Fire risk report for *Stylosanthes guianensis*

Full Species Name *Stylosanthes guianensis var. intermedia* (Aubl.) Sw.	
Family: Fabaceae	
Common names: stylo	
Synonyms:	
Known occurrences (as of 2020) 	
Year first documented as naturalized in Hawai'i: 2004	
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 **0.16**.

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*	No Data
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	"Stylosanthes guianensis is the most widely distributed species of the genus. Its natural distribution extends from Mexico to Argentina and it has been introduced into most tropical countries for use as a cover crop and as a pasture legume." Mannetje, L 't. "A Revision of Varieties of Stylosanthes Guianensis (Aubl.) Sw." Australian Journal of Botany 25 (1977): 347–62. ---------------------------- "The ranking of fire resistance among the Stylosanthes spp. was surprisingly consistent across the five burns. Species adapted to more arid conditions were generally more resistant to fire than those used in the wetter coastal areas (S. guianensis). S. guianensis is only marginally adapted to Lansdown even without burning, but elsewhere (excluding Oxley) has a reputation for being susceptible to fire" https://doi.org/10.1071/ea9800587 Gardener, CJ. (1980). Tolerance of perennating Stylosanthes plants to fire. Australian Journal of Experimental Agriculture, 20(106), 587. ---------------------------- "A significant ecological difference, recorded from field observations in Brazil, Colombia and Venezuela, is that Stylosanthes gracilis and S. guianensis have an essentially allopatric distribution: Stylosanthes gracilis occurs exclusively in dry and open areas, mainly savannas, on acid and rather sandy, well-drained soils, adapted to fire, and at elevations below 1000 m a.s.l. while S. guianensis is found in the savanna-forest ecotone or in forest clearings, also on acid soils but at elevations up to 2000 m a.s.l. Only one variety, Stylosanthes guianensis var. pauciflora, grows under the same ecological conditions as S. gracilis" Calles, T., & Schultze-Kraft, R. (2010). Re-establishment of Stylosanthes gracilis (Leguminosae) at species level. Kew Bulletin, 65(2), 233-240.
Fire promoting plant in its native range (Does the species act as a major fuel source,	No	#S. guianensis does not create a "fire hazard in natural ecosystems" according to its HWRA.

increase fire severity, frequency, or modify fuel bed characteristics within its native range?)		
Fire promoting plant in its introduced range (Same as Fire Promoting Native but within the species introduced range)	No	"The ranking of fire resistance among the Stylosanthes spp. was surprisingly consistent across the five burns. Species adapted to more arid conditions were generally more resistant to fire than those used in the wetter coastal areas (S. guianensis). S. guianensis is only marginally adapted to Lansdown even without burning, but elsewhere (excluding Oxley) has a reputation for being susceptible to fire... Species like S. guianensis-that depend on regeneration-should therefore be managed to permit only cool burns that do not completely consume all surface litter and seed" https://doi.org/10.1071/ea9800587 Gardener, CJ. (1980). Tolerance of perennating Stylosanthes plants to fire. Australian Journal of Experimental Agriculture, 20(106), 587.
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	"[S. guianensis only survived the most mild of the burns, it has complete mortality in all other burn conditions table 2. However, regeneration via seed was intense for one strain (table 4)]" https://doi.org/10.1071/ea9800587 Gardener, CJ. (1980). Tolerance of perennating Stylosanthes plants to fire. Australian Journal of Experimental Agriculture, 20(106), 587. ---------------------------- "It was intended that a single harvest be made in 1974 but a fire in late 1973 killed legume in all plots [of S. guianensis] and no regeneration occurred" https://doi.org/10.1071/ea9770607 Miller, CP, & Jones, RK. (1977). Nutrient requirements of Stylosanthes guianensis pastures on a euchrozem in north Queensland. Australian Journal of Experimental Agriculture, 17(87), 607. ---------------------------- "A wild fire in December 1979 burnt off both sites and again the plots re-established from selfsown seed." #contradicts previous sources, however it is not mentioned what intensity the fire is. https://doi.org/10.1071/ea9810334 Gilbert, MA, & Shaw, KA. (1981). Residual effects of sulfur fertilizers on cut swards of a Stylosanthes guianensis and

		native grass pasture on a euchrozem soil in north Queensland. Australian Journal of Experimental Agriculture, 21(110), 334. ---------------------------- "None of the perennial legum plants survied a fire during October 1971 and the trial was replanted" https://www.tropicalgrasslands.info/public/journals/4/Historic/Tropical%20Grasslands%20Journal%20archive/PDFs/Vol_16_1982/Vol_16_03_82_pp146_155.pdf Anning, P. (1982). EVALUATION OF INTRODUCED LEGUMES FOR PASTURES IN THE TROPICS OF NORTH QUEENSLAND. Tropical Grasslands, 16(3), 47.
Promoted by fire (Does the plant increase in abundance after a fire?)	No	"S. guianensis cv. Schonfield appears the most sensitive of the perennial species to fire" https://www.google.com/books/edition/The_Biology_and_Agronomy_of_Stylosanthes/DZk7YiopHWEC?hl=en&gbpv=1&bsq=fire Thomas, D. (1984). Global ventures in Stylosanthes. I. South America. The biology and agronomy of Stylosanthes, 451-466.
Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?)	No Data	#Plenty of studies mention burning this species, but it's uncertain if there is grass mixed in adding fuel, or if it is just this species burning.
Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	No	, varying fire tolerances within Stylosanthes "S. guianensis cv. Schofield appears to be the most sensitive of the perennial species to fire, while Seca and S. viscosa are the most tolerant of fire damage" Williams, John, and C Gardener. “9. Environmental Constraints to Growth and Survival of Stylosanthes.” In The Biology and Agronomy of Stylosanthes, 181–202. Academic Press Australia, 1984. ---------------------------- "Stylosanthes montevidensis (Fig 2f) and Desmanthus tatuhyensis (both Leguminosae) resprouted and quickly flowered after fire events (Fidelis & Blanco, in preparation). Seedlings from both species could be found after fire on Morro Santana (data not shown)." Fidelis, Alessandra, Carolina Blanco, Sandra Müller, Valério Pillar, and Jörg Pfadenhauer. “SHORT-TERM CHANGES CAUSED BY FIRE AND MOWING.” In Fire in Subtropical

		Grasslands in Southern Brazil: Effects on Plant Strategies and Vegetation Dynamics, 103–45, 2008.

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 Hawaiʻi 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 Hawaiʻi is available from the Hawaiʻi 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 Ronja Steinbach and Kevin Faccenda in 2020.

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