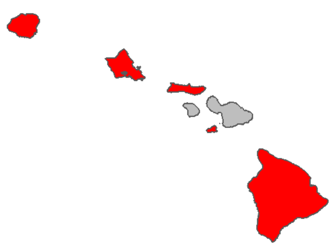
Fire risk report for *Urochloa decumbens*

Full Species Name *Urochloa decumbens* (Stapf) R.D.Webster
Family: Poaceae
Common names: signal grass
Synonyms: *Brachiaria decumbens* *Urochloa eminii*
Known occurrences (as of 2020) 
Year first documented as naturalized in Hawai'i: 1993
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 **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	No
Fire promoting plant in its introduced range*	Yes
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?)	No	
Fire promoting plant in its introduced range (Same as Fire Promoting Native but within the species introduced range)	Yes	"For example, invasion of Cerrado neotropical savanna by the grass Urochloa brizantha alters frequency and intensity of natural fires, which in turn benefits the invaders U. brizantha and Urochloa decumbens, i.e. creates positive feedbacks that aggravate the problem (Gorgone-Barbosa, Pivello, Baeza, & Fidelis, 2016; Gorgone-Barbosa et al., 2015). " https://onlinelibrary.wiley.com/doi/pdf/10.1111/avsc.12407 Thomas, P. A., Schüler, J., Boavista, L. D. R., Torchelsen, F. P., Overbeck, G. E., & Müller, S. C. (2019). Controlling the invader Urochloa decumbens: Subsidies for ecological restoration in subtropical Campos grassland. Applied Vegetation Science, 22(1), 96-104. ---------------------------- "Over an 8-year period since the commencement of these treatments, we documented: (i) the annual rate of pasture and native grass invasion in response to increasing fire frequency; (ii) the establishment of Brachiaria decumbens (an African C4 grass) as a function of decreasing canopy cover and (iii) the effects of grass fine fuel on fire intensity. Grasses invaded approximately 200 m from the edge into the interiors of burned plots (B1yr: 4.31 ha; B3yr: 4.96 ha) but invaded less than 10 m into the unburned plot (0.33

		ha). The probability of B. decumbens establishment increased with seed availability and decreased with leaf area index. Fine fuel loads along the forest edge were more than three times higher in grass-dominated areas, which resulted in especially intense fires. Our results indicate that synergies between fires and invasive C4 grasses jeopardize the future of tropical forests." https://royalsocietypublishing.org/doi/full/10.1098/rstb.2012.0427 Silvério, D. V., Brando, P. M., Balch, J. K., Putz, F. E., Nepstad, D. C., Oliveira-Santos, C., & Bustamante, M. M. (2013). Testing the Amazon savannization hypothesis: fire effects on invasion of a neotropical forest by native cerrado and exotic pasture grasses. Philosophical Transactions of the Royal Society B: Biological Sciences, 368(1619), 20120427.
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	"This experiment shows that the removal of shoots and surface residues increases early tillering, which is desirable in seed crops of B. decumbens. Removal of shoots by cutting, field-drying and burning is feasible if the fuel load is not too large and the interval between cutting and burning is short" https://www.jstor.org/stable/pdf/2403625.pdf Stur, W. W., & Humphreys, L. R. (1988). Defoliation and burning effects on the tillering of Brachiaria decumbens. Journal of applied ecology, 273-277.
Promoted by fire (Does the plant increase in abundance after a fire?)	Yes	[table 2 and 3 show the perecent cover dramatically increases in regularly burned areas] http://tropicalgrasslands.info/public/journals/4/Historic/Tropical%20Grasslands%20Journal%20archive/titles%20only/early%20vol%20pdfs/Vol%208%20No%202/Vol%208%20%5B2%5D%20Paper%203%20Harrington.pdf I-IARRINGTON, G. N. (1974). Fire effects on a Ugandan savanna grassland. Tropical grasslands, 8(2), 87.
Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?)	High	"Approximately twice the dryseason fuel load of annual wild rice (Oryza meridionalis). While para grass has a similar fuel load to the native perennial hymenachne, it tends to produce taller, drier fuel making it more likely to burn each dry season." https://www.daf.qld.gov.au/__data/assets/pdf_file/0004/65254/IPA-Para-Grass-Risk-Assessment.pdf

Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	Yes	"U. mutica can also change the fire regime in invaded habitats because during the dry season the aboveground portion of the grass dries out becoming a potential “fuel activator” for fires. I" https://www.cabi.org/isc/datasheet/9667

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 Hawaiʻi 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 Hawaiʻi is available from the Hawaiʻi 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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