

2024–2025 Florida Citrus Production Guide: Brown Rot of Fruit¹

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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 chapter 31, “[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 extended periods of high rainfall. It can be confused with fruit drop from other causes at that time of year. If caused by *P. nicotianae*, brown rot is limited to the lower third of the canopy because the fungus-like organism is splashed onto fruit from the soil. *P. palmivora* produces abundant sporangia on infected fruit that can splash onto 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 soilborne 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.

Fruit on the ground become infected and produce inoculum, especially in *P. palmivora*, where fruit-grown sporangia can readily splash upward into the tree 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. Boom application of herbicides and other operations dislodge low-hanging fruit. Furthermore, trees affected by huanglongbing (HLB; citrus greening) are prone to premature fruit drop. Early stage inoculum production from fallen fruit may be reduced by using residual herbicides early in the summer rather than late summer post-emergence herbicide applications that can knock fruit off the trees.

Before the first signs of brown rot appear in late July, a single spray application of Aliette, Phostrol, ProPhyt, or another product with a FRAC P 07 (formerly FRAC 33) mode of action should be made. Doing so protects fruit, usually through most of the normal infection period. Alternatively, the newer fungicides Orondis Ultra (FRAC 40+49) or Revus (FRAC 40) can be used from September

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Use pesticides safely. Read and follow directions on the manufacturer's label.

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to November, before symptoms of the brown rot. If more than one disease management application is required in a season, rotate to an alternate mode of action for resistance management. *Phytophthora* spp. resistance to FRAC P 07 containing products has been observed in California although not in Florida at this time. 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. It is not legal to use products containing phosphite salts without a fungicide label for disease management. Orondis Ultra and Revus are also systemic and estimated to protect fruit up to 30 days, but the full period of protection is not yet certain. Copper fungicides are primarily protective but are capable of killing sporangia on the fruit surface, 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 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 preharvest intervals carefully (see chapter 44, “[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 fruit affected by brown rot from field containers because 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 gal of water or the recommend rate listed in Table 1. 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 ¹	Mature Trees Rate/Acre ²
Aliette WDG	P 07	5 lb or 1 lb/100 gal—Not more than 4 applications per year for all uses and no more than 20 lb/acre. Do not apply within 30 days of harvest.
Orondis Ultra	40 + 49	5.5–8.0 fl oz—Maximum 1 application a year, and do not apply more than 8 fl oz (0.02 lb a.i. oxathiapiprolin and 0.13 lb a.i. mandipropamid).
Phostrol	P 07	4.5 pt—Can cause phytotoxicity if applied above 90°F, at color break, or after rainfall.
ProPhyt	P 07	4 pt—Recommended application volume of 100–205 gal/acre.
Revus	40	8.0 fl oz—Maximum 2 applications a year with a minimum 30-day retreatment interval. Do not apply more than 16 fl oz (0.26 lb a.i.)/year.
copper fungicide	M 01	Use label rate.

¹ Mode of action class for citrus pesticides from the Fungicide Resistance Action Committee (FRAC) 2024. Refer to chapter 4, “[Pesticide Resistance and Resistance Management](#),” for more details.

² Lower rates may be used on smaller trees. Do not use less than the minimum label rate.