Fundamentals of citrus canker management

By L.W. Timmer, J.H. Graham and H.L. Chamberlain

The 1900-foot rule has been suspended and eradication of citrus canker-affected trees has been essentially ended. The Citrus Health Response Plan (CHRP) is being developed, but it does not appear that obligatory removal of affected trees will be a part of that plan. Thus, growers probably have to use their best judgment in management of citrus canker.

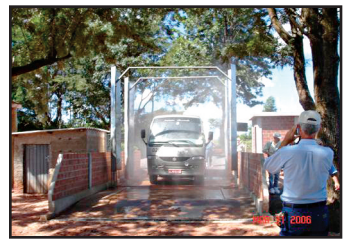
The Division of Plant Industry (DPI) has found canker in most citrus areas of the state except the northwestern production areas. DPI will continue to monitor and report detections of the disease in commercial groves. Currently, 75 percent of the citrus acreage is within five miles of a canker find.

Although it is difficult to predict exactly how severe canker will be under Florida conditions, indications from outbreaks in the state are that it will be difficult to control. Areas that are currently canker-free should be protected to the extent possible.

PROTECTING CANKER-FREE AREAS

DECONTAMINATION

Rules for decontamination are still in place and should be followed. With more canker around the state, the possibility of spread is greater than ever. In moving equipment and personnel from grove to grove, every effort should be made to make sure that plant material is not moved inadvertently and that all equipment has been thoroughly decontaminated. Decontamination is especially important in harvesting operations and in any other practices involving extensive contact with foliage. Obviously, when equipment is moved from blocks where canker is endemic to other infected blocks, decontamination serves little purpose.



INOCULUM SUPPRESSION

TREE REMOVAL

If canker is detected in areas previously free of the disease, removal and burning of trees on site can slow the establishment of the disease. For tree removal to be effective, canker has to be localized and limited to a small number of trees. Tree removal is not likely to be effective if canker is already present within a mile of the grove.

A few apparently healthy trees surrounding the infested area should be removed as well or defoliated. More trees should be removed if the focus is large, but if it is very large, tree removal may need to be reconsidered.

This measure is unlikely to eradicate the disease, but can substantially slow disease development. Tree removal must be followed by monthly inspections and removal of any more trees found positive for the disease.

At some point, tree removal will no longer be economically sustainable and should be discontinued.

DEFOLIATION

There are currently no registered defoliants. Some growers are using high concentrations of urea or soluble copper compounds on an experimental basis. However, no rates or spray volumes have been established for this practice. Chemical defoliants may be available at some point in the near future.

Defoliation of known canker-infected trees is not likely to eliminate the disease. A strong flush of highly susceptible leaves follows defoliation and that foliage is likely to become infected from residual inoculum in the tree or nearby.

Defoliation can be useful in areas surrounding foci of infected trees that have been removed. These trees may appear healthy, but are likely to harbor undetectable canker lesions. Defoliation can eliminate this inoculum and still save many trees.

ENDEMIC CANKER

Where canker is already endemic, the primary means of control are:

1) planting of windbreaks,
2) protection of fruit and leaves with copper sprays,
3) control of leafminer, and
4) planting tolerant varieties.

WINDBREAKS

Windbreaks are highly effective in reducing the spread of canker, but more importantly, they reduce the severity of the infection in endemic situations. When canker lesions are wetted, millions of bacteria ooze onto the leaf surface. While bacteria can swim very short distances, they have no active means to penetrate the fruit, leaves or twigs. The vast majority of the infection occurs by wind-blown rains. Winds of 18 to 20 mph are needed to actually force bacteria into the stomates on leaves and fruit.

Windbreaks are the single most effective means of dealing with canker. In our observations in Argentina, the number of canker lesions was 10 times greater on the side of the tree exposed to the prevailing winds than on the protected side of the same tree. In tests in nursery situations, artificial windbreaks greatly diminished the distance of spread of canker down the nursery row and reduced disease to only a few scattered lesions.

Windbreaks reduce wind speed for a distance 10 times the height of the windbreak. That is, a 30-foot tall windbreak will exert an effect for about 300 feet.

To be effective for canker control, windbreaks need not be dense. All that is required is to reduce wind speed to less than 20 mph.

The need for and the distance required between windbreak rows will depend on the destination of the fruit – fresh or processed – and the susceptibility of the variety. With grapefruit for the fresh market in Florida, it is likely that

each 5 to 10-acre block will need to be surrounded by windbreaks. In many groves of less susceptible varieties, a windbreak down the row about every 300 feet may be sufficient.

In some situations where some protection exists and tolerant varieties are grown for processing, additional windbreaks may be unnecessary. Currently, we recommend that growers plant windbreaks along fence lines, ditches, around wetlands, or wherever they can plant without removing citrus trees. If it becomes obvious that more windbreak protection is needed, rows of citrus or end trees can be removed to accommodate windbreaks.

For more information on selection of plant species and design, see the CREC Web site (www.crec.ifas.ufl.edu).

COPPER SPRAYS

Over the last 30 years, University of Florida-IFAS has evaluated dozens of products for canker control in several projects in Argentina and Brazil. Products such as antibiotics, compounds that induce resistance in plants, and disinfectants often provide limited canker control, but no product has proven more effective than copper products.

Copper products are quite effective in preventing infection of fruit, less effective for reducing leaf infection, and have limited value in reducing spread of the disease.

Application of copper to young leaves protects against infection, but protection is soon lost due to rapid expansion of the surface area. Fruit grows more slowly and is easier to protect.

Fruit is susceptible to infection after the stomates open when the fruit is about one-half inch to 1 inch in diameter until they develop resistance in mid to late July. Infection through wounds can occur at any stage.

Programs needed for effective control of canker in Florida have not been determined. However, we believe that most of the infection will occur during June and July here. With endemic canker, we suggest that three copper sprays be used for early oranges grown for processing — one in mid-May, a second in early to mid-June, and the final one in early July. Two applications should be sufficient for Valencias, in early June and in early July.

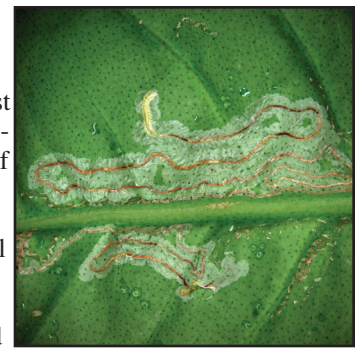
Programs for fresh fruit are more complex, but many copper sprays are already used on these varieties. For fresh market grapefruit, a low rate of copper should be added to the spray of spring flush for scab. Subsequently, the copper spray program used for melanose control should also control canker, but additional applications may be needed in late June and July. Copper may need to be added to applications of fungicides or petroleum oil.

Most tangerines are fairly tolerant to canker. Programs used for control of Alternaria should also protect against canker, but copper will have to be used in each spray. Navel oranges are highly susceptible to canker and will probably need to be sprayed every three weeks from late April to mid-July. Fallglo is more tolerant and probably three sprays in May, June and July should suffice.

Spray programs will have to be adjusted as we develop experience. The rates needed depend on the length of protection expected and the weather. As little as 0.5 to 1.0 lb. of metallic copper will protect spring flush growth or fruit during the dry spring season. However, in the rainy season, up to 2 to 3 lbs. of metallic copper will be required to protect fruit for three to four weeks. To the extent possible, we are trying to minimize copper usage since this metal accumulates in soil and may cause phytotoxicity and creates environmental concerns.

LEAFMINER CONTROL

Leafminers do not spread canker, but extensive invasion of leafminer tunnels by the bacterium greatly increases inoculum levels, making the disease difficult to control. Leafminers are not usually a problem on the spring flush and no control is needed at that time. Leafminer control on the first summer flush can reduce disease pressure considerably. If properly timed, applications of petroleum oil, Agri-mek, Micromite, Spintor, or Assail will reduce damage by leafminer. Late summer flushes tend to be erratic and effective control at that time will probably be difficult.



VARIETAL RESISTANCE

Of the varieties grown in Florida at present, grapefruit, navel oranges, and some early oranges like Early Gold are highly susceptible. Hamlins and tangelos are somewhat less susceptible, but still can be severely damaged. Tangerines and some hybrids like Murcotts are more tolerant, as are Valencia oranges.

Since nursery trees are relatively unavailable currently, it will be difficult to change the varieties grown in Florida in the near future. Canker may greatly limit shipment of fresh fruit to many areas. The ability to market fruit, consumer preference, and our ability to deal with canker will ultimately dictate the varieties grown in Florida. Our industry will be greatly changed by endemic canker, but we will survive this challenge as we have others.

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