# Fire risk report for *Calendula arvensis*

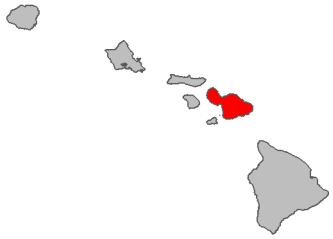
**Full Species Name**
*Calendula arvensis* L.

**Family**: Asteraceae

**Common names:**
field marigold

**Synonyms:**

Known occurrences (as of 2020)



Year first documented as naturalized in Hawai'i: 2010

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

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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 | 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 | Yes |
| 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?) | Fire-prone | "its native range is Macaronesia, Europe to Medit. and W. Himalaya, Arabian Peninsula." http://www.plantsoftheworldonline.org/taxon/urn:lsid:ipni.org:names:187819-1<br>---<br>"Calendula is a relatively small genus (about 12–20 species native to the Macaronesian and Mediterranean regions are currently recognized) that belongs to the Asteraceae family" https://doi.org/10.1016/j.bse.2010.07.009<br>Paolini, Julien, Toussaint Barboni, Jean-Marie Desjobert, Nassim Djabou, and Jean Costa. “Chemical Composition, Intraspecies Variation and Seasonal Variation in Essential Oils of Calendula Arvensis L.” Biochemical Systematics and Ecology 38, no. 5 (October 2010): 865–74.<br>---<br>"Disturbed places; 0–200 m" http://efloras.org/florataxon.aspx?flora_id=1&taxon_id=250005003<br>---<br>"[regenerated and occured 1st and 2nd year post burn]" https://www.researchgate.net/profile/Necattin_Tuerkmen2/publication/267792677_Changes_in_floristic_composition_of_Quercus_coccifera_macchia_after_fire_in_the_Cukurova_region_Turkey/links/551bc2f20cf20d5fbde20bc6/Changes-in-floristic-composition-of-Quercus-coccifera-macchia-after-fire-in-the-Cukurova-region-Turkey.pdf<br>Türkmen, N., & Düzenli, A. (2005, January). Changes in floristic composition of Quercus coccifera macchia after fire in the Çukurova region (Turkey). In Annales Botanici Fennici (pp. 453-460). Finnish Zoological and Botanical Publishing Board.<br>---<br>"[listed as ocurring in fire adapted ecosystem]" https://www.jstor.org/stable/pdf/20146570.pdf<br>Kazanis, D., & Arianoutsou, M. (2004). Long-term post-fire vegetation dynamics in Pinus halepensis forests of Central Greece: a functional group approach. Plant ecology, 171(1-2), 101-121. |
| Fire promoting plant in its native range (Does | No | |

| | | |
|---|---|---|
| the species act as a major fuel source, 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 | |
| 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 | "[regenerated and occured 1st and 2nd year post burn]"<br>https://www.researchgate.net/profile/Necattin_Tuerkmen2/publication/267792677_Changes_in_floristic_composition_of_Quercus_coccifera_macchia_after_fire_in_the_Cukurova_region_Turkey/links/551bc2f20cf20d5fbde20bc6/Changes-in-floristic-composition-of-Quercus-coccifera-macchia-after-fire-in-the-Cukurova-region-Turkey.pdf<br>Türkmen, N., & Düzenli, A. (2005, January). Changes in floristic composition of Quercus coccifera macchia after fire in the Çukurova region (Turkey). In Annales Botanici Fennici (pp. 453-460). Finnish Zoological and Botanical Publishing Board. |
| Promoted by fire (Does the plant increase in abundance after a fire?) | Yes | "Annual forbs as Anagallis arvensis, Calendula arvensis and Silene gallica, had significantly higher cover two and four years after PB (Table 3)"<br>https://doi.org/10.1111/avsc.12463<br>Silva, V., Catry, F. X., Fernandes, P. M., Rego, F. C., & Bugalho, M. N. (2020). Trade-offs between fire hazard reduction and conservation in a Natura 2000 shrub–grassland mosaic. Applied Vegetation Science, 23(1), 39-52.<br>---<br>"[did not occur in control plots, but occured in cut plots and burned plots. table 4]"<br>https://core.ac.uk/reader/188788726<br>Arévalo, J. R., Fernández-Lugo, S., García-Domínguez, C., Naranjo-Cigala, A., Grillo, F., & Calvo, L. (2014). Prescribed burning and clear-cutting effects on understory vegetation in a Pinus canariensis stand (Gran Canaria). The Scientific World Journal, 2014. |
| Reported flammable (Is the species described | No Data | |

| | | |
|---|---|---|
| as being flammable, being a major wildfire fuel, or high fire risk?) | | |
| Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?) | No | #Calendula officinalis does not "create a fire hazard in natural ecosystems: n" according to its Hawaii Weed Risk Assessment |

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

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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 Ronja Steinbach and 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.