Falcataria moluccana

System: Terrestrial

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Phylum</th>
<th>Class</th>
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<td>Magnoliophyta</td>
<td>Magnoliopsida</td>
<td>Fabales</td>
<td>Fabaceae</td>
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</tbody>
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Common name

tamaligi paepae (English, Samoa), falcata (English), parasiante (Portuguese), ukall ra ngebard (Palauan), tuhke kerosene (English), mara (Portuguese), tamaligi, tamalini (Samoan), albizzia (English), tuhkehn karisihn (Pohnpeian), tamaligi palagi (English, American Samoa), tuhke kerosin (Pohnpeian), peacock plume (English), sau (English), malacana (English), tamaligi uliuli (English, Samoa), ‘arapitia (Cook Islands), albizia (Portuguese)

Synonym

Adenanthera falcataria, L.
Albizia falcataria, (L.) Fosb.
Albizia moluccana, Miq.
Paraserianthes falcataria, (L.) I. Nielsen
Albizia falcat a, auct. pl.
Albizia moluccana, F.A. Miquel
Paraserianthes falcataria, subsp. falcataria

Similar species

Falcataria moluccana

Summary

Falcataria moluccana is an invasive, nitrogen-fixing tree species. It is has been introduced to the Seychelles, Mauritius, Reunion and many Pacific islands; including, most notably, Hawaii where it has become a problematic invader. Its rapid growth habit allows it to outcompete slow-growing native trees, and its abundant, high-quality litter alters nutrient dynamics in the soil. This affects decomposition rates and microorganism and invertebrate community composition. Ecosystem processes may be altered in both terrestrial and aquatic environments where F. moluccana invades riparian areas.

view this species on IUCN Red List
Species Description

Trees up to 40 m tall, bark white, gray or greenish, smooth or slightly warty, young parts densely reddish brown tomentose or puberulent. Leaves with a large nectary below the lowermost pair of pinnae and smaller ones between or below most pairs of pinnae, pinnae (4-) 8-15 pairs, leaflets 15-25 pairs per pinna, obliquely elliptic, falcate, 10-20 mm long, 3-6 mm wide, midrib strongly excentric near 1 of the margins. Flowers in panicles ca 20 cm in diameter, often with 2 serial branches from 1 bract scar; calyx 1-1.5 mm long, silky pubescent, the teeth 0.5 mm long; corolla cream or greenish yellow, 3-4.5 mm long (excl. stamens); stamens 10-17 mm long. Pods 9-12 cm long, 1.5-2.5 cm wide, densely pubescent or glabrous, with a narrow, longitudinal wing along the upper suture. Seeds transversely arranged, ellipsoid, 5-7 mm long, 2.5-3.5 mm wide, laterally flattened, with a pleurogram ca 3 mm long and 1.5 mm wide." (Wagner et al., 1999).

Lifecycle Stages

Produces abundant seeds contained in lightweight pods and are dispersed by wind (Little & Skolmen, 1989 in Starr et al., 2003).

Uses

Falcataria moluccana was originally introduced to Hawaii in 1917 from North Borneo and Java. Since then this tree has been planted in the hundreds of thousands. It is used for reforestation and as an ornamental due to its aesthetic looks, including attractive gray bark and feather-like flowers (Wagner et al. 1999; Starr et al. 2003). Plantations of F. moluccana have also been established in Hawaii short-rotation forestry applications, due to its fast growth and nitrogen fixation capacity (Binkley & Giardina, 1997 in Hughes & Denslow, 2005). The wood is used for a variety of purposes including canoe building and furniture making (Starr et al. 2003). Japanese farmers in Palau planted F. moluccana for use as a shade tree for cacao, coffee and tea plantations (Endress, 2002). More recently F. moluccana has been approved for use as a biofuel, to generate electricity on the Hawaiian island of Kauai (Eagle, 2008; Chimera et al., 2010).

Habitat Description

Falcataria moluccana grows well on a variety of soil types, including degraded sites and acidic or nutrient poor soils (Hughes & Denslow, 2005). It is able to grow on poor soils due to its nitrogen-fixing roots (Kitalong, 2008). In Hawaii F. moluccana often establishes on young lava flows with minimal soil development (Mascaro et al. 2009). In Hawaii F. moluccana spreads rapidly in areas below 305 m elevation with 2,032-3,810 mm annual rainfall (Little & Skolmen, 1989 in Starr et al., 2003).
General Impacts
The exotic nitrogen-fixing tree *Falcataria moluccana* dramatically alters forest structure and litter inputs in forests it invades. In rare wet lowland forest on young lava flows in Hawaii, *F. moluccana* is a particular problem as it grows rapidly, reducing light-levels and outcompeting native slow-growing *Metrosideros polymorpha*. Enhanced leaf litter quality and quantity of *F. moluccana* compared to native species causes increases in soil nutrient levels, decomposition rates, microorganism community composition and soil invertebrates. Ecosystem processes are altered in both terrestrial and aquatic environments where *F. moluccana* invaded riparian areas (Hughes & Denslow, 2005; Allison *et al*., 2006; Atwood *et al*., 2010).

For a detailed account of the impacts of *F. moluccana* please read *Impacts of Falcataria moluccana*. 

Management Info

Preventative measures: A Risk Assessment of Falcataria moluccana produced a high score of 8 and a recommendation of: "reject the plant for import (Australia) or species likely to be of high risk (Pacific)." (PIER, 2005). This species is also listed on the Hawaii state Noxious Weed List (Ostertag et al., 2009).

Cultural control: The planting of F. moluccana is discouraged in many regions; both where it is a known invasive and where further research is required to determine its impact (e.g. Space & Flynn, 2000b; Space et al., 2003; Space et al., 2004; Space et al., 2009). In Hawaii, Starr et al. (2003) recommend asking public not to spread trees and to instead plant alternatives such as native koa (Acacia koa).

Manual control: Girdling (ring-barking) of F. moluccana in the sapling stage may be a cost-effective control measure (Mueller-Dombois, 2008). It is relatively easy to achieve and tends to be successful (Gerlach, 2004). Uprooting seedlings and saplings, followed by chemical control can also be effective (Meyer, 2008). F. moluccana is also reportedly susceptible to being killed by root damage by heavy equipment (Motooka et al., 2003).

Chemical control: F. moluccana is very susceptible to hormone-type herbicides. 2,4-D and glyphosate cause severe injury, while dicamba and triclopyr are even more effective. Herbicides may be applied by injecting into the trunks of trees, or as a spray on the trunk after debarking (Motooka et al., 2003; Meyer, 2008).

Integrated management: Trees can be removed by hand or using saws, and stumps treated with a triclopyr-based herbicide to prevent resprouting (Ostertag et al., 2009). Ostertag et al., (2009) carried out removal experiments in Hawaii to determine native species’ response to the removal of all invasive trees and shrubs from plots. While there were major environmental changes in removal plots, native species growth and litterfall productivity did not change over three years, confirming the slow growth response capabilities of Hawaiian trees. However with continued removal of invasive species, it may be possible to alter the seedbank enough to encourage native regeneration (Cordell et al., 2009). Cordell et al. (2009) recommend non-native species removal to encourage natural regeneration, with supplemental native species planting as an additional strategy. Follow-up removal is essential to success (Cordell et al., 2009). In reality, treating and sustaining such removal plots to control invasive species is highly labour intensive, and may not be feasible at a regional scale (Ostertag et al., 2008).

Other: Recently F. moluccana has been approved for use as a biofuel, to generate electricity on the Hawaiian island of Kauai (Eagle, 2008; Chimera et al., 2010). The president of the project states that “the project will reduce the overall amount of albizia on island and positively benefit the community”. However in order to fulfill the wood requirements, an additional 2000 acres of F. moluccana would be necessary. However Chimera et al. (2010) list a number of reasons why this is unlikely to result in effective control of the invasive tree, and will most likely lead to it being more widely planted and greater spread.

Pathway

Spread long distances by humans who plant the tree for landscaping, forestry or other purposes (Little & Skolmen, 1989 in Starr et al., 2003). Grown as an ornamental garden plant due to its attractive flowers. Spread long distances by humans who plant the tree for landscaping, forestry or other purposes (Little & Skolmen, 1989 in Starr et al., 2003).

Principal source:
GLOBAL INVASIVE SPECIES DATABASE
FULL ACCOUNT FOR: *Falcataria moluccana*

Compiler: Comité français de l’UICN (IUCN French Committee) & IUCN SSC Invasive Species Specialist Group (ISSG)

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ALIEN RANGE


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