Fire risk report for *Cryptomeria japonica*

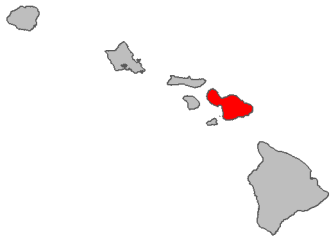
Full Species Name
Cryptomeria japonica (Thunb. ex L.f.) D.Don

Family: Cupressaceae

Common names:
Japanese cedar
sugi
tsugi

Synonyms:

Known occurrences (as of 2020)



Year first documented as naturalized in Hawai'i: 2001

This species has been ranked by the Hawai'i Weed Risk Assessment program as Evaluate with a score of 5.

View photos on Starr Environmental

View on Wikipedia

View occurrences on iNaturalist

View at Plants of Hawaii

View photos on Flickr

0	.5	1
Lowest risk	⇔	Highest risk

This species is likely a **high** fire risk in Hawai'i with a fire risk score of **0.50**.

This species was ranked by our machine learning algorithm using the data presented on the next page. A predicted score of > .34 suggests the plant is a high fire risk.

Summary of Fire ecology	
Native habitat fire proneness	No Data
Fire promoting plant in its native range	No
Fire promoting plant in its introduced range*	No
Regenerates after fire	Yes
Promoted by fire	No Data
Reported flammable*	High
Relative is flammable*	No

*These values were used by the model to predict fire risk

Detailed summary of Fire Ecology

Native habitat fire proneness (In any part of the plant's native range is its habitat described as fire prone due to natural or human caused fires?)	No Data	
Fire promoting plant in its native range (Does the species act as a major fuel source, increase fire severity, frequency, or modify fuel bed characteristics within its native range?)	No	#there seems to be articles about this species in japanese. but accessing them is difficult
Fire promoting plant in its introduced range (Same as Fire Promoting Native but within the species introduced range)	No	
Regenerates after fire (Does the plant regrow after fire by any means? This includes resprouters, reseeders, and recruiters which dispersed into the area within approximately one year post fire)	Yes	"No new species emerged in the second year, but in the third year Sugi and bracken appeared. [sugi is common name for C. japonica]" https://www.jstage.jst.go.jp/article/jjfe/34/2/34_KJ00005291225/_pdf/-char/ja Goto, Y., Magarisawa, O., & Morisawa, T. (1992). Early stages of regeneration after fire in a sugi (Cryptomeria japonica D. Don) forest in Kiryu city, Gunma prefecture [Japan]. Journal of Forest Environment (Japan).
Promoted by fire (Does the plant increase in abundance after a fire?)	No Data	
Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?)	High	"[Produces flammable litter, but densely packed litterbeds may actually inhibit fires] "The terpene-rich Cryptomeria burned hotter and the fire front moved faster than in Cunninghamia (Table 2; Fig. 3). The total burning time was also dependent on species: in general, the burning time for

		Cryptomeria litter was twice that of Cunninghamia litter." ... "Even for Cryptomeria japonica, which is particularly rich in terpenes and burned at one of the hottest temperatures in our across-species survey, there was still a profound effect of the size of the litter particles (Figs 2, 3), suggesting that litter particle size can be considered to have a first-order effect on surface fires (Scarff & Westoby, 2006), and small particles forming dense litterbeds can preclude litter fires even if the material itself is chemically highly flammable." https://doi.org/10.1111/nph.13317 Cornwell, W. K., Elvira, A., van Kempen, L., van Logtestijn, R. S. P., Aptroot, A. and Cornelissen, J. H. C. (2015), Flammability across the gymnosperm phylogeny: the importance of litter particle size. New Phytologist. --- "NOT Firewise (4)" # that I don't think this is invasive in north america, but is rather planted as an ornamental http://fire.sref.info/plants/cryptomeria-japonica --- "The following species are highly flammable and should be avoided when planting within the first 50 feet adjacent to a structure. The plants listed below are more susceptible to burning, due to rough or peeling bark, production of large amounts of litter, vegetation that contains oils, resin, wax, or pitch, large amounts of dead material in the plant, or plantings with a high dead to live fuel ratio." [List includes Cryptomeria japonica]" http://www.sandiegocounty.gov/pds/docs/DPLU199.pdf County of San Diego, Department of Planning and Land Use. 2010. Fire, Plants, Defensible Space, and You. [Accessed 11 Mar 2015]
Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	No	#monotypic genus

Text in quotes are direct quotes from the source
Text in square brackets was added by the assessor to clarify something or to summarize from a figure.
Text preceded by a “#” is comment from the assessor

The data presented were assembled from literature and database searches for each species using as much data as could be collected regarding the plant's fire ecology under natural conditions. Searches aimed to be exhaustive and consist of as much data as could be located in 2020. Our machine learning algorithm was trained on 49 species of plants which had their fire risk ranked by 49 managers in Hawai'i in November 2020. The model used a conditional random forest regression algorithm to predict scores for each species using the manager score as the response variable and the fire ecology traits of each plant as the predictor variables to generate a fire risk score. This trained model was then used to predict the fire risk for all species which were not ranked by managers. The model was calibrated such that it is 90% accurate at predicting high fire risk plants and 79% accurate at predicting low fire risk plants. This research and the resulting fire risk model has been published in the journal Biological Invasions by Kevin Faccenda and Curt Daehler (both at the University of Hawai'i at Mānoa).

Note that the analysis doesn't account for a plant species' spatial distribution, population density, or distinct climate and ecosystem conditions (which can also influence fire risk). The fire risk of these species are mostly under "worst case" environmental conditions where the climate is dry enough to maintain fire, but wet enough to allow for plant growth and fuel accumulation. The fire risk ranking should not be taken as a stand-alone risk metric in prioritizing weed control efforts. Rather, this information may also be useful for determining if a newly discovered species poses a potential fire threat in wildland areas.

More general information on the weed risks and ecology of non-native plants in Hawai'i is available from the Hawai'i Invasive Species Committee's Weed Risk Assessment database.

View more fact sheets at https://www.pacificfireexchange.org/weed-fire-risk-assessments

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Fact sheet prepared by Kevin Faccenda (faccenda@hawaii.edu) in November 2021. Data were prepared by Kevin Faccenda in 2020.

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