

HIGH RISK INSECT PESTS: MONITORING AND DIAGNOSIS

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Abstract. It is extremely important to identify potentially high-risk pests and to respond quickly to eradicate, constrain, or manage them. Some factors that increase the chance of a pest being high risk include newly introduced pests that have little or no known natural enemies, pests with a wide host range particularly if they cross commodity groups or affect native or rare species, pests involved in the transmission of disease, pests that are difficult to detect or easily spread, and pests with short life cycles and high reproductive rates. Communication is key in the process of monitoring and diagnosing high-risk pests. It is important that pertinent information is shared among all interested parties but particularly to the clients who are many times the first to see a potential new pest. Some of the high-risk pests in ornamental and other crops in Florida include *Diaprepes root weevil*, *Sri Lanka weevil*, *pink hibiscus mealybug*, *lobate lac scale*, and *Asian cycad scale*.

Pest management is extremely important in crop production, in our landscapes, and in natural areas. Without pest management, we would not be able to grow, utilize, and enjoy many of our plants. Not all insect pests or insect pest situations are high risk. However, with the continuous influx of exotic pests, many of which can become high risk, it is important to be able to monitor and diagnose when a pest is or may become high risk.

In situations with a potentially high-risk pest, it is important to identify the pest, determine the risks associated with that pest, and to respond quickly to eradicate or manage the pest. There are many factors that may make a pest high risk. Newly introduced pests have the potential to become high risk because they usually have few or no natural enemies in their new environment. This is particularly devastating if the new environment provides a suitable habitat and abundant food sources. Many times new pests are not recognized until they are well established and already spreading to new areas. Often, there is little information on the biology or control of these pests. Some or all of these factors can increase the chances of a pest becoming high risk.

There are other factors important in determining the potential of an insect pest becoming high risk. Those insects with a wide host range are potentially high risk pests, particularly if the host plants include different commodity groups. In this case, an insect has a good chance at survival, can potentially cause damage to different crops, and can likely be spread to new areas. The type of crop and type of damage or host plant tolerance will influence the severity of risk. It is not unusual for a pest to endanger our native or rare plants or in-

vade natural areas. In these cases, the economic value or the actual number of plant types affected may not be great, however, the risk is still very high because of the potential complete loss or devastation of these plants. Those insects involved in transmission of diseases or that interact with other organisms (which increases the damage potential) are sometimes high risk. Many times it is the disease that causes damage or crop loss, but the insect vector would still be considered high risk. It is particularly important to identify those situations in which either the disease organism or the insect vector is already present and there is potential for the second one to be introduced.

Other general parameters that may make an insect high risk would be insects that live in cryptic habitats, because these insects are difficult to detect and to manage once established. Insect biology such as short life cycles and high reproductive rates can contribute to an insect becoming high risk. Any insect with a high likelihood of being spread either by its own means or mechanically with plants or animals is always a concern.

Monitoring, diagnosing and ultimately managing high-risk pests are monumental tasks. Therefore, it is critical to identify those pests not yet introduced but that have some of the attributes or contributing factors discussed above. There is approximately one new insect establishing itself in Florida each month. From 1986-2000, 150 exotic arthropods have become established in Florida. Not all of these become high-risk pests but it is important to identify those pests that have that potential. Efforts at determining potentially high-risk pests with a high likelihood of being introduced to Florida are ongoing and are extremely important. This allows the prevention or slowing of a pest introduction as well as providing critical information for the eradication or management of the pest once it is introduced. In response to this, the Florida Nurserymen and Growers Association has implemented a task force that involves the University of Florida, USDA, and the Florida Department of Agriculture and Consumer Services. The purpose of the task force is to identify the high-risk pests not yet in Florida and to promote monitoring and communication regarding these pests.

Communication is key in the process of monitoring and diagnosing high-risk pests. It is important that pertinent information is shared among all interested parties, but particularly to the clients who are many times the first to see a potential new pest. Ideally, a pest is identified as potentially high risk and steps are taken to eradicate or manage it before it spreads or causes economic damage. However, there can be negative repercussions to the client when this happens. For example, growers are encouraged to report new pests, but if they do, they may be required to treat infested areas, destroy plant material, or at worse, be prohibited from selling or shipping their product. Growers are well aware of this and many times are not comfortable in reporting new pests. This predicament creates a problem in communication and needs to be addressed.

Examples of High Risk Pests Established in Florida

Diaprepes root weevil, *Diaprepes abbreviatus* (Coleoptera: Curculionidae). *Diaprepes root weevil* is native to the Caribbean

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Islands and was first reported in Florida in 1964 in a nursery in central Florida. It is a major pest of citrus, sugar cane, and ornamental and root crops (Knapp et al., 2001). The adults feed on the foliage of host plants and the larvae feed on the roots. The adult weevils are fairly strong fliers, but most widespread distribution of this pest is attributed to movement of plant material. To date, 22 counties in Florida are considered infested. Diaprepes root weevil has been established in Florida for many years and continues to be a pest of high risk. There is tremendous concern of spreading it to other states, particularly in areas of major citrus production. This pest is considered high risk because it is damaging to multiple plant hosts that cross commodity groups, it attacks major economic plant hosts, it feeds on multiple parts of the plant, it is easily spread to new locations in soil or plant material, and much of its life cycle is below ground, making management particularly difficult.

Sri Lanka weevil, *Myloccerus undecimpustulatus* (Coleoptera: Curculionidae). This weevil is thought to be native to Sri Lanka. It was first reported in Broward County in 2000 and is currently in Miami-Dade, and Palm Beach Counties as well. The adults feed on a wide range of hosts including citrus, numerous tropical fruit, and ornamental trees (Thomas, 2002). The larvae are root feeders so they have potential to become serious pests as their populations spread and increase. This pest is high risk because it is damaging to multiple plant hosts across commodity groups, it attacks major economic plant hosts, it feeds on multiple parts of the plant, it is easily spread to new locations in soil or plant material, its biology is not well known, and much of its life cycle is below ground, making management particularly difficult.

Pink hibiscus mealybug, *Macdonellcoccus hirsutus* (Homoptera: Pseudococcidae). Pink hibiscus mealybug is commonly found in tropical Africa, India, Egypt, northern Australia, and SE Asia, where it feeds on more than 215 plants (Hoy et al., 2003). In the 1990s, it was discovered in the Caribbean and has spread throughout the islands. In 2002, it was found in Broward County. This pest sucks juices from its host plant and injects a toxic saliva as it feeds that causes malformation of leaves and fruit, as well as stunted leaves and terminal growth, which is commonly called "bunchy top". The mealybug feeding can also lead directly to the death of its host. The mealybug may be spread naturally by wind, birds, or other wildlife, or by people moving infested plant material to non-infested areas. This pest is high risk because it causes severe damage and plant death, it has a large host range that crosses commodity groups, and it has a high potential to spread to new areas and additional hosts.

Pink hibiscus mealybug was spreading throughout the Caribbean, so its introduction to Florida was anticipated. This is an excellent example of identifying a high-risk pest before it was introduced to the state. Information and training was provided so that when the mealybug was found, it was quickly identified and steps were taken immediately to constrain and

manage it. A program of long-term management with natural enemies was in place and was rapidly brought to Florida to manage pink hibiscus mealybug.

Lobate lac scale, *Paratachardina lobata lobata* (Homoptera: Kerriidae). The lobate lac scale is native to India and Sri Lanka. It was found on hibiscus in Broward County in 1999 and is currently also in Miami-Dade, Palm Beach, and Collier Counties. Lobate lac scale can cause severe damage and plant death with some hosts. It has been found on more than 120 woody plant species (Howard et al., 2003) that include ornamental and fruit trees. It is high risk because it attacks numerous host plants that cross commodity groups, some of the host plants are of economic importance, it attacks numerous native trees, and is threatening natural areas, and it appears to spread easily to new locations.

Asian cycad scale, *Aulacaspis yasumatsui* (Homoptera: Diaspididae). The Asian cycad scale was originally described from Thailand. It was found in Miami in 1996 and has spread northward in Florida into Georgia. Although it is similar to a common scale in Florida, magnolia white scale, *Pseudaulacaspis cockerelli*, it is far more damaging and ultimately kills its host plant (Howard et al., 1999). It is a pest of cycads, primarily the king and queen sagoes. Some of the cycads it attacks are very old and valuable plants. Although this pest only attacks cycads, it is high risk because of the value of some of the plants it attacks and because it has ultimately changed the cycad industry. This pest is difficult to control because it can live below ground on the roots and in protected parts of the plant. It is also spread easily to new locations.

The key to managing or reducing the impact of high risk pests is to keep informed, monitor for pests, damage, or unusual situations, diagnose new pests as quickly as possible, and communicate quickly and often. Keeping informed can be done by checking the Pest Alert websites of the University of Florida (<http://extlab7.entnem.ufl.edu/PestAlert/>) and Department of Agriculture and Consumer Service (<http://www.doacs.state.fl.us/~pi/enpp/pi-pest-alert.html>), routinely talking to county agents, and attending workshops and training.

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