3 The Status of Exotic Plants in the Preserves of Southern Florida

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Abstract

The Institute for Regional Conservation has been developing "The Floristic Inventory of Southern Florida" (FISF) since 1994. The FISF includes the development of a relational database which incorporates plant inventories from each of the preserves of the ten county area south of and including Lake Okeechobee. Field surveys are being conducted to develop inventories for sites without plant lists. Field surveys have also been conducted on seven South Florida Water Management District properties to determine which exotic species are invasive on those properties. The FISF database also contains data on ranges, conservation status, habitats, and origin of each plant taxon in the region. The FISF has documented over 700 exotic plant taxa as being naturalized in southern Florida.

Introduction

The southern Florida region is host to great biological diversity. The area south of Lake Okeechobee is a rich meeting ground of temperate and tropical plants and supports a diverse endemic flora. These plants exist in a landscape mosaic of extraordinarily different habitat types, ranging from great expanses of sawgrass that make up the Everglades to high xeric sandy ridges dominated by sand pine and rosemary to small rocky islands covered primarily by tropical trees.

According to recent estimates, the flora of Florida is made up of approximately 4012 species, subspecies, and varieties (Wunderlin et al. 1996). Of these, 1171 taxa (29%) are considered to be non-native. This is a disturbing number. With over a quarter of the flora comprising non-native plants, and new exotic invaders increasing in frequency, land managers across the state are striving to reduce these numbers.

The purpose of this study was to assess the status of exotic plants in the preserves of southern Florida, with the specific aim of obtaining estimates of (1) their numbers, (2) the most frequent taxa, (3) the habitats most frequently invaded, (4) their numbers according to plant form, (5) plant families with the most numbers, and (6) their numbers compared to native plants. Preserves include natural areas owned publicly or privately, e.g., The Nature Conservancy, National Audubon Society, that are designated by the owner as a preserve in perpetuity.

Methods

The Institute for Regional Conservation, Miami, began developing a relational database, "The Floristic Inventory of Southern Florida" (FISF), in 1994. The FISF was designed to store data on plant occurrences for the 10 county region of southern Florida, south of and including Lake Okeechobee, namely Monroe, Miami-Dade, Broward, Palm Beach, Martin, Collier, Lee, Charlotte, Glades, and Hendry counties. This database was developed with Paradox software and stores information on plant occurrences extracted from plant lists, herbarium labels, literature citations, and personal observations. The database currently consists of 12 tables and holds nearly 75 000 records. In addition to occurrence records, the database includes information on origin, natural and introduced ranges, conservation status, plant form (graminoid, vine, etc.), and habitat.

Using the best available data, the origin of each taxon was determined. In some situations, this could not be accomplished satisfactorily. For example, there has been a great deal of debate over the status of two trees, *Cordia sebestena* L. and *Clusia rosea* Jacq.; conclusive evidence of the origin for either species could not be found. Such taxa were relegated to an "Unknown Origin" category.

In 1997, a series of surveys on seven properties owned or managed by the South Florida Water Management District was conducted. On each of these properties, a list of all plant taxa encountered was prepared. For each exotic plant taxon recorded, the number of individuals and total acreage covered was estimated. These estimates were placed in categories defined by a log scale: 1-100, 101-1000, 1001-10 000, 10 001-100 000, and >100 000. Whether each exotic taxon occurred in an intact natural area or not was also recorded.

Results

The assessment revealed approximately 2226 plant taxa occurring in southern Florida. Of these, 754 taxa (33.8%) were considered to be exotic and 104 taxa (4.7%) were considered to be of unknown origin. The percentage of exotic taxa was higher than that reported for the state (29%) by Wunderlin et al. 1996.

The most frequent exotic plant taxa in the preserves of southern Florida were Brazilian pepper (*Schinus terebinthifolius*), shrub verbena (*Lantana camara*), Australian pine (*Casuarina equisetifolia*), Madagascar periwinkle (*Catharanthus roseus*), and rosary pea (*Abrus precatorius*) (Table 1).

Most (70%) exotic plant taxa in the study region occurred in disturbed habitats. Among natural areas, upland habitats were the most susceptible to invasion, with 24.1% of the total number of exotics. Freshwater and coastal wetlands had a much lower diversity of invaders, with only 4.9% and 0.5% of the total number of exotics, respectively (Fig. 1).

Table 1. The most frequent exotic plants in southern Florida.

Scientific name	Common name	Occurrence (%)[1]
Schinus terebinthifolius Raddi	Brazilian pepper	91
Lantana camara L.	shrub verbena	60
Casuarina equisetifolia L.	Australian pine	57
Catharanthus roseus (L.) G. Don	Madagascar periwinkle	56
Abrus precatorius L.	rosary pea	56
Dactyloctenium aegyptium (L.) Asch. & Schweinf.	crowfoot grass	53
Momordica charantia L.	balsam apple	52
Wedelia trilobata (L.) Hitchc.	creeping wedelia	52
Rhynchelytrum repens (Willd.) C.E. Hubb.	Natal grass	49
Spermacoce verticillata L.	whitehead broom	49
Psidium guajava L.	guava	45
Pteris vittata L.	China brake	45
Albizia lebbeck (L.) Benth.	tongue tree	44
Schefflera actinophylla (Endl.) Harms	Queensland umbrella	44
Emilia fosbergii Nicolson	tassel flower	42

[1] Percentage of preserves having the exotic species.

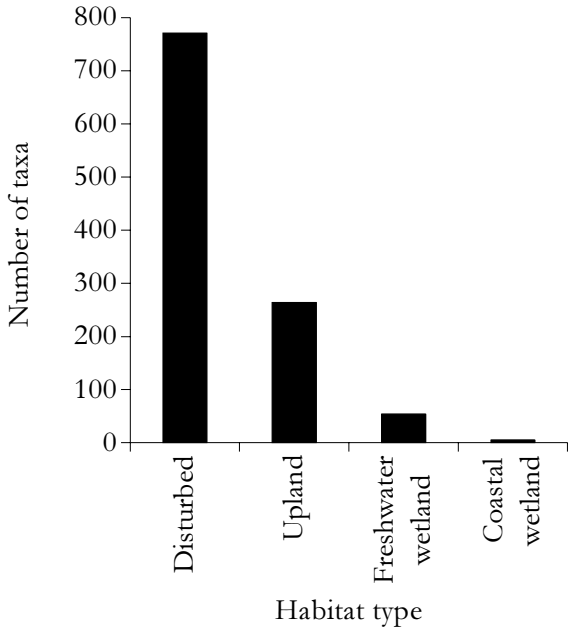

Figure 1. Numbers of exotic plant taxa, by habitat.

A high proportion of exotic trees, shrubs, and vines were found (Fig. 2). Herbs, aquatic (freshwater) and marine forbs, epiphytes, and epipetric taxa were not well represented. The families Poaceae, Fabaceae, and Asteraceae contained the highest numbers of exotic taxa (Fig. 3).

On the seven South Florida Water Management District properties surveyed, the numbers of all plants encountered ranged from 187 to 574 taxa, depending on the site (Fig. 4). The status of exotics on these properties varied widely, comprising from 10% to 22.5% of the total number of taxa on the site. Of these exotic plant taxa, from 16.3 to 50% were found to invade natural areas (Fig. 5).

Discussion

The flora of southern Florida is composed of a higher percentage of exotic plant taxa than the state as a whole (33.8 and 29.0%, respectively). There are a number of possible reasons for this difference. One is a difference in what the authors consider exotic and what is considered exotic by Wunderlin et al. (1996). For example, we consider the American sycamore (*Platanus occidentalis* L.) to be exotic in

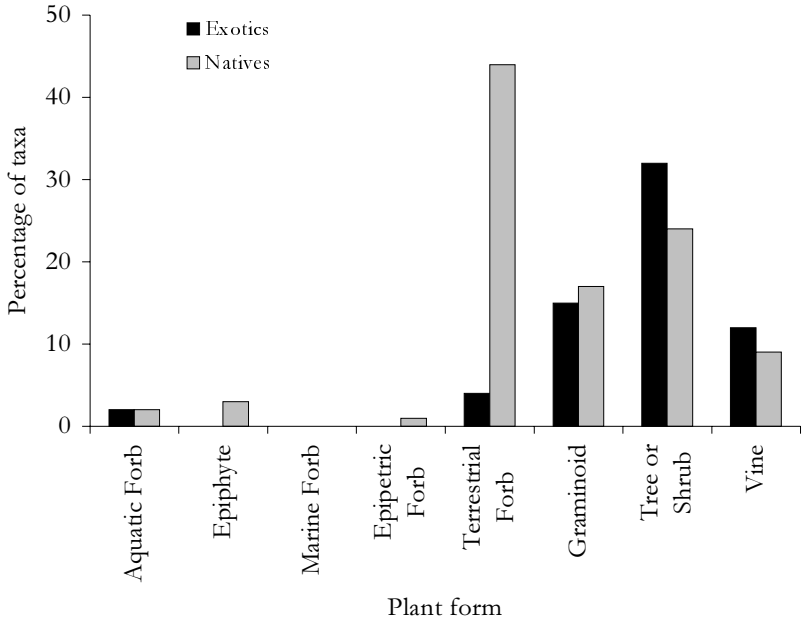

Figure 2. Percentages of exotic and native taxa, by plant form.

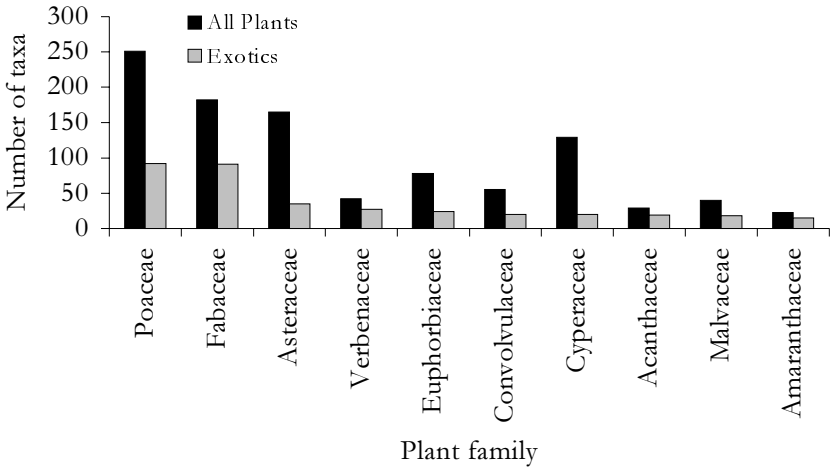

Figure 3. Numbers of exotic taxa, by largest plant families.

our range. While this tree is native to Florida, its natural range is limited to extreme northern Florida, reaching south to Gilchrist County only. A small popula-

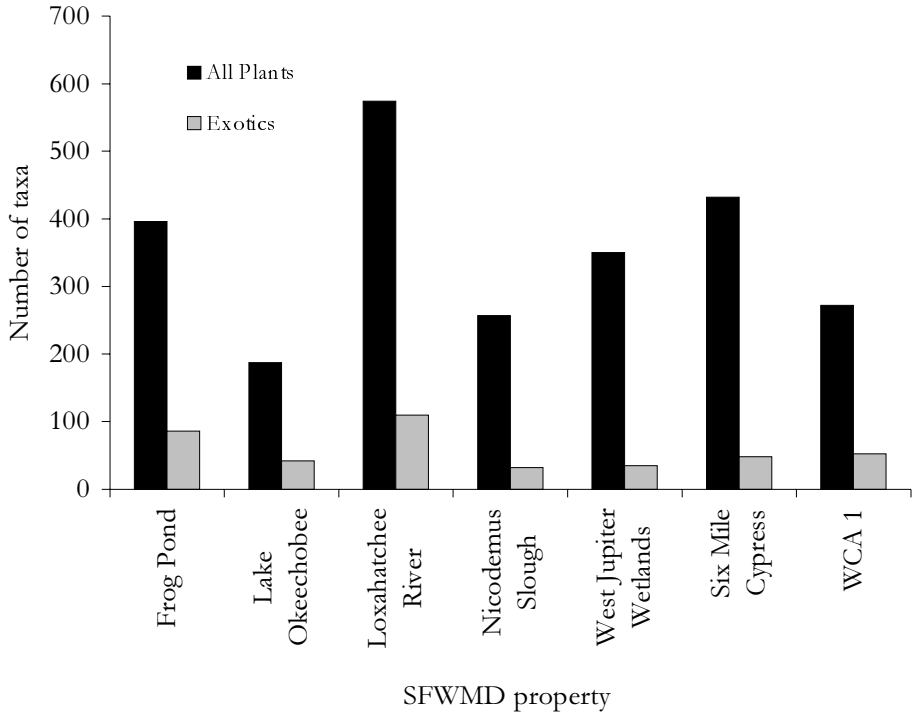

Figure 4. Exotic plant taxa on South Florida Water Management Distric (SFWMD) properties.

tion exists in Lee County where it has escaped from cultivation.

Another reason for a higher proportion of exotic plants in southern Florida when compared to the entire state may be the density of people in the region. While the study region covers 23% of the total acreage in the state, this area was home to 37% of the state's human population in 1996 (U.S. Census Bureau 1998). With a denser population, there are more plant introductions through the horticultural trade. This theory is supported by the higher proportion of exotic trees, shrubs, and vines that exist here than would normally be expected; most of these species have become naturalized following introductions.

The exotic flora of southern Florida may also simply be better documented than other parts of the state. Southern Florida has a rich botanical history and is one of the best botanically known parts of the state. It may be that other regions have an equally high number of exotic plant taxa that have not yet been fully documented.

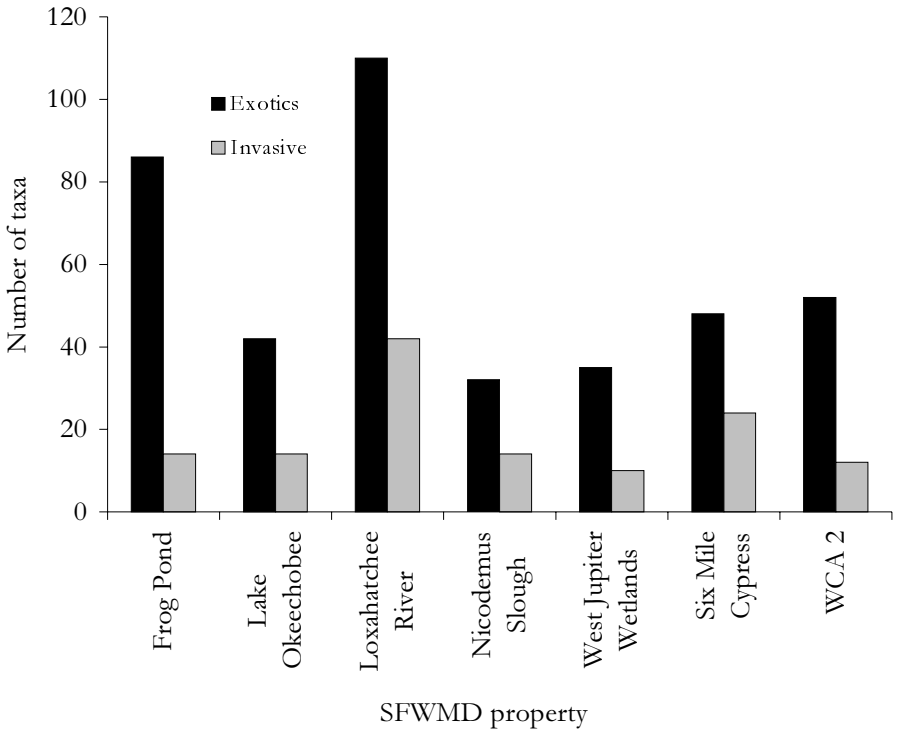

Figure 5. Invasive plant taxa on South Florida Water Management District (SFWMD) properties.

Lastly, exotic pest plants are very capable of invading southern Florida's subtropical climate. While the southern Florida region constitutes only 23% of the land area of the state, it contains 51% of the state's native plant taxa. It could be expected that the factors which make southern Florida host to a diverse native flora could also make it home to an equally rich exotic one.

Literature Cited

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Wunderlin, R.P., B.F. Hansen, and E.L. Bridges. 1996. *Atlas of Florida Vascular Plants*. CD-ROM. Tallahassee: Florida Department of State.