Melaleuca quinquenervia, the melaleuca tree or paper-bark tree, is an evergreen tree with a slender crown, which grows up to 29 m tall. It has white many-layered papery bark and white flowers in brush-like spikes. It is native to Australia and Papua New Guinea and was introduced to Florida, USA, at the beginning of the twentieth century to provide a useful crop that would grow in an area subject to drought, flooding and periodic fires where little else was productive (Bodle et al., 1994). Although hopes of using the melaleuca tree for timber were not fulfilled, it did prove economical to produce as an ornamental.

But it was an unfortunate choice for an introduction. It grows phenomenally fast in Florida (18-month-old trees can be 6-7 m tall) and it flowers up to five times a year (Turner et al., 1998). Its wind- and water-dispersed seeds are produced from trees as young as 2 years old, and are retained on the tree to be released in times of stress - fire, frost and herbicide all cause seed capsules to open. Mature trees can hold up to 20 million seeds; on the tree they can remain viable for up to 10 years, but viability is lost quickly once the seeds are in the soil. Frequent fires in natural areas produce sapling populations as high as 250,000 per ha that eventually overwhelm other plant species. The melaleuca tree burns with an intensity higher than native plants and thus organic soils burn leaving depressions that favour melaleuca seeds (Schmitz and Hofstetter, 1999). It grows densely, forming impenetrable thickets, and also spreads by adventitious roots, which cause soil accretion to occur owing to thick mats of roots at the water surface, and this, along with a thick leaf layer, leads to an increase in the elevation of the infested area. Small increases in elevation of a few centimetres make huge differences in the composition of Everglades plant communities, so the melaleuca tree is converting wetland to upland in this manner. It is adapted to subtropical climates with a preference for seasonally wet sites and flourishes in standing water.

In the past 35-45 years M. quinquenervia spread rapidly and infested close to 200,000 ha in south Florida, causing extensive environmental and economic damage particularly in the Everglades where it threatens the native habitat (Turner et al., 1998). Dense melaleuca tree forests, 5000 trees per ha, 12 m tall, have little to no
understorey with closed canopies. These tree monocultures completely displaced 12 species of native plants in two prairie marshes (Schmitz and Hofstetter, 1999). The impact on wildlife is affected by the degree of infestation and the surrounding habitat. Although melaleuca tree forests have been described as biological deserts, several rodent species and birds have been reported to utilize them but at lower levels than in other habitats (Mazotti et al., 2002). Biodiversity was reduced 60-80% by melaleuca tree invasion of marsh communities (Austin, 1978). The melaleuca tree also invades cypress swamps, pine flatwoods, hardwood bottomlands, and mangrove swamps (Turner at al., 1998). Leaf quality is poor forage for deer and the dense melaleuca tree forests are considered a threat to endangered species, i.e. the Florida panther, wood stork, snail kite, and several plant species. Additionally, waterways that contribute to healthy fisheries and to nursery sites for fish and crustaceans are degraded (Laroche, 1999).

Intensive control efforts have reduced melaleuca tree populations in Florida an estimated 25% to 145,000 ha (Ferriter et al., 2002) and two biological control agents have been released that should help reduce it on public and private lands (Rayamajhi et al., 2002). However, a competing invader, Old-world climbing fern, Lygodium microphyllum, which climbs up and over entire tree islands, is invading at an unprecedented rate and has now replaced melaleuca as the most immediate plant threat to the Everglades (Pemberton et al., 2002).

References


**Additional Web Sites**

University of Florida, IFAS: http://plants.ifas.ufl.edu/melainv.html.

USDA, ARS, Invasive Plant Research Laboratory and UF-IFAS: http://tame.ifas.ufl.edu/.