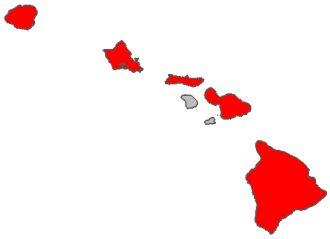
Fire risk report for *Holcus lanatus*

Full Species Name *Holcus lanatus* L.
Family: Poaceae
Common names: common velvet grass Yorkshire fog
Synonyms:
Known occurrences (as of 2020) 
Year first documented as naturalized in Hawai'i: 1909
This species has been ranked by the Hawai'i Weed Risk Assessment program as High Risk with a score of 20.
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 **0.38**.

This species was ranked by 49 managers on a scale of 'no risk', 'low risk', 'medium risk', or 'high risk'. The numerical score ranges from 0 to 1 with higher scores indicating more managers considered it a higher risk. A score of > .31 indicates high 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*	Yes
Regenerates after fire	Yes
Promoted by fire	Yes
Reported flammable*	Low
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	"In heathland vegetation in Hertfordshire, England, frequency of common velvetgrass was 10%, 19% and 9% on sites burned less than 4 years ago, 4 to 6 years ago, and a little more than 6 years ago, respectively [41]." #H. lanatus certainly occurs in other habitats aswell. https://www.fs.fed.us/database/feis/plants/graminoid/holla n/all.html#FIRE%20EFFECTS%20AND%20MANAGEMENT
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	"However, all native species subsequently have lower cover values following fire, as compared with alien species, particularly velvet grass (Holcus lanatus) and sweet vernalgrass (Anthoxanthum odoratum). The fire potential of subalpine ecosystems is increasing because alien grasses, particularly sweet vernalgrass and velvet grass, are invading the naturally discontinuous fuel bed" http://www.hear.org/books/apineh1992/pdfs/apineh1992II I3smithtunison.pdf Smith, C. W., & Tunison, J. T. (1992). Fire and alien plants in Hawaii: research and management implications for native ecosystems. Alien plant invasions in native ecosystems of Hawaii: management and research. Cooperative National Park Resources Studies Unit, Honolulu, 394-408. ---------- "The accumulation of litter can prevent the germinaton of native grasses and increase the risk of fire." https://wric.ucdavis.edu/information/natural%20areas/wr_ H/Holcus.pdf Weed Control in Natgurael Reas in the Western United States 2013
Regenerates after fire (Does the plant regrow after fire by any	Yes	"Soil-stored common velvetgrass seed may survive fire. In a laboratory study, germination of common velvetgrass was not affected by up to 10 minutes of exposure to

means? This includes resprouters, reseeders, and recruiters which dispersed into the area within approximately one year post fire)		temperatures of 180 to 230 °F (80-110 <U+FFFD>C). Germination was inhibited after 10 minutes at 300 °F (150 <U+FFFD>C), but seeds were not "destroyed". Smoke exposure did not affect common velvetgrass germination [120]...Common velvetgrass is generally present soon after fire; it often occurs on sites in the first postfire growing season. On burned sites, persistence or increases in abundance are often short-lived. The recovery and type of associated vegetation may affect the persistence of common velvetgrass." https://www.fs.fed.us/database/feis/plants/graminoid/holla n/all.html#FIRE%20EFFECTS%20AND%20MANAGEMENT
Promoted by fire (Does the plant increase in abundance after a fire?)	Yes	"Native habitats: Studies do not indicate that common velvetgrass' response to fire is different in its native and nonnative ranges. In heathlands in France's Brittany region, common velvetgrass appeared after a "humus" fire but not after a less severe "flash" fire. The flash fire burned on 26 October 1985 and the humus fire on 7 March 1986. Vegetation recovery was more rapid on sites burned the flash fire due to abundant heath sprouting. The humus fire consumed the organic layer, eliminated heath sprouting, and likely removed most of the seed bank. Common velvetgrass was abundant in the first 2 postfire years, and cover reached 90% in the 3rd postfire year on heathland plots burned by the humus fire. Common velvetgrass began to decline after the 5th postfire year. Researchers suggested that common velvetgrass established from off-site seed [123]. In heathland vegetation in Hertfordshire, England, frequency of common velvetgrass was 10%, 19% and 9% on sites burned less than 4 years ago, 4 to 6 years ago, and a little more than 6 years ago, respectively [41]." https://www.fs.fed.us/database/feis/plants/graminoid/holla n/all.html#FIRE%20EFFECTS%20AND%20MANAGEMENT --- "In a review of nonnative species in Hawaii, Smith [127] reports that common velvetgrass "tolerates fire and regenerates rapidly from basal shoots" https://www.fs.fed.us/database/feis/plants/graminoid/holla n/all.html#FIRE%20EFFECTS%20AND%20MANAGEMENT
Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?)	Low	"However, all native species subsequently have lower cover values following fire, as compared with alien species, particularly velvet grass (Holcus lanatus) and sweet vernalgrass (Anthoxanthum odoratum). The fire potential of subalpine ecosystems is increasing because alien grasses,

		particularly sweet vernalgrass and velvet grass, are invading the naturally discontinuous fuel bed" http://www.hear.org/books/apineh1992/pdfs/apineh1992III3smithtunison.pdf Smith, C. W., & Tunison, J. T. (1992). Fire and alien plants in Hawaii: research and management implications for native ecosystems. Alien plant invasions in native ecosystems of Hawaii: management and research. Cooperative National Park Resources Studies Unit, Honolulu, 394-408. --- "In coastal grasslands of Sonoma, California, litter accumulations are often greater in common velvetgrass communities than in annual grasslands [13], which may affect fire probability and/or behavior." https://www.fs.fed.us/database/feis/plants/graminoid/holland/all.html#128
Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	Yes	"[H. setiglumis present after fire [appendix 1]. Fire return interval of study site earlier listed as 1.7-16 years]" this is weak evidence. Pérez, B., & Moreno, J. M. (1998). Fire-type and forestry management effects on the early postfire vegetation dynamics of a Pinus pinaster woodland. Plant Ecology, 134(1), 27-41.

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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