

## 2010 Florida Citrus Pest Management Guide: Management Options for Nonbearing Groves and Fresh or Processed Fruit<sup>1</sup>

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Citrus growers must maximize profits by maximizing fruit production and optimizing expenditures to remain competitive during these challenging economic times. Basic horticultural inputs to maximizing production include the optimization of fertilization, irrigation, weed control and pest management of various foliar and soil pests. A fundamental working assumption to maximizing grower profits is that the cost of any input should be matched by an increased return of greater value. While expenditures for scouting and tree removal to control the spread of greening may not be matched by an increased return of greater value in the same or the coming season, these activities are of critical importance to help ensure long-term viability.

Florida citrus is marketed either for the fresh market (50% grapefruit and specialty varieties, 5% round oranges) or processed market. Prior to the identification of citrus greening disease in Florida in 2005, the pest management strategies employed by growers producing fruit destined for these different

markets could differ considerably; therefore, management expenditures differed as well. This is particularly true when comparing healthy mature round orange groves with healthy mature grapefruit and specialty fresh fruit varieties. Simply put, it is not necessary to achieve fresh market fruit quality in a processing fruit production operation, as external cosmetics play virtually no role in processors' acceptance of fruit for processing. Given that the profit margin for processing fruit is usually less than that for fresh market production, the inputs, including pest management, have been adjusted proportionally in order to realize the maximum profit potential. However, in the era of citrus greening and canker, management inputs for effective control of Asian citrus psyllid and citrus leafminer will likely need to increase for both fresh market and processing oranges. The Asian citrus psyllid is a true vector of citrus greening, while the citrus leafminer facilitates the spread of canker by injuring leaves. Curtailing disease spread will in large part depend on effective suppression of both pests.

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In the production of fresh market fruit, a high level of control of external blemishes is needed to achieve maximum profitability. A greater input of pesticides and a higher level of monitoring can be economically justified to achieve this end. The approaches differ, however, with different varieties of citrus. With most round oranges, the value of fresh fruit is often marginally different from processing fruit. Also, fungal and canker disease problems are less severe on oranges than on some other types of citrus. Thus, with additional fungicide and miticide application to control melanose and a high level of control of rust mites, oranges can be marketed fresh. If pest or windscar damage occurs early in the season, the grove can be switched to a processing program without suffering severe economic loss.

Grapefruit, navel oranges, tangerines, and tangerine hybrids have high values as fresh fruit and relatively low value for processing. Depending on the variety, specialty fruit are also more severely affected by diseases such as canker, scab, melanose, *Alternaria* brown spot, and greasy spot rind blotch than are round orange cultivars. They must be monitored very closely and timely applications must be made to control rust mites and fruit blemishing canker and fungal diseases. If a high degree of control is not achieved and the fruit must be processed, the producer will almost always experience a net loss. White grapefruit can be grown profitably for processing, but such groves must be designated at the beginning of the season and the inputs reduced correspondingly.

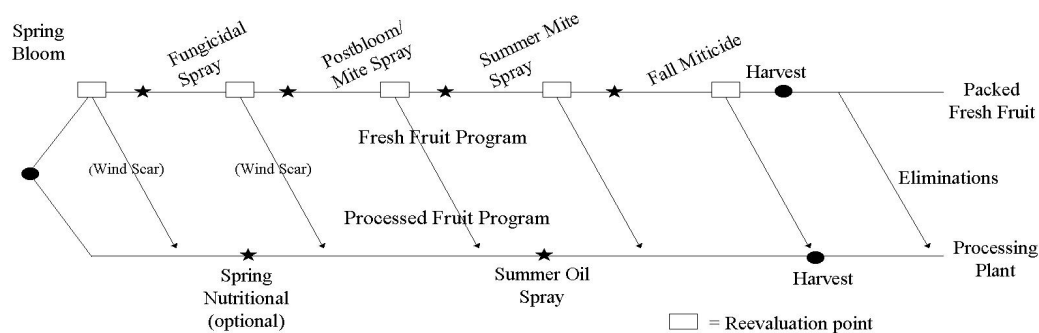
In the production of fruit for processing, yields and internal quality must be maintained with minimal input. Although irrigation, fertilizer, and weed control should not be reduced, less control of foliar diseases and arthropod pests such as citrus rust mite may be justified. However, today's management of processing fruit will require input for effective suppression of Asian citrus psyllid and citrus leafminer to mitigate spread of citrus greening and canker, respectively. When the protection of foliage and fruit are the key objective, only a few diseases and pests are of primary importance—namely, canker on fruit, greasy spot fungus on foliage and citrus rust mite on fruit. High mite populations over time can lead to reduced fruit size and productivity. Other pests

and diseases which threaten tree vigor and subsequent productivity, notably nematodes, root weevils and *Phytophthora* root rot, should be monitored and controlled when population levels dictate.

In most cases, there is no way to predict on a seasonal basis the incidence and severity of pests and diseases. However, based on grove history and some within-season observations, you can reasonably assess the situation and look at available options. In the final economic evaluation, net savings in pest management can be considered as profit to the extent that they do not cause loss through increased incidence of diseased trees, premature fruit drop, reduced fruit size, and lower internal quality. With most citrus pests, the pressure must be extremely high before economic damage levels on the processing fruit crop are experienced. Thus, there may be considerable latitude in taking measures to suppress certain pests. However, greening and canker management may necessitate more intense pest management than has been previously recommended for arthropod pest of citrus. Although close observations and pest monitoring, informed decision-making, and **judicious pesticide application** should reduce the level of input and associated costs in most seasons, psyllid and leafminer management remains a priority. Eliminating psyllid infestations in the winter months when naturally-occurring populations are low will be a good strategy for reducing the need for greater pesticide inputs during bloom and spring flush.

Within a season, circumstances may dictate a decision change in marketing from fresh to processing and this decision may be based on many factors (Figure 1). One is that the composite of pest and disease pressures and environmental factors (wind) have produced fruit damage (e.g., windscar) such that packout will be so low that fruit must be marketed for processing. In this case, the grower should immediately change his IPM strategy for the remainder of the season to reduce costs.

When the original marketing strategy is made prior to the beginning of the season, crop variety, local conditions, and pricing information are major factors in the decision-making process. Clearly, the pre-season decision to seek processing markets



**Figure 1.** Fruit marketing decision matrix for citrus production.

affords the manager more latitude in modifying the pest management program. The decision towards processing may be determined by a multi-year contract (round oranges), may vary annually, or remain fixed for a given block or grove. The grower may still elect to market fresh fruit from this grove if fruit condition, fruit contract and price warrant.

Managing pests on nonbearing citrus trees (<4 yr old), either as a new planting or as resets to an existing grove, is essential to the subsequent development of a healthy, highly productive, mature grove. Young tree care differs somewhat from mature grove care, in that management expenditures should focus on maximizing the protection of rapidly produced foliage and roots; fruit is not a factor. Therefore, a citrus grower's goal should be to maximize the production of leaves and roots of young trees through the optimization of fertilization, irrigation, weed control, and management of various foliar and root pests.

The various foliar and root pests, comprised of insects, mites, nematodes and diseases, that infest nonbearing citrus trees differ widely in distribution and abundance compared to those found on mature trees. Differences in tree size and canopy density alone result in changes in microclimate that will affect pest and natural enemy population dynamics and injury thresholds for various pests. Frequent leaf and root flushing patterns typical of young trees supply a copious, continuous source of food that stimulates rapid pest and pathogen development. Severe and repeated canker infection of new leaf flushes may induce defoliation and debilitate young trees. Foliar insects such as psyllids, aphids, citrus

leafminer, orangedog larvae, grasshoppers and the little leaf notcher weevil can severely injure new leaf flushes without appropriate control, while these same insects are incidental pests of mature trees. Currently, the Asian citrus psyllid and citrus leafminer are the arthropod pests of greatest concern for young, non-bearing trees because of the need for greening and canker management. Both pests require new flush for reproduction and development into the adult stage. Given that young trees continuously produce new flush season-long, population densities of both pests can reach high densities if left uncontrolled. Furthermore, resets in mature groves can serve as the only breeding site and food source for psyllids and leafminers in the off-season when there is little to no flush on mature trees. Thus, new leaf flush should be intensely scouted and managed. Root pests, such as sting nematode and termites, are also important pests of nonbearing trees and require control in certain situations. By contrast, greasy spot, a major economic disease of mature trees, is of much less importance in nonbearing citrus groves. Rust mites and spider mites, important defoliators or fruit pests of mature trees, can be more injurious on nonbearing trees, particularly those trees with open canopy.

Although judicious use of pesticides is highly recommended for young tree care, effective management of citrus greening and canker dictates effective suppression of psyllid and leafminer populations. Scouting should be intensified on young trees such that treatment applications for psyllid and leafminer are timed to prevent major outbreaks of these pests. Spot treatment is also encouraged when pests are localized within the grove. General predators, such as ladybeetles, can be quite numerous

feeding on psyllids, aphids, leafminers and other foliar pests. Avoiding treating groves where natural enemies are numerous may help improve biological control. Consulting your extension agent will help in choosing the most effective and selective pesticide for the occasion. Refer to other sections of this guide that address specific pests of citrus trees in more detail.