GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Angiopteris evecta***

Angiopteris evecta **System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Pteridophyta	Filicopsida	Marattiales	Marattiaceae

Common name giant fern (English), bersarm (Palauan), katar (English, Pohnpei), paiued (English, Pohnpei), la'au fau pale (Samoan), king's fern (English), hulufe vai (Tongan), ne'e (Maori), nase (Samoan), palatao (Niuean), gwaegwae (Kwara'ae), mule's foot (English), oriental vessel fern (English), fa'agase (Samoan), dermarm (Palauan), demarm (Palauan), gase (Samoan), mongmong (Yapese), kalme (English, Kosrae), umpai (English, Pohnpei), oli oli (Samoan), ponga (Tongan), nahe (Tahitian), mule's-foot fern (English), payuit (English, Pohnpei), mong (Yapese)

Synonym *Polypodium evectum* , G. Forster

Similar species

Summary *Angiopteris evecta* is a fern native to Polynesia, Melanesia, Micronesia, Australia, and New Guinea that has established invasive populations in Hawaii, Costa Rica, and Jamaica. It is known to establish dense stands that displace and shade out native plants and reduce biodiversity in ecosystems.

view this species on IUCN Red List

Species Description
Rhizomes form a massive, somewhat spherical trunk to ca. 120 cm high and 100 cm in diameter. On either side of the petiole insertion the rhizome bears two flat, rounded, dark brown, leathery, stipule-like outgrowths, ca. 10-15 cm long that bear proliferous buds and can grow into new plants when broken off. The petioles are thick and fleshy and can reach ca. 2 m long with a swollen base and bipinnate lamina which are glabrous, very large and spreading, usually to ca. 6 m long and to ca. 2.5-3 m broad. The pinnae are ca. 30 cm wide; ultimate segments (pinnules) are numerous, alternate, shortly stalked, commonly (8-) 10-13 (-20) cm long, (0.8-) 1.5-2.5 (-4) cm wide, linear, the base unequally wedge-shaped to more or less rounded, the margins serrate towards the apical part, the apices acuminate. Sporangia are clustered in short double-rows of three to seven with no indusium (PIER, 2008; Christenhusz & Toivonen, 2008; McCormack, 2007).

Notes
The taxonomy of *Angiopteris* is not fully understood. Especially the species of Indonesia and Southeast Asia are poorly defined, but do not appear to belong to *A. evecta* in its strict sense. *Angiopteris madagascariensis* and *A. boivinii* of the Indian Ocean islands are morphologically and ecologically different and do not pose a threat of invasion, nor do rare species belonging to the subgenus *Archangiopteris*. *Angiopteris evecta* is rare and protected in Australia.

Lifecycle Stages
Angiopteris evecta is very long-lived. Like other pteridophytes, it experiences and alteration of generations of gametophyte and sporophyte stages for sexual reproduction. The sporophyte, or \"fern\" stage produces spores that germinate to produce a prothallium, the gametophyte that bears sex organs which then, in turn, produces a sporophyte (Haupt, 1940; Christenhusz & Toivonen, 2008)

Uses
Angiopteris evecta is cultivated worldwide as an ornamental fern. Also, its starchy rhizomes are sometimes eaten or used to perfume coconut oil (Christenhusz & Toivonen, 2008).

Habitat Description
Angiopteris evecta inhabits tropical environments. Its typical climatic range was found to include an annual mean temperature of 19-27 °C, annual precipitation of 1,054–5,447 mm, and an elevational range of 0–1,492 m. It is known to thrive in moist forest and rainforest at low to middle elevations and appears to naturalize freely in wet valleys, gorges, and on slopes in montane and lowland rainforests of Hawaii, Costa Rica and Jamaica. It does not mind mild disturbance, and fragmentation of rhizomes may enhance the asexual growth of populations. Juvenile plants thrive in both sunny and shady locations, allowing the species to spread in dark primary rain and cloud forest as well as in open secondary vegetation (Christenhusz & Toivonen, 2008; PIER, 2008).

Reproduction
Angiopteris evecta can reproduce vegetatively or by producing spores. Vegetative reproduction occurs when fleshy stipules located at the base of each petiole produce proliferous buds that break off on suitable substrate and produce new plants. *A. evecta* is very long lived and it reproduces sexually by producing billions of spores during its lifetime Like other ferns, spores that are produced by the sporophyte stage (the spore producing plant or fern) germinate and produce the gametophyte (gamete producing plant), usually called the prothallium, which is a short lived, heart shaped , liverwort-like structure, that bears both sex organs the archegonium and antheridium. After gamete production and fertilization, which only happens in humid environments, a new sporophyte (fern) emerges. *A. evecta* takes many years before it is capable of producing spores. However, once it has it typically becomes well established. Adult leaves are covered in thousands of sporangia, each of which produces 1,440 spores (Haupt, 1940; Christenhusz & Toivonen, 2008). This way it can form dense stands that threaten native flora.

General Impacts
Angiopteris evecta establishes dense stands that dramatically alter ecosystems by displacing and outshading native species. It has established abundant, invasive populations in Hawaii, Costa Rica, and Jamaica that threaten native plants as well as general biodiversity and may pose a serious threat to native plant diversity in the tropics. *Angiopsteris evecta* is thought especially problematic on islands that house many of endemics, have patchy, relatively disturbed forests (Christenhusz & Toivonen, 2008; Christenhusz, pers. comm., 2010). Nevertheless in some areas of its native range the species is rare and does not pose any threat.

Management Info
Preventative measures: The restriction of cultivation and trade of *Angiopteris evecta* is advised to discourage further potentially invasive introductions (Christenhusz & Toivonen, 2008).

Pathway
In historical times the species was spread as a famine food, the rhizomes being a good source for starch. This practice dropped out of fashion because of the laborious process to extract the starch from the rhizomes. It was however most likely the reason for its original introduction to the plantations of Jamaica in the 18th century (M. Christenhusz, pers. comm.).These giant ferns remind people of prehistoric forests and are often planted in tropical gardens for the dramatic effect. Many botanical gardens value the species for its ornamental and educational value (M. Christenhusz, pers. comm.)

Principal source:
Christenhusz, Maarten J. M., Toivonen, Tuuli K. 2008. Giants invading the tropics: the oriental vessel fern, *Angiopteris evecta* (Marattiaceae). Biological Invasions. 10(8): 1215-1228.
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Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

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ALIEN RANGE

[1] COSTA RICA
[2] INDONESIA
[1] MADAGASCAR
[1] MEXICO
[1] SRI LANKA
[7] UNITED STATES
[1] CUBA
[1] JAMAICA
[1] MALAYSIA
[1] NEW CALEDONIA
[1] THAILAND

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