GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Morella faya***

Morella faya 简体中文 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Magnoliopsida	Myricales	Myricaceae

Common name firebush (English), Feuerbaum (German), candleberry myrtle (English), fire tree (English), fayatree (English)

Synonym *Myrica faya* , Ait.

Similar species

Summary Morella faya, commonly called the fire tree, is a native to the Azores, Madeira Islands and the Canary Islands. It has been introduced to several places including Hawaii, New Zealand and Australia. This fast growing tree, whose dispersal is facilitated by introduced frugivorous birds, is capable of rapidly forming dense stands and has a negative effect on the recruitment and persistence of native plant species.

view this species on IUCN Red List

Species Description
The fire tree is an evergreen shrub or small tree that usually grows around 8 metres tall. It has been reported as growing to heights of approx. 17mtrs (50 feet) in some areas (Benton, 2002). Stem and branches of the fire tree are covered with reddish peltate hairs. Leaves are coriaceous, oblanceolate, 4-11cm long, 1-2.5cm wide, and have glandular dots that are inconspicuous (PIER, 2002). Leaves are dark green, shiny, smooth, aromatic, and alternate along the stem. Flowers are usually branched catkins borne among leaves of the current year's growth. Male flowers have four stamens and occur in small hanging clusters near the branch tip. Female flowers, also grouped in small hanging clusters, occur in threes, further from the branch tip. Fruits of fire tree are small, and red to purple when ripe (Benton, 2002).*M. faya* is considered to be dioecious, but \"male\" plants still produce some fruit and \"female\" plants a few male inflorescences (PIER, 2002).

Notes
The time-lag between the lava flow formation and *Morella faya* colonisation appear to be much shorter on Hawai'i than on the Azores, (Binggeli, 1997). *M. faya* has several characteristics of a successful invader including its early reproduction, rapid growth, ability to fix atmospheric nitrogen, high fecundity and despersal by frugivorous birds. In Hawai'i the main dispersal vector is a non-native silver-eye, *Zosterops japonica*, of which there are 3 species in Australia with wide ranges. Should *M. faya* become naturalised in Australia these bird species would be the most likely dispersal vectors.

Uses
Probably used as an ornamental or medicinal plant. In Hawai'i, Portuguese labourers made wine from the fruit. (Binggeli, 1997)

Habitat Description
Fire tree is known to adapt to a wide range of habitats and soil types. In Hawai'i it has invaded wet and mesic forests where it forms dense, monotypic stands, it is reported to be spreading over drier sub-montane forests (D'Antonio and Mack, 2001) It occurs in recent volcanic cinder deposits and various types of native forest, and is most abundant on steep slopes, in seasonal montane forests, pastures, and roadsides (Benton, 2002). In Volcanoes National Park in Hawai'i, the main infestation occurs at 1250m, and although it rapidly forms dense monotypic stands it does not readily invade closed, late-successional native forest (Binggeli, 1997).

Reproduction
Fire tree propagates by seeds, which are produced in small fruits (Benton, 1997). It is a prolific seed producer with the seeds also remaining *via*ble in the soil for a long period of time. *M. faya* is considered to be a dioecious species, however 'male' plants often produce some fruits and 'female' individuals a few male inflorescences (PIER, 2002). It appears to be a wind-pollinated species although in Hawai'i it is visited by the introduced *Apis mellifera*, and feral pigs also play a role in dispersal, (Binggeli, 1997). An average adult female tree will produce more than 400,000 fruits per year

General Impacts
Morella faya is capable of rapidly forming dense stands and has a negative effect on the recruitment and persistence of native plant species (Walker andVitousek 1991). *M. faya* an actinorrhizal nitrogen-fixer alters primary successional ecosystems in Hawai'i Volcanoes National Park [Hawai'i, USA] by quadrupling inputs of nitrogen, the nutrient limiting to plant growth (Vitousek, 1990).

Management Info
Preventative measures: A Risk Assessment of \r\r\n*Morella faya* for Hawai'i and other Pacific islands was prepared by Dr. Curtis Daehler (UH Botany) with funding from the Kaulunani Urban Forestry Program and US Forest Service. The alien plant screening system is derived from Pheloung *et al*. (1999) with minor modifications for use in Pacific islands (Daehler *et al.* 2004). The result is a score of 8 and a recommendation of: \"Likely to cause significant ecological or economic harm in Hawai'i and on other Pacific Islands as determined by a high WRA score, which is based on published sources describing species biology and behaviour in Hawai'i and/or other parts of the world.\"
Physical: Introduced frugivorous birds and feral pigs are important dispersal agents of fire tree seeds, management options should include control of these dispersal agents to limit further spread. Goats can also be used to control the fire tree.
Chemical: Herbicide is the primary tool used for fire tree. Roundup (Glysophate based herbicide) was found to be the most efficient herbicidal treatment because of its effectiveness in undiluted form and through its rapid absorption rate (30-40 minutes). Research results concluded that injection of undiluted Roundup provided the least exposure to nearby non-target species. Environmental soundness is related to the chemical's rapid inactivation in the soil by micro-organisms. In its undiluted form, Roundup can be used in small quantities (5-10 ml per tree). Tordon 22K was also effective in small quantities of undiluted form, however, absorption rate was intermediate (24-48 hours). Kuron absorption rate was slow (more than 1 week). Treatment of undiluted Roundup or Tordon 22K allowed for the reduction in treatment quantity. The smaller quantities of treatments necessary due to the elimination of a solution reduced the amount of total treatment needed out in the field, therefore reducing labour and transportation costs. The absorption rate of Roundup allowed for the rapid re-use of tube sections, which affected the amount of equipment needed in the field. Also, the absorption rate (30-40 minutes) allowed the field workers to leave the site shortly after application allowing for quicker site-to-site application. Injection of undiluted Roundup provided the least exposure to nearby non-target species.
Biological: A moth *Caloptilia* sp. nr. *schinella* a native of the Azores and Madeira Islands in the eastern Atlantic where its natural host is *M. faya* was released in Hawai'i in 1991 as a potential biological control agent (Markin, 2002).
Phyllonorycter myricae (Lepidoptera: Gracillariidae) is also under investigation as a possible biological control agent at the Institute of Pacific Islands Forestry laboratory, Volcano, Hawai'i.
Botrytis cinerea is the first pathogen to be reported on the fire tree and is reported to cause widespread fruit rot. Fruit rot has been observed on trees of all sizes in a variety of habitats throughout the Hawai'ian range. The authors of this study suggest that the selection of more aggressive strains or the introduction of large numbers of Botrytis-infested insect vectors early in the fruiting season may assist in enhancing biocontrol of the fire tree (Duffy and Gardner, 1994). The infected fruit were also found to be less attractive to birds, therefore lessening the spread of firetree (Seibold, 2000). *Septoria hodgesii* sp. *nov* a common fungal leaf pathogen of *Myrica cerifera* in the southeastern U. S has been identified as a potential biocontrol agent as it has been shown (by artificial inoculation) to be pathogenic on *M. faya* (Gardner, 1999).

Pathway
Probably introduced for ornamental purposes in the early 18th century by colonists from Europe and Asia (Seibold, 2000).Probably introduced for medicinal purposes in the early 18th century by colonists from Europe and Asia (Seibold, 2000).

Principal source: Pacific Island Ecosystem at Risk (PIER) *Morella faya*

Compiler: IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Dr. Lloyd Loope, Station Leader HFS: Haleakala Field Station Maui Hawaii

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ALIEN RANGE

[1] AUSTRALIA
[1] UNITED STATES

[1] NEW ZEALAND

Red List assessed species 1: CR = 1;

Schiedea kaalae **CR**

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