Fire risk report for *Digitaria abyssinica*

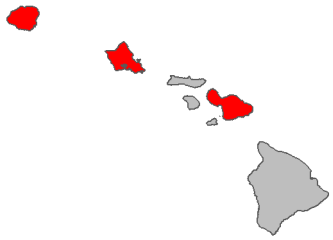
Full Species Name
Digitaria abyssinica (Hochst. ex A.Rich.) Stapf

Family: Poaceae

Common names:
crabgrass

Synonyms:

Known occurrences (as of 2020)



Year first documented as naturalized in Hawai'i: 1940

This species has been ranked by the Hawai'i Weed Risk Assessment program as High Risk with a score of 16.

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 **0.72**.

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	Yes
Fire promoting plant in its introduced range*	No
Regenerates after fire	Yes
Promoted by fire	Yes
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?)	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?)	Yes	"The dominant and subdominant species, Digitaria scalarum [=D. abyssinica] and Sporobolus fimbriatus, responded negatively to fire during year 3, but only in the ungrazed block." Belsky, A. J. (1992). Effects of grazing, competition, disturbance and fire on species composition and diversity in grassland communities. Journal of vegetation science, 3(2), 187-200. ---------- " The present study was confined to a frequently burnt miombo woodland of Ilunde in Kigoma Region [D. abyssinica was listed as 35% cover in thier study site]" https://www.researchgate.net/profile/Nyatwere_Mganga/publication/304712427_Plant_Species_Diversity_in_Western_Tanzania_Comparison_between_Frequently_Burnt_and_Fire_Suppressed_Forests/links/57849e5508aeca7daac4b802.pdf Mganga, N. D., & Lyaruu, H. V. (2016). Plant Species Diversity in Western Tanzania: Comparison between Frequently Burnt and Fire Suppressed Forests. Int. J. Pure App. Biosci, 4(3), 28-44.
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	Yes	"Although one of the most pernicious arable weeds, it is an effective soil protector due to its rhizomatous habits which make it also resistant to fire; it is a grass which will be the first to emerge when litter or crop debris are burnt in the field. If left unchecked, the grass is hard to control by one simple mechanical operation."

dispersed into the area within approximately one year post fire)		1993. Boonman, J.G.. East Africa's grasses and fodders: their ecology and husbandry. Kluwer Academic Publishers, Dordrecht, The Netherlands
Promoted by fire (Does the plant increase in abundance after a fire?)	Yes	"Rhizomatous weed grasses such as Imperata cylindrica and Digitaria scalarum are encouraged by continuing cultivation and particularly by fire [page 43]" Coulter, J. K. (1991). Population Pressures, Deforestation, and Land in the Wet Tropical Forest Zones: The Technical Dimensions. In Priorities for Forestry and Agroforestry Policy Research: Report of an International Workshop (p. 33).
Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?)	High	"The dominant and subdominant species, Digitaria scalarum [=D. abyssinica] and Sporobolus fimbriatus, responded negatively to fire during year 3, but only in the ungrazed block." Belsky, A. J. (1992). Effects of grazing, competition, disturbance and fire on species composition and diversity in grassland communities. Journal of vegetation science, 3(2), 187-200. ---------- " The present study was confined to a frequently burnt miombo woodland of Ilunde in Kigoma Region [D. abyssinica was listed as 35% cover in thier study site]" https://www.researchgate.net/profile/Nyatwere_Mganga/publication/304712427_Plant_Species_Diversity_in_Western_Tanzania_Comparison_between_Frequently_Burnt_and_Fire_Suppressed_Forests/links/57849e5508aeca7daac4b802.pdf Mganga, N. D., & Lyaruu, H. V. (2016). Plant Species Diversity in Western Tanzania: Comparison between Frequently Burnt and Fire Suppressed Forests. Int. J. Pure App. Biosci, 4(3), 28-44.
Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	Yes	"Digtiaria eriantha was the dominant grass species in all the fire break transects. The high flammability factor of this grass species contributed significantly to the spread of the fire even though the percentage grass curing was relatively low, and resulted in a clean burn. ... The explanation for this phenomenon is that Digitaria eriantha, Themeda triandra and many other species of grass dry off in the winter from the bottom up resulting in higher levels of dead material at the base of the grass tufts thereby facilitating the ignition of the grass tufts and the spread of the fire."

		de Bruno Austin, C., Trollope, W. S., Trollope, L. A., Sowry, R., & Connolly, B. 2011. Development of Open Ended Fire Breaks in the Kruger National Park, South Africa. In: Living with Fire Addressing Global Change through Integrated Fire Management. Sun City, South Africa, 9-13 May 2011

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.