


Fire risk report for *Agrostis hyemalis*

Full Species Name <i>Agrostis hyemalis</i> (Walter) Britton, Sterns & Poggenb.
Family: Poaceae
Common names: Winter bentgrass
Synonyms:
Known occurrences (as of 2020) 
Year first documented as naturalized in Hawai'i: 2005
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 **0.31**.

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	No Data
Reported flammable*	No Data
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	<p>"The habitat at the only known site of <i>A. hyemalis</i> in Minnesota is a sand prairie PDF/black oak savanna PDF. The plants grow in full sunlight and partial shade. This is probably similar to the native habitats where this species is found more commonly to the south and east of Minnesota. Yet published reports make it clear that at the heart of its range, <i>A. hyemalis</i> is not restricted to native habitats. It also occurs where human alterations of the landscape have created dry, open and sandy habitats, where this species' ecological requirements can be met (Reznicek et al. 2011; Harvey 2007).....Furthermore, the dry and exposed nature of its habitat indicates that populations of <i>A. hyemalis</i> are at least occasionally exposed to wildfire....The prairie PDF/savanna PDF community where this species is found is normally maintained by wildfire."</p> <p>https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PMPOA040LO</p> <p>Smith, W. (2018). <i>Agrostis hyemalis</i>. Minnesota Department of Natural Resources.</p> <p>-----</p> <p>"Prairie herbs were not common on either barren. On Forbes Barrens, two graminoid species, <i>Carex pensylvanica</i> and <i>Agrostis hyemalis</i>, dominated... . They attributed the absence of trees on the barrens to the annual fires that swept over the barrens. "</p> <p>McClain, W. E., Edgin, B. R., Esker, T. L., & Ebinger, J. E. (2007). Two closed-canopy barren plant communities in East-central Illinois. <i>Northeastern Naturalist</i>, 14(1), 35-50.</p>
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	No	#not introduced outside of HI

(Same as Fire Promoting Native but within the species introduced range)		
Regenerates after fire (Does the plant regrow after fire by any means? This includes resprouters, reseeder, and recruiters which dispersed into the area within approximately one year post fire)	Yes	"Straw burning did not consistently reduce germination of hair fescue or winter bentgrass, indicating that a surface burn occurring above weed seeds may not be consistently effective at reducing seed viability. [Exposure to temperatures up to 100c did not decrease germination, 200 and 300 degree treatments did]" White, S. N., & Boyd, N. S. (2016). Effect of dry heat, direct flame, and straw burning on seed germination of weed species found in lowbush blueberry fields. Weed Technology, 30(1), 263-270.
Promoted by fire (Does the plant increase in abundance after a fire?)	No Data	
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?)	Yes	"[A. capillaris and A. muelleriana were both "low flammable" in appendix A]" http://dspace.lincoln.ac.nz/bitstream/handle/10182/12130/Cui_PhD.pdf?sequence=3&isAllowed=y Cui, X. (2020). Patterns of flammability across the vascular plant phylogeny, with special emphasis on the genus Dracophyllum [Lincoln University]. ----- "Redtop [A. gigantea] was not present on the Curtis Prairie, Wisconsin, in 1951, but after 10 years of biennial dormant season burning, it had 8 percent frequency [1]. " https://www.fs.fed.us/database/feis/plants/graminoid/agri g/all.html#FIRE%20ECOLOGY ----- "Every couple of years during the 1950s and 1960s, farmers burned tussock grassland in late spring or early winter to encourage new shoot growth. In the 1970s, many grasslands were converted to cropland due to the wheat production boom (Newsome, 1987). At this time, browntop (Agrostis capillaris) was the most dominant exotic grass throughout tussock grasslands. "

		https://ir.canterbury.ac.nz/bitstream/handle/10092/4245/thesis_fulltext.pdf?sequence=1 Wakelin, H. M. (2010). Ignition Thresholds for Grassland Fuels and Implications for Activity Controls on Public Conservation Land in Canterbury.
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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 Ronja Steinbach and Kevin Faccenda in 2020.

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