

2018–2019 Florida Citrus Production Guide: Brown Rot of Fruit¹

M. M. Dewdney, E. G. Johnson, and J. H. Graham²

Management of brown rot, caused by *Phytophthora nicotianae* or *P. palmivora*, is needed on both processing and fresh market fruit. While the disease affects all citrus types, it is usually most severe on Hamlin, Navel, and other early maturing sweet orange cultivars. See [PP-156 Phytophthora Foot Rot, Crown Rot, and Root Rot](#) for information on other phytophthora diseases.

Phytophthora brown rot is a localized problem, usually associated with restricted air and/or water drainage. It commonly appears from mid-August through October following periods of extended high rainfall. It can be confused with fruit drop from other causes at that time of the year. If caused by *P. nicotianae*, brown rot is limited to the lower third of the canopy because the fungus is splashed onto fruit from the soil. *P. palmivora* produces airborne sporangia and can affect fruit throughout the canopy.

Early season inoculum production and spread of *Phytophthora* spp. are minimized with key cultural practice modifications. Skirting of trees reduces the opportunity for soil-borne inoculum to contact fruit in the canopy. The edge of the herbicide strip should be maintained just inside of the dripline of the tree to minimize the exposure of bare soil to direct impact by rain. This will limit rain splash of soil into the lower canopy. Boom application of

herbicides and other operations dislodge low-hanging fruit. Trees affected by huanglongbing (HLB; citrus greening) are prone to prematurely drop fruit. These fruit on the ground become infected and produce inoculum, especially for *P. palmivora* where fruit grown sporangia can rapidly move up in the canopy. The sporangia can infect green fruit and result in brown rot infection in the canopy as early as July. The beginning of the epidemic is very difficult to detect before the fruit are colored and showing typical symptoms. Application of residual herbicides earlier in the summer may reduce the need for post-emergence materials later and minimize fruit drop throughout this early stage of inoculum production from fallen fruit.

Usually a single spray application of Aliette, Phostrol or ProPhyt before the first signs of brown rot appear in late July is sufficient to protect fruit through most of the normal infection period. No more than 20 lb/acre/year of Aliette should be applied for the control of all phytophthora diseases. Aliette, Phostrol, and ProPhyt are systemic fungicides that protect against postharvest infection and provide 60–90 days control. Copper fungicides are primarily protective but are capable of killing sporangia on the fruit surface and thus reducing inoculum. They may be applied in August before or after the appearance of brown rot and provide protection for 45–60 days. If the rainy season is

1. This document is PP-148, one of a series of the Plant Pathology Department, UF/IFAS Extension. Original publication date December 1995. Revised September 2013, April 2016, and May 2018. Visit the EDIS website at <https://edis.ifas.ufl.edu> for the currently supported version of this publication.

2. M. M. Dewdney, associate professor, Plant Pathology Department; E. G. Johnson, Plant Pathology research assistant scientist; J. H. Graham, professor emeritus, Department of Soil and Water Sciences, UF/IFAS Citrus Research and Education Center; UF/IFAS Extension, Gainesville, FL 32611.

The use of trade names in this publication is solely for the purpose of providing specific information. It is not a guarantee or warranty of the products named, and does not signify that they are approved to the exclusion of others of suitable composition.

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Opportunity Institution authorized to provide research, educational information and other services only to individuals and institutions that function with non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, marital status, national origin, political opinions or affiliations. For more information on obtaining other UF/IFAS Extension publications, contact your county's UF/IFAS Extension office.

U.S. Department of Agriculture, UF/IFAS Extension Service, University of Florida, IFAS, Florida A & M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Nick T. Place, dean for UF/IFAS Extension.

prolonged into the fall, a follow-up application of either systemic fungicide at one-half of the label rate, or copper in October may be warranted. If a second application is needed, follow the pre-harvest intervals carefully ([Pesticides Registered for Use on Florida Citrus](#)). With average quality copper products, usually 2–4 lb of metallic copper per acre are needed for control.

Precautions should be taken during harvesting to exclude brown rot-affected fruit in the field containers as this could result in rejection at the processing or packing facility.

Recommended Chemical Controls

READ THE LABEL.

See Table 1.

Rates for pesticides are given as the maximum amount required to treat mature citrus trees unless otherwise noted. To treat smaller trees with commercial application equipment including handguns, mix the per acre rate for mature trees in 250 gallons of water. Calibrate and arrange nozzles to deliver thorough distribution and treat as many acres as this volume of spray allows.

Table 1. Recommended Chemical Controls for Brown Rot of Fruit.

Pesticide	FRAC MOA ²	Mature Trees Rate/Acre ¹
Aliette WDG	P07	5 lb—not more than 4 applications per year for all uses and no more than 20 lb/A
Phostrol	P07	4.5 pints
ProPhyt	P07	4 pints
copper fungicide	M01	Use label rate.

¹ Lower rates may be used on smaller trees. Do not use less than minimum label rate.
² Mode of action class for citrus pesticides from the Fungicide Resistance Action Committee (FRAC) 2018. Refer to ENY-624, Pesticide Resistance Management, in the *2018–2019 Florida Citrus Production Guide* for more details.