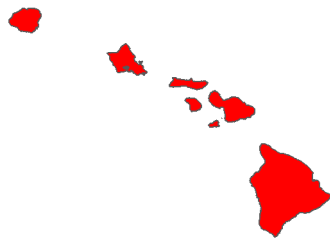


# Fire risk report for *Acacia confusa*

|                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------|
| <b>Full Species Name</b><br><i>Acacia confusa</i> Merr.                                                             |
| <b>Family:</b> Fabaceae                                                                                             |
| <b>Common names:</b><br>Formosan koa                                                                                |
| <b>Synonyms:</b>                                                                                                    |
| Known occurrences (as of 2020)<br> |
| Year first documented as naturalized in Hawai'i: 1946                                                               |
| This species has been ranked by the Hawai'i Weed Risk Assessment program as High Risk with a score of 10.           |
| <a href="#">View photos on Starr Environmental</a>                                                                  |
| <a href="#">View on Wikipedia</a>                                                                                   |
| <a href="#">View occurrences on iNaturalist</a>                                                                     |
| <a href="#">View at Plants of Hawaii</a>                                                                            |
| <a href="#">View photos on Flickr</a>                                                                               |

0      **I**      .5      1  
Lowest risk      ⇌      Highest risk

This species is likely a **high** fire risk in Hawai'i with a fire risk score of **0.36**.

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                 | No Data |
| Fire promoting plant in its native range      | Yes     |
| Fire promoting plant in its introduced range* | No      |
| Regenerates after fire                        | Yes     |
| Promoted by fire                              | Yes     |
| Reported flammable*                           | High    |
| 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?) | Yes     | <p>"In this study, the sampling plots were conducted in the protected Acacia forest plantation, which has been established more than 65 years to stabilize the slope and prevent mass movement near the rims of the Datu tableland. .... The protected forest is surrounded by graveyards and farm fields. Accidental fires resulting from human negligence and acts of will make the protected forest highly prone to fire. According to the local Forest District Office, the number of fire events (larger than 1 ha) within the protected forest area was 9.2 per year between 1991 and 2003, and they mainly occurred during the relatively dry winter season between December and April. Most fire events started from the graveyards, farm fields, and grassland and then spread to the edge of the forest"</p> <p>#A. confusa is native to Taiwan<br/> Cheng, C. H., Chen, Y. S., Huang, Y. H., Chiou, C. R., Lin, C. C., &amp; Menyailo, O. V. (2013). Effects of repeated fires on ecosystem C and N stocks along a fire induced forest/grassland gradient. Journal of Geophysical Research: Biogeosciences, 118(1), 215-225.</p> |
| Fire promoting plant in its introduced range (Same as Fire Promoting Native but within the species introduced range)                                                                   | No      | <p>"The plant is essentially fire resistant because fire will not carry under the tree due to the lack of fuel."</p> <p>Smith, C. W. 1985. Impact of alien plants on Hawaii's native biota. In Hawaii's terrestrial ecosystems: preservation and management, ed. C.P. Stone, J. M. Scott. Pgs 180 - 250. University of Hawaii Cooperative National Park Resource Studies Unit. Honolulu. University of Hawaii.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Regenerates after fire (Does the plant regrow after fire by any means? This includes                                                                                                   | Yes     | <p>"Tsai [2005] reported that Acacia trees may resprout after an initial fire but rarely do so after repeated fires. Thus, the invasive grass-fire cycles have resulted in a drastic shift from</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|                                                                                                                   |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| resprouters, reseeder, and recruiters which dispersed into the area within approximately one year post fire)      |      | <p>Acacia forest plantation to invasive grassland in the Datu tableland [Tsai, 2005; Chiou et al., 2006]."</p> <p>Cheng, C. H., Chen, Y. S., Huang, Y. H., Chiou, C. R., Lin, C. C., &amp; Menyailo, O. V. (2013). Effects of repeated fires on ecosystem C and N stocks along a fire induced forest/grassland gradient. <i>Journal of Geophysical Research: Biogeosciences</i>, 118(1), 215-225.</p> <p>-----</p> <p>"Seeds present in the ground can germinate profusely after fire.... Will often resprout after fire"</p> <p><a href="http://www.hear.org/pier/species/acacia_confusa.htm">http://www.hear.org/pier/species/acacia_confusa.htm</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Promoted by fire (Does the plant increase in abundance after a fire?)                                             | Yes  | <p>"Seeds present in the ground can germinate profusely after fire.... Will often resprout after fire"</p> <p><a href="http://www.hear.org/pier/species/acacia_confusa.htm">http://www.hear.org/pier/species/acacia_confusa.htm</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?) | High | <p>"In this study, the sampling plots were conducted in the protected Acacia forest plantation, which has been established more than 65 years to stabilize the slope and prevent mass movement near the rims of the Datu tableland. .... The protected forest is surrounded by graveyards and farm fields. Accidental fires resulting from human negligence and acts of will make the protected forest highly prone to fire. According to the local Forest District Office, the number of fire events (larger than 1 ha) within the protected forest area was 9.2 per year between 1991 and 2003, and they mainly occurred during the relatively dry winter season between December and April. Most fire events started from the graveyards, farm fields, and grassland and then spread to the edge of the forest"</p> <p>#A. confusa is native to Taiwan Cheng, C. H., Chen, Y. S., Huang, Y. H., Chiou, C. R., Lin, C. C., &amp; Menyailo, O. V. (2013). Effects of repeated fires on ecosystem C and N stocks along a fire induced forest/grassland gradient. <i>Journal of Geophysical Research: Biogeosciences</i>, 118(1), 215-225.</p> |
| Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)                      | Yes  | <p>"Acacia melanoxylon reported as a fire hazard"</p> <p><a href="https://firesafemarin.org/plants/fire-hazardous">https://firesafemarin.org/plants/fire-hazardous</a></p> <p>-----</p> <p>"However, since flammability and fire severity are also elevated due to invasion by Acacia spp."</p> <p>Rascher, Katherine G., André Große-Stoltenberg, Cristina Máguas, Joao Augusto Alves Meira-Neto, and Christiane Werner. "Acacialongifolia invasion impacts vegetation structure and regeneration dynamics in open dunes and</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

|  |  |                                                                  |
|--|--|------------------------------------------------------------------|
|  |  | pine forests." Biological Invasions 13, no. 5 (2011): 1099-1113. |
|--|--|------------------------------------------------------------------|

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>

---

Fact sheet prepared by Kevin Faccenda ([faccenda@hawaii.edu](mailto: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.

