Fire risk report for *Miconia crenata*

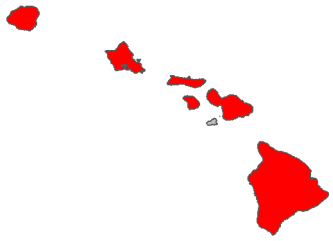
Full Species Name
Miconia crenata (Vahl) Michelang.

Family: Melastomataceae

Common names:
Koster's curse

Synonyms:
Clidemia hirta

Known occurrences (as of 2020)



Year first documented as naturalized in Hawai'i: 1949

This species has been ranked by the Hawai'i Weed Risk Assessment program as High Risk with a score of 28.

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 **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	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	Yes
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?)	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	
Fire promoting plant in its introduced range (Same as Fire Promoting Native but within the species introduced range)	No	#of moist areas, no evidence of it fueling fires
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	"Fire disturbance creates opportunities for the establishment of somenative plants (e.g.Acacia koa; Scowcroft and Wood, 1976) but also asuite of exotic plants regarded by managers in Hawai‘i and elsewhere as‘ecosystem modifiers’(Crooks, 2002). These typically include in-troduced, fast-growing pioneer trees such as Falcataria moluccana,Psi-dium cattleianum,Miconia calvescens,and Trema orientalis, some fire-adapted trees like Melalueca quinquenervia, understory shrubs such as Rubus argutus and Clidemia hirta" Trauernicht, C., Ticktin, T., Fraiola, H., Hastings, Z., & Tsuneyoshi, A. (2018). Active restoration enhances recovery of a Hawaiian mesic forest after fire. Forest Ecology and Management, 411, 1-11. ---------- "In stands 11 months after burns were also found in the existing Clidemia hirta type in stands not burnt, but not in stands 6 months after burning. Reappearance of type

		Selaginella doederleinii and Clidemia hirta indicates that the standing ecosystem is burning have started to return to its original state through succession process.[translated from indonesian]" Putra, E. I., Mulyana, D., & Junio, L. (2016). The Composition of Vegetation on Post Fire Land in Hutan Pendidikan Gunung Walat KOMPOSISI VEGETASI PADA LAHAN BEKAS TERBAKAR DI HUTAN PENDIDIKAN GUNUNG WALAT. Jurnal Silvikultur Tropika, 7(2).
Promoted by fire (Does the plant increase in abundance after a fire?)	Yes	"Between 13.5 and 25.5 months after the fire in the Kawailoa Forest Reserve, a dramatic change occurred ; C. hirta had literally taken over the area, both in numbers of plants and percentage cover. The plants had grown to an average height of 120 cm (4 ft), and the number of C. hirta plants had increased fourfold over the previous countings. The original plot-centres could not be precisely located for the 80.0-month measurements" Wester, L. L., & Wood, H. B. (1977). Koster's curse (Clidemia hirta), a weed pest in Hawaiian forests. Environmental Conservation, 4(1), 35-41. ---------- "[higher coverage and importance value in unburned area - table 1 and 2]" Mojiol, A. R., Adella, A., Kodoh, J., Lintangah, W., & Wahab, R. (2010). Common medicinal plants species found at burned and unburned areas of Klias peat swamp forest, Beaufort, Sabah Malaysia. Journal of Sustainable Development, 3(1), 109. ---------- "PCA analysis (Fig. 3) showed a significant tendency marked by Component 1. Higher positive values correspond to those species with abundance decrease after fire [C. hirta has postive value in PCA]" De Las Heras, J., Bonilla, M., & Martínez, L. W. (2005). Early vegetation dynamics of Pinus tropicalis Morelet forests after experimental fire (W Cuba). Annals of forest science, 62(7), 771-777. ---------- " In Sri Lanka, Shibayama et al. (2006) found clidemia plants contributed greatly to the density of shrubs in areas of pine plantations that had been burnt either repeatedly, once or not at all in the previous five years. Saharjo and Watanabe (1999) identified clidemia as one of the less flammable species present in Acacia mangium plantations of Southern

		Sumatra. A fire every two to five years increased the density of Clidemia sericea D. Don in Belize (Myanishi and Kellman 1988" Breaden, R. C., Brooks, S. J., & Murphy, H. T. (2012). The Biology of Australia Weeds 59. Clidemia Hirta (L.) D. Don. Plant Protection Quarterly, 27(1), 3.
Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?)	Low	"Based on the silica-free ash content, shrubs that should be taken into attention in order to prevent fire invasion area: D. tinearis (stems), I. cylindrica (leaves), E. pubescens (stems), C. laurifolia (stems), Pterospermum sp. (stems), H. similis (leaves), C. hirta (stems), and T. orientalis (leaves and stems). [based on silica-free ash content]" Saharjo, B. H., & Watanabe, H. (1999). The flammability of shrubs and trees in anAcacia mangium plantation based on silica-free ash content. Journal of Forest Research, 4(1), 57-59. ---------- "The annual distribution of flammability of the eight species studied were shown in Table 9. It can be seen that the B. crassifolia and C. hirta are extremely flammable all year, [translated from spanish]" #I'm somewhat skeptical of the Rodriguez paper as they had very high ignition rates for all species, i could not understand their methodology as it is in spanish Rodríguez, Y. C., Rodríguez, M. P. R., Mesa, F. J., Hernández, Y. C., & Becerra, L. W. M. (2016). Flammability of plant species of pine ecosystem. Revista Cubana de Ciencias Forestales. ---------- "Saharjo and Watanabe (1999) identified clidemia as one of the less flammable species present in Acacia mangium plantations of Southern Sumatra. " Breaden, R. C., Brooks, S. J., & Murphy, H. T. (2012). The Biology of Australia Weeds 59. Clidemia Hirta (L.) D. Don. Plant Protection Quarterly, 27(1), 3.
Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	No	#plants mostly of rain forests

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.

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

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