

Taxon: Diospyros kaki Thunb.	Family: Ebenaceae
Common Name(s): Chinese persimmon Japanese persimmon kaki kaki persimmon	Synonym(s): Diospyros argyi Lév. Diospyros aurantium André Diospyros bertii André Diospyros chinensis Blume, nom. Diospyros costata Carr. Diospyros elliptica André Diospyros kaempferi Naudin Diospyros lycopersicon Carr. Diospyros mazelii Carr. Diospyros sahuti André Diospyros schi-tse Bunge Embryopteris kaki G. Don.

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 18 May 2022
WRA Score: 2.0	Designation: L	Rating: Low Risk

Keywords: Domesticated Tree, Naturalized, Edible Fruit, Dioecious, Parthenocarpic

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	y
102	Has the species become naturalized where grown?	y=1, n=-1	y
103	Does the species have weedy races?	y=1, n=-1	n
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)	n
303	Agricultural/forestry/horticultural weed		
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y

Qsn #	Question	Answer Option	Answer
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	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	n
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	n
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	2
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	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	y
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		

Qsn #	Question	Answer Option	Answer
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	Is the species highly domesticated?	y
	Source(s)	Notes
	Luo, Z., & Wang, R. (2008). Persimmon in China: Domestication and traditional utilizations of genetic resources. <i>Advances in Horticultural Science</i> , 22(4), 239–243	"China is one of the origins of persimmon and has the longest cultivation history (Yu, 1979). Ever since ancient times, Japanese persimmon and Chinese people's daily lives have been inseparable, as referred to some extent in all the previous dynasties writers' literature."
	Lim, T.K. (2012). <i>Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits</i> . Springer, New York	"Persimmon is native to China, where it has been cultivated for centuries and more than 2,000 different cultivars exist. It was introduced to Korea and Japan where additional cultivars were developed. Persimmon is a fruit crop in East Asia and is also grown in the cooler areas in north Thailand, Vietnam and in the sub temperate areas in USA, Australia, New Zealand, South Africa, South America and the Mediterranean areas in Europe."

102	Has the species become naturalized where grown?	y
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 16 May 2022]	"Naturalized Asia-Temperate EASTERN ASIA: Japan"

103	Does the species have weedy races?	n
	Source(s)	Notes
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	Categorized as an environmental weed, citing Mulvaney (1991) as evidence. However, the cited reference rates <i>Diospyros kaki</i> as "Non-intrusive" in the W = Intrusive Species category. In addition, Mulvaney scores <i>D. kaki</i> with a -10, and state that "None of the 286 species (36% of all common introductions) with a sub-zero score was invasive."
	CABI. (2022). <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	No evidence
	Mulvaney, M. J. (1991). <i>Far from the Garden Path: An Identikit Picture of Woody Ornamental Plants Invading South-Eastern Australian Bushland</i> . PhD Dissertation. Dept. Australian National University, Canberra ACT	This publication's Invasive Species Model scores <i>D. kaki</i> with a -10, and state that "None of the 286 species (36% of all common introductions) with a sub-zero score was invasive."

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

Qsn #	Question	Answer
	Ng, F.S.P. (1991). <i>Diospyros kaki</i> L.f.. In: Verheij, E.W.M. and Coronel, R.E. (Editors): <i>Plant Resources of South-East Asia No 2: Edible fruits and nuts</i> . PROSEA Foundation, Bogor, Indonesia. https://www.prota4u.org/prosea . [Accessed 16 May 2022]	"Although of subtropical origin, oriental persimmon is adaptable to a range of warm temperate climates, including those in tropical highlands."
	Lim, T.K. (2012). <i>Edible Medicinal and Non-Medicinal Plants</i> . Volume 2, Fruits. Springer, New York	"Persimmon is native to China, where it has been cultivated for centuries and more than 2,000 different cultivars exist. It was introduced to Korea and Japan where additional cultivars were developed. Persimmon is a fruit crop in East Asia and is also grown in the cooler areas in north Thailand, Vietnam and in the sub temperate areas in USA, Australia, New Zealand, South Africa, South America and the Mediterranean areas in Europe."

202	Quality of climate match data	High
	Source(s)	Notes
	Ng, F.S.P. (1991). <i>Diospyros kaki</i> L.f.. In: Verheij, E.W.M. and Coronel, R.E. (Editors): <i>Plant Resources of South-East Asia No 2: Edible fruits and nuts</i> . PROSEA Foundation, Bogor, Indonesia. https://www.prota4u.org/prosea . [Accessed 16 May 2022]	"Although of subtropical origin, oriental persimmon is adaptable to a range of warm temperate climates, including those in tropical highlands."

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Ng, F.S.P. (1991). <i>Diospyros kaki</i> L.f.. In: Verheij, E.W.M. and Coronel, R.E. (Editors): <i>Plant Resources of South-East Asia No 2: Edible fruits and nuts</i> . PROSEA Foundation, Bogor, Indonesia. https://www.prota4u.org/prosea . [Accessed 16 May 2022]	"Although of subtropical origin, oriental persimmon is adaptable to a range of warm temperate climates, including those in tropical highlands. Experience in South-East Asia indicates that a prominent seasonal climate is not required. Cultivation is successful in the highlands above 1000 m; but there are examples of bearing trees in the lowlands, e.g. in Kuching (Sarawak). Sheltered sites are important to prevent wind damaging the tender young foliage and to prevent blemishes occurring on the fruit."
	Lim, T.K. (2012). <i>Edible Medicinal and Non-Medicinal Plants</i> . Volume 2, Fruits. Springer, New York	"It is grown from sea level to 2,500 m elevation. Persimmons can withstand a wide range of conditions as long as the soil is not excessively saline, but does best in deep, well-drained loam in the pH range of 6.5–7.5. Persimmon trees will withstand brief periods of drought, but the fruit will be larger and of higher quality with regular watering."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Ng, F.S.P. (1991). <i>Diospyros kaki</i> L.f.. In: Verheij, E.W.M. and Coronel, R.E. (Editors): <i>Plant Resources of South-East Asia No 2: Edible fruits and nuts</i> . PROSEA Foundation, Bogor, Indonesia. https://www.prota4u.org/prosea . [Accessed 16 May 2022]	"Although of subtropical origin, oriental persimmon is adaptable to a range of warm temperate climates, including those in tropical highlands. Experience in South-East Asia indicates that a prominent seasonal climate is not required."
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	"Preferred Climate/s: Mediterranean, Subtropical, Tropical"

Qsn #	Question	Answer
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"Persimmon is native to China, where it has been cultivated for centuries and more than 2,000 different cultivars exist. It was introduced to Korea and Japan where additional cultivars were developed. Persimmon is a fruit crop in East Asia and is also grown in the cooler areas in north Thailand, Vietnam and in the sub temperate areas in USA, Australia, New Zealand, South Africa, South America and the Mediterranean areas in Europe".

301	Naturalized beyond native range	y
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 17 May 2022]	"Naturalized Asia-Temperate EASTERN ASIA: Japan"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Reported as naturalized in Australia, Spain, Europe, Laos, and India. Unclear if these are naturalized, escaped, or persisting from a long history of cultivation.

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Plants for a Future. (2022). <i>Diospyros kaki</i> . https://pfaf.org . [Accessed 18 May 2022]	"Weed Potential: No"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Categorized as an agricultural weed and an environmental weed, but cited references do not provide evidence for these categorizations.
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence
	Mulvaney, M. J. (1991). Far from the Garden Path: An Identikit Picture of Woody Ornamental Plants Invading South-Eastern Australian Bushland. PhD Dissertation. Dept. Australian National University, Canberra ACT	This publication's Invasive Species Model scores <i>D. kaki</i> with a -10, and state that "None of the 286 species (36% of all common introductions) with a sub-zero score was invasive."

303	Agricultural/forestry/horticultural weed	
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Categorized as an agricultural weed, citing Cardenas and Coulston (1967). However, the supporting reference is only a list of plants, and does not provide any evidence of negative or detrimental impacts for any of the plants included in the list.

Qsn #	Question	Answer
	Cardenas, J. and Coulston, L. (1967). Weeds of Peru. A list of common and Scientific Names. Oregon State University in cooperation with AID/Peru-S.A. OSU/AID Mimeo. 67-7, Farm Crops Department, Oregon State University, Corvallis	Included in a list of weeds of Peru, but no other information is provided.
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Categorized as an environmental weed, citing Mulvaney (1991) as evidence. However, the cited reference rates <i>Diospyros kaki</i> as "Non-intrusive" in the W = Intrusive Species category. In addition, Mulvaney scores <i>D. kaki</i> with a -10, and state that "None of the 286 species (36% of all common introductions) with a sub-zero score was invasive."
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence
	Mulvaney, M. J. (1991). Far from the Garden Path: An Identikit Picture of Woody Ornamental Plants Invading South-Eastern Australian Bushland. PhD Dissertation. Dept. Australian National University, Canberra ACT	This publication's Invasive Species Model scores <i>D. kaki</i> with a -10, and state that "None of the 286 species (36% of all common introductions) with a sub-zero score was invasive."

305	Congeneric weed	y
	Source(s)	Notes
	Langeland, K.A.& Stocker, R.K. (2001). Control of Non-native Plants in Natural Areas of Florida. SP 242. Institute of Food & Agricultural Sciences, University of Florida, Gainesville, FL	"Treatment: Large individuals are difficult to kill. Applying 50% Garlon 3A to a freshly cut stump is recommended. Basal bark treatments with Garlon 4 does not work. Comments: Black bark, shiny alternate leaves; scattered throughout a few hammocks in South Florida; fruits large, edible; green when ripe." [<i>Diospyros digyna</i> is controlled with herbicides, but impacts unspecified. Potentially an environmental weed]

401	Produces spines, thorns or burrs	n
	Source(s)	Notes

Qsn #	Question	Answer
	<p>Wu, Z. Y. & P. H. Raven, eds. (1996). Flora of China. Vol. 15 (Myrsinaceae through Loganiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis</p>	<p>[No evidence] "Trees to 27 m tall, deciduous. Young branchlets densely pubescent to glabrous, sometimes with reddish brown lenticels. Winter buds small, blackish. Petiole 0.8–2 cm; leaf blade lanceolate, elliptic, or ovate, occasionally obovate, 5–18 × 2.6–9 cm, papery, pubescent when young drying brown, adaxially often glabrescent when mature and paler with dark veinlets, base cuneate, subtruncate, or rarely cordate, apex usually acuminate; lateral veins 5–7 per side, reticulate veinlets clearly defined, flat, dark. Staminate flowers in 3–5-flowered cymes; calyx ± as long as corolla, hairy on both sides; lobes 4; corolla white, yellowish white, or red, 6–10 mm; stamens (14–)16–24. Pistillate flowers solitary; calyx 3 cm or more in diam., lobes 4; corolla usually yellowish white, campanulate, (0.9–)1–1.6 cm; corolla lobes recurved, ovate; staminodes 8(–16); ovary glabrous or pubescent. Fruiting calyx 3–4 cm in diam. Berry yellow to orange, flattened globose to ovoid but usually globose, 2–8.5 cm in diam., 8-locular, glabrescent. Seeds dark brown, 1.3–1.6 cm × 7.5–9 × 4–5 mm."</p>

402	Allelopathic	
	Source(s)	Notes
	<p>Cui, C., Liu, B., Hou, L., & Zhang, S. (2017). Allelopathic effects of persimmon (<i>Diospyros kaki</i>) leaves extracts on germination, seedling growth and enzymatic activities of receptor plants. <i>Allelopathy Journal</i>, 42(1), 49-64</p>	<p>[Potentially. Extracts demonstrate allelopathic properties] "Abstract : We studied the mechanism of allelopathic effects of fresh persimmon (<i>Diospyros kaki</i>) leaves extract on: (i). seed germination, seedling growth and chlorophyll content of seedlings of receptor plant and (ii). analysed the activity of superoxidedismutase (SOD), peroxidase (POD), catalase (CAT) and root activity of receptor plants and content of malondialdehyde (MDA). The aqueous extracts of persimmon leaves had variable allelopathic effects on the receptor plants. All aqueous extracts significantly inhibited the lettuce and cabbage than control, but only high concentrations (50 mg and 100 mg) were inhibitory to mung bean, millet, rapeseed and corn. The extracts at 100 mg concentration were most inhibitory to lettuce and cabbage than other receptor plants. The growth and development of plants were significantly affected and the roots activity decreased with the increasing extracts concentration. The effects of extracts from persimmon leaves on activities of CAT, SOD, POD and the content of MDA of receptor plants were determined during the lettuce and cabbage seedling growth. The extracts had significant effects on the activities of CAT, SOD and POD in receptor plants, which in vivo first increased and then decreased. Of all the enzymes assayed (SOD, POD, CAT), the SOD and the POD activity cooperated to remove the reactive oxygen radicals. The allelopathy affected the activity of protective-enzymes of receptor plants and broke the structure and function of membrane. So the balance of activate oxygen metabolism was broken, the cell membrane was destroyed and the content of MDA increased."</p>

Qsn #	Question	Answer
403	Parasitic	n
	Source(s)	Notes
	Wu, Z. Y. & P. H. Raven, eds. (1996). Flora of China. Vol. 15 (Myrsinaceae through Loganiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Trees to 27 m tall, deciduous." [Ebenaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Tsuji, Y., Shimoda-Ishiguro, M., Ohnishi, N., & Takatsuki, S. (2007). A friend in need is a friend indeed: feeding association between Japanese macaques and sika deer. <i>Acta Theriologica</i> , 52(4), 427-434	"Table 1. List of the gleaning foods (G) of sika deer on Kinkazan Island, northern Japan from May 2000 to December 2005. Numbers show the gleaning event. bk – bark, fb – flower buds, fl – flowers, fr – fruits, l – leaves, n – nuts, wb – winter buds." [Diospyros kaki fruit and leaves are consumed]
	Harper, E. (2020). Edible (Native) Landscaping – Persimmon. https://thelandconnection.org/blog/edible-native-landscaping-persimmon/ . [Accessed 18 May 2022]	"The unharvested fruit may remain on the tree well into the winter and is an important food source for deer. Deer also eat the twigs and leaves of the tree through the year. Other wildlife, such as opossum, fox, coyote, and several bird species, also feed on the fruit in the winter. Many bees and moths utilize the tree through the spring and summer months." [Generic description]

405	Toxic to animals	n
	Source(s)	Notes
	Plants for a Future. (2022). <i>Diospyros kaki</i> . https://pfaf.org . [Accessed 18 May 2022]	"Known Hazards None known"
	Rover.com (2022). Can My Dog Eat Persimmons https://www.rover.com/blog/can-my-dog-eat-persimmons/ . [Accessed 18 May 2022]	"Maybe. Persimmons are safe for your dog to eat and are full of vitamins C and A. However, the seeds and pit can cause intestinal blockage leading to various digestive problems. The seeds and pit aren't toxic, and they must be removed if you feed your dog a persimmon. In addition, dogs that eat too many persimmons may have diarrhea."

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Missouri Botanical Garden. (2022). <i>Diospyros kaki</i> . http://www.missouribotanicalgarden.org . [Accessed 16 May 2022]	"No serious insect or disease problems. Scale and mealybug may need to be controlled. Leaf spot may occur. Falling fruit can cause litter problems."
	Ng, F.S.P. (1991). <i>Diospyros kaki</i> L.f.. In: Verheij, E.W.M. and Coronel, R.E. (Editors): Plant Resources of South-East Asia No 2: Edible fruits and nuts. PROSEA Foundation, Bogor, Indonesia. https://www.prota4u.org/prosea . [Accessed 16 May 2022]	"Numerous diseases and pests occur in the major production centres, but their importance in South-East Asia has not been confirmed. Black leaf-spots, pink disease (<i>Corticium salmonicolor</i>), leaf rollers, leaf-eating beetles and — in the dry season — various aphids have been found on the trees in Java."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes

Qsn #	Question	Answer
	Plants for a Future. (2022). <i>Diospyros kaki</i> . https://pfaf.org . [Accessed 18 May 2022]	"Known Hazards None known"
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[<i>Diospyros kaki</i>] "Ripe fruit prescribed as a stomachic; persistent calyx used to treat cough, hiccups. The juice extracted from unripe fruit employed in hypertension."
	Burrows, G. E., & Tyrl, R. J. (2013). Toxic Plants of North America. Second Edition. Wiley-Blackwell, Hoboken, NJ	[Problems associated with persimmon consumption not directly attribute to <i>D. kali</i> . May have laxative and diuretic properties] " <i>Diospyros kaki</i> has been grown for centuries in the Orient for its large, edible fruits, and extracts of its leaves have been used for their hemostatic, diuretic, laxative, and hypotensive effects. <i>Diospyros virginiana</i> and <i>D. texana</i> are likewise eaten; the former is especially relished after fall frosts in rural regions of the southeastern United States. The most consistent problem associated with their consumption by both animals and humans is the propensity of the fruit tissues to congeal into obstructing masses, termed phytobezoars or diospyrobezoars, in the stomach and small intestine (Haslam and Lilley 1988)." ... "The hypotensive effects of <i>D. kaki</i> are attributed to kaempferol 3 -glucoside (astragalins) and quercetin 3-β-glucoside (Funayama and Hikino 1979). These compounds also have laxative and diuretic actions."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Fire Performance Plant Selector. (2022). <i>Diospyros kaki</i> . https://fire.sref.info/plants/diospyros-kaki . [Accessed 18 May 2022]	"Firewise Rating - MODERATELY Firewise (2)"
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"Persimmons do best in cool areas that have moderate winters and relatively mild summers It can tolerate temperatures of -17.8°C when fully dormant." [No evidence. Does not grow in fire prone areas, or form stands that increase fire risk]

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"It prefers full sun with protection from strong wind."
	Missouri Botanical Garden. (2022). <i>Diospyros kaki</i> . http://www.missouribotanicalgarden.org . [Accessed 16 May 2022]	"Sun: Full sun"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"Persimmons can withstand a wide range of conditions as long as the soil is not excessively saline, but does best in deep, well-drained loam in the pH range of 6.5–7.5. Persimmon trees will withstand brief periods of drought, but the fruit will be larger and of higher quality with regular watering."

Qsn #	Question	Answer
	Ng, F.S.P. (1991). <i>Diospyros kaki</i> L.f.. In: Verheij, E.W.M. and Coronel, R.E. (Editors): <i>Plant Resources of South-East Asia No 2: Edible fruits and nuts</i> . PROSEA Foundation, Bogor, Indonesia. https://www.prota4u.org/prosea . [Accessed 16 May 2022]	"The trees tolerate a wide range of soils, but it is much easier to sustain high yields on well-drained deep soils that are not too heavy. The recommended pH is between 5.5–6.5."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Wu, Z. Y. & P. H. Raven, eds. (1996). <i>Flora of China</i> . Vol. 15 (Myrsinaceae through Loganiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Trees to 27 m tall, deciduous."

412	Forms dense thickets	n
	Source(s)	Notes
	Spongberg, S. A. (1991). Notes on Persimmons, Kakis, Date Plums, and Chapotes. <i>Arnoldia</i> , 51(4), 47–54	[No evidence. Long cultivated] "Like the date plum, kakis have been cultivated for such an extended period of time that the natural species range has become totally obliterated."
	Ng, F.S.P. (1991). <i>Diospyros kaki</i> L.f.. In: Verheij, E.W.M. and Coronel, R.E. (Editors): <i>Plant Resources of South-East Asia No 2: Edible fruits and nuts</i> . PROSEA Foundation, Bogor, Indonesia. https://www.prota4u.org/prosea . [Accessed]	[No evidence] "Although of subtropical origin, oriental persimmon is adaptable to a range of warm temperate climates, including those in tropical highlands. Experience in South-East Asia indicates that a prominent seasonal climate is not required. Cultivation is successful in the highlands above 1000 m; but there are examples of bearing trees in the lowlands, e.g. in Kuching (Sarawak). Sheltered sites are important to prevent wind damaging the tender young foliage and to prevent blemishes occurring on the fruit. "

501	Aquatic	n
	Source(s)	Notes
	Ng, F.S.P. (1991). <i>Diospyros kaki</i> L.f.. In: Verheij, E.W.M. and Coronel, R.E. (Editors): <i>Plant Resources of South-East Asia No 2: Edible fruits and nuts</i> . PROSEA Foundation, Bogor, Indonesia. https://www.prota4u.org/prosea . [Accessed 16 May 2022]	[Terrestrial] "Cultivation is successful in the highlands above 1000 m; but there are examples of bearing trees in the lowlands, e.g. in Kuching (Sarawak)."

502	Grass	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). <i>Germplasm Resources Information Network (GRIN-Taxonomy)</i> . National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 16 May 2022]	"Family: Ebenaceae"

503	Nitrogen fixing woody plant	n
	Source(s)	Notes

Qsn #	Question	Answer
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 16 May 2022]	"Family: Ebenaceae"

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
Source(s)		Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"A deciduous, branched tree growing to 27 m high with densely pubescent to glabrous young branchlets, with reddish brown lenticels."

601	Evidence of substantial reproductive failure in native habitat	n
Source(s)		Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"Persimmon is native to China, where it has been cultivated for centuries and more than 2,000 different cultivars exist. It was introduced to Korea and Japan where additional cultivars were developed. Persimmon is a fruit crop in East Asia and is also grown in the cooler areas in north Thailand, Vietnam and in the sub temperate areas in USA, Australia, New Zealand, South Africa, South America and the Mediterranean areas in Europe."

602	Produces viable seed	y
Source(s)		Notes
	George, A. P., Mowat, A. D., Collins, R. J., & Morley-Bunker M. (1997). The pattern and control of reproductive development in non-astringent persimmon (<i>Diospyros kaki</i> L.): A review. <i>Scientia Horticulturae</i> , 70(2-3), 93-122	"In Japan, Fukae et al. (1987) reports that for satisfactory pollination (> 3 seeds per fruit), a persimmon flower requires at least 20 honeybee visits. Earlier res.earchers have suggested that wind pollination may also occur in persimmon (Kikuchi, 1933), but later studies by Asami and Chow (1941) have shown that wind pollination was not effective."
	Ng, F.S.P. (1991). <i>Diospyros kaki</i> L.f.. In: Verheij, E.W.M. and Coronel, R.E. (Editors): Plant Resources of South-East Asia No 2: Edible fruits and nuts. PROSEA Foundation, Bogor, Indonesia. https://www.prota4u.org/prosea . [Accessed 16 May 2022]	"Propagation in Indonesia and Malaysia is normally by separation of root suckers which are several years old. Plants produced from seed tend to be whippy and weakly branched. In the subtropics propagation is normally by grafting mature buds onto seedling stock. Cuttings are very difficult to root."

603	Hybridizes naturally	n
Source(s)		Notes
	Tamura, M., Tao, R., & Sugiura, A. (1998). Production of somatic hybrids between <i>Diospyros glandulosa</i> and <i>D. kaki</i> by protoplast fusion. <i>Plant Cell, Tissue and Organ Culture</i> , 54(2): 85-91	"Most <i>Diospyros kaki</i> cultivars are hexaploid (2n=6x=90) or nonaploid (2n=9x=135) (Zhuang et al., 1990) while most other <i>Diospyros</i> species are diploid (2n=2x=30). There is a strong interspecific or interploid crossing barrier between hexaploid <i>Diospyros kaki</i> and other <i>Diospyros</i> spp."

Qsn #	Question	Answer
604	Self-compatible or apomictic	n
	Source(s)	Notes
	Roubik, D. W. (ed.). (2018). The pollination of cultivated plants: A compendium for practitioners: Volume 1. FAO, Rome	"Persimmon (<i>Diospyros kaki</i>) is dioecious, and some cultivars produce fruit without pollination, but most cannot. The flowers produce nectar and pollen used by bees."
	Ng, F.S.P. (1991). <i>Diospyros kaki</i> L.f.. In: Verheij, E.W.M. and Coronel, R.E. (Editors): Plant Resources of South-East Asia No 2: Edible fruits and nuts. PROSEA Foundation, Bogor, Indonesia. https://www.prota4u.org/prosea . [Accessed]	"The main cultivars bear only male-sterile flowers. Parthenocarpic fruit set is common, but pollination is often desirable to reduce early fruit drop and to improve fruit quality, especially for non-astringent cultivars." [Parthenocarpy, development of fruit without fertilization. The fruit resembles a normally produced fruit but is seedless]
605	Requires specialist pollinators	n
	Source(s)	Notes
	George, A. P., Mowat, A. D., Collins, R. J., & Morley-Bunker M. (1997). The pattern and control of reproductive development in non-astringent persimmon (<i>Diospyros kaki</i> L.): A review. <i>Scientia Horticulturae</i> , 70(2-3), 93-122	"In Japan, Fukae et al. (1987) reports that for satisfactory pollination (> 3 seeds per fruit), a persimmon flower requires at least 20 honeybee visits. Earlier researchers have suggested that wind pollination may also occur in persimmon (Kikuchi, 1933), but later studies by Asami and Chow (1941) have shown that wind pollination was not effective."
606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Ng, F.S.P. (1991). <i>Diospyros kaki</i> L.f.. In: Verheij, E.W.M. and Coronel, R.E. (Editors): Plant Resources of South-East Asia No 2: Edible fruits and nuts. PROSEA Foundation, Bogor, Indonesia. https://www.prota4u.org/prosea . [Accessed]	"Propagation in Indonesia and Malaysia is normally by separation of root suckers which are several years old."
	NC State Extension. (2022). <i>Diospyros kaki</i> . https://plants.ces.ncsu.edu/plants/diospyros-kaki/ . [Accessed 18 May 2022]	"They have no serious insect or disease problems and they do not require annual pruning like some other deciduous fruit trees. However, they do produce root suckers. Remove promptly unless a naturalized effect is wanted."
607	Minimum generative time (years)	2
	Source(s)	Notes
	Ng, F.S.P. (1991). <i>Diospyros kaki</i> L.f.. In: Verheij, E.W.M. and Coronel, R.E. (Editors): Plant Resources of South-East Asia No 2: Edible fruits and nuts. PROSEA Foundation, Bogor, Indonesia. https://www.prota4u.org/prosea . [Accessed]	[2+ years] "Dwarf cultivars come into bearing 2—3 years after planting; more vigorous cultivars take 2 more years to produce an appreciable crop."
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	"Dispersed by: Humans"

Qsn #	Question	Answer
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"Fruit yellow, orange to orangey red, globose, oblate, subglobose to ovoid, 2–9 cm across, 8-locular, glabrescent (Plates 1–8). Seeds dark brown, 13–16 mm × 7.5–9 mm × 4–5 mm." [No means of external attachment]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"In Hawai'i, kaki is cultivated on Maui and the Big Island at higher elevations (2,000-4,000') where cooler temperatures pre-vail."
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"Persimmon is native to China, where it has been cultivated for centuries and more than 2,000 different cultivars exist. It was introduced to Korea and Japan where additional cultivars were developed. Persimmon is a fruit crop in East Asia and is also grown in the cooler areas in north Thailand, Vietnam and in the sub temperate areas in USA, Australia, New Zealand, South Africa, South America and the Mediterranean areas in Europe".

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[No evidence. Fruit and seeds large and unlikely to become a produce contaminant] "Fruit yellow, orange to orangey red, globose, oblate, subglobose to ovoid, 2–9 cm across, 8-locular, glabrescent (Plates 1–8). Seeds dark brown, 13–16 mm × 7.5–9 mm × 4–5 mm."

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[No evidence. Fleshy-fruited] "Fruit yellow, orange to orangey red, globose, oblate, subglobose to ovoid, 2–9 cm across, 8-locular, glabrescent (Plates 1–8). Seeds dark brown, 13–16 mm × 7.5–9 mm × 4–5 mm."

705	Propagules water dispersed	n
	Source(s)	Notes
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"Fruit yellow, orange to orangey red, globose, oblate, subglobose to ovoid, 2–9 cm across, 8-locular, glabrescent (Plates 1–8). Seeds dark brown, 13–16 mm × 7.5–9 mm × 4–5 mm." [No evidence]

706	Propagules bird dispersed	y
	Source(s)	Notes

Qsn #	Question	Answer
	Sakamoto, Y., & Takatsuki, S. (2015). Seeds recovered from the droppings at latrines of the raccoon dog (<i>Nyctereutes procyonoides viverrinus</i>): the possibility of seed dispersal. <i>Zoological Science</i> , 32(2), 157-162	[May be dispersed short distances by bulbuls] "Fukui (1995) attempted a feeding experiment with the brown-eared bulbul (<i>Hypsipetes amauroti</i>) and showed that they vomited large seeds such as those of the persimmon (<i>Diospyros kaki</i>), the ginkgo (<i>Ginkgo biloba</i>), and the chinaberry (<i>Melia azedarach</i>). Thus, for long-distance dispersal, large seeds are not adapted to dispersal by birds."
	Lai, X., Guo, C., & Xiao, Z. (2014). Trait-mediated seed predation, dispersal and survival among frugivore-dispersed plants in a fragmented subtropical forest, Southwest China. <i>Integrative Zoology</i> , 9(3), 246-254	[Seeds are possibly too large to be dispersed by most birds present in the Hawaiian Islands] "Table 1 Population density, fruit/seed traits and dispersal agents of fleshy-fruited species studied" [<i>Diospyros kaki</i> var. <i>silvestris</i> - Primary seed disperser = Mammals]

707	Propagules dispersed by other animals (externally)	y
	Source(s)	Notes
	Lai, X., Guo, C., & Xiao, Z. (2014). Trait-mediated seed predation, dispersal and survival among frugivore-dispersed plants in a fragmented subtropical forest, Southwest China. <i>Integrative Zoology</i> , 9(3), 246-254	[Rodent seed predators externally carry and disperse a proportion of seeds that survive in caches] "Large-seeded species with hard seeds (i.e. <i>C. axillaries</i> and <i>D. kaki</i> var. <i>silvestris</i>) had more seeds removed, cached and then surviving at caches. They also had fewer seeds predated but a relatively higher proportion of seeds surviving at the source. Thus, scatter-hoarding rodents can have positive effects on secondary seed dispersal and subsequent survival for some frugivore-dispersed plants producing large seeds and/or high-defense seeds. Moreover, secondary seed dispersal by scatter-hoarding rodents can compensate for limited seed dispersal of these frugivore-dispersed plants in fragmented forests where medium/large vertebrate frugivores are locally extinct (Wright et al. 2007; McConkey et al. 2012)."

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Sakamoto, Y., & Takatsuki, S. (2015). Seeds recovered from the droppings at latrines of the raccoon dog (<i>Nyctereutes procyonoides viverrinus</i>): the possibility of seed dispersal. <i>Zoological Science</i> , 32(2), 157-162	[Pigs, and perhaps mongoose, may serve as seed dispersers in the Hawaiian Islands] "the raccoon dog eats a variety of foods and ingests large-seeded fruits including the kaki persimmon, and the ginkgo. Thus, for plants bearing fruits containing large seed(s), the raccoon dog is a more reliable, longer-distance seed disperser than birds."

801	Prolific seed production (>1000/m2)	n
	Source(s)	Notes
	Ng, F.S.P. (1991). <i>Diospyros kaki</i> L.f.. In: Verheij, E.W.M. and Coronel, R.E. (Editors): <i>Plant Resources of South-East Asia No 2: Edible fruits and nuts</i> . PROSEA Foundation, Bogor, Indonesia. https://www.prota4u.org/prosea . [Accessed]	[Relatively large seeds, or seedless if fruit produced via parthenocarpy] "Fruit a depressed, obtusely quadrangular-globose berry, resembling a tomato and even more variable in size, yellowish-green to red, with enlarged persisting calyx; mesocarp thick, edible, in which thin jackets of edible endocarp are embedded around each seed or locule; seeds 0—10, ovoid-oblong, flattened on one side." ... "The main cultivars bear only male-sterile flowers. Parthenocarpic fruit set is common, but pollination is often desirable to reduce early fruit drop and to improve fruit quality, especially for non-astringent cultivars."

Qsn #	Question	Answer
	Lim, T.K. (2012). Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[Seeds relatively large, when produced] "Fruit yellow, orange to orangey red, globose, obovate, subglobose to ovoid, 2–9 cm across, 8-locular, glabrescent (Plates 1–8). Seeds dark brown, 13–16 mm × 7.5–9 mm × 4–5 mm."
802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Hong, T. D., Linington, S., & Ellis, R. H. (1996). Seed Storage Behaviour: a Compendium. Handbooks for Genebanks: No. 4. International Plant Genetic Resources Institute, Rome	[<i>Diospyros kaki</i> with recalcitrant seeds] "Fig. 10. Seed storage behaviour of 94 contrasting species (number within symbol) in relation to seed moisture content at harvest/natural shedding (MCS) and thousand seed weight (TSW, log scale). Circles represent orthodox (including orthodox p and orthodox?, see Part IB, Introduction), triangles intermediate (including intermediate?), and squares recalcitrant (including recalcitrant?) seed storage behaviour."
803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Unknown. No evidence on herbicide efficacy or chemical control of this species
804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	NC State Extension. (2022). <i>Diospyros kaki</i> . https://plants.ces.ncsu.edu/plants/diospyros-kaki/ . [Accessed 18 May 2022]	"It can be trained as an espalier or pruned as a hedge or screen away from foot traffic or wet soil. They have no serious insect or disease problems and they do not require annual pruning like some other deciduous fruit trees." [Tolerates some pruning]
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Unknown] "In Hawai'i, <i>kaki</i> is cultivated on Maui and the Big Island at higher elevations (2,000-4,000') where cooler temperatures prevail."

Summary of Risk Traits:

High Risk / Undesirable Traits

- Broad climate suitability
- Able to grow in subtropical and tropical climates
- Reported as naturalized in Japan (but no evidence from the Hawaiian Islands)
- Unconfirmed reports of weediness
- Other *Diospyros* species are invasive
- Potentially allelopathic
- Tolerates many soil types
- Can reproduce by seeds and vegetatively by suckers
- Some cultivars may produce fruit after 2 years
- Seeds, if produced, may be dispersed by frugivorous mammals, birds, seed caching rodents, and through intentional cultivation
- Tolerates pruning (may resprout if cut)

Low Risk Traits

- A domesticated tree with a long history of cultivation and no confirmed reports of negative impacts where grown
- Cultivated in the Hawaiian Islands with no evidence of naturalization or invasiveness
- Unarmed (no spines, thorns, or burrs)
- Foliage palatable to browsing animals
- Non-toxic
- Grows in full sun and high light environments (dense shade may inhibit spread)
- Dioecious
- Parthenocarpic trees may produce seedless fruit
- Seeds, when produced, are relatively large and unlikely to be dispersed long distances by animals or accidentally

Second Screening Results for Trees/tree-like shrubs

(A) Shade tolerant or known to form dense stands? No

Outcome = Accept (Low Risk)

