Fire risk report for *Piptatherum miliaceum*

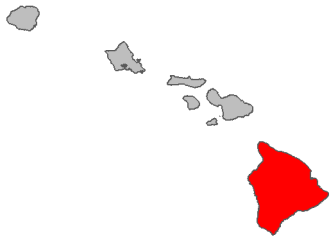
Full Species Name
Piptatherum miliaceum (L.) Coss.

Family: Poaceae

Common names:
smilograss
Millet mountain rice

Synonyms:
Achnatherum miliaceum
Oloptum miliaceum
Oryzopsis miliacea

Known occurrences (as of 2020)



Year first documented as naturalized in Hawai'i: 2000

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 **0.25**.

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	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	"for (a) Avena sterilis, Parietaria diffusa and Piptatherum miliaceum, three annual herbaceous plants representing dominant understory species of the Pinus brutia (Calabrian pine) forests in Crete" [earlier notes that this is a fire prone system]" http://people.atmos.ucla.edu/ycao/papers/Predicting%20live%20herbaceous%20moisture%20content%20from%20a%20seasonal%20drought%20index.pdf Dimitrakopoulos, A. P., & Bemmerzouk, A. M. (2003). Predicting live herbaceous moisture content from a seasonal drought index. International Journal of Biometeorology, 47(2), 73-79. "Amongst the most prominent and successful pyrophytes in Israel are Oryzopsis miliacea ("Smilo"), which is also used in California for reseeding of brush burns " https://talltimbers.org/wp-content/uploads/2018/09/131-Naveh1973_op.pdf Naveh, Z. (1973, March). The ecology of fire in Israel. In Proceedings of the 13th Annual Tall Timbers Fire Ecology Conference'.(Ed. EV Komarek) pp (pp. 131-170).
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	"Smilograss (Oryzopsis miliacea [L.] Benth.) is a palatable, long-lived grass adapt"d to 16 inches (40 cm) or more rainfall, and elevations to 3000 feet (914 m). It could be a valuable plant for fuelbreak use because the stems stay green into the summer, except that seeding success has been poor." https://www.smgrowers.com/resources/PacificSouthwestForestRept.pdf Nord, E. C., & Green, L. R. (1977). Low-volume and slow-burning vegetation for planting on clearings in California chaparral (Vol. 124). Department of Agriculture, Forest

		Service, Pacific Southwest Forest and Range Experiment Station.
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	"In certain perennial grasses, an additional regeneration mechanism is provided by reactivation of intercalary meristem and axillary buds along the charred culms. Among these, Piptatherum miliaceum is the most prominent pyrophyte, increasing germination from seeds, heated to 90 °C." Naveh, Z., Goldammer, J. G., & Jenkins, M. J. (1990). Fire in the Mediterranean–a landscape ecological perspective. Transdisciplinary Challenges in Landscape Ecology and Restoration Ecology, 95. --- "In fact, in such forest gaps near waste heaps on Mt. Carmel we found that the most prolific fire followers were Hordeum spontaneum, the progenitor of domesticated barley, and Piptatherum miliaceum, the most abundant perennial grass whose plentiful, milletlike seeds can be baked and used as staple food. " https://doi.org/10.1007/978-1-4613-8395-6_9 Naveh, Z. (1994). The Role of Fire and Its Management in the Conservation of Mediterranean Ecosystems and Landscapes. The Role of Fire in Mediterranean-Type Ecosystems, 163–185. --- "Smilo plants were recorded in a three-foot wide belt transect 200 feet long located in the study area. The area was burned and the plots re-sampled a year later. No live smilo plants remained of the original 127. Smilo remained unburned or only scorched in rocky areas not included in the transect and did not appear to have been damaged. " #conflicting source https://journals.uair.arizona.edu/index.php/jrm/article/viewFile/4953/4564 Kay, B. L. (1960). Effect of Fire on Seeded Forage Species. Rangeland Ecology & Management/Journal of Range Management Archives, 13(1), 31-33.
Promoted by fire (Does the plant increase in abundance after a fire?)	Yes	"In certain perennial grasses, an additional regeneration mechanism is provided by reactivation of intercalary meristem and axillary buds along the charred culms. Among these, Piptatherum miliaceum is the most prominent

		pyrophyte, increasing germination from seeds, heated to 90 °C." Naveh, Z., Goldammer, J. G., & Jenkins, M. J. (1990). Fire in the Mediterranean–a landscape ecological perspective. Transdisciplinary Challenges in Landscape Ecology and Restoration Ecology, 95. --- "But if fire also has direct, stimulative physiological effects on their regeneration and germination, as is the case with the earlier-mentioned Piptatherum miliaceum and other pyrophytes, then fire should become an indispensable tool in the dynamic conservation management of protected maquis and shrublands. " https://doi.org/10.1007/978-1-4613-8395-6_9 Naveh, Z. (1994). The Role of Fire and Its Management in the Conservation of Mediterranean Ecosystems and Landscapes. The Role of Fire in Mediterranean-Type Ecosystems, 163–185. --- "Whereas in the ash seedbed, 2-5 plants per square meter-mostly Oryzopsis miliacea emerged-none of this species and only few other grasses emerged in the undisturbed maquis floor seedbed of the clear-cut plot.... Good examples for such plants are the perennial fire followers mentioned above and especially Oryzopsis miliacea, a shade tolerant edge plant with great pheno-ecological plasticity, apt to make best use of the changing light, moisture and nutrient regimes. It may persist for many years in the closed wood and brush thicket as a suppressed "relic" with shrub-like· "whole-shoot" regeneration behaviour, until re-occurring fire may provide a new opportunity for increased productivity and for invasion of newly a~ailable niches. These are then exploited by typical perennial grass basal-bud regeneration and by increased germination. " https://talltimbers.org/wp-content/uploads/2018/09/131-Naveh1973_op.pdf Naveh, Z. (1973, March). The ecology of fire in Israel. In Proceedings of the 13th Annual Tall Timbers Fire Ecology Conference'.(Ed. EV Komarek) pp (pp. 131-170).
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	

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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