Fire risk report for *Elymus repens*

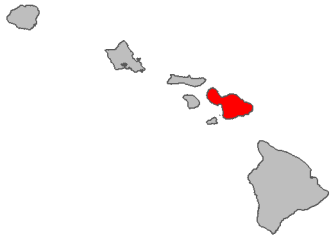
Full Species Name
Elymus repens Gould

Family: Poaceae

Common names:
couch grass
quackgrass

Synonyms:
Elytrigia repens
Agropyron repens

Known occurrences (as of 2020)



Year first documented as naturalized in Hawai'i: 2006

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	No Data
Fire promoting plant in its native range	No
Fire promoting plant in its introduced range*	No
Regenerates after fire	Yes
Promoted by fire	Yes
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?)	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	"The largest is the ash residue for Elymus repens and Phleum pretense, which indicates that they have less ability to ignite in comparison with other plant species. " https://sci.ldubgd.edu.ua/bitstream/handle/123456789/6915/147-154_eb.20123.pdf?sequence=1&isAllowed=y Kuzyk, A. D., Yemelianenko, S. O., Drach, K. L., & Tovarianskyi, V. I. (2020). Fire Dangerous Properties of the Most Common Plantsof Grass Ecosystems in Ukraine.
Fire promoting plant in its introduced range (Same as Fire Promoting Native but within the species introduced range)	No	"Gary Haase (The Nature Conservancy-Ohio) reports that burning was not effective in controlling the spread of E. repens. Burning on a repeated or biennial schedule for several years, however, has been effective in eradicating E. repens in some cases. Species that grow early in the season, including cool-season grasses such E. repens, should suffer greater damage from early spring burns than species that grow in the mid-growing season (e.g., warm-season grasses).[10] Further, since cool-season grasses can grow in the fall following summer dormancy, fall burns might also help reduce undesirable cool-season grasses.[11] In experimental treatments that compare the results of early spring and growing season burns in Wisconsin, E. repens declined most significantly following repeated early spring (March and April) burns.[10] A May burn in oak savannas in Wisconsin significantly reduced E. repens biomass and cover and halted flowering. Similar reductions in biomass and cover have been shown for other areas. In some cases E. repens cover increased following fire. Five annual late April to early May burns in Minnesota resulted in a decrease in E. repens height, but in an increase in cover. Plant vigor was reduced and flowering stopped, but E. repens continued to spread to adjacent areas. May and June burns on North Dakota grasslands reduced E. repens in the first

		post-burn season, but it recovered to almost pre-burn levels by the second post-burn season.[12] Following a late June fire, E. repens showed a slight increase in cover, height, shoot density, production, and flowering. Wisconsin grassland fires in March caused an increase in seed production by July and August.[13]" https://wiki.bugwood.org/Elymus_repens#cite_note-hal-13
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	"FIRE ECOLOGY OR ADAPTATIONS : Quackgrass is adapted to certain seasonal fires because of its rhizomes." https://www.fs.fed.us/database/feis/plants/graminoid/elyrep/all.html
Promoted by fire (Does the plant increase in abundance after a fire?)	Yes	"Gary Haase (The Nature Conservancy-Ohio) reports that burning was not effective in controlling the spread of E. repens. Burning on a repeated or biennial schedule for several years, however, has been effective in eradicating E. repens in some cases. Species that grow early in the season, including cool-season grasses such E. repens, should suffer greater damage from early spring burns than species that grow in the mid-growing season (e.g., warm-season grasses).[10] Further, since cool-season grasses can grow in the fall following summer dormancy, fall burns might also help reduce undesirable cool-season grasses.[11] In experimental treatments that compare the results of early spring and growing season burns in Wisconsin, E. repens declined most significantly following repeated early spring (March and April) burns.[10] A May burn in oak savannas in Wisconsin significantly reduced E. repens biomass and cover and halted flowering. Similar reductions in biomass and cover have been shown for other areas. In some cases E. repens cover increased following fire. Five annual late April to early May burns in Minnesota resulted in a decrease in E. repens height, but in an increase in cover. Plant vigor was reduced and flowering stopped, but E. repens continued to spread to adjacent areas. May and June burns on North Dakota grasslands reduced E. repens in the first post-burn season, but it recovered to almost pre-burn levels by the second post-burn season.[12] Following a late June fire, E. repens showed a slight increase in cover, height, shoot density, production, and flowering. Wisconsin

		grassland fires in March caused an increase in seed production by July and August.[13]" #promoted under certain conditions https://wiki.bugwood.org/Elymus_repens#cite_note-hal-13
Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?)	No Data	"The largest is the ash residue for Elymus repens and Phleum pretense, which indicates that they have less ability to ignite in comparison with other plant species. " # weak evidence https://sci.ldubgd.edu.ua/bitstream/handle/123456789/6915/147-154_eb.20123.pdf?sequence=1&isAllowed=y Kuzyk, A. D., Yemelianenko, S. O., Drach, K. L., & Tovarianskyi, V. I. (2020). Fire Dangerous Properties of the Most Common Plantsof Grass Ecosystems in Ukraine.
Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	Yes	"Slender wheatgrass is a short-lived species that is favored by summer or fall fires [3,41]. The dense roots survive, and plants establishes from tillers and soil-stored seed in the seed bank." https://www.fs.fed.us/database/feis/plants/graminoid/elytra/all.html#FIRE%20ECOLOGY

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.

This research was funded by the Department of the Interior Pacific Islands Climate Adaptation Science Center. The project described in this publication was supported by Grant or Cooperative Agreement No.G20AC00073 to Curt Daehler from the United States Geological Survey. The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the U.S. Geological Survey. Mention of trade names or commercial products does not constitute their endorsement by the Pacific Islands Climate Adaptation Science Center or the National Climate Adaptation Science Center or the US Geological Survey.