The citrus copper application scheduler, formerly known as the “DISC copper model,” was released originally in 2002 (Figure 1) and designed to assist growers with decisions on timing the next copper application. The system was intended for groves where melanose and other foliar fungal diseases were of concern. Historically, there was concern about inadequate disease control with copper, fruit phytotoxicity or stippling, and toxic buildup of copper residues in the soil. The tool assisted growers in determining the residue remaining on fruit surfaces after application and the timing of an additional application.

The aim was to avoid unnecessary copper sprays and to reduce production costs when possible but, conversely, to warn when residue levels were lower than expected so that an application could be made before the next rain event. In other words, avoid infection because copper residues were too low, but also minimize the number of applications.

Copper residue levels are affected by two main factors: fruit growth and rain. When fruit are small and growing rapidly, the fruit surface area expands, but the copper deposit does not, leaving the areas in between copper residues exposed to disease infection. Rainfall is also important because it reduces copper residues below effective levels, leaving fruit vulnerable to disease.

Since the development of the original “DISC copper model,” many things have changed in citrus production. For instance, canker was re-introduced to Florida and has since spread through many production areas of the state. Depending on the scion cultivar, copper sprays may be needed until October whereas most foliar fungal diseases only need applications into June. Black spot, a fungal disease, was also recently introduced into Florida. While it has not spread throughout the state as canker has, black spot management requires copper sprays from spring through the summer until September.

The original model was based on growth and residue data that ended in June and may not be accurate for the later season applications. Disease management is not the only thing that has changed in the time since the model was released; computer technology has also evolved impressively. This initial revision of the copper model, renamed the “Citrus Copper Application Scheduler,” has taken advantage of current Web-based technologies to make the model interface as user-friendly as possible.

When you open the model on the AgroClimate Web site (www.agroclimate.com), first and foremost, you...
will notice the interface has changed dramatically from the original model. Instructions on how to find and use the tool are given below. The model (Figure 2) has been given an entirely new, more appealing appearance. We have tried to make data input simple. Four pieces of information are needed to use the model:

1. Weather station nearest to block;
2. Scion;
3. Approximate bloom date; and
4. Date of application, copper concentration (lb. metallic) and spray volume (gal./acre).

Rainfall data can be input in one of two formats: Select a FAWN weather station close to your block or upload data from a CSV (comma-separated value) file on your computer. Instructions on how to format your data for the model are available on the Web site when you click on the word “Help.”

Model predictions will only be as good as the data that is uploaded into the model. FAWN weather equipment is checked regularly and the accuracy verified, but there are no such guarantees for other sources of data. Scion is selected from the drop-down menu and you can choose from grapefruit, navel, Valencia or generic orange. We plan to link this tool to the flower-monitoring model to help growers approximate bloom dates in case they do not have them noted for all blocks. Visit http://www.crec.ifas.ufl.edu/extension/plant_pathology/cdm.shtml to view short video demonstrations of how to use the models.

Since the “Citrus Copper Application Scheduler” is now a Web-based application and can be accessed via the Web anytime, there is no longer a file that must be saved and downloaded to your computer. In the current format, it is not possible to save the season’s data online as could be done in the former version. If we get enough feedback from users that this is a needed service, it can be implemented, but a fee may be required. It is not yet compatible with smart phones or other mobile devices, but we plan to create a version for mobile platforms.

Another feature we are still working on is the forecasting of residues and their persistence. We are also gathering additional data to make late-season copper residue estimates as accurate as possible, but this will take at least another year after this season.

We are very interested in feedback from users, so please contact Megan.
To successfully use abscission agents for Valencia sweet orange mechanical harvesting throughout the harvesting season, unwanted flower, fruitlet and leaf drop must be assessed and minimized, according to abscission team leaders Bob Ebel and Jackie Burns in the UF/IFAS Abscission and Harvesting 2009-2010 Final Report.

Studies were conducted from 2006 through 2008 to determine the sensitivity of the various plant organs to CMNP and ethylene, a compound known to cause senescence and abscission in other crops. During the harvesting period, mature fruit responded to CMNP but not ethylene, indicating ethylene is not a major contributor to abscission. Also during the harvesting period, abscission of young fruitlets and leaves were not responsive to CMNP or ethylene.

Visit http://citrusmh.ifas.ufl.edu for further information on this study.