Fire risk report for *Lolium arundinaceum*

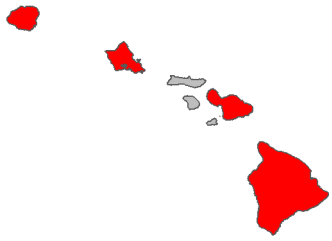
Full Species Name
Lolium arundinaceum (Schreb.) Darbysh.

Family: Poaceae

Common names:
fescue

Synonyms:
Festuca arundinacea
Schedonorus arundinaceum

Known occurrences (as of 2020)



Year first documented as naturalized in Hawai'i: 1990

This species has been ranked by the Hawai'i Weed Risk Assessment program as High Risk with a score of 17.

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 **0.70**.

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*	Yes
Regenerates after fire	Yes
Promoted by fire	No
Reported flammable*	High
Relative is flammable*	No

*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	#basically all data is from america rather than the 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	
Fire promoting plant in its introduced range (Same as Fire Promoting Native but within the species introduced range)	Yes	"We suggested that tall fescue could potentially modify fire behavior because it is often alive and growing at the time of fire (McGranahan, 2012). Such moisture-rich fuel loads could cause incomplete burns, resulting in thicker litter layers developing in association with tall fescue presence. We found only a marginally significant relationship between litter depth and fescue cover.... While burned patches receive intense grazing pressure, unburned patches tend to "stockpile" plant biomass and litter, which, in turn provides fuel for future burns (Fuhlendorf & Engle, 2004)" # contradictory info https://core.ac.uk/reader/45660560 Jokela, K. J. (2016). An examination of the complex ecological role of tall fescue in grassland restoration. Iowa State University Thesis
Regenerates after fire (Does the plant regrow after fire by any means? This includes resprouters, reseeders, and recruiters which dispersed into the area	Yes	"In south-central Iowa tall fescue was burned to test the effectiveness of spring fire in eliminating or suppressing cool-season grasses. Plots were within livestock exclosures constructed in 1984. A baseline inventory of plots was conducted in 1985; plot inventories were conducted after treatments were completed in 1986, 1987, and 1988. Tall fescue was burned in late March or early April. Some plots were initially burned in 1986 and some in 1987. In 1988 the

within approximately one year post fire)		plots burned in 1986 were burned again. In 1986 tall fescue relative shoot frequency increased significantly (p<.10) after fire in the same year; the increase did not persist in subsequent years. Fire had no significant effect on tall fescue in any other year [54]." https://www.fs.fed.us/database/feis/plants/graminoid/scharu/all.html#FIRE%20ECOLOGY --- "Tall fescue seeds have been found in the seedbank [45]; tall fescue may regenerate from soil-stored seed." https://www.fs.fed.us/database/feis/plants/graminoid/scharu/all.html#FIRE%20ECOLOGY
Promoted by fire (Does the plant increase in abundance after a fire?)	No	"In south-central Iowa tall fescue was burned to test the effectiveness of spring fire in eliminating or suppressing cool-season grasses. Plots were within livestock exclosures constructed in 1984. A baseline inventory of plots was conducted in 1985; plot inventories were conducted after treatments were completed in 1986, 1987, and 1988. Tall fescue was burned in late March or early April. Some plots were initially burned in 1986 and some in 1987. In 1988 the plots burned in 1986 were burned again. In 1986 tall fescue relative shoot frequency increased significantly (p<.10) after fire in the same year; the increase did not persist in subsequent years. Fire had no significant effect on tall fescue in any other year [54]." https://www.fs.fed.us/database/feis/plants/graminoid/scharu/all.html#FIRE%20ECOLOGY --- "Over the three years of the study, tall fescue cover was not reduced as a result of the treatments, and there was only a weak positive correlation between tall fescue and litter cover." https://core.ac.uk/reader/45660560 Jokela, K. J. (2016). An examination of the complex ecological role of tall fescue in grassland restoration. Iowa State University Thesis
Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?)	High	"[areas with up to 65% cover by this species burned in controlled burn, this species must have been the domiant fuel; however, this not a natural ecosystem.]" # weak evidence McGranahan, D. A., Engle, D. M., Miller, J. R., & Debinski, D. M. (2013). An invasive grass increases live fuel proportion and reduces fire spread in a simulated grassland. Ecosystems, 16(1), 158-169.

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Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	No	

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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