

# 2009 Production of Organic Heirloom Tomatoes

Led by Jeanine Davis and Dilip Panthee, NC State University



- The study was conducted at the Mountain Research Station in Waynesville, NC.
- Twenty varieties of tomatoes were grown in an organic production system. Eleven of the varieties were heirloom varieties and nine were heirloom-type hybrids with late blight resistance.



We combined the Brandt products, Sporatec, Ecotec, and Saf-T-Side with Serenade, Neem, Dipel, and copper to create an integrated program that is less expensive to use than the Serenade based program that many organic growers in the region depend on.





Late blight moved into our region very early and was quite severe. This is an example of what many commercial, certified organic farms in our area experienced. This photo was taken on August 20, 2009. Here the farmer grew 'Mountain Fresh' tomatoes and had sprayed compost tea, kelp, and other nutrients. Late blight killed the field within the matter of a few days.



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## Now is the Time to Control Late Blight on Tomatoes and Potatoes in North Carolina

by Jeanine Davis, Associate Professor and Extension Specialist, Horticultural Science

I've been getting lots of questions on late blight, especially in the western part of the state. So I'm sharing some information I recently distributed to extension agents and listservs in WNC.

There's been a lot of concern about late blight, especially among the organic tomato growers. You should know that there are cases confirmed on tomatoes and potatoes in Buncombe, Henderson, Jackson, Tyrrell, Camden, Pasquotank, and Hoke counties. I'm sure there are many more cases out there, these are just the ones reported through the NCSU Plant Disease and Insect Clinic or confirmed by the pathologist at the Research and Extension Center in Mills River.

Farmers using conventional agricultural chemicals have a pretty good arsenal of products to protect their plants with. Extension agent, Sue Colucci, has information on that and a link to a Late Blight factsheet on her blog at <http://wncvegies.blogspot.com/>.

Organic growers, this is the big test this year, especially if the tomatoes are out in the open and not protected by a high-tunnel. There is a great article on organic management of late blight on tomato and potato on eXtension. It is written by an extension specialist in Oregon, and I think you will find it very informative <http://www.extension.org/article/18361>. Copper products (check OMRI list for specific ones), Serenade, and Sporatec are some of the products that may give you some control. The key to using these products successfully is they must be applied BEFORE you have an infection. So if you are going to spray, now is the time to start. Also, you need to get excellent coverage of the foliage. A powered mist blower works great. Also, spray frequently. If you spray and it rains an hour later and washes it all off, spray again. We are on a five day spray schedule with our organic tomato research plots right now. And alternate products. We are using copper every other spray right now. Please remember to read the labels for any product you spray, and pay attention to any REIs (restricted entry intervals) and PHIs (preharvest intervals). For example, following copper sprays, you are not to re-enter the field for 24 hours unless wearing the specified PPEs (personal protective equipment). Also remember not to work your plants when they are wet, clean your tools and picking buckets. Do everything you can not to spread disease from plant to plant. If you already have some infection, remove affected leaves and keep spraying. As always, check with your certifier about any restrictions on product use and timing!

One other note, this is the year to keep close records on the varieties you grow. You will probably notice a big difference in diseases among varieties, especially with heirloom tomatoes. This will help in your variety selections for next year.

We issued a late blight alert in early August and also went to a five day spray schedule in our study. We sprayed Sporatec and Saf-T-Side alternating with Serenade plus copper.

In the organic heirloom tomato variety trial, late blight was evident on only a few of the most susceptible heirloom varieties on August 21, 2009.





Within a week, late blight had made rapid progress through the field. Some of the heirloom varieties succumbed very quickly, even with regular sprays of Sporatec, Saf-T-Side, copper, and Serenade.





But the heirloom-type hybrids with late blight resistance continued to produce throughout the season (these were sprayed every five days with the alternating Sporatec and Serenade + copper program).





By early October, this is what all the heirloom tomato varieties plots looked like. These plants did not have late blight resistance. The sprays delayed the progress of the disease, but could not stop or control it.



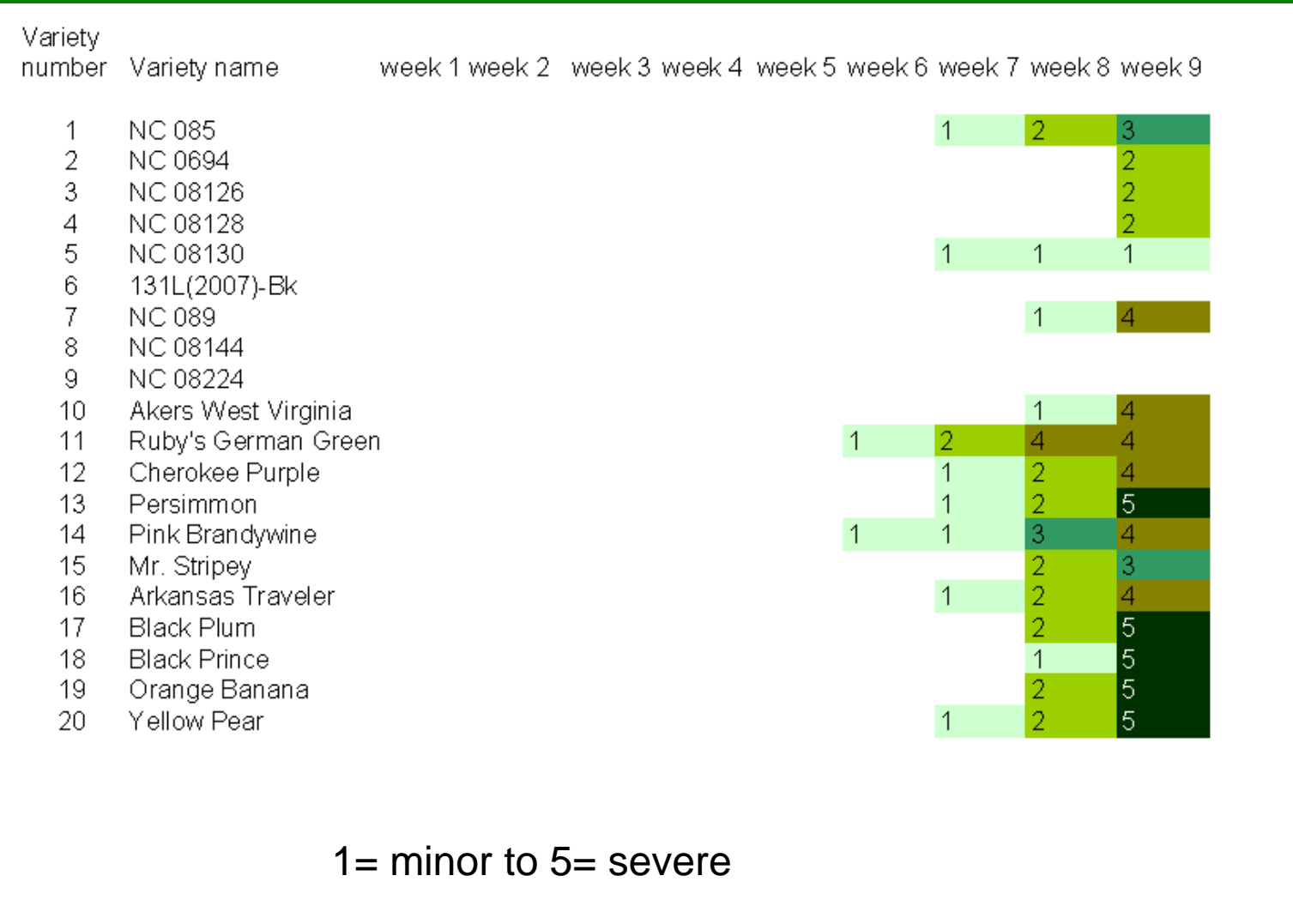


But this is what the heirloom-type hybrids with late blight resistance and the organic spray schedule looked like!

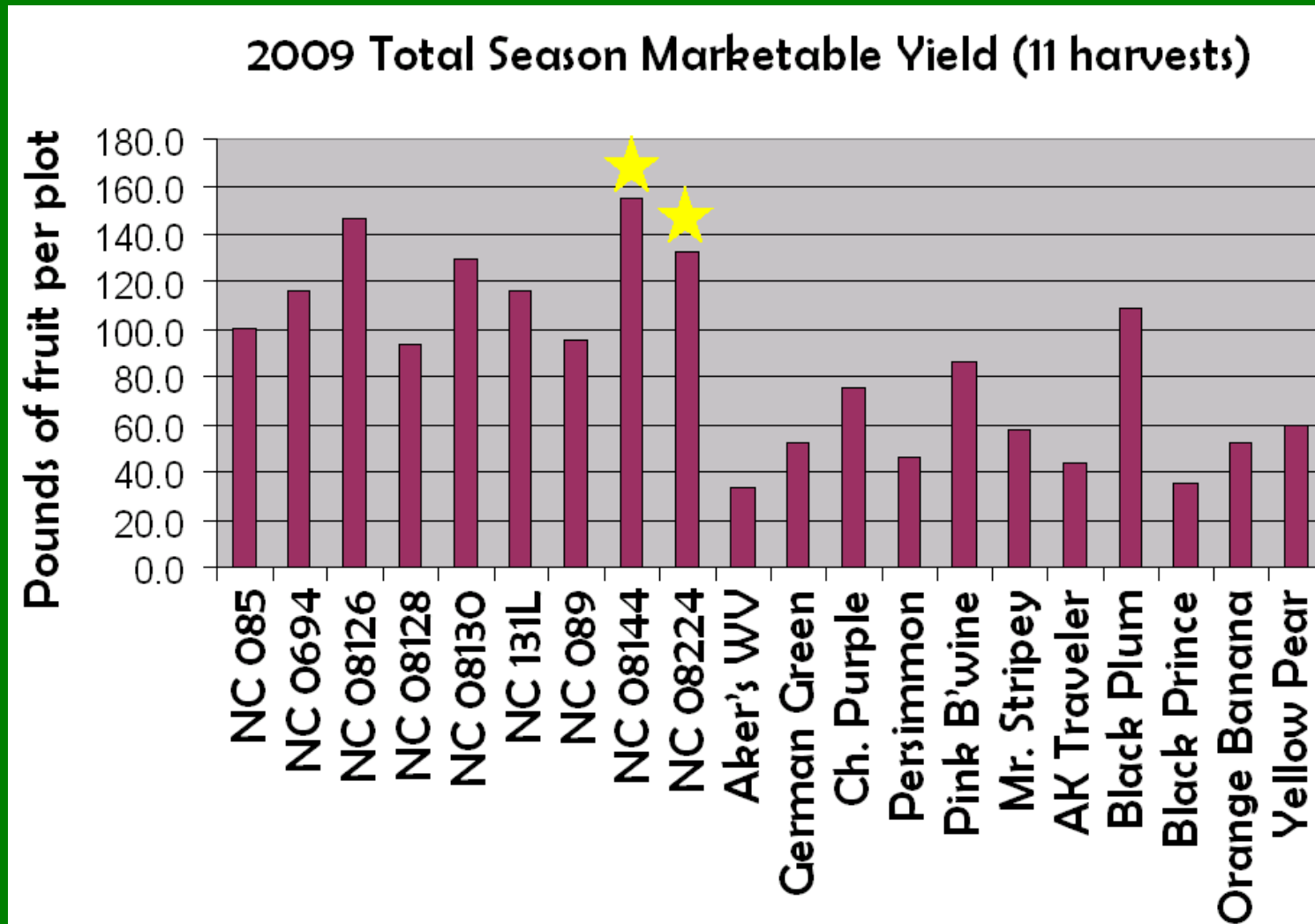




This graph illustrates the progression of late blight from July 2 (week 1) to August 28 (week 9). The heirlooms were very severely affected, as indicated by the 4 and 5 ratings. With the exception of one, the hybrids either had no late blight or were not severely affected.



The two heirloom-type hybrids, NC 08144 and NC 08224 showed superb disease resistance, gave high yields of excellent quality fruit, and were the two top rated varieties in the taste test.





It's clear, that in order for organic farmers to reliably produce tomatoes in western NC, they will need to grow varieties with late blight resistance. This picture shows late blight resistant and late blight susceptible varieties.



Organic growers in the region were impressed with how long we were able to harvest our tomatoes using the spray schedule we used and have asked us to expand our studies on evaluating the effectiveness of organic fungicides alone and in combination.





This study was discussed with the aid of this poster at the big tomato field day at the Mills River research station.

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## Organic Production of Heirloom and Heirloom-type Hybrid Tomatoes

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### Objectives:

1. Compare 11 heirloom tomato varieties with 9 heirloom-type hybrids.
2. Optimize an organic disease and insect control program for WNC.
3. Test a high-stake, string and weave system for indeterminate tomatoes.



Indeterminate tomatoes on traditional high-trellis (left) and high-stake system being tested this year (right).

### Organic Products Being Used:

- Sporatec\* - fungicide (essential oils)
  - Serenade - fungicide (*Bacillus subtilis*)
  - Copper - fungicide
  - Neem Oil - insecticide
  - Ecotec\* - insecticide (essential oils)
  - Dipel - insecticide (*Bacillus thuringiensis*)
  - Biolink - spreader/sticker (vegetable based)
  - Saf-T-Side\* - fungicide, insecticide, miticide (oil emulsion)
- \*Brandt products

See this study at the Tomato Workshop at 10:00 am on August 21, 2009 at the Mountain Research Station in Waynesville.

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This project is generously funded by Brandt Consolidated.



First harvest (top)

Local price, not even organic (right)



There was a good crowd of people the following week at the field day highlighting the studies at the research station in Waynesville.





# Conclusions

- Late blight dominated the picture this year. Nothing else mattered.
- We think the spray program we used, with Sporatec, copper, and Serenade, slowed the progression of the disease, but since this study was not designed to specifically study that (we didn't know this would be a severe late blight year), we don't know for sure.
- However, organic farmers and many of our university colleagues were very impressed with how our study "held up" compared to what was observed on local organic farms.
- Late blight resistant varieties are necessary for reliable organic tomato production in WNC.





## Future Studies

- In direct response to farmers' requests, we would like to establish replicated organic product testing trials to test product effectiveness in our region.
- We would also like to work more with combinations of products, as we did in this year's trial.



# New Organic Research Program Being Established in WNC

Jeanine Davis has been awarded a small grant to establish a permanent organic research program at the Mountain Research Station in Waynesville. Starting with two acres in 2010, the area dedicated to organic research and demonstration will eventually expand to ten acres.



# This program will focus on meeting the immediate needs of WNC farmers

- Existing organic farmers will be surveyed for their immediate research needs.
- Product testing has already been expressed as a top need.
- Research will also be designed to help conventional farmers transition into organic production in direct response to buyers desire to buy more locally grown organic produce.





We would like to thank Brandt Consolidated for funding this project and for their continuing support of our organic tomato research efforts.

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