THE STRAWBERRY GROWER
NORTH CAROLINA STRAWBERRY ASSOCIATION
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Spotlight on Strawberry Tissue Analysis and Spring Nitrogen Recommendations

By Brenda Cleveland, NCDA&CS Agronomist

Soil testing provides lime and fertilizer recommendations to help get the strawberry crop off to a good start. Later, during bloom and fruit stages, the NCDA&CS Agronomic Division recommends using plant tissue analysis on a biweekly schedule to determine if the crop has taken up essential nutrients at optimum rates. This test includes a measurement of the petiole nitrate-nitrogen (NO3-N) concentration.

For plasticulture strawberry, NCDA&CS recommends 120 lbs nitrogen (N) per acre: 60 lbs to be applied preplant and the remaining 60 lbs in the spring during bloom and fruiting. The suggested practice is to apply the spring N through the drip tape at a rate of 5.25 lbs per acre (actual area, not area under plastic) per week.

Fertilization of an intensively managed, high-value crop like strawberry requires knowledgeable decision-making. Potential consequences of too much N include soft fruit with poor shelf life, reduced yield, poor cost-benefit ratio and environmental pollution. On the other hand, too little N results in poor growth and reduced yield. The crop uses only about one-third of the preplant N by the time active spring growth begins. At that time, the NCDA&CS Plant Analysis Report should be used to determine the appropriate rate of N to apply.

The plant report's N recommendation is based on the growth-stage week and the amount of NO3-N detected in the petiole sample (see page 3). These recommendations are based on work done by Gordon S. Miner (NCSU) and C. Ray Campbell (NCDA&CS) in the 1990s on Chandler and Camarosa varieties. Their research resulted in the development of petiole NO3-N sufficiency ranges

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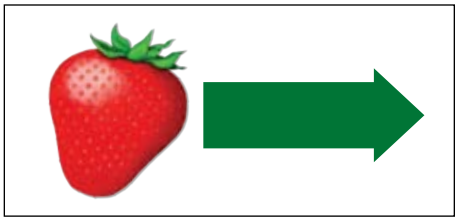
It's been cold! The photo shows a strawberry field at Pete Waller's Ottawa Farms near Savannah, GA, during a cold rain in early January. It was taken during a tour sponsored by the North American Raspberry & Blackberry Association.

Marketing This Year's Upcoming Harvest



Work is underway on the NC Strawberry Association's marketing and promotion efforts for this spring With the help of a new grant from the USDA Specialty Crops Program, we'll be able to expand these efforts into several new areas:

- **Focus groups of consumers** before and after harvest season. What are consumers looking for? What catches their attention? What promotions are effective?
- **More signs for growers.** Growers will be able to order from an assortment of sign designs, including "generic" signs that can be used by out-of-state members. Because we will order these in quantity, they will be very reasonably priced. If you have suggestions for these signs, let NCSA know very soon.
- **Signs for schools, stores, and roadside stands.** We had some requests for signs last year from roadside stands and stores that sold NC berries – this year we will be able to supply all these, to get attention on our "brand".
- **New tools for growers** such as forms and instructions for customers' group orders and templates for flyers and informational signs
- **Strawberry health benefit cards** and recipe brochures... hopefully in full color.
- **An Art Contest for kids.** It's been a while since we did this – it gets lots of buzz!

We will also continue our radio promotions, expand our PR (with the help of Angela Jamison of Communicopia Marketing, who has worked with NCSA in the past), boost our website, Facebook, Twitter, and YouTube presence, and more. We want to get people aware of and excited about the local harvest season.

Watch for more information via email and in the March newsletter about ordering signs, stickers, and coloring books. If you would like to be on the advisory committee for this year's promotions, or have specific ideas, do please contact the NCSA office.

Tissue Analysis and Spring Nitrogen Recommendations

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for each week of the bloom and fruiting growth stages (see table below).

Here is how the recommendations work. When the petiole NO3-N concentration is within the desired range, 5.25 lbs N per acre per week is recommended. When the petiole NO3-N concentration falls below the desired range, 7.0 lbs N per acre per week is recommended. When the petiole NO3-N concentration is above the desired range, no N is recommended. The recommendations are guidelines and must be used in conjunction with site-specific factors – such as fertilization history, temperature, and pest/disease pressure – to make the most appropriate nutrient management decisions.

The growth stage (GS) and week coded by the grower on the Plant Sample Information form drives the N recommendation. The bloom (B) growth stage starts the first week of bloom and continues for approximately five weeks; the fruit (F) growth stage starts the first week of berry harvest and continues approximately seven weeks or through the final fruit harvest. B week 1 is characterized by the presence of 5–10 open blossoms on at least 50% of the plants. It also means that strawberries will be ready to pick in 4½ to 5 weeks. For example, if a tissue sample is collected on March 15 during the first week of bloom, then the grower should be anticipating berry harvest the week of April 19.

Customized NCDA&CS agronomist comments and recommendations are based on tissue test results and crop growth stage and week. For this reason, *it is critical that the Plant Sample Information form be filled out correctly and completely.* Recommendations cannot be provided based on analytical results alone. Incorrect or incomplete information on the form may lead to incorrect N recommendations. For example, a crop with a petiole NO3-N concentration of 1600 ppm does not need any N if it is week 1 of bloom, but if it is actually week 2 of bloom, a recommendation of 7 lbs per acre is appropriate.

Strawberry trifoliate leaf with the petioles detached from the blades.

As an alternative, or in addition, to specifying growth stage and week, the grower can indicate when strawberry harvest will begin or how long it has been underway.

In summary, each strawberry tissue sample should include 25–30 trifoliate leaf blades with the petioles detached, a completed Plant Sample Information form, and a processing fee of $7 per sample (see a pictorial guide at www.ncagr.gov/agronomi/pictorial.htm). Out-of-state growers are also welcome to use these services, at a cost of $27 per sample. The NCDA&CS Plant Analysis Report will provide concentrations for 11 of the essential plant elements in the leaf blade as well as petiole NO3-N, an interpretation of the results, and recommendations. Recommendations other than the N rate are based upon leaf blade results. For any questions related to strawberry tissue analysis, please contact agronomists Brenda Cleveland or Michelle McGinnis at 919-733-2655 or the regional agronomist assigned to your area (www.ncagr.gov/agronomi/rahome.htm).❖

***Be sure to send samples** to the correct address and in a way that gets the sample there quickly. Visit www.ncagr.gov/agronomi/uyrplant.htm to download the plant sample information form, which includes these addresses. The site also has instructional powerpoints on collecting the sample, filling out the form, and understanding the report.*

NCDA&CS Petiole Nitrate Nitrogen (NO3-N) Sufficiency Range and Nitrogen (N) Rate Recommendations by Growth Stage and Week

Growth Stage[1]	Week	Petiole NO_3-N Sufficient Range (ppm)	Nitrogen Rate Recommendation when Petiole NO_3-N is: Below—	Within— the Sufficient Range	Above—
B	1	600–1500			
B	2	4000–6000			
B	3	4000–6000	7 lb N/a/wk	5.25 lb N/a/wk	None
B	4	3500–6000			
B	5	3000–5000			
F	1	3000–5000			
F	2	3000–5000			
F	3	3000–5000			
F	4	2000–4500	7 lb N/a/wk	5.25 lb N/a/wk	None
F	5	2000–4000			
F	6	1500–3000			
F	7	1000–2000			

1. B = Bloom F = Fruit (harvest begins)