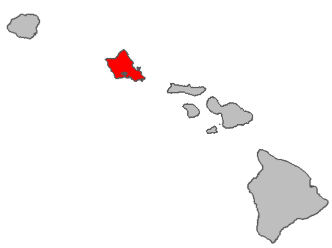
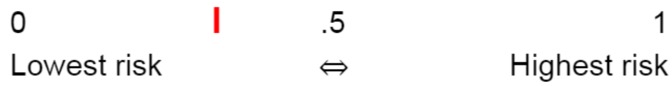
Fire risk report for *Euphorbia ingens*

Full Species Name *Euphorbia ingens* E.Mey. ex Boiss.	
Family: Euphorbiaceae	
Common names: candelabra tree naboom	
Synonyms:	
Known occurrences (as of 2020) 	
Year first documented as naturalized in Hawai'i: 2012	
This species has been ranked by the Hawai'i Weed Risk Assessment program as High Risk with a score of 7.	
View photos on Starr Environmental	
View on Wikipedia	
View occurrences on iNaturalist	
View at Plants of Hawaii	
View photos on Flickr	



This species is likely a **low** fire risk in Hawai'i with a fire risk score of **0.25**.

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	Fire-prone
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*	Low
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?)	Fire-prone	"The savanna ecosystem in which E. ingens occurs covers approximately 35% of South Africa (Scholes, 1997; Scholes and Archer,1997). Savanna ecosystems are maintained by interactions among fire, herbivory and precipitation" #article does not mention how E. ingens interacts with fire https://doi.org/10.1016/j.sajb.2017.03.022 Van der Linde, J. A., Wingfield, M. J., Crous, C. J., Six, D. L., & Roux, J. (2017). Landscape degradation may contribute to large-scale die-offs of Euphorbia ingens in South Africa. South African Journal of Botany, 111, 144-152. ---------------------------- "[table 1 lists several sites with recent fires]" https://repository.up.ac.za/bitstream/handle/2263/31158/VanDerLinde_Factors_2011.pdf?sequence=3 der Linde, V., & Alwyn, J. (2011). Factors associated with the decline of Euphorbia ingens in the Limpopo Province of South Africa (Doctoral dissertation, University of Pretoria).
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	
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	Yes	"[table 1 lists several sites with recent fires]" #does not explicitly claim regeneration, but they must survive if they were recorded on the survey and not killed. https://repository.up.ac.za/bitstream/handle/2263/31158/VanDerLinde_Factors_2011.pdf?sequence=3 der Linde, V., & Alwyn, J. (2011). Factors associated with the decline of Euphorbia ingens in the Limpopo Province of South Africa (Doctoral dissertation, University of Pretoria).

within approximately one year post fire)		---------------------------- "Species such as Grewia and Euphorbiaceae are considered to be fire-sensitive and typically restricted to termite mounds instead of dominating the open savanna [6] However, Euphorbia candelabrum has been found to be quite widespread throughout the savanna and short-grass areas of the Queen Elizabeth National Park in Uganda. [7] This is an unusual habitat for tall succulents, as they have been proven to typically be poor invaders of frequently burned stands of land. " #E. candelbrum is a very closely related relative https://en.wikipedia.org/wiki/Euphorbia_candelabrum
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?)	Low	#succulent, intrinsically low flammability.
Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	No	#most euphorbias have a somewhat high water content. Although this genus is huge, there are likely some flammable members, but the highly succulent members are very likely not fire promoting.

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 Hawaiʻi 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 Hawaiʻi is available from the Hawaiʻi 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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