

Responses to Questions Asked at Public Hearing  
Regarding Amendments to Rule No. 5B-58.001  
Citrus Canker Eradication  
1400 W. Commercial Blvd.  
Ft. Lauderdale, FL  
November 14, 2001

**1. Magna Bon Eradicator claimed to stay on leaf for up to six weeks and effective against citrus canker, is this accurate?**

This is a copper product that is claimed to have long residual activity, most notably on hard surfaces in a laboratory testing situation. Virtually all copper products could make such a claim. As a pesticide applied to the plant, the product works superficially, not within the tissues, so its ability to manage the disease will be comparable to that of other copper-containing pesticides. The product can manage and reduce the severity of the disease on an infected plant, but cannot prevent or effectively control the spread of the disease.

**2. *Murraya* is claimed to be a host plant of citrus canker in Japan; did Dr. Gottwald address that in his study?**

*Murraya* spp. have not been regarded as host plants of citrus canker in the field (see <http://doacs.state.fl.us/~pi/enpp/pathology/cank377.html> for detailed host information) and therefore Dr. Gottwald did not include *Murraya* spp. as hosts in his study.

**3. Did Dr. Gottwald do a protein analysis on non-citrus, Rutaceae, and *Murraya* in the study?**

No, Dr. Gottwald did not run any unspecified “protein analyses” on non-citrus, Rutaceae, and *Murraya* in his epidemiological study. A protein analysis would be irrelevant to the objectives of the study.

**4. Did Gottwald take into account average rainfall in Florida over the past 39 years was 53 inches which allegedly is marginal for existence of *Xanthomonas*, in light of comment that bacteria require at least 50 inches of rain to “exist” and in some years Florida has barely 20 inches of rain and over 120 inches other years?**

Dr. Gottwald took into account monthly average rainfall and other tropical storm-related weather conditions in the experiment sites. He also explored their correlations with pathogen dispersal pattern, disease intensity, and disease progress. Average annual precipitations in Florida over the last 39 years have provided little insight and no significant information toward this epidemiological study.

**5. *Xanthomonas* is all over state. Did Dr. Gottwald consider genetic drift and natural rate of mutation? Some genetic drift could be caused by ultraviolet light.**

Citrus canker is not currently distributed throughout Florida. Although xanthomonads are all over

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Florida, only *Xanthomonas axonopodis* pv. *citri* causes citrus canker on citrus. Issues of genetic drift and natural rate of mutation were not relevant to the study. Dr. Gottwald did not consider genetic drift of the pathogen via natural mutation such as ultraviolet light because the closest distance between a focal tree and subsequently infected trees was measured through confirmation of new infections on the adjacent citrus, not the pathogen. The mutation rate and mutation frequency are extremely low, ranging between  $10^{-4}$  and  $10^{-8}$ . In addition, it takes many, many years for any mutants with an altered trait to adapt to a new host, host conditions or a different environment. Therefore, genetic shift of the canker bacterium was not considered as an issue in his 18-month epidemiological study.

### **6. Some people talk about a Coral Springs strain—is there such a strain?**

Plant pathologists have not discussed the existence of a Coral Springs strain. There is no irregular disease symptom to prompt this distinction.

### **7. What about thermal therapy and SAR application to control citrus canker?**

It would be impractical to treat via thermal therapy a whole tree (some trees are quite large in size) with bacteria occupying internal tissues. The lethal temperatures for plants and bacteria are too close together to avoid extensive damage or kill the citrus canker-infected tree.

Any applications of a commercially prepared product would be similar to other causal factors that elicit a systemic acquired resistance (SAR) in a plant. Once a plant becomes infected with a pathogen, a localized defense response is triggered in the area of infection. This response involves localized death of cells (necrosis), which is designed to keep the pathogen from spreading; the cell walls in the area undergo lignification, and the formation of a variety of pathogenesis-related proteins (phytoalexins). However, disease infection pathways such as wounds caused by the citrus leafminer and mechanical damage and windstorm events would still lead to successful bacterial infections. Field performances of commercial products have not shown much promise with a citrus plant disease model.

### **8. If *Xanthomonas campestris poa* or *Xc hibiscus* were put on citrus, what would happen in three or four months?**

Nothing will happen if *Xanthomonas campestris poa* or *Xc hibiscus* are inoculated on citrus because both xanthomonads are not pathogenic to citrus.

### **9. Did Dr. Gottwald do DNA analysis of focal trees?**

No, there was no scientific need to do DNA-based analysis on focal trees in his study.

### **10. Did Dr. Gottwald do a protein analysis which is also a chemical stress analysis?**

No, there was no scientific need to do a protein analysis on focal trees in his study.

### **11. Need a definition for effective eradication.**

Effective eradication can be defined as the state of affairs that exist when, to the best of our ability to detect the disease, no disease is found.

**12. Why hasn't the Department used radii smaller than 1900 feet?**

The department employed previously a 125-foot radial distance to determine what citrus plants were exposed to a citrus canker-diseased citrus plant and required removal. Recent research demonstrated that this distance would not allow successful eradication of the disease from Florida because too much disease inoculum remained with exposed trees beyond 125 feet. With a better understanding of the long distance dispersal of the disease, knowledgeable plant pathologists recommended using a 1900-foot radial distance for determining which plants were exposed to a diseased plant and therefore needed to be removed in a timely manner. Their collective expert opinion was that use of this larger radial distance would remove a sufficiently high percentage of secondarily infected trees to result in the effective eradication of citrus canker in Florida when that tree removal is accompanied by proper surveying to detect any secondarily infected trees which may not be within that radius.

**13. Why is the 95% capture so magical---it appears to be completely arbitrary?**

“95% capture” is neither magical nor arbitrary. Due to the inherent increase potential in bacterial populations and resulting disease, it is essential that a major portion of the bacterial inoculum be removed. Population elimination strategies at such levels are commonly employed to achieve significant reduction in inoculum load and geographic area of spread.

**14. Why has the Department eliminated the Risk Assessment process that was previously in the rule?**

The Administrative Law Judge John Van Laningham criticized the department's risk assessment process principally because he opined it provided too much discretion to the department in tree removal decisions. The department considers its risk assessment process scientifically valid and believes it promoted variances from the 1900-foot removal strategy where supported by sufficient scientific evidence. The change is proposed to comply with Judge Van Laningham's order which is now being appealed, and any such variances would now need to be pursued under the Administrative Procedures Act.

**15. Why are trees removed under an IFO?**

The time exigencies posed by the need to remove infected and exposed trees are consistent with those circumstances which are appropriate for the issuance of IFO's under the APA.

**16. Explain why host-free buffer areas surrounding uninfected citrus groves will not work.**

There is no evidence that a host-free buffer zone will prevent the spread of citrus canker into those groves. The fact remains that the disease can be spread long distances (1- 190+miles) through means such as wind-driven rain, or through movement of bacteria-contaminated people, equipment, vehicles, or citrus plants. Creating a (half-mile, 1- mile, 5-mile....) citrus-free zone around a grove and allowing the bacterial inoculum to spread and build-up among residential citrus plants will not prevent the spread of citrus canker into that grove in the long run.

**17. What is the economic analysis on which the Department bases its contention that the cost of living with citrus canker would be \$340 million per year?**

See response to question 22.

**18. How did citrus canker get to Martin Co.? Was it through a failure to decontaminate?**

According to the disease severity, the disease spread pattern, and the age of the oldest infections in both counties and their possible connections to the grove management, the disease might have been introduced to Martin and Desoto cos. through two growers' failure to comply with required decontamination procedures.

**19. Dr. Peter Harsany, Montreal, Canada believes that eradication can't stop spread of citrus canker and that citrus canker is only cosmetic—is this true?**

Eradication has been achieved successfully in many places including Florida. Citrus canker is not just cosmetic. Premature fruit drop resulting in crop losses of 5 to 50% can result. Branch dieback and tree decline will result from chronic severe infestations. Secondary pests will infest weakened citrus trees.

**20. Why does my tree need to be cut since my tree is still healthy nearly thirteen months after receipt of my IFO?**

Your tree may well appear healthy thirteen months after you receive the IFO due to non-uniform disease spread, unsuccessful inoculation, subclinical infections, and unfavorable weather conditions. If the infected tree and nearby exposed tree are not removed, your tree will become infected eventually.

**21. Cut infected trees and treat exposed trees with compounds and periodically inspect the trees for disease.**

This tactic has been attempted in many locations and found inadequate to stop the spread of the disease. The pesticides which can reduce the severity of the disease on an infected plant do not effectively prevent or control the spread of the disease.

**22. What is the department's response to information provided by Mr. Jack Haire regarding the economic impact of citrus canker?**

In reference to information supplied by Mr. Jack Haire on September 17, 2001, November 1, 2001 and November 8, 2001, the following response is offered:

If the United States Department of Agriculture (USDA) were to quarantine the entire State of Florida, it is reasonable to expect that the European Union (EU) would not accept fresh citrus fruit from Florida. The EU phytosanitary regulations are standard for all EU Countries. Using your figures, there would be a \$198 million impact per year. Furthermore, this impact does not include the loss of shipments to markets like Japan, that demand high quality, blemish-free fruit nor does it include the increased costs associated with reduced packinghouse efficiencies (less fruit from each load meeting fresh market standards). Since they grow a highly perishable commodity that is in competition with a cornucopia of citrus and non-citrus fruits produced around the world, growers do not have the ability to raise prices to offset the reduction in shipments or to pass on the canker related increases in production costs. Representing a substantial downward shift in Florida grapefruit demand, the loss of fresh market outlets due to canker would actually push grower prices down as this fruit is crammed into whatever markets are left and would ultimately drive a

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considerable number of grapefruit growers out of business.

It's true that 95% of Florida oranges go into the juice processing market. However, increasing competition from lower cost producers such as Brazil have already driven per acre revenues for most Florida orange groves to levels that barely cover production expenses let alone any debt that may be outstanding on the groves. Countries that are attempting to live with citrus canker experience fruit production losses of 10% - 50%. It is reasonable to expect that yield losses of even 10%, coupled with minimum costs to control the severity of the disease, would seriously impair the Florida grower's ability to financially survive in an increasingly competitive global market.

Citrus canker will effect the entire Florida citrus industry by compressing available fresh fruit markets, yield reductions due to premature fruit drop, and increased control cost. It is not the position of the Florida Department of Agriculture and Consumer Services (FDACS) that citrus canker will cause the citrus industry to cease to exist. However, citrus canker, if allowed to spread throughout the industry, will greatly impact the entire industry over time. Many growers will not be able to remain profitable and will go out of business resulting in lost employment and tax revenue.

Another factor that should not be taken lightly is the value of the citrus industry as the primary source of citrus for U.S. consumers. Approximately 80% of the domestic citrus supply comes from Florida. If Florida citrus growers cannot remain profitable due to citrus canker or other exotic diseases, the U.S. will be forced to import citrus from foreign sources. Is this a critical issue? Maybe not in itself, but it is a symptom of a larger issue. If this trend continues, we will be reliant on other countries for much of our food supply.

In reference to citrus canker-free zones, this concept may be applicable at the country level but not practical at the state or local level. Canker-free areas require significant distances / geographic barriers from infected areas. An example would be California being a canker-free area if Florida has the disease. Due to the distribution of citrus within peninsular Florida, it would be very difficult to designate any area free from the disease should eradication not be achieved.

Concerning the figures on the estimated costs for eradication, the FDACS questions the figures provided. The two-year eradication cost will not be \$200 million. There may be no compensation paid to residential property owners in the future. Property depreciation cost appears inflated because exposed trees have no compensable value, and because you have provided no substantiation for your \$250/site assertion (which, in any event, would be duplicative of your equally unfounded and speculative estimate of judicial inverse condemnation awards). Compensation for trees removed via court action is based on speculation. The FDACS would be interested to know how you arrived at the intangible cost figures as they appear to have no real justification.

Regarding the \$342 million estimated impact, the report issued by Mr. Ken Keck, Florida Citrus Mutual, provides clear and concise justification supportive of the \$342 million figure. This estimate is viewed as conservative, as market loss and yield reduction would likely exceed the

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low estimates used in the paper.

Any suggested alternatives to the existing CCEP must be based on substantive evidence with well justified research by parties with expertise in the field of plant pathology (especially bacterial disease epidemiology). To date, the FDACS has not received any alternatives from parties that have submitted oral or written testimony at previous workshops that are supported by research or plant pathologists with expertise in the field of citrus canker. The question on the status of an updated Environmental Assessment should be addressed to the USDA/APHIS as the FDACS is not required to conduct or prepare an environmental assessment. It is, however, the FDACS position that the existing Environmental Assessment provides a reasonable conclusion of no finding of significant impact.

No one within the FDACS has blamed anyone for the occurrence of the Wellington Strain of citrus canker in Palm Beach County. The date, time and location of all the workshops and the hearing of 11/14/01 are viewed as reasonable by the FDACS. The transcripts of the workshops we have received back from the court reporter services may be accessed at our citrus canker website: <http://doacs.state.fl.us./canker/>.

The CCEP will take action to quarantine all or a portion of Palm Beach County when citrus canker outbreaks in the area reach the point that an area wide quarantine is justified. The removal of citrus canker affected trees at a radius of 1,900 feet has been a key factor that has allowed us to avoid area wide quarantines in Palm Beach County.

The FDACS has considered all possible alternatives and consulted with plant pathologists that are knowledgeable about the biological impact of citrus canker. Any alternatives other than eradication was viewed as unacceptable due to the damage potential of the disease. As has already been stated in this correspondence, the FDACS has not received any evidence that is supported by research that would indicate another approach is warranted.

### **23. Independent scientists say citrus canker has been here since 1910, always will be, and it can't be eradicated.**

Independent scientists are certainly entitled to their opinions, but the evidence available points clearly to the fact that citrus canker is eradicable, and has indeed been eradicated from the US and other countries before. By far, the majority of scientists who have plant pathology education and experience, regardless of their affiliations, have come to this conclusion.

### **24. When will Dr. Gottwald's study be released?**

Dr. Gottwald et al.'s manuscript has received final acceptance for publication by the senior editor of the journal Phytopathology. The official posting of this acceptance is anticipated to be on the journal's website next week (web link: <http://www.apsnet.org/phyto/accepted.asp>)

### **25. What are the costs of the CCEP, and of the failure to eradicate citrus canker?**

See above response to question 22.

**26. Doesn't the use of copper in groves mask the disease and that actually citrus canker is everywhere?**

The use of copper-containing pesticides can reduce the severity of the disease on an infected plant, but it cannot prevent or effectively control the spread of the disease. Anything that can be done to encourage early symptom expression and detection works toward the goal of eradication, and anything that suppresses symptom expression has the potential to interfere with or delay reaching that goal. There is plenty of pesticide-free, organically-grown citrus in Florida to refute the contention that citrus canker currently is everywhere in the state. However, canker inoculum cannot reside in the vicinity of citrus for very long without eventually causing obvious disease symptoms.

**27. Is it true that all trees within 1900 feet of an infected tree will become infected as well?**

All citrus trees within 1900 feet of an infected one will become infected eventually if the infected and subclinically infected trees are not removed, although a few citrus may escape the disease for substantial periods of time due to their unique locations, host condition, and other unfavorable environment conditions.

**28. Are some trees immune to citrus canker? Is it because they are grafted?**

There is varying susceptibility to citrus canker in the citrus plant family. Unfortunately, almost all of the important commercially citrus species and varieties are in the susceptible category. Most citrus grown in dooryards and commercially in groves is grafted, or more accurately budded. Budding a scion onto a rootstock has some effect on canker susceptibility in that vigorous rootstocks (ones that impart vigor to the scion) will increase canker susceptibility, whereas dwarfing rootstocks will impart less susceptibility to the scion. This effect is not due to some basic alteration in the genetic susceptibility of the scion, but due to the vigor of the scion. Simply put, vigorous growth is more susceptible to canker. This applies to residential trees as well as commercial grove trees.

See the following web pages for information on susceptibility of citrus varieties:

<http://doacs.state.fl.us/~pi/enpp/pathology/ckhost.html>  
<http://doacs.state.fl.us/~pi/enpp/westphal-questions.pdf>

**29. Can the department publish on its website the budget of the CCEP?**

Yes, and has done so.

**30. Is it true that citrus canker kills trees?**

Citrus canker has been recorded to kill young and mature trees under conditions optimal to colonization, reproduction, and spread of the bacterium and leading to high levels of disease incidence (e.g., Maldive Islands). In Florida, environmental conditions and host cultivars are present such that tree death may result under limited circumstances. More times, it is fair to say, that citrus canker (which flourishes in Florida) will cause susceptible citrus varieties to exhibit unacceptable levels of premature fruit drop; reduced tree vigor, and risk of infestation by secondary plant pests.

Like with most biological questions, absolute black and white answers are impossible without leaving a person only partially informed. It is true that citrus canker can kill a citrus plant. The literature documents such an event [Plant Disease 73: 363-367 (1989)]. Canker can also kill young trees in the

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nursery environment. But it is not safe to extrapolate from that statement to say that “citrus canker kills trees”, perhaps implying that death is always the result of infection, because that is not the normal situation. Nor is it accurate to say that citrus canker does not kill trees, because it certainly can.

### **31. What do the results from the five study sites show for determining a 1900-foot radius strategy for removal of exposed citrus trees?**

Data collected in Dr. Gottwald’s study includes distances between infested trees and secondary infected trees. An analysis of the data by epidemiologists and plant pathologists led to a conclusion by those experts that the use of the 1900-foot tree removal radius is necessary to eliminate sufficient infected and exposed trees to accomplish effective eradication of citrus canker.

### **32. Does the department know what percentage of dooryard citrus trees will remain standing in Broward or Miami-Dade cos. After the rule takes effect?**

The percentage of dooryard citrus trees that will remain depends greatly on when the Citrus Canker Eradication Program can resume the removal of citrus canker-affected trees within the 1900 foot radius. As the disease continues to spread without tree removal within 1900 feet of a visually positive tree the percentage of infected trees will increase and the percentage of standing trees will decrease.