

Branch Dieback of *Syzygium paniculatum* (Eugenia)¹

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Introduction

Syzygium paniculatum (Myrtaceae; syns. *Eugenia myrtifolia*; *E. paniculata* var. *australis*) is an economically important plant in the South Florida ornamental industry. Known as eugenia in the trade, the plant's popularity stems from its dense, attractive foliage, the ease with which the canopy can be sculpted, and its relatively carefree management. It is used as a potted plant, in espaliers and topiaries, and in hedges in USDA Hardiness Zones 10 and 11 (Figs. 1–3). Shortly after Hurricane Wilma in November 2005, a serious dieback disease began to affect nursery production of eugenia in the Homestead area (southern Miami-Dade County). Since then, the disease has become prevalent, affecting local nurseries throughout South Florida.

Symptoms

Symptoms include wilting and death of terminal and lateral branches and vascular discoloration in dead and dying branches and the main stem (Figs. 4 and 5). Disease develops in both sculpted (pruned) and nonsculpted plants. Leaves turn necrotic (dead) and remain attached for a week or longer after death, although branches and plants affected by the disease eventually defoliate. Brick red, vascular discoloration is extensive in dead and dying branches at their insertion points along the main stem (Figs. 6 and 7). In general, the disease develops during late summer and becomes infrequent as temperatures drop in the late fall and winter.



Figure 1. Large-scale eugenia production for the topiary market.

Pathogen

The fungus, *Neofusicoccum parvum*, causes the dieback disease. *Neofusicoccum parvum* (= *Fusicoccum parvum*, teleomorph *Botryosphaeria parva*) is actually a complex of closely related species that have a wide host range, with 43 different hosts reported in the USDA-ARS Systematic Mycology and Microbiology Fungal Database. The pathogen has also reportedly caused a dieback on *Syzygium cordatum* in South Africa, a native ornamental tree in that country. *Neofusicoccum parvum* has been associated with dieback on many other tropical and subtropical hosts, including avocado, guava, citrus, eucalyptus, and mango. The fungus grows rapidly in culture, producing fluffy

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Figure 2. Eugenia pruned into popular patterns, such as spirals and balls.



Figure 3. Eugenia is often pruned to resemble shapes of animals, such as a duck.

gray colonies that darken with age (Fig. 8). It can produce unicellular conidia (Fig. 9) that eventually form septa and become pigmented with age, but many isolates grow vegetatively without producing spores.



Figure 4. Branch dieback affecting numerous plants in a large eugenia production nursery.



Figure 5. Symptoms of branch dieback are affecting the mid-plant canopy and main stem of this eugenia.

Disease Cycle and Epidemiology

Dieback occurs mainly in the late summer with the onset of high temperatures. The severity of external and internal symptoms increases as temperature increases. Sunlight does not impact disease severity, so the production of eugenia in full sun is not a contributing factor to the disease. Research findings working with related pathogens that cause dieback diseases have shown that drought stress induces disease. Further research is under way to fully characterize the disease cycle and to determine the environmental factors that contribute to disease development in *Syzygium paniculatum*.



Figure 6. The split stem of a diseased branch showing typical brick red vascular discoloration. Note the stark contrast between discolored pith tissue and the healthy greenish-white tissue.



Figure 8. Fluffy gray colony of a *Neofusicoccum parvum* isolate growing on acidified potato dextrose agar.

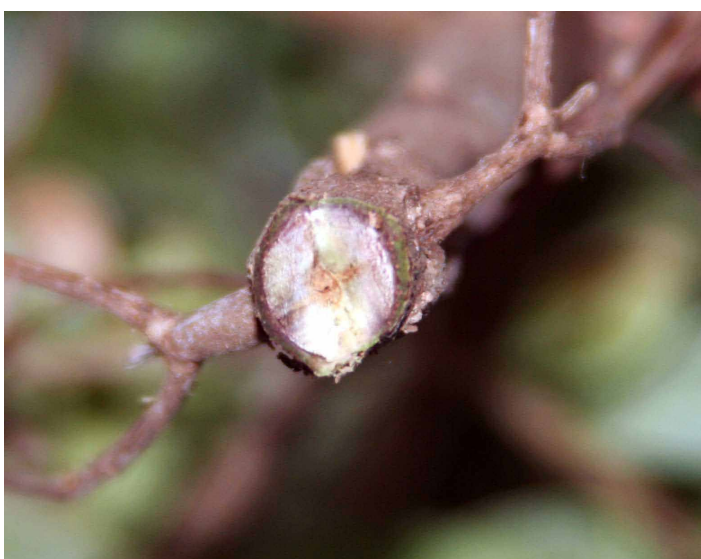


Figure 7. A cross section of diseased branch tissue showing the discolored pith.



Figure 9. Uniccular conidia of *Neofusicoccum parvum*, the causal agent of branch dieback of eugenia.

Management Recommendations

Currently, good sanitation measures are recommended to manage this disease. When pruning symptomatic branches, be sure to remove the diseased cuttings from the landscape or nursery. Sanitize all tools used to prune or work with plants before each use. It's best to sanitize pruning shears between each plant. There are numerous disinfectants commercially available at home or hardware stores for this purpose. Some growers dip pruning tools in bleach and dunk them in oil after drying (to minimize rust). Examples of disinfectants for tools include: 1) 25% chlorine bleach (3 parts water and 1 part bleach); 2) 25% pine oil cleaner (3 parts water and 1 part pine oil); 3) 50% rubbing alcohol (70% isopropyl; equal parts alcohol and water); 4) 50% denatured ethanol (95%; equal parts alcohol and water);

and 5) 5% quaternary ammonium salts. Soak tools for 10 minutes (or as directed by the product label) and rinse in clean water. *Do not mix quaternary ammonia with bleach.*

Chemical control options are available and should be applied in a preventative manner. This disease is most severe under hot and humid conditions, so a preventative management program should begin with fungicide applications in early to mid-spring. Triazoles are products such as myclobutanil, propiconazole, tebuconazole, or triadimefon. These products provide systemic activity with the ability to get into the plant tissue. Another group of systemic fungicides is the strobilurins, which include azoxystrobin, pyraclostrobin, and trifloxystrobin. Many contact fungicide products, which do not have the ability to access the plant's vascular system, provide cheaper alternatives but

are generally applied more often and at higher rates than systemic fungicide products. Active ingredients for contact fungicides include captan, chlorothalonil, copper formulations, and mancozeb.

Once symptoms (i.e., branch dieback) are present, the affected tissue should be pruned a minimum of 4 inches below the lowest symptomatic branch on the main stem. After pruning, ensure that the exposed vascular tissue of the freshly cut stem appears greenish white (healthy) as opposed to the diseased brick red tissue shown in Figures 6 and 7. If the freshly pruned vascular tissue is still discolored, cut lower on the stem until only healthy tissue remains. Fungicide applications after pruning help to minimize infection of the freshly cut tissue. When using contact fungicides, be certain to achieve good coverage, especially on new wounds made during pruning. Because it is likely that plant stress contributes to disease outbreaks, maintaining plant health is important for dieback management. Provide adequate fertilizer— especially slow-release formulations that are suitable for subtropical and tropical weather conditions. In addition, it's important to provide adequate moisture through irrigation. Do not allow soil in the root zone to dry out completely, especially to the point where plants are wilting.

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