Melanose[1]

L.W. Timmer and T.A. Kucharek[2]

Melanose is a disease caused by the fungus *Diaporthe citri* Wolf. On the fruit, the disease produces a superficial blemish which is unlikely to affect the overall yield of processing fruit, but causes external blemishes which reduce the value of fruit intended for the fresh market. This disease is generally of minor economic importance on foliage.

All commercial citrus varieties grown in Florida are susceptible to melanose. Pustules are larger on grapefruit, so blemishes tend to be more serious on this species.

Symptoms

Leaf symptoms begin as tiny water-soaked specks that become depressed in the center and surrounded by a translucent yellow area that is not depressed. Later, the leaf cuticle ruptures and a gummy substance is exuded which turns brown and hardens. The yellowish margin disappears and the hardened gummed areas will have a sandpaper-like texture. Infected areas on the leaf may be scattered, aggregated, or in streaks, depending on where water transported the spores prior to infection (Figure 1). Heavily infected leaves become pale green to yellow, can be distorted and may fall from the tree. Melanose is seldom severe on the spring growth flush. When it does occur on this flush, the pustules are usually few and little or no leaf drop occurs. On the summer growth flushes, melanose can be severe enough to cause defoliation, particularly in years following freeze-induced twig dieback.

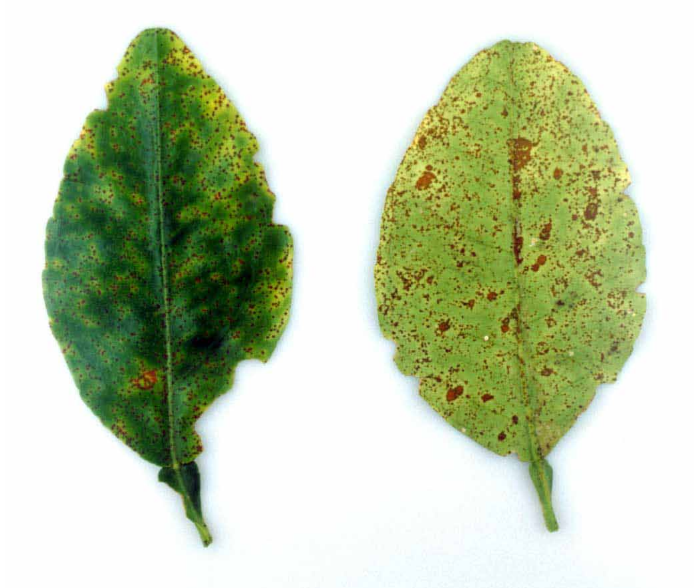

Figure 1. Close-up of melanose on grapefruit leaves.

On fruit there is a tendency for the diseased areas to form tear-streak and water droplet patterns (Figures 2, 3). When copper fungicides are applied to citrus in hot, dry weather, they can result in small, black, raised spots on leaves or fruit (Figures 4, 5) which can resemble melanose. Light

1. This document is PP150, one of a series of the Plant Pathology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date July 2001. Revised May 2008. Reviewed April 2012. Visit the EDIS website at http://edis.ifas.ufl.edu.

2. L.W. Timmer, Professor, Extension Plant Pathologist, Citrus Research and Education Center, Lake Alfred, Florida; T.A. Kucharek, Professor, Extension Plant Pathologist, Department of Plant Pathology, Gainesville, Florida; Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.

infestation produces scattered specks on the fruit. Fruit infected when young may remain small and abscise prematurely. Late infection produces flatter pustules. If the severity is such that solid patches of blemish are produced, the fruit surface can crack producing a roughened condition called mudcake melanose (Figure 3). Mudcake melanose occurs if infection takes place soon after petal fall (usually early April). Melanose on fruit can be distinguished from rust mite injury by the presence of a roughened surface with melanose and a smooth rind blemish with rust mite injury (Figure 6).

Figure 2. Speck melanose on grapefruit.

Figure 3. Tear stain and mudcake melanose on grapefruit.

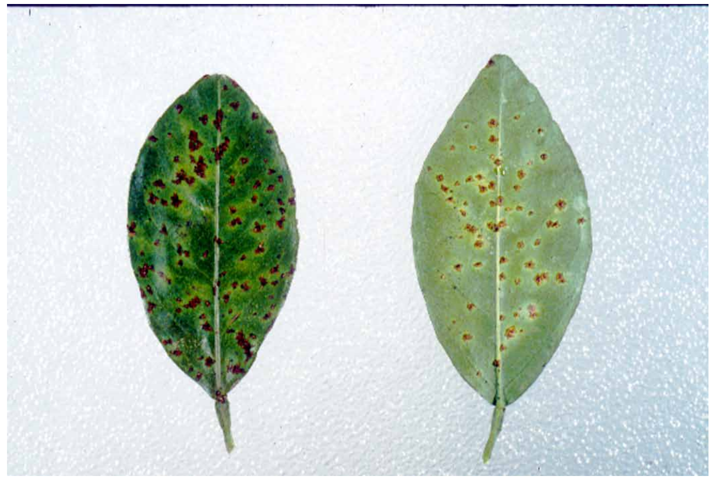

Figure 4. Copper damage on sweet orange leaves.

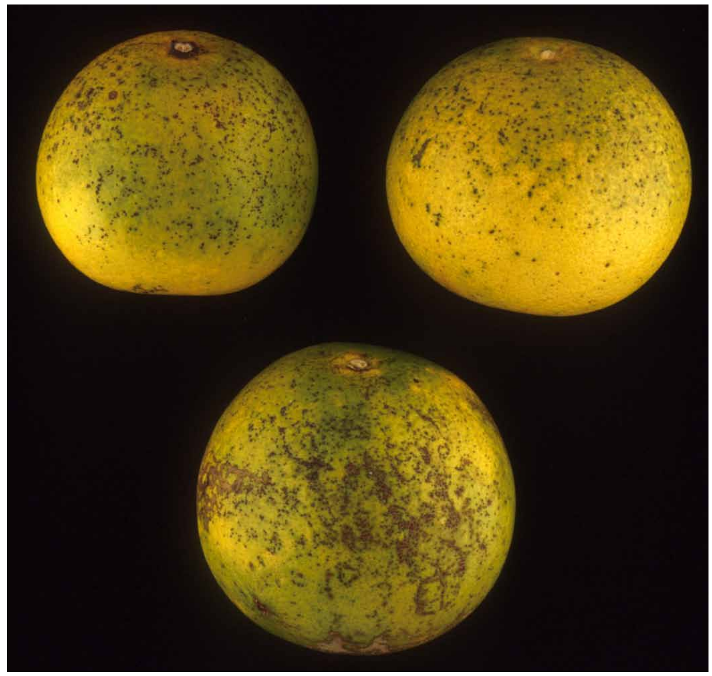

Figure 5. Copper injury on fruit (top) compared to melanose damage (bottom).

Figure 6. Rust mite damage (left) and melanose (right) on grapefruit.

Disease Cycle

There must be recently killed young twigs in the tree canopy to support spore production for fungal infection to occur. Also, the host tissue must be in a susceptible state. Temperature and rainfall conditions during the period of leaf expansion and during the first 12 weeks after petal fall regulate disease severity. After a spore lands on susceptible tissue, a period of 10-12 hours of moisture is required for infection at 77°F (25°C) whereas at 59°F (15°C) 18-24 hours of wetness are necessary for infection. Thus extended wet periods resulting from afternoon rain showers plus dew periods in May and June coupled with warmer temperatures during these months create favorable weather for infection. In contrast, rainfall prior to May in central and south Florida often is associated with fast-moving cold fronts that are quickly followed by temperatures that are too cool for infection. Also, winds behind the front quickly dry surface moisture on plant tissue. At temperatures between 75-82°F (24-28°C) initial symptoms appear 4 to 7 days after infection.

The fungus *Diaporthe citri* produces ascospores (sexually produced) and pycnidiospores (asexually produced). This latter spore type is the part of the life cycle that provides most of the inoculum for disease and is referred to as *Phomopsis citri*. Ascospores are formed within a vesicle-like structure on decaying wood on the soil or on dead branches remaining on the tree or in brush sites. These spores are produced in relatively small numbers and contribute slightly to disease potential in a grove. Their main contribution to disease development relates to spread of the fungus over long distances because ascospores are windborne.

Pycnidiospores, on the other hand, are produced abundantly on dead branches within flask-shaped structures (pycnidia). They provide for short distance spread within a tree or from one tree to an adjacent tree by rain splash. Spores can be washed down over infected branches by rain or irrigation water and spreading them to lower leaves, fruit, or live branch tissue of the tree canopy. Therefore, freeze-damaged citrus trees, older groves, and poorly maintained groves with much recently killed wood should be considered high melanose incidence areas. All types of citrus are susceptible. Other hosts for this fungus have not been identified.

Leaves become resistant to infection once they are fully expanded. Fruit rind becomes resistant about 12 weeks after petal fall, but the later the infection occurs during that 12-week period the smaller will be the resulting pustules. Thus, even though suitable weather conditions exist for infection after late June or early July, melanose will not infect the fruit rind after that time except in years when the bloom is later than normal.

Disease Management

Melanose is usually not severe on the spring growth flush. Copper fungicides provide little protection when applied at this time. In practice, only melanose on fruit that can be economically controlled. For copper fungicides to control melanose on fruit they have to be applied postbloom, preferably late April, prior to anticipated increased frequency of attack. Several applications may be needed to protect the fruit from petal fall until it becomes resistant in late June or early July. Recommended commercial fungicides and cultural suggestions for control of melanose on all varieties are shown in the *Florida Citrus Pest Management Guide*.

Melanose can be reduced by pruning and burning dead wood which will reduce inoculum (spore supply). Regardless of how conscientiously the pruning and burning are carried out, fungicide spraying will still be necessary to produce blemish-free fruit. Overhead irrigation for up to 12 hours has shown to have little or no effect on melanose severity. Melanose is usually most serious in older groves.