Fire risk report for *Eucalyptus cinerea*

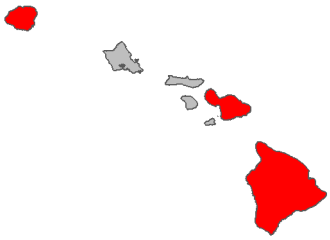
Full Species Name
Eucalyptus cinerea F.Muell. ex Benth.

Family: Myrtaceae

Common names:
argyle apple

Synonyms:

Known occurrences (as of 2020)



Year first documented as naturalized in Hawai'i: 2011

This species has been ranked by the Hawai'i Weed Risk Assessment program as Low Risk with a score of 4.

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 **0.53**.

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	Yes
Fire promoting plant in its introduced range*	Yes
Regenerates after fire	Yes
Promoted by fire	No Data
Reported flammable*	High
Relative is flammable*	Yes

*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	"trees show evidence of past fires and clearly survive fire well. Clearing for agriculture is probably not a threat because of the low fertility of the soil" https://doi.org/10.1071/sb9950499 Brooker, MIH, Slee, AV, & Briggs, JD. (1995). A taxonomic revision of Eucalyptus ser. Argyrophyllae. Australian Systematic Botany, 8(4), 499.
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?)	Yes	"trees show evidence of past fires and clearly survive fire well. Clearing for agriculture is probably not a threat because of the low fertility of the soil" Brooker, MIH, Slee, AV, & Briggs, JD. (1995). A taxonomic revision of Eucalyptus ser. Argyrophyllae. Australian Systematic Botany, 8(4), 499. doi:10.1071/sb9950499
Fire promoting plant in its introduced range (Same as Fire Promoting Native but within the species introduced range)	Yes	"Other areas within the Trails contain an extremely diverse variety of vegetation with some being very flammable such as Mexican Palms (Washingtonia robusta) and Eucalyptus (Eucalyptus cinerea)" http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.390.9969&rep=rep1&type=pdf Maranghides, A., McNamara, D., Mell, W., Trook, J., & Toman, B. (2013). A case study of a community affected by the Witch and Guejito Fires: Report# 2: Evaluating the effects of hazard mitigation actions on structure ignitions. National Institute of Standards and Technology, US Department of Commerce and US Forest Service, Gaithersburg, MD.
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	"trees show evidence of past fires and clearly survive fire well. Clearing for agriculture is probably not a threat because of the low fertility of the soil" Brooker, MIH, Slee, AV, & Briggs, JD. (1995). A taxonomic revision of Eucalyptus ser. Argyrophyllae. Australian Systematic Botany, 8(4), 499. doi:10.1071/sb9950499 ---------- [regenerates from lignotuber] Graham, A. W., Wallwork, M. A., & Sedgley, M. (1998). Lignotuber bud development in Eucalyptus cinerea (F.

		Muell. ex Benth). International Journal of Plant Sciences, 159(6), 979-988.
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	"Eucalyptus oil is highly flammable (ignited trees have been known to explode) (Williams 2007); bushfires can travel easily through the oil-rich air of the tree crowns (Dold et al. 2005)." https://link.springer.com/chapter/10.1007/978-81-322-2244-6_23 Hiwale, S. (2015). Eucalyptus (Eucalyptus sp.). In Sustainable Horticulture in Semiarid Dry Lands (pp. 301-309). Springer, New Delhi.
Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	Yes	"Most eucalyptus communities in Australia have evolved in the presence of periodic fire [3]. Tasmanian bluegum is highly flammable, but is seldom killed by fire. The bark catches fire readily, and deciduous bark streamers and lichen epiphytes tend to carry fire into the canopy and to disseminate fire ahead of the main front [3,7,8,50]. Other features of Tasmanian bluegum that promote fire spread include heavy litter fall, flammable oils in the foliage, and open crowns bearing pendulous branches, which encourages maximum updraft [3,9]. Despite the presence of volatile oils that produce a hot fire, leaves of Tasmanian bluegum are classed as intermediate in their resistance to combustion, and juvenile leaves are highly resistant to flaming [11]." https://www.fs.fed.us/database/feis/plants/tree/eucglo/all.html#FIRE%20EFFECTS

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

---

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

This research was funded by the Department of the Interior Pacific Islands Climate Adaptation Science Center. The project described in this publication was supported by Grant or Cooperative Agreement No.G20AC00073 to Curt Daehler from the United States Geological Survey. The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the U.S. Geological Survey. Mention of trade names or commercial products does not constitute their endorsement by the Pacific Islands Climate Adaptation Science Center or the National Climate Adaptation Science Center or the US Geological Survey.