

# Jungle Island's PESP Strategy

## **Describe your Organization's Five-Year Goals Related to Pesticide Risk Reduction**

Jungle Island has now been open to the public for over four years. The premise behind the initial landscape design and ongoing maintenance was an IPM and plant health care program that was developed over the previous decade at the original Parrot Jungle and Gardens. All insect and plant disease issues are approached in an eco-friendly and eco-efficient manner that are cost effective and value-added. This method thus far has been very successful in growing the new landscape. The next five years will see a continuance and expansion of the current program(s) to address any current and future plant pathogens that may harm the landscape and in certain cases, the animal collection.

The success of the IPM and sustainable landscape development/maintenance programs at the park has generated substantial educational outreach both to the general public and professionals. Jeff Shimonski has been publishing a monthly garden column in a local newspaper for the past two years that has focused on sustainable issues. Other publications have appeared in arboricultural and zoological horticulture journals and newsletters. Many speaking engagements and classes have been given from local and national garden clubs to landscape architects. This year there will be TV appearances (Comcast Newsmakers) and lectures at various conferences including the annual Trees Florida conference and a joint presentation with EPA GreenScapes at the American Public Gardens Association's natural conference.

## **What do you envision doing (broadly) to try to resolve your major issues?**

Every insect or disease needs to be viewed and managed in a different manner. Some of the means and methods of control or avoidance are as follows:

- The landscape at Jungle Island is being developed with as many species of plants as possible to avoid monocultures or large groups of same plant species to reduce favorable habitats for pathogens.
  - Pesticides have never been used in the landscape thereby avoiding chemical resistance and insect selection issues. Insect predators are able to establish viable populations without the threat of pesticides, and habitats such as environmental lawns that harbor plants that beneficials take nectar from are established.
  - Sanitation and habitat reduction has proven to be a very successful component in the control of mosquitoes at the park. The same concept can be carried over to other pathogen issues.
  - Daily and weekly scouting is proving to be a critical component of monitoring insect populations. This enables the park to establish workable action and economic thresholds that will trigger controls methods that vary from pruning or the removal of certain plant species to the use of bio-chemicals or other methods.
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## **Goal 1 and Tactics**

With the assistance of the EPA, Jungle Island has been able to successfully eliminate spraying for mosquitoes in the Park for the past two years. A weekly scouting program has been running throughout this period that samples bromeliads, storm drains and other areas in the park to determine mosquito species and their populations. Seven species have been found to breed in the park, with three species being the most prevalent in both the bromeliad collection and the storm drains.

Successful larvae control of these nuisance insects and disease vectors has been accomplished through different methods including the use of biochemicals, insect growth regulators and monomolecular films. Further control follows the example of Dr. William Gorgas in the elimination of yellow fever mosquitoes in Havana, Cuba and the Panama Canal Zone in the beginning of the 1900's through sanitation methods; whenever the mosquito population approaches the action threshold, a thorough inspection of the surrounding area is made and always a source of the mosquitoes is found and removed.

Through judicious record keeping and examination of water samples, it has become apparent that natural controls are also working to control mosquito larvae. Among the organisms found are copepods. A program will be established to rear them in a lab to test for the control of 1st instar mosquito larvae. The hope will be to utilize the copepods with other on-going control methods and possibly reduce the amount of bio-chemicals used especially on bromeliads. If successful, the use of copepods in the control program will reduce the overall cost by reducing the amount of biochemicals needed. Other insects and micro organisms are suspected to control to some degree the mosquito larvae. These are being identified and their use as control agents will be tested.

The success of this mosquito control program is measured in several ways. The action threshold for pesticide spraying is now rarely approached. The cost of daily pesticide spraying vs. a sampling and larvae bio-control program has been shown to be very cost effective. Although sampling still occurs on a weekly basis to document long-term the mosquito species breeding in the park, it has been found that sampling is only necessary every two to three weeks thereby reducing labor costs and unnecessary application of bio-chemicals or monomolecular films.

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## **Goal 2 and Tactics**

Throughout the mosquito larvae sampling program as noted in Goal 1, other insect larvae species have been found. An effort is being made to determine if larvae of biting midges, Ceratopogonidae and sand flies, Psychodidae indeed inhabit bromeliads and storm drains at the Park. If identified, various bio-controls will be tested on these insects to determine their efficacy for control.

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### **Goal 3 and Tactics**

A newly introduced species of insect from India and South Asia, the fig whitefly (*Singhiella simplex*) has been found recently in South Florida. This insect is infesting several species of popular landscape trees in the genus *Ficus*, and causing defoliation. At Jungle Island there are currently ten species of ficus, and after conducting a site survey, the fig whitefly was found to be infesting three species of ficus onsite.

The insect's life cycle has been investigated and a monitoring and sampling program was established. The role of insect predators that are parasitizing the nymphal stages of the whitefly is being monitored and measured, and their populations documented.

The goal is to understand how the fig whitefly predators and parasites are regulating the population and if there can eventually be *natural* control of the fig whitefly without the use of chemicals or the removal of the vulnerable species of ficus.

An attempt to identify the local/onsite plant habitat of the beneficial predators and parasites will be undertaken to see if these locations can be modified or enhanced to encourage their year round establishment.

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### **Goal 4 and Tactics**

Another new species of plant pathogen has entered South Florida. This is a mite species commonly called the red palm mite. It is expected to eventually spread throughout the area and infest palms, bananas, and many other species of plants. If and when it reaches Jungle Island, it will be monitored and natural control measures will be investigated.