

FLEPPC Research Grant Competition Update

Last year, FLEPPC conducted its first annual competitive research proposal program for the study of invasive non-indigenous plants in Florida. The FLEPPC research committee reviewed a large number of submitted proposals and subsequently recommended four of the proposed research projects for funding. Following are brief reports on the progress of the four funded projects.

The effect of *Lygodium microphyllum* on wildlife forage and predation in South Florida *Taxodium Swamps*

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Old World climbing fern (*Lygodium microphyllum*) is a non-native fern in Florida with dark brown or black, wiry rhizomes and climbing, twining fronds of intermediate growth, to 30 meters long. *L. microphyllum* was reportedly introduced to Florida in the Loxahatchee River Basin in southern Martin and northern Palm Beach Counties and originated from Africa to southeast Asia, and south Pacific islands and Australia. The exponential spread of *L. microphyllum* in South Florida is beginning to be recognized by many public and private land managers. Near the origin of introduction, the Loxahatchee National Wildlife Refuge reported nearly 17,000 acres of fern blanketing entire tree islands by 1995. Sporadic patches of *L. microphyllum* totaling more than 300 acres have also been discovered in Everglades National Park and are currently undergoing aerial herbicide control. It is a common perception that invasive, non-native plant species such as *L. microphyllum* negatively impact native vegetation and other higher trophic levels within the ecosystems invaded. However, there is little quantifiable evidence of how these plant species

affect other vegetation, insects or wildlife. We are currently conducting a study examining the effects of *L. microphyllum* on wildlife predation and forage in three South Florida cypress swamps, Corbett Wildlife Management Area, DuPuis Preserve and the Corkscrew Regional Ecosystem Watershed land. We will be identifying predator species and level of predation in cypress understories with and without *L. microphyllum* as well as in understories where *L. microphyllum* has been treated with herbicide. In addition, we will examine the amount of preferred and usable forage in these same study sites.

Genetic variation within *Melaleuca quinquenervia* in Florida, and its effect on performance of biological control insects

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Melaleuca quinquenervia (broad-leaved paperbark, niaouli) was first imported into the United States from

Australia during the 1880s. Horticultural nurseries near Sarasota, Florida, and San Diego, California, imported this species (then known as *M. leucadendron*) as a landscape tree because of its showy cream-colored bottlebrush flowers and spongy peeling white bark. During the subsequent 40 years, 10 more introductions occurred in Florida from 5 different sources including botanical gardens in France (3x), Italy (1x), and Australia (4x), and plantations in Australia (1x) and Madagascar (1x). By the mid-1920s, the plant had become naturalized on both coasts of southern Florida, invading diverse habitats within the Everglades ecosystem including freshwater and brackish wetlands as well as pine flatwoods. Preliminary isozyme analyses show that these naturalized weed populations differ genetically from one another. Chromato-



graphic profiles of leaf essential oils show that these genetic differences partially result from the presence of two primary chemical varieties (called chemotypes) of *M. quinquenervia* in Florida. The essential oils of chemotype I plants contain the terpenoid *trans*-nerolidol as their principle constituent, whereas chemotype II plants contain the terpenoids

1,8-cineole and viridiflorol as their primary constituents. Laboratory bioassays with the biological control agent *Oxyops vitiosa* suggest that the insects currently in Florida may be better adapted to type I than type II plants. For instance, survivorship of *O. vitiosa* larvae fed type I plants was threefold greater than larvae fed type II plants. Also, adults reared on the type I plants weighed 40% more than those reared on type II plants. Similar decreases in fecundity have been noted. Studies are underway to determine the impact of these differences on *O. vitiosa* population dynamics at field sites in Florida.