Fire risk report for *Leea indica*

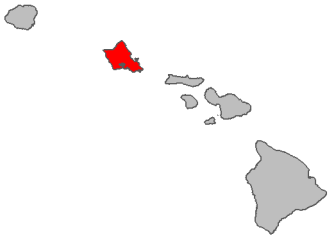
Full Species Name
Leea indica (Burm.f.) Merr.

Family: Vitaceae

Common names:
kalet

Synonyms:

Known occurrences (as of 2020)



Year first documented as naturalized in Hawai'i: 2005

This species has not yet been ranked by the Hawai'i Weed Risk Assessment program as of 2020.

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 **0.16**.

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	Yes
Reported flammable*	No Data
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	"This species is very widely distributed, found in India, Sri Lanka, Nepal, Bangladesh, Burma, Thailand, Cambodia, Laos, Vietnam, China, throughout Malesia, and extending east towards New Guinea, north Australia, Solomon Islands, Santa Cruz Island, New Hebrides, and Fiji (Ridsdale, 1974; 1976). This species has extremely large ecological amplitude and is extremely widespread: it is found in back mangroves, secondary forests, primary forests in the lowlands and wet ridges up to 1,700 m in altitude. In Singapore, this species is found in many habitats: in coastal vegetation, back mangroves, secondary forests, freshwater swamp forests near the edges or in gaps, and also in the undergrowth of primary forests." Lok, Alvin Francis, W Ang, B Ng, S Suen, C Teo, and Hugh Tan. "LEEA L. (VITACEAE) OF SINGAPORE." Nature in Singapore 4 (2011): 55–71. --- "The ground cover is more or less continuous, with grasses and herbs. The grasses are dense and of similar species to those in the Shorea associations, such as Imperata cylindrica, Apluda mutica, Heteropogon spp, Themeda spp and Arundinaria spp, but they are more mixed, with a higher proportion of herbs and seedlings, which probably make any fire less intensive. Around Khao Nang Rum Research Station in Huai Kha Kheng wildlife sanctuary, west Thailand, Heteropogon spp are more widespread in the Shorea associations, while Apluda mutica, is often more pronounced in the Dipterocarpus types. This is significant because Heteropogon spp are known to burn appreciably better and earlier in the dry season than Apluda mutica, even in the same stand (see Chapter 6). Tree seedlings are also more numerous in the Dipterocarpus associations than in the Shorea associations, and often they not only survive, but actually remain green after the fire has passed through (Ogawa et a 1 1961). Some large climbersare present, such as Spatholobus parviflorus Ktze. Epiphytes and orchids can be abundant, especially Loranthaceae, Other common non-grass plants are Cycas siamensis, members of the Zingiberaceae and the Leeaceae [L. india later listed as the

		only species in this family present], and Elephantropus scaber L." https://core.ac.uk/reader/161529158 Kanjanavanit, S. (1992). Aspects of the temporal pattern of dry season fires in the dry dipterocarp forests of Thailand (Doctoral dissertation, SOAS University of London).
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 within approximately one year post fire)	Yes	"Forest fires remain a devastating phenomenon in the tropics that not only affect forest structure and biodiversity, but also contribute significantly to atmospheric CO2. Fire used to be extremely rare in tropical forests, leaving ample time for forests to regenerate to pre- fire conditions. In recent decades, however, tropical forest fires occur more frequently and at larger spatial scales than they used to. We studied forest structure, tree species diversity, tree species composition, and aboveground biomass during the first 7 years since fire in unburned, once burned and twice burned forest of eastern Borneo to determine the rate of recovery of these forests.' [L. indica occured in twice-burned forests at 1-5% cover table 1]" Slik, J. F., Bernard, C. S., Van Beek, M., Breman, F. C., & Eichhorn, K. A. (2008). Tree diversity, composition, forest structure and aboveground biomass dynamics after single and repeated fire in a Bornean rain forest. Oecologia, 158 (3), 579-588. ---------- "One month after nonmal rainfall recommenced, many germinated seedlings were observed in the burned forest floors. These were M gigantea, M. hypoleuca, M. trichocarpa, M triloba, Trema cannabina, T. orientalis,

		Homalanthus populneus, Leea indica, Vitex pubescens, Glochidion obscurum, Mallotus paniculatus, A. mangium, etc. All of these pioneer tree species germinated from seed banks in the soil. For many of these species, the seeds can germinate readily and simultaneously after a forest fire because germination is stimulated by heat. Germination from the seed banks was completed within three months after recommencement of rain, in agreement with the observation by Kartawinata et al. " https://doi.org/10.1007/978-4-431-67911-0_3 Mori, T. (2000). Effects of droughts and forest fires on dipterocarp forest in East Kalimantan. In Rainforest ecosystems of East Kalimantan (pp. 29-45). Springer, Tokyo.
Promoted by fire (Does the plant increase in abundance after a fire?)	Yes	"Other species promoted by fire are Moraceae (Ficus spp.), Datiscaceae (Octomeles spp.), Leeaceae (Leea indica), Rubiaceae (Anthocephalus spp. and Nauclea spp.), Sonneratiaceae, Ulmaceae (Trema spp.) and Verbenaceae (Vitex spp.)." http://www2.fire.uni-freiburg.de/se_asia/background/sea_4.html Goldammer, Johann. "The Role of Fire on Greenhouse Gas and Aerosol Emissions and Land Use and Cover Change in Southeast Asia: Ecological Background and Research Needs." International Conference on Science and Technology for the Assessment of Global Environmental Change and its Impacts on the Indonesian Maritime Continent, November 1997. --- "Besides species that were abundant in both burnt forests, there were also many species that were only abundant in the twice-burnt forest. Typical examples were Homalanthus populneus and Mallotus paniculatus (both Euphorbiaceae), Piper aduncum (an exotic species of the Piperaceae), Callicarpa pentandra (Labiatae), Ficus obscura and F. grossularioides (Moraceae), Leea indica (Vitaceae), Melicope glabra (Rutaceae) and Trema tomentosa and T. cannabina (Ulmaceae s.l.). All these species were absent or rare in the once-burnt forest but among the dominant species in the twice-burnt forest. " https://openaccess.leidenuniv.nl/bitstream/handle/1887/4420/thesis.pdf Eichhorn, K. A. O. (2006). Plant diversity after rain-forest fires in Borneo (Vol. 18). Nationaal Herbarium Nederland. Thesis

Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?)	No Data	
Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	No	Note: L. guineensis not considered a fire hazard in natural ecosystems

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 Ronja Steinbach and Kevin Faccenda in 2020.

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