The question posed in this slide remains critical and demanding especially in the face of HLB or greening disease and the possible role of rootstock selection in reducing the incidence and/or severity of greening disease. Another way to ask the question is: Given that growers are regularly spraying for psyllid management, is it now safe to use sour orange because the BrCA or Brown Citrus Aphid is coincidentally managed via the insecticides used for the psyllid?
Sour orange is a well known rootstock among Florida citrus growers especially those with groves in the Indian River District. The traits of the rootstock are well established. However, it’s a different world today given the HLB environment in Florida and other changes. Furthermore, there are two very active breeding programs within Florida leading to the release of many new scion and rootstock options for growers. As a result, some of the presumably less important traits of sour orange may have a new life and others are possibly being discovered. For example, as stated in this slide, sour orange is broadly adapted to soils and, thus, is often chosen because it is the only rootstock that will grow in certain situations.

Of the new scions being released, many are mandarins and they have not been tested for their compatibility with trifoliate orange-based rootstocks like Swingle citrumelo and Carrizo or Kuharske citranges. Compatibility is not expected to be an issue with sour orange rootstock. Most importantly perhaps, are cumulating grower observations that trees on sour orange appear to be less affected by HLB. All of these reasons support the increasing interest in sour orange as a viable rootstock choice. Of course, any use of this rootstock must be balanced by its major deficiency, susceptibility to citrus tristeza virus.
Sour orange was the 2nd most popular rootstock in 2013 as recorded by the Citrus Budwood Registration Office. Among grapefruit scions, 73% of the trees across all rootstocks were propagated on sour orange. Perhaps more surprising, however, is that among all rootstocks, 35% of mandarins were propagated on sour orange which supports the contention that compatibility might be a meaningful concern leading to increased use of sour orange. It is interesting to note that the three trifoliate orange-based rootstocks, Swingle citrumelo, Kuharske citrange and Carrizo citrange, still accounted for 55% of all nursery propagations.
Part of the sour orange story is this question: What is its genetic background? From sophisticated genetic studies conducted by Dr. Fred Gmitter and his colleagues from around the world, the answer is very cleanly this: It is a hybrid of a pummelo and a mandarin. That information is important in trying to understand the behavior of sour orange and in trying to make a better sour orange.
Choosing to use sour orange is a risk as with any other rootstock. In searching the internet for information about risk, the Chinese word for risk was discovered. It consists of two symbols, one meaning crisis and the other, opportunity. Together those two symbols give risk a meaningful and useful definition.
Spending a moment with the word RISK should be a part of the decision-making process leading to the use of sour orange as a rootstock. In searching further on the internet, one will find a book chapter on risk from which the quotes above were taken. The first one above might be deemed a platitude which it is, but it nevertheless, has value for its perspective. The 2nd quote establishes that risk of and in itself is not necessarily a bad thing. There are those who see it as something to pursue and manage to an advantage. That attitude applies to using sour orange specially among growers familiar with the risks and managing those risks. The 3rd quote addresses the matter of why risk exists at all in any situation. The answer is the existence of uncertainty and having outcomes that matter. Clearly, if an action leads to outcomes that don’t matter, then there is essentially no risk. And what is the difference? As stated above, risk is quantifiable. That would not be so true with choosing sour orange, i.e., putting numbers to the decision. **HOWEVER, choosing sour orange does have the advantage of the rootstock being a so-called KNOWN QUANTITY!**
RISK involves at least assessment and management. As those concepts apply to sour orange use, the risks are well known and to some degree, management has been long practiced. A form of the latter that should be practiced is to hedge your best by not investing in only one rootstock, but several. And, **ALL growers** should be investing in small-scale rootstock plantings as a hedge against the future.
A major factor leading to reconsideration of sour orange use is the purported incidental control of the citrus tristeza virus [CTV] vector by way of the management programs in place for the Asian Citrus Psyllid. The view among many entomologists in Florida is expressed in the comments presented on this slide. Basically, biological control and chemical control are incompatible, but there is some evidence that under the right conditions, various predators especially ladybeetle can be voracious feeders on the psyllid. Whether the two approaches to vector management can be integrated remains to be determined, but sharp observers may note something of importance in groves. The BrCA is still present in Florida, but the dynamics of the grove environment apparently are not fully discovered yet.
54 growers across the State were surveyed by email to assess their use of sour orange. There were 15 responses that seemed to the author as representative of the industry as a whole. The first question on the survey was: Are you using sour orange? Among the respondents, about 50% were using sour orange and 50% were not. The latter group consisted mostly of growers not in the Indian River District. For those using the rootstock, most indicated they were willing to take the citrus tristeza virus [CTV] risk with sour orange and take advantage of the rootstock’s well known good traits. Those not using the rootstocks were still mostly concerned about the aphid vector and the disease.

Growers using the rootstock have planted 10s of thousands of trees on sour orange in the past 5 years and have noticed, in some instances, less fruit drop on those trees and less incidence of HLB. However, those are only casual observations, not research data. Furthermore, one grower-respondent noted that in the weaker, poorer soils of the River such as Winder, Diaprepes root weevil often was problematic, leading to Phytophthora root rot problems. That complex is a serious one regardless of the rootstock.

The last question asked growers to name those rootstocks they were using if not sour orange. The most common reply was x639 followed by others listed on the slide.
So, if you are thinking about using sour orange, then there is a balance of risks and rewards to be considered.
Back to the beginning: SOUR ORANGE, among all rootstock options presently available in Florida, is a known risk. In the author’s opinion, it is a good risk given that a grower engages in risk assessment beforehand [e.g. are BrCA present in my groves? Am I considering the rootstock mostly or only to use in places where I have no other choices?] and remains vigilant.
To make the choice to use sour orange, the balance board must be fairly stacked with all factors that make affect the outcomes experienced.
At the end of the day, RISK cannot be completely eliminated, therefore, there is always the element of uncertainty. One must still roll the dice and influence the outcomes as much as possible! [Bill Castle: bcastle@ufl.edu; 863.956.1151]