales: Anacardiaceae) naturally grew around the orchard."

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. (2001). <i>Noxious Weeds of Australia. Second Edition.</i> CSIRO Publishing, Collingwood, Australia	"A large woody deciduous shrub or small tree, 5 to 8 m high, with brilliantly coloured autumn foliage, reproducing by seed and suckers."

607	Minimum generative time (years)	3
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. (2001). <i>Noxious Weeds of Australia. Second Edition.</i> CSIRO Publishing, Collingwood, Australia	[In Australia, flowers appear in second year and open in third growing season] "Seeds germinate in spring, producing a single erect stem and fibrous roots. Toward the end of summer, a few short rhizomes form on the basal nodes of the stem. Seedling plants become dormant during winter and recommence growth the following spring (September). Towards the end of the second summer, flower buds form on the new wood but do not open immediately, remaining dormant during winter. As new growth occurs in spring, the flower buds continue developing and open in November or December when the new season's leaves are fully expanded."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Queensland Government. (2021). Weeds of Australia. <i>Toxicodendron succedaneum</i> . <a href="https://keyserver.lucidcentral.org">https://keyserver.lucidcentral.org</a> . [Accessed 23 Mar 2021]	"Spread also occurs occasionally through the sale of plants at nurseries and markets, and by seeds that are contained in dumped garden waste or contaminated soil."
	Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	" <i>Toxicodendron succedaneum</i> " ... "Rhus may also be spread during garden maintenance if contaminated soil and refuse are dumped in bushland rather than at recognized garbage tips."

702	Propagules dispersed intentionally by people	y
	<b>Source(s)</b>	<b>Notes</b>
	Kubitzki, K. (ed.). (2011). The Families and Genera of Vascular Plants. Vol. X. Flowering Plants. Eudicots: Sapindales, Cucurbitales, Myrtaceae. Springer, New York	"Many Anacardiaceae species are also valued for their horticultural appeal. Specimens of <i>Cotinus</i> , <i>Harpephyllum</i> , <i>Lansea</i> , <i>Pistacia</i> , <i>Rhodospaera</i> , <i>Rhus</i> , <i>Schinus</i> , <i>Searsia</i> , <i>Smodingium</i> , and <i>Toxicodendron</i> are planted for their beautiful inflorescences, infructescences, evergreen foliage, and/or fall foliage."
	Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	[Formerly Yes in Australia] "Most spread has been through commercial nurseries but now, because of its toxic properties, it is no longer stocked."
	Webb, C. J., Sykes, W. R., & Garnock-Jones, P. J. (1988). Flora of New Zealand Volume IV. Botany Division, DSIR, Christchurch, New Zealand	[New Zealand] "Japanese wax-tree, is commonly cultivated in warmer parts of the country and has been collected wild 3 times, in open coastal forest on Middle Id (Mercury Group, Coromandel), as a weed in an Auckland garden, and from waste ground in Havelock North."

703	Propagules likely to disperse as a produce contaminant	n
	<b>Source(s)</b>	<b>Notes</b>
	NSW WeedWise. (2021). Rhus ( <i>Toxicodendron succedaneum</i> ). <a href="https://weeds.dpi.nsw.gov.au/Weeds/Details/115">https://weeds.dpi.nsw.gov.au/Weeds/Details/115</a> . [Accessed 23 Mar 2021]	[Unlikely. Seeds could possibly contaminated potting mix if grown with other plants, but birds are the primary dispersal vector] "Spread also occurs occasionally through the sale of plants at nurseries and markets, and by seeds that are contained in dumped garden waste or contaminated soil."

704	Propagules adapted to wind dispersal	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Drupe large, asymmetrical, 7–10 mm in diam., compressed, apex eccentric; epicarp thin, yellow, glabrous; mesocarp thick, white, waxy, with brown longitudinal resin ducts."

Qsn #	Question	Answer
705	Propagules water dispersed	n
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	[Water may infrequently provide some secondary dispersal, but birds are the primary dispersal vector] "Spread into public areas and urban bushland is the result of birds and animals eating the fruit and shedding seed in their droppings."

706	Propagules bird dispersed	y
	Source(s)	Notes
	Heenan, P. B., de Lange, P. J., Cameron, E. K., & Parris, B. S. (2008). Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 2004–06. <i>New Zealand Journal of Botany</i> , 46(2): 257-283	"Japanese wax tree is bird dispersed, and the first record from a rodent-free uninhabited island dominated by indigenous vegetation was from a seedling collected under a large starling ( <i>Sturnus vulgaris</i> ) roost."
	Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Spread into public areas and urban bushland is the result of birds and animals eating the fruit and shedding seed in their droppings."
	Kubitzki, K. (ed.). (2011). The Families and Genera of Vascular Plants. Vol. X. Flowering Plants. Eudicots: Sapindales, Cucurbitales, Myrtaceae. Springer, New York	"The major seed dispersers of fleshy-fruited species are birds (e.g., <i>Metopium</i> , <i>Rhus</i> , <i>Schinus</i> , <i>Searsia</i> , <i>Toxicodendron</i> ), ..."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. (2001). Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	[Dispersed internally] "Spread into public areas and urban bushland is the result of birds and animals eating the fruit and shedding seed in their droppings."

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	"Spread into public areas and urban bushland is the result of birds and animals eating the fruit and shedding seed in their droppings."

Qsn #	Question	Answer
801	<b>Prolific seed production (&gt;1000/m<sup>2</sup>)</b>	
	<b>Source(s)</b>	<b>Notes</b>
	NSW WeedWise. (2021). Rhus ( <i>Toxicodendron succedaneum</i> ). <a href="https://weeds.dpi.nsw.gov.au/Weeds/Details/115">https://weeds.dpi.nsw.gov.au/Weeds/Details/115</a> . [Accessed 23 Mar 2021]	"Birds eat the fruit and spread the seed in their droppings, and many thousands of seedlings germinate in home gardens, public areas and urban bushland." ... "Fruit hang in clusters on the tree throughout autumn and winter, falling in spring. Seeds are produced in large numbers and germinate readily. Seedlings grow vigorously in their early years and if unpruned, form spreading crowns on single erect trunks."
	Parsons, W.T. & Cuthbertson, E.G. (2001). <i>Noxious Weeds of Australia</i> . Second Edition. CSIRO Publishing, Collingwood, Australia	"Fresh seeds require a short period of after-ripening before germination is possible. Germination capacity is very high and large numbers of seedlings are found wherever the plant occurs. Such fecundity indicates a potential for extremely rapid spread under appropriate environmental conditions."

802	<b>Evidence that a persistent propagule bank is formed (&gt;1 yr)</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	NSW WeedWise. (2021). Rhus ( <i>Toxicodendron succedaneum</i> ). <a href="https://weeds.dpi.nsw.gov.au/Weeds/Details/115">https://weeds.dpi.nsw.gov.au/Weeds/Details/115</a> . [Accessed 23 Mar 2021]	"The seed remains viable for many years and rhus can also be spread by movement of garden soil containing viable seed."

Qsn #	Question	Answer
803	Well controlled by herbicides	y
	Source(s)	Notes
	CABI. (2021). <i>Toxicodendron succedaneum</i> . In: <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	"Chemical control - In Australia, the herbicides glyphosate and picloram have been used to control infestations of <i>T. succedaneum</i> (Government of South Australia, 2014; van Oosterhout et al., 2014)."
	NSW WeedWise. (2021). <i>Rhus</i> ( <i>Toxicodendron succedaneum</i> ). <a href="https://weeds.dpi.nsw.gov.au/Weeds/Details/115">https://weeds.dpi.nsw.gov.au/Weeds/Details/115</a> . [Accessed 23 Mar 2021]	"Chemical control Herbicides are registered for stem injection and cut stump application for <i>rhus</i> control. Refer to the Noxious and Environmental Weed Control Handbook for a list of registered herbicides and application methods. Precautions to avoid the sap should still be taken when carrying out chemical control methods. Stem injections of herbicide should be carried out in summer when the tree is actively growing. The tree can then be left in place to die. The dead plant material should still be disposed of safely and not burnt. Any live trees that are cut down should have their stumps treated with herbicide to prevent regrowth. If a brush is used to paint stumps it should be bagged and safely disposed of."
	Ensbeys, R. (2011). <i>Noxious and environmental weed control handbook. A guide to weed control in non-crop, aquatic and bushland situations</i> . 5th Edition. Department of Primary Industries, NSW	[Two recommended herbicides presumably provide effective control] "Chemical and concentration Rate Comments Glyphosate 360 g/L - Various trade names Undiluted (1–2 mL per cut) 1 part glyphosate to 1 part water Stem injection technique, as per label. Cut stump application. Picloram 45 g/kg Vigilant® Undiluted Cut stump/stem injection application. Apply a 3–5 mm layer of gel for stems less than 20 mm. Apply 5 mm layer on stems above 20 mm (see label)."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. (2001). <i>Noxious Weeds of Australia</i> . Second Edition. CSIRO Publishing, Collingwood, Australia	[Able to resprout after cutting] "Mechanical control is the only recommended method of control at present. But, as contact with the sap is dangerous, delay removal until mid-winter, when all leaves have fallen. Then, after raking the leaves and wearing heavy protective clothing, including gloves, so as to cover as much of the skin as possible, grub the trees. In so doing, remove as much of the root as possible so as to minimize suckering. Bury all material removed in a safe place or dispose of it at the local tip. Do not burn: smoke particles from <i>rhus</i> carry the toxic oil, which is particularly dangerous in this form. Seedlings growth is susceptible to cultivation and should be hoed or dug in where practicable."
	NSW WeedWise. (2021). <i>Rhus</i> ( <i>Toxicodendron succedaneum</i> ). <a href="https://weeds.dpi.nsw.gov.au/Weeds/Details/115">https://weeds.dpi.nsw.gov.au/Weeds/Details/115</a> . [Accessed 23 Mar 2021]	[Regrows after cutting without herbicide treatment] "Small plants may be dug out, taking care to dig out the entire stem to discourage suckering. When larger trees are cut down their remaining stumps need to be treated with herbicide to prevent regrowth. Tools such as chainsaws and mattocks need to be cleaned to remove sap. Personal protective equipment such as overalls, hats, protective eyewear or face shields, dust masks and gloves should be used by operators, even when dealing with small seedlings. The risk of contact with sap can also be reduced by waiting until after the leaves have fallen in winter before attempting to remove plants."



Qsn #	Question	Answer
	Kubiak, P. J. (2009). Fire responses of bushland plants after the January 1994 wildfires in northern Sydney. <i>Cunninghamia</i> , 11(1): 131-165	[Resprouts after fires] "Appendix 1. Observations on fire responses (after 100% leaf scorch) of vascular plants in the Lane Cove River (LCR) (observations mainly Jan 1994 – Oct 1999) and Narrabeen Lagoon (NL) (Mar – Oct 1994) catchments, following the fires of January 1994." [Toxicodendron succedaneum - Fire Response: R = majority of adult plants resprouted after the fires]

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. (2021). Personal Communication	Unknown

**Summary of Risk Traits:**

High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in temperate to subtropical climates
- Naturalized in Australia, New Zealand, & Brazil
- A disturbance adapted weedy tree with possible negative environmental impacts
- Other *Toxicodendron* species are weedy and invasive
- Highly toxic, allergy causing tree
- Shade tolerant
- Tolerates many soil types
- Seeds dispersed by birds & unintentionally in contaminated soil
- Can reach reproductive maturity in 3 years
- Able to spread by root suckers
- Seeds persist in the soil
- Able to coppice & resprout after cutting or burning

Low Risk Traits

- Unarmed (no spines, thorns or burrs)
- Palatable to goats (despite toxic properties)
- Ornamental
- Trees appear to be functionally dioecious
- Effectively controlled by herbicide