Tobacco transplant producers: Have fertilized float-bed water tested!

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Successful production of transplants depends on adding fertilizer to the float-bed water at the rates recommended in NCSU’s 2013 Flue-cured Tobacco Guide. The best way to ensure fertilizer is added according to those recommendations is to test the float-bed nutrient solution. The appropriate test is solution analysis, available through the Agronomic Division of the N.C. Department of Agriculture and Consumer Services.

Solution analysis lets a grower know whether a float-bed nutrient solution is suitable for tobacco seedling production. Samples are analyzed for chemical properties important for plant growth. The test measures total alkalinity, pH, electrical conductivity (soluble salts), sodium and concentrations of 12 essential plant nutrients (nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, zinc, copper, boron, chloride). The NCDA&CS solution report also provides comments by an agronomist regarding the suitability of the nutrient solution for transplant production and suggestions for corrective action, if necessary.

Growers are advised to collect nutrient solution samples after adding and thoroughly mixing the first fertilization. It is also good practice to sample again prior to adding the next batch of fertilizer to determine if additional fertilizer is needed and, if so, the appropriate rate. The publication Solution Analysis for Tobacco Transplant Float Beds provides detailed information on best management practices, timing of fertilization and recommended nutrient concentrations in float-bed water. In this note, solution report values for nitrogen, boron and sodium absorption ratio are given particular attention.

Nitrogen (N)

The 2013 Flue-cured Tobacco Guide recommends that float-bed water contain 100–150 ppm N. Typically a 2-1-2 or 3-1-3 fertilizer ratio is added about seven days after seeding at a rate to achieve the recommended range. An additional 100–150 ppm N should be added about four
weeks later. If a fertilizer injection system is used, a constant injection rate of 125 ppm is recommended.

In 2010, only 39% of nutrient solution samples from float-bed tobacco had the desired N concentration. N was low in 30% and high in 31%. Excess N produces succulent tobacco seedlings that are more susceptible to disease, while deficient N inhibits growth and vigor. Agronomists review analytical laboratory data and often include comments regarding nitrogen management on the solution report.

**Boron (B)**

Tobacco float-bed water should contain 1–2 ppm boron, yet water sources in North Carolina rarely contain adequate amounts of this micronutrient. According to 2010 solution analysis test results, 86% of float-bed samples were deficient in B. Boron helps tobacco achieve optimum growth and development. Deficient plants may show bud distortion and/or die.

When solution analysis of source water indicates a need for boron, use a tobacco fertilizer that contains it. However, if you have already added fertilizer, you can apply boron alone by adding 0.2 ounces of borax (11% B) per 1000 gallons of float-bed water. This rate should bring the concentration to 1.5 ppm B. Be very cautious when adding boron because the gap between sufficiency and toxicity is very narrow.

**Sodium Adsorption Ratio (SAR)**

The SAR describes sodium concentration in relation to calcium and magnesium concentrations. A high SAR value (>4) is not desirable. This situation is typically found where wells are fed by brackish water. SAR values greater than 4 indicate that there is potential for excess uptake of sodium that can lead to leaf burn. In 2010, 15% of float-bed samples had high SAR. Materials like gypsum can be used to lower SAR because they add calcium to float-bed water.

**Collecting & Submitting Nutrient Solution Samples**

To collect a sample, first make sure that the fertilizer has completely dissolved and been thoroughly mixed in the float bed. Use a clean, plastic bottle that will hold 8–16 ounces. Before filling the bottle, rinse it with the float-bed water being collected.

Label each sample and fill out a *Solution Sample Information* form. When filling out the form, use the code for nutrient solutions, which is NT. Send the sample, completed form and appropriate fee ($5 per sample) to the NCDA&CS Agronomic Division. The appropriate mailing address will depend on the method of delivery (U.S. Postal Service vs. DHL, FedEx or UPS). Follow the instructions given on the sample information form.

Solution reports are available 3-4 days after the samples are received, though often within two days. Reports are posted on the Agronomic Division website. From the home page, select “Find Your Report” from the left-column navigation bar.

**Problems**

If abnormal growth or color develops in tobacco seedlings, do not wait. Submit diagnostic samples as quickly as possible. For optimum diagnosis, submit float-bed water, soilless media and tobacco tissue samples. Information on how to collect and submit soilless media and tissue samples is available in *Sampling for Soilless Media Analysis* and *Sampling for Plant Analysis*.

If you have questions about how to collect samples or interpret your report, contact Brenda Cleveland or Aaron Pettit at 919-733-2655. Your NCDA&CS regional agronomist is also a good source of advice. A list of agronomists and their county assignments is posted at [www.ncagr.gov/agronomi/rahome.htm](http://www.ncagr.gov/agronomi/rahome.htm).