Fire risk report for *Bromus diandrus*

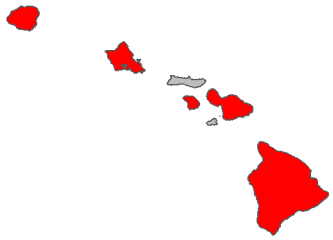
Full Species Name
Bromus diandrus Roth

Family: Poaceae

Common names:
ripgut grass

Synonyms:
Anisantha diandra

Known occurrences (as of 2020)



Year first documented as naturalized in Hawai'i: 1910

This species has been ranked by the Hawai'i Weed Risk Assessment program as High Risk with a score of 18.

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	No Data
Fire promoting plant in its native range	No
Fire promoting plant in its introduced range*	No
Regenerates after fire	No
Promoted by fire	No
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	#Few references to this plant's native range
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	#Few references to this plants native range
Fire promoting plant in its introduced range (Same as Fire Promoting Native but within the species introduced range)	No	#No literature references fire in this species outside of controlled burns.
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)	No	"Thus far it has been found that B. diandrus seedbanks are concentrated more heavily in the aboveground litter than soil, and the reverse is true for native species, though the former has at least an order of magnitude higher density. For the first year of burning, higher fuel-load prescribed burns more effectively destroyed or sterilized B. diandrus seeds in the litter and soil seedbanks than low fuel-load burns. Longer fire duration and higher below-ground temperatures were responsible for the success of the higher fuel-load prescribed burns. These findings suggest that high intensity prescribed burning can effectively control invasive annual grass seedbanks, and thereby facilitate native species restoration efforts." https://eco.confex.com/eco/2008/techprogram/P13275.HTM Levine, A. E. (2008, August). COS 72-4: Evaluating prescribed burn methods for controlling invasive Bromus

		diandrus, ripgut bromegrass. In The 93rd ESA Annual Meeting. --- "For both species, burning stubble was very effective in killing seedlings and seeds. Almost 1 week after burning in March, only 4.5 ripgut brome and 6 soft brome seedlings/m2 were measured, a reduction of 89% and 97%, respectively compared to the no-till treatment " http://journal.nzpps.org/index.php/nzpp/article/download/6539/6367 Dastgheib, F., & Poole, N. (2010). Seed biology of brome grass weeds (Bromus diandrus and B hordeaceus) and effects of land management. New Zealand Plant Protection, 63, 78-83. --- "Yet the previously dominant Bromus diandrus declined steeply, even as other exotic grasses and some native forbs increased." Thomson, D. M., Bonapart, A. D., King, R. A., Schultz, E. L., & Startin, C. R. (2020). Long-term monitoring of a highly invaded annual grassland community through drought, before and after an unintentional fire. Journal of Vegetation Science, 31(2), 307-318.
Promoted by fire (Does the plant increase in abundance after a fire?)	No	"Yet the previously dominant Bromus diandrus declined steeply, even as other exotic grasses and some native forbs increased." Thomson, D. M., Bonapart, A. D., King, R. A., Schultz, E. L., & Startin, C. R. (2020). Long-term monitoring of a highly invaded annual grassland community through drought, before and after an unintentional fire. Journal of Vegetation Science, 31(2), 307-318.
Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?)	High	"Ripgut brome becomes very dry and flammable during dry seasons, and has been linked to increased fire frequency." https://wiki.bugwood.org/HPIPM:Ripgut_brome
Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	Yes	"Cheatgrass [B. tectorum] has a very fine structure, tends to accumulate litter, and dries completely in early summer, thus becoming a highly flammable, often continuous fuel" https://www.fs.fed.us/database/feis/plants/graminoid/brotec/all.html#FireEcology

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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