


# THE STRAW BERRY GROWER



## Strawberry Diseases: A Review of Anthracnose in 2002

By Dr. Frank Louws, Extension Plant Pathologist, NCSU

A number of reports of anthracnose occurred in the fall and winter of 2001/2002 on plug plants and topped bare-root plants. Two types of symptoms occurred. In several cases, plants collapsed and a cross section of the crown revealed a red, marbled coloring. These cases of anthracnose crown rot were likely caused by the strain known as *Colletotrichum gloeosporioides*, and in several cases we were able to verify this. Other plantings had a general unthriftiness in the fall and then plants began to collapse in the spring. Such plantings also experienced anthracnose fruit rot. Still other plantings showed no apparent plant health problems but discouragingly had high levels of anthracnose fruit rot when favorable weather condi-

tions occurred. The latter cases were caused by the strain known as *Colletotrichum acutatum*.

In several cases the presence of infected plants was detected during the plug production process, and management strategies were implemented (see: [http://ipmwww.ncsu.edu/current\\_ipm/palart35.html](http://ipmwww.ncsu.edu/current_ipm/palart35.html)). Of course, at such a late stage in the fall it was difficult to find an alternative source of plants, so fungicide applications were recommended for the fall and again in the spring. In other cases, problems became apparent only after plants were field set or during early April as harvesting commenced.

In cases where anthracnose occurred, most growers had to rely on the use of fungicides to limit the extent of the losses. Fortunately, we did not have extended periods of wet, warm weather in the spring

of 2002 during harvest. Wind-driven rains can result in high levels of disease incidence. Quadris combined with a captan spray program appeared to minimize disease losses. If Quadris and/or captan were included in the early bloom applications, disease levels appeared to be lower than in cases where these fungicides were initiated after the onset of anthracnose fruit rot. Indeed, it takes 14 days or more to see a reduction in disease pressure if applications are initiated after the first signs of fruit rot are observed. Much research has been done at NCSU and other places with regard to the use of Quadris and other fungicides. This data, though incomplete, will be a productive topic to discuss at the preplant meetings and the fall conference. ❖

## A Strawberry Preplant Meeting Near You...

Come to one of the strawberry preplant meetings this summer for discussion of this year's growing season and information to help you in the upcoming season. These meetings are supported by the NC Strawberry Association with funding provided through the Strawberry Assessment.

The meetings normally start at 6 pm with a sponsored meal and usually involve Dr. Poling, various other specialists, local agents, growers, and sometimes supplier representatives. \*Indicates meetings added since the last newsletter. Additional information has also been included in some of the other listings.

Feel free to go to whichever meeting is most convenient for you, whether or not you are in one of the counties listed. Please preregister for the meeting if you can (by contacting one of the listed agents or the agent in other counties listed), so meal counts can be as accurate as possible. Check with the agents for additional information.

**July 9 (Tue):** Rockingham, Alamance and Caswell counties. Location: 525 NC Hwy 65, Suite 200, Reidsville. Contact Kathryn Holmes at 336-342-8230 or [kathryn\\_holmes@ncsu.edu](mailto:kathryn_holmes@ncsu.edu).

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### Will Anthracnose Recur?

Rarely does anthracnose recur year after year on the same farm. There is evidence in the scientific literature that the pathogens can persist in the soil for short periods of time or on other living plants and therefore could potentially become a problem in subsequent strawberry plantings. However, experience in NC suggests this is not an important source of the problem. *All serious epidemics in the last few years have been associated with infected plants.* Thus, the use of disease-free plants is the most important management strategy for controlling anthracnose.

Regretably, there is no reliable/economical technique to detect the presence of anthracnose pathogens in strawberry transplants. The pathogens can grow in and on the plants without showing symptoms, and the disease becomes apparent when it is too late (i.e. after planting). This past year, a large number of plants were infected. The question arises – "Should an alternative source of plants be used?" All our major suppliers have high quality standards and no one supplier has a consistent history of anthracnose-infected plants. Odds are that the plants from your supplier will not have anthracnose next year.

There does not appear to be more or less risk with bareroot compared to plug plants. However, if a few tips are infected, then the disease becomes more widespread among the plants during the plug production process as compared to the sporadic distribution of disease that occurs in fields with bareroot plants. There also is more risk with plants that have been grown in nurseries for several field seasons (several generations) as compared to those that have been grown for fewer generations since tissue culture. Much effort has focused on producing anthracnose-free plants; such efforts have been highlighted in previous editions of this newsletter.

—Frank Louws



## The Dawn of a New Age: Compost Use in Strawberry Production

By Ron Alexander

We published a related article by this author last issue. Here is a followup with some more details.

Thanks to funding provided through the North Carolina Department of Environment and Natural Resources (NC DENR)/Division of Pollution Prevention & Environmental Assistances Organic Wastes Recycling Grants, guidelines for the use of compost in strawberry production have been developed for use by the North Carolina strawberry industry. The guidelines illustrate how best to use compost in the production of strawberries, and provide insight as to growing strawberries with a decreased dependency on chemical inputs (e.g., methyl bromide, chemical fertilizers), and by improving 'soil health.' Research completed at Vollmer Farms, in Bunn, NC, illustrated that a compost-based growing system could favorably compete, both in economics and yield, with a chemical-based growing system. High-quality compost products supply stabilized organic matter, nutrients, and beneficial microbes to the soil, reducing the requirement

for additional inputs, while increasing yield and fruit quality and reducing disease incidence and severity.

The 'compost use guideline' for strawberry production follows the same format used in a series of landscape and nursery guidelines developed through the United States Composting Council (USCC) during the mid 1990s.

The compost use guidelines for strawberries were developed as part of the Compost Promotional Initiative project (NC CPI). The NC CPI was instituted by the NC DENR to improve both compost awareness and stimulate market growth. The compost use guidelines were developed using both peer reviewed research and the practical experiences of North Carolina farmers.

### Compost Use Guidelines for Strawberries Production

Compost to be used for strawberry production should meet all state and federal health and safety standards (e.g., EPA's Part 503 regulations), as crops are being grown for human consumption. Compost with a pH range of 5.0 to 8.0 may be used for cultivating strawberries. However, products with a pH of between 5.5 and 7.0 are preferred since this narrower pH range is consistent

with the optimum soil pH for growing strawberries. The use of composts that are both stable and pass growth -screening tests is essential to optimize plant growth and yield. Soluble salt content of the compost should be low, as strawberries are considered a salt sensitive species. The soluble salt content of the amended soil must be below 1 dS/m to prevent growth suppress and yield reduction. The soluble salt content of the compost/soil blend can be reduced through leaching (irrigation practices). The compost should also be free of weeds.

To help determine appropriate pre-plant and ongoing fertilizer application rates, the content and availability of macronutrients contained in the compost, particularly nitrogen, should be identified. Although composts with high nutrient contents have been successfully used as the sole source of pre-plant nutrients in strawberries production, they should be used with care. Composts containing enough micronutrients (trace elements) to meet the crop's annual requirements are also preferred. To improve the handling and application of the compost, its moisture content should be between 35 and 55 percent. Compost passing through a 1/2-inch screen, or smaller, is preferred to minimize the content of large foreign matter or

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## Compost in Strawberry Production

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carbonaceous material in the finished product. However, the preferred product particle size may be somewhat dependent upon the soil texture, the compost feedstock, application rates and the type of spreading equipment used.

Composts produced from both manure and yard trimmings have been used in the strawberry cultivation both in actual field use and research.

### Application Method

Compost may be applied using a traditional manure spreader (flail/rear discharge or side discharge) or other specialized equipment. Approximately 5 to 15 tons/acre of compost are typically used on conventionally grown and 8 to 20 tons/acre on organically grown strawberries. Directed applications of compost, within the area of the fielded to be bedded can reduce the application rate in half. Lower rates of compost are typically being used as 'maintenance' applications as a nutrient supplement or media for microbial growth and humus formation. Application rates of 10 to 20 tons and higher are used to modify soil physical properties and as a primary nutrient source in short terms. The product should be uniformly surface-applied, then incorporated to an approximate depth of 5 to 6 inches using a rototiller, disc or moldboard plow, or other tillage equipment. Existing soil conditions and compost characteristics will influence appropriate compost application rates.

Once the compost is incorporated, raised beds may be established using a bedding machine. The raised beds may then be



**Healthy strawberries grown with compost. Photo courtesy of Ron Alexander.**

mulched using organic materials or covered with plastic to assist in weed control. If drip irrigation is to be used, the drip tubing should be laid before or at the same time the mulch is applied. Fumigation of the beds, if desired, can be performed in conjunction with laying the plastic. Fumigation may be eliminated by using specific compost products, as some research and field experience has shown a reduced dependency on fumigation where biologically active (disease suppressive) compost has been applied. Once planted, the strawberry plugs or bare root plants should be irrigated and soon after fertilized as necessary. If the soluble salt content of the compost or the soil blend is identified as potentially damaging to the crop, one or more thorough watering prior to planting should follow incorporation of the compost.

### Use of Related Materials

Fertilizer programs should be designed based on the requirements of the crop, taking into account the cultural practices being used, soil fertility, nutrient content of the compost product, and the availability and release rates of these nutrients. For best results, the amended soil should be tested prior to fertilization. Often, fertilizers used to prepare the soil before planting may be reduced or even eliminated when using rich, stable compost. Usually, both pre-plant and ongoing fertilizer application rates can be adjusted (reduced) based on the nutrient content of the compost. Irrigation should be applied based on plant needs, soil moisture, and climatic conditions. Frequency of irrigation may be reduced during both plant establishment and the growing season due to compost addition. Compost may affect soil pH, so pH of the compost-amended soil should be determined before pH adjustment is performed.

### Long-term Maintenance

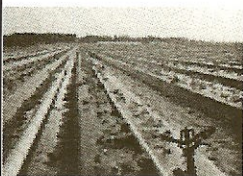
Compost may be reapplied when new raised beds are established. If applied at suggested rates, specific composts may supply nutrients to crops planted after the initial growing season (multiple cropping). Therefore, fertilizer programs must be adapted to account for this residual nutrition.

### Health/Environmental Conditions

Compost with moisture content less than 40 percent tends to be dusty, which may be irritating to the eyes and respiratory tract. Protective eyewear and a dust mask should eliminate any such nuisance. Inert and foreign materials contained in the compost may

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## Compost in Strawberry Production

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cause minor lacerations if sharp. If hand labor is used during planting and harvesting, sharp materials in the compost should be minimized. ❖

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**Planting strawberries on Killdee Farm, in Ramseur, NC. Photo by Jeff Davis.**

## Strawberries in the News

Gorgeous strawberries recently graced the front of *Our State* magazine (May, 2002), in a issue celebrating North Carolina foods. The issue also featured Ervin and Debbie Lineberger's Killdeer Farm in Kings Mountain, NC, in a very nice article, "Take Your Pick."

Are you getting good coverage from your local paper? Featured on your local TV station? Most papers and stations will do at least one story on strawberries at the beginning of the season, and will do more if you work

with them and keep them informed. Grower Michael Beal, in Ramseur, NC, has developed a good relationship with photographer Jeff Davis of the *Chatham News/Record*, so Jeff goes out to the farm whenever there's anything photogenic, like setting plants in the photo above. Send us *your* clippings and photos for our files; you'll also help us build our list of news media contacts! ❖

*We plan to have a session on how to work with the media at the conference this fall.*



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