Lygodium microphyllum 简体中文 正體中文 **System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Pteridophyta	Filicopsida	Polypodiales	Lygodiaceae

Common name small-leaf climbing fern (English), Old World climbing fern (English)

Synonym *Ugena microphylla* , Cav

Similar species

Summary

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Species Description
Lygodium microphyllum is a fern with dark brown, wiry rhizomes and climbing, twining fronds of indeterminate growth, to 30m (90 ft) long; main rachis (leaf stalk above petiole) wiry, stemlike. Leafy branches off main rachis (constituting the pinnae) once compound, oblongish in overall outline, 5-12cm (2-5 in) long. Leaflets (pinnules) usually unlobed, stalked, articulate (leaving wiry stalks when detached); leaf-blade tissue usually glabrous below; fertile leaflets of similar size, fringed with tiny lobes of enrolled leaf tissue covering the sporangia along the leaf margin.\" (University of Florida, 2001).

Lifecycle Stages
Pemberton *et al.* (2003) states that, \"The life cycle of *L. microphyllum* is the same as with other ferns. The spores require moist conditions to germinate and grow into small, liverwort-like gametophytes. Male and female organs are produced on the same gametophytes and fertilization occurs when the swimming spermatozoid swims from the male organ to a female organ to penetrate the ovule. Fertilization gives rise to the familiar large leafy fern, which is the sporophyte stage. The fern spreads locally by vegetative growth and over long distances by wind-borne spores. The plant can grow in standing water and wet soils, and either in full sun or shade. The fern produces large numbers of spores; more than 800 spores/m3/hour were trapped in one Florida infestation (Pemberton and Ferriter, 1998). Spores can germinate in six to seven days (Brown, 1984). Dried spores taken from the plants have germinated after two years (Lott and Pemberton, unpub.).\"

Uses
FLEPPC (2001) reports that *L. microphyllum* has been used, \"As fiber for the weaving of handicrafts (Thaweesakdi Boonkerd, pers. comm. 1999) and herbal therapeutic applications as an anti-diuretic, a swelling reduction agent and as a general skin amendment (EthnobotDB website 1999)\".

Habitat Description
FLEPPC (2001) states that, \"In its introduced range, *L. microphyllum* is common in cypress stands, but also infests pine flatwoods, wet prairies, sawgrass marshes, mangrove communities and Everglades tree islands. In its natural range, *L. microphyllum* is found in a variety of habitats including mesic forests, rain forest, and open swampy areas, at altitudes from 0 to more than 1000 m.\"
In a study by Volin *et al.* (2004), the authors found that, \"The presence of *L. microphyllum* was significantly correlated to hydrology, coinciding with a wet, but not permanently inundated environment. In addition, the fern's coverage was greatest in a low-light under-story environment, where it has been shown to establish and eventually dominate (Pemberton & Ferriter, 1998).\"

Reproduction
FLEPPC (2001) states that, \"*L. microphyllum* reproduces sexually during the sporophyte and gametophyte stage. Fertile pinnae of the sporophytes produce spores within sporangia. When released from the sporangia, the spores will, given needed moist environmental conditions, germinate into tiny, thin-tissued plants called prothallia, the gametophyte generation (where eggs and sperm are formed). The gametophytes have both male and female organs producing sperm and ovules. Fertilization gives rise to the familiar plants (the sporophytes). Spores of the Lygodium genus have very thick walls, giving these propagules long environmental viability (Tryon pers. comm. 1999).\" The authors also state that, \"*L. microphyllum* is a homosporous fern which may engage in three type of sexual reproduction: 1) intragametophytic selfing, involving the union of egg and sperm from the same gametophyte; 2) intergametophytic selfing, the cross-fertilization of gametophytes produced by spores from the same sporophytes; and 3) intergametophytic crossing, the cross fertilization of gametophytes arising from different sporophytes.\"

General Impacts
Pemberton *et al.* (2003) refers to *L. microphyllum* as, \"An aggressive invasive weed of moist habitats in Florida (Pemberton and Ferriter, 1998). This rapidly spreading weed colonizes new areas without the need of habitat disturbance and frequently completely dominates native vegetation. Herbicidal and mechanical controls are expensive, temporary solutions, and are damaging to non-target plants.\"
Once *L. microphyllum* has established, FLEPPC (2001) reports that, \"It climbs and blankets other vegetation, ultimately causing mortality to mature canopy and subcanopy trees (Roberts 1996, 1997). Sometimes, *L. microphyllum* covers other vegetation so completely, it is not possible to see other plants beneath it (Pemberton and Ferriter 1998). Near the ground surface, a thick mat of old and new fronds also forms, ultimately smothering and stifling native plants including herbs and tree seedlings that would ordinarily maintain the forest canopy if allowed to mature.\" Ferriter et al. (2004) similarly report that, \"*L. microphyllum* forms dense mats of rachis plant material. These thick, spongy mats are slow to decompose, exclude native understory plants, and can act as a site for additional fern colonization. It is difficult for other plant species to grow through the dense mat made by this fern, thereby reducing plant diversity. Large expanses of fern material also may alter drainage and water movement.\"
The University of Florida (2001) reports that, \"*L. microphyllum* poses management problems for both wildfires and prescribed burns because growth into canopy creates an avenue for fire to spread where swamp waters have usually provided a natural barrier. It has caused loss of some canopy trees with such \"crown\" fires, as well as loss of native bromeliads residing on tree trunks.

Management Info
Chemical: While Pemberton *et al.* (2003) warns that, \"Herbicidal and mechanical controls are expensive, temporary solutions, and are damaging to non-target plants,\" it may still be a viable option in certain cases. FLEPPC (2001) has reported some success controlling *L. microphyllum* with Rodeo in Florida stating that, \"The invasive fern was browned close to 100%. The cypress and maple canopy trees showed slight damage from the herbicide. Midstory plants and understory plants exhibited significant damage.\" While Rodeo applications have been successful in killing back the fern, this case and others have been overshadowed as the authors state, \"By the presence of thousands of new *L. microphyllum* plants germinating in the moist moss collar zone of the swamp trees and cypress knees. Even floating logs were covered with new Lygodium plants. There had been an apparent massive spore release and germination.\" Continual monitoring of the treated areas will be required to identify regrowth of *L. microphyllum* and to apply spot treatments to keep the fern from re-establishing.
Biological: FLEPPC (2001) states that, \"Biological control is a very suitable approach for *L. microphyllum*, because it is an introduced species that is taxonomically isolated from all but one U.S. native plant and a few Latin American species. Biological control is an appropriate tool for the control of *L. microphyllum* because it grows among other plants in complex natural vegetation that would be damaged by most control methods.\" The biology of *L. microphyllum* is not well studied and therefore little is known of natural predators, but research into this area of the ferns natural history is increasing steadily (Pemberton *et al.* 2003). FLEPPC (2001) reports some species of interest that have been identified such as *Puccinia lygodii* (Hariot) Arth. The authors state that, \"This rust is a pest of *Lygodium spp.* in greenhouses (Jones 1987). *Puccinia lygodii* is native to tropical South America (Sydow 1925) and has been collected from *L. japonicum* in Louisiana (McCain *et al.* 1990). It is of interest because rusts often have very narrow host ranges\".
Goolsby *et al.* (2004) have assessed the impact of a potential biological control agent, *Floracarus perrepae* (Knihinicki and Boczek), on *L. microphyllum* in its native range of Australia. The authors found that, \"The mite caused a significant reduction in biomass of above ground stems and leaves and below ground roots and rhizomes. Based on its potential to cause significant damage to *L. microphyllum* under field conditions in the native range and its extremely narrow host range, *F. perrepae* is an excellent candidate for biological control of this invasive *L. microphyllum*.\"
Jones *et al.* (2002) have identified a fungus *Colletotrichum gloeosporioides* from *L. microphyllum* grown indoors and specimens found naturally outdoors. The authors found that, \"Within 3 weeks of inoculation cause the foliage to develop abundant discoloured spots that lead to edge browning and wilting of the pinnules. The effect can be very severe in *L. microphyllum* with plants suffering as much as 50% dieback.\"

Principal source: FLEPPC, 2001. *Lygodium* Management Plan for Florida

Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

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General information

ITIS (Integrated Taxonomic Information System). 2005. Online Database *Lygodium microphyllum*.
Summary: An online database that provides taxonomic information, common names, synonyms and geographical jurisdiction of a species. In addition links are provided to retrieve biological records and collection information from the Global Biodiversity Information Facility (GBIF) Data Portal and bioscience articles from BioOne journals.
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