Fire risk report for *Bothriochloa bladhii*

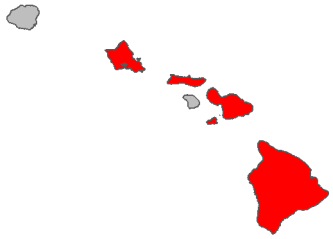
Full Species Name
Bothriochloa bladhii (Retz.) S.T.Blake

Family: Poaceae

Common names:
Australian bluestem
airport grass

Synonyms:

Known occurrences (as of 2020)



Year first documented as naturalized in Hawai'i: 1916

This species has been ranked by the Hawai'i Weed Risk Assessment program as High Risk with a score of 19.

View photos on Starr Environmental

View on Wikipedia

View occurrences on iNaturalist

View at Plants of Hawaii

View photos on Flickr

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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	Fire-prone
Fire promoting plant in its native range	Yes
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?)	Fire-prone	"Between these extremes of important environmental variables ie. at mid altitudes (120m), moderate burning frequency (8 - 12 bums) and intermediate levels of woody cover (25 - 40 %), species dominant are Panicum deustum, Bothriochloa bladhii, B. insculpta and Chloris gayana" Graham, P. M. (1992). The responses of grasses to fire and bush clearing in the Hluhluwe Game Reserve (Doctoral dissertation). http://ukzn-dspace.ukzn.ac.za/bitstream/handle/10413/6246/Graham_Philip_Mark_1992.pdf?sequence=1&isAllowed=y
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	"Between these extremes of important environmental variables ie. at mid altitudes (120m), moderate burning frequency (8 - 12 bums) and intermediate levels of woody cover (25 - 40 %), species dominant are Panicum deustum, Bothriochloa bladhii, B. insculpta and Chloris gayana" Graham, P. M. (1992). The responses of grasses to fire and bush clearing in the Hluhluwe Game Reserve (Doctoral dissertation). http://ukzn-dspace.ukzn.ac.za/bitstream/handle/10413/6246/Graham_Philip_Mark_1992.pdf?sequence=1&isAllowed=y
Fire promoting plant in its introduced range (Same as Fire Promoting Native but within the species introduced range)	Yes	"In a grassland ecosystem where burning is an important management tool for controlling exotic-species establishment, maintaining native-species dominance, and increasing productivity, A. bladhii may be able to successfully out-compete the native C4 grass species by using traits typically used to explain the dominance of the native species. With frequent fire, the invasive species has the potential to decrease longterm fertility by lowering N inputs in litter and increasing erosion in non-vegetated soil between bunches, while also having a negative effect on plant diversity. By using fire to promote native C4 grasses and maintain these tallgrass prairies, the threat of invasion by nonnative C4 species may raise a dilemma for future management of these C4 grasslands." Reed, H. E., Seastedt, T. R., & Blair, J. M. (2005). ECOLOGICAL CONSEQUENCES OF C4 GRASS INVASION OF A C4 GRASSLAND: A DILEMMA FOR MANAGEMENT. Ecological Applications, 15(5), 1560–1569. doi:10.1890/04-0407

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	"OWBs rapidly recover after fire and may return at greater densities than before. Thus, burning is not recommended as a single or stand-alone control method. "[OWB = old world blustem, inlcuding B. bladhii] https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd597000.pdf Coyne, P. J., & Bradford, J. A. (1986). Biomass partitioning in'Caucasian'and'WW-Spar'old world bluestems. Rangeland Ecology & Management/Journal of Range Management Archives, 39(4), 303-310.
Promoted by fire (Does the plant increase in abundance after a fire?)	Yes	"Depending on the site, fires significantly increased the frequency of Enneapogon spp., Bothriochloa bladhii (Retz.) S.T.Blake and Dichanthium sericeum (R.Br.) " https://doi.org/10.1071/RJ17132 Silcock, R. G., Hall, T. J., Jones, P., Filet, P. G., & Douglas, J. (2018). Spring fire effects on two Aristida/Bothriochloa native pastures in central Queensland, Australia. The Rangeland Journal, 40(5), 485-500. ---------- "OWBs rapidly recover after fire and may return at greater densities than before. Thus, burning is not recommended as a single or stand-alone control method. "[OWB = old world blustem, inlcuding B. bladhii] https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd597000.pdf Coyne, P. J., & Bradford, J. A. (1986). Biomass partitioning in'Caucasian'and'WW-Spar'old world bluestems. Rangeland Ecology & Management/Journal of Range Management Archives, 39(4), 303-310.
Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?)	High	"Mature patches of OWBs are typically avoided by grazing animals, which can cause accumulation of residual dead standing material that is also avoided. High levels of dry matter accumulated in these patches may be prone to wildfire. " [OWB = old world bluestem, including B. bladhii] https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd597000.pdf Coyne, P. J., & Bradford, J. A. (1986). Biomass partitioning in'Caucasian'and'WW-Spar'old world bluestems. Rangeland Ecology & Management/Journal of Range Management Archives, 39(4), 303-310.
Relative is flammable (Does a plant in the same genus meet the	Yes	"Fire adaptations: Based on the studies available (as of 2011), it appears that cane bluestem sprouts from surviving root crowns following fire, since several studies report relatively unchanged abundance on burned and unburned

Reported Flammable criteria?)		sites [12,13,88]. Buried cane bluestem seeds, if present (see Seed banking), could survive fire [70], and cane bluestem recruitment on burned sites has been reported [83]." https://www.fs.fed.us/database/feis/plants/graminoid/botbar/all.html#FireEffectsAndManagement

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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