Combined Proceedings IPPS 74:313-316. 2024.

Emerging Pests and Pathogens

Chris Shogren

University of California, Cooperative Extension, Alhambra, California 91801 USA

cjshogren@ucar.edu

Keywords: invasive, introduction, plant disease, spread

Summary

Since the arrival of Europeans in North America, an estimated 50,000 non-native species have been introduced, causing significant ecological impacts. In California alone, more than 17% of plants, 35% of freshwater fish, and over 1,000 invertebrates are considered exotic pests. Among recent invasive pests, *Thrips parvispinus* (pepper thrips) and *Nipaecoccus viridis* (Lebbeck mealybug) pose serious threats. Pepper thrips, detected in Florida in 2020, attacks at least 43 plant species and has spread to multiple states, causing extensive damage to leaves and flowers of affected plant species. Effective control requires careful monitoring and rotation of insecticides. Lebbeck mealybug, native to India, targets over 140 plant species and deforms leaves and fruit, causing wilting and dieback. Biological controls are recommended alongside chemical treatments. Other emerging threats include the *Cydalima perspectalis* (box tree moth), which damages ornamental boxwoods, and diseases like pine 'ghost canker' and fusarium wilt of palms, both of which are exacerbated by drought and warmer temperatures.

INTRODUCTION

An estimated 50,000 non-native species have been introduced into North America since the arrival of Europeans about 500 years ago. In California, more than 17% of plants are exotic, more than 35% of all freshwater fish are non-native, and more than 600 species of invertebrates have invaded California, with another 400 species deliberately introduced as biological control agents. Records in California for the period 1955–1988 indicate a constant influx of non-native species at an average rate of 6.1 species per year. Between 1989-2010, that rate of acquisition jumped to approximately nine exotic species per year, or one every 40 days. The continuous establishment of non-native species poses many challenges, which include identification of species that are a high risk of becoming serious pests; monitoring for those high-risk species; creation of management strategies to combat invasive species; the implementation of the management strategies; and the costs associated with any potential management program.

Thrips parvispinus (pepper thrips) is an invasive pest native to the Asian tropics. In May 2020, it was found causing damage on *Anthurium* plants in Florida, USA. Since its intitial detection in Florida, it has spread to at least four other states (Colorado, Georgia, North Carolina, and South Carolina). The species has also been detected in Ohio and Pennsylvania, and caused extensive damage to greenhouse crops in Ontario, Canada. Pepper thrips are small (~1mm long), with females brown-black in color and males entirely yellow and smaller in size (~0.6mm). The invasive thrips attacks at least 43 species including; *Gardenia*, *Mandevilla*, pepper, *Anthurium*, *Hoya*, *Ficus*, *Hibiscus*, jasmine, *Chrysanthemum*, *Schefflera*, and strawberry. Pepper thrips feeds on leaves and flowers causing extensive damage. Regular monitoring and establishment of action thresholds for the pest is extremely important for control. The University of Florida has published a recommended pesticide list for *T. parvispinus*. It is important to rotate insecticide groups to reduce the risk of the thrips building resistance.

Figure 1. Pepper thrips.

Nipaecoccus viridis (Lebbeck mealybug) is a destructive polyphagous pest native to India (**Fig. 2**). Lebbeck mealybug, also called hibiscus mealybug, has a host range of over 140 species, which includes citrus, gardenia, jasmine, oleander, and hibiscus. *Nipaecoccus viridis* prefers to feed on actively growing tissues, such as new growth, new branches, and fruit. Feeding can cause twisted/distorted fruit and leaves; branch dieback; wilting; and even plant death. Lebbeck mealybug seems to mostly be an issue in absence of natural enemies or the overuse of insecticides. The invasive mealybug is difficult to control with insecticides, and the use of adjuvants to penetrate its waxy covering is critical for gaining control with chemical applications. Biological control options include *Anagyrus aegyptiicus*, *Anagyrus dactylopii*, *Anagyrus indicus*, *Leptomastix phenacocci*, and *Cryptolaemus montrouzieri*.

Figure 2. Lebbeck mealybug. Photos by Erin Powell, Ph.D., Lance Osborne, Ph.D., and Muhammad Z. Ahmed, Ph.D.

Cydalima perspectalis (box tree moth) is a destructive lepidopteran pest spreading quickly in North America. Boxwoods (*Buxus* spp.) are the preferred host of box tree moth. While there are no native boxwoods in North America, potentially slowing its spread, boxwood is a widely used plant in landscapes for topiaries and hedges. Box Tree Moth is easily recognized by the webbing the caterpillars create throughout the shrub. Caterpillars cause extensive feeding damage to boxwoods, feeding first on the leaves and leaving only the midrib. Once the leaves are gone, caterpillars feed on the bark, leading to girdling and plant death.

Figure 3. Box moth.

Pine ‘ghost canker’ (*Neofusicoccum* spp.) and Fusarium wilt of palm (*Fusarium oxysporum* f.sp. *palmerum*) are two emerging plant pathogens. Pine ‘ghost canker’ is a disease recently detected in southern California affecting multiple pine species in urban forests and parks. Multiple *Neofusicoccum* spp. have been isolated from symptomatic trees. Symptoms first appear as lower branch death and if not properly managed will lead to tree death as the canker spreads. Drought and higher temperatures may be predisposing pines to this disease.

Fusarium wilt of palms primarily attacks queen palms (*Syagrus romanzoffiana*) and Mexican fan palms (*Washingtonia robusta*). Initial symptoms occur on the lower or older leaves in the palm canopy, and exhibit one-sided discoloration or necrosis. Symptoms move from the older leaves to the upper, younger leaves, killing the spear leaf in the top center of the canopy last. Fusarium wilt of palms is fast acting and can kill palms within two to three months.