

# *Pteris vittata* L.



**Common Name:** Chinese ladder brake fern; Chinese brake fern

**Synonymy:** *Pycnodoria vittata* (L.) Small

**Origin:** China, Taiwan, Australia, Africa

**Botanical Description:** Terrestrial or epilithic fern; stems (rootstock) rhizomatous, stout, short-creeping, branched, often appearing knotted, covered with light brown scales. Leaves (fronds) erect, spreading, clustered at base, to 1 m (3.3 ft) tall; petioles straw-colored to light brown, scaly, to 30 cm (12 in) long; leaf blades to 80 cm (32 in) long and 25 cm (10 in) wide, rigid, once-pinnate; rachis scaly, appearing hairy, grooved; leaflets (pinnae) opposite, sessile, upper pinnae longer and close together with bases often slightly overlapping, lower pinnae shorter, broader, and further apart, linear to lanceolate, to 18 cm (7.1 in) long and 1 cm (0.4 in) wide; tips sharply pointed, bases unequal sided to heart shaped and usually with evident lobes, margins finely toothed towards tips of leaflets; veins forked near leaflet margins. Sori in narrow rows along underside of leaflet margins.

**NOTE:** *P. vittata* differs from the native *P. bahamensis*, which has a glabrous leaf rachis, blunt leaflet tips, and rolled leaflet margins.

**Ecological Significance:** Cultivated as an ornamental and commonly escaped in the southeastern US coastal plain (Stanford and Diggs 1998). Naturalized in Florida as early as the 1920s (Small 1938) and noted as abundant in Florida by the 1930s, thriving in lime sinks, hammock gaps and Everglade Keys (Small 1938). Now found throughout the state in a variety of habitats, including pine flatwoods, hammocks, roadsides, canal banks, and very commonly on limestone substrates (Nelson 2000, Nauman 1993b). Establishes in calcareous masonry, including walls, buildings, and cracks in sidewalks (Nauman 1993b). One of the most frequently occurring nonnative plants, it was discovered in 45% of preserves surveyed in south Florida (Bradley and Gann 1999). Currently naturalized in 92 conservation areas across south Florida from habitats including marl prairies, pine rocklands, prairies and rockland hammocks, shell mounds, and sinkholes (Gann et al. 2001). Also documented from swampy roadsides, wet flatwoods, and growing in the harsh understory beneath *Casuarina* thickets on Key Biscayne (FLAS). Hybridizes with the native *P. bahamensis* in southernmost Florida

counties (Wunderlin and Hansen 2000). Spores cause allergic reactions in humans (Geller et al. 1987, Singh et al. 1989) and spore extracts are damaging to human DNA (Siman et al. 2000).

**Distribution:** Herbarium specimens documented from 27 counties throughout Florida (Wunderlin and Hansen 2002). Established across the southeast from Texas (Stanford and Diggs 1998) to South Carolina and in California, Hawaii, Puerto Rico, the Virgin Islands (USDA NRCS 2002), and the Cayman Islands (Guala et al. 2002). Naturalized throughout the Caribbean, Central and South America (Nauman 1993b, MOBOT), Spain (Crespo et al. 1989), Italy (Mariotti 1988), South Africa (Wells et al. 1986), and New Zealand (LRNZ 2001). Rapidly spreading through India and other tropical areas (Devi and Singh 1986). Targeted for removal from commercial production by FNGA/TBWG growers associations (FNGA 2001).

**Life History:** Fast growing; produces large amounts of biomass; easily and rapidly adapts to a wide range of climates and substrates (Chen et al. 2002, Khare and Kaur 1987). Prefers full sun but will grow in shaded locations (Small 1938). Heat and drought tolerant (Kaur and Yadav 1985) and frost hardy. Establishes as an epiphyte in areas with little or no soil. Tolerates a variety of soils, including acidic (to pH 4.5), alkaline, and arsenic rich soils (Chen et al. 2002). Extracts arsenic from soil and hyper-accumulates it in fronds, making it potentially useful for phytoremediation (Ma et al. 2001), possibly leading to further spread from deliberate plantings. Withstands high levels of pollutants in urban areas and can be used to monitor atmospheric metal deposition due to its accumulation ability (Ho and Tai 1985). Spores are dispersed great distances by wind and may germinate in almost any moist habitat (Devi and Singh 1986). Spores produced year round; plants average 12-30 fronds, and each frond can produce over 140 million spores (Devi and Singh 1986). Germination decreases in spores stored over 30 days at room temperature, most likely because of water and nutrient loss during storage (Beri and Bir 1993). Over 95% germination recorded for fresh spores, while spores stored 100 days had 60% germination (Beri and Bir 1993). Storage at 0°C (32°F) and 40°C (104°F) also decreased germination (Ambika et al. 1995).