Plant Tissue Sampling & Analysis

NCDA&CS: Agronomic Division

by: Dianne Farrer, Ph.D.

June 15, 2010

Reasons for Collecting Plant Tissue Samples

- Fine-tune fertility program
- Detect problems
- Diagnose problems
- Optimize harvest

When to Take a Tissue Sample

- Depends on crop/plant:
  - Fruit and Vegetable crops — just before or during flowering/fruiting
  - Diagnose problems
- How often:
  - Bi-weekly

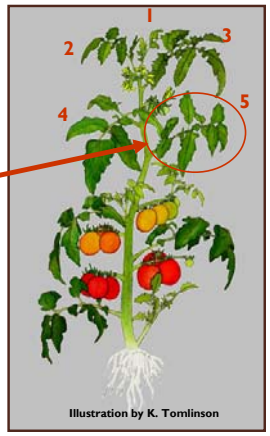
What Part of the Plant to Collect

- Most common is the MRML or the Most Recently Matured Leaf
- Usually found as the 3rd to 5th leaf down from the growing point
- Handout on tissue sampling

What Part of the Plant to Collect

- Refer to the **Plant Tissue Sampling Guide — preliminary draft** provided today as a handout.
- The Agronomic Division is working on a more comprehensive guide, which should be available by the end of the year.

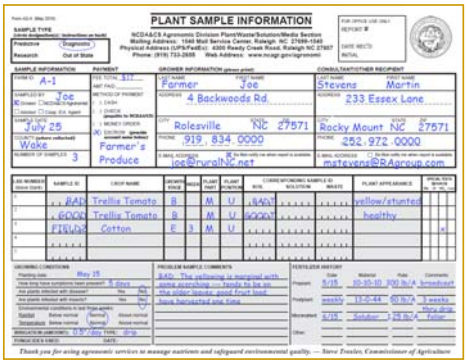
Tomato MRML 5th entire leaf from the plant's growing point



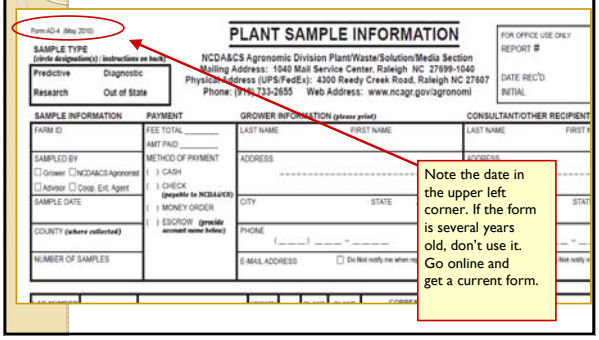
How to Collect a Representative Sample

- Stop at 8 to 12 random spots in the field
- Collect 15 to 50 leaves
- Diagnostic sample
  - Same as above but collect from "good" and "bad" areas in the field
- Get sample to Lab ASAP
  - Store in refrigerator
  - Air-dry sample

Complete Plant Sample Information Form:

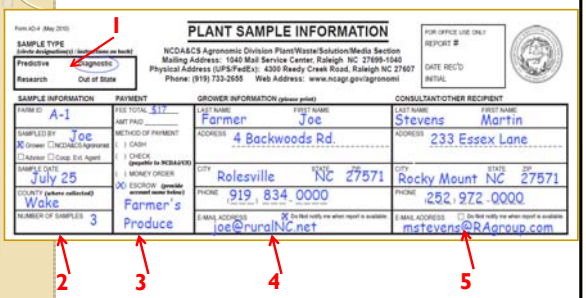


Standard Paper Form



Note the date in the upper left corner. If the form is several years old, don't use it. Go online and get a current form.

Standard Paper Form



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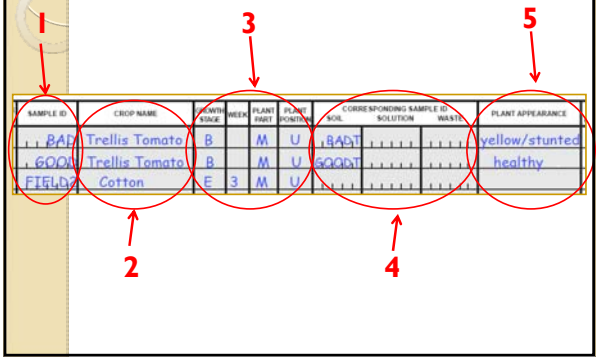
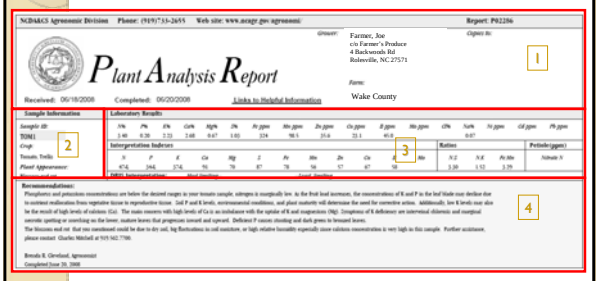
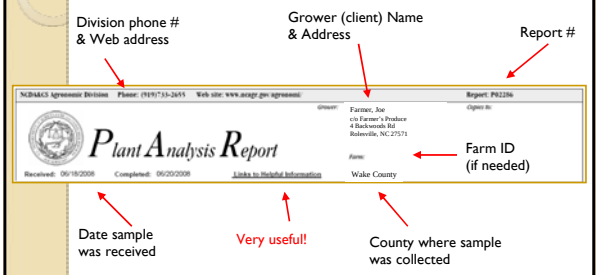


Standard Paper Form

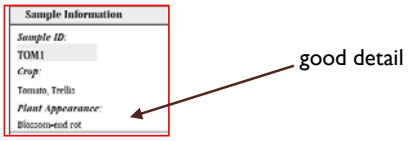
Standard Plant Analysis Report



Standard Plant Analysis Report: Box # 1



Standard Plant Analysis Report: Box # 2



This section contains identifying information provided by the client.

Standard Plant Analysis Report: Box # 3

Laboratory Results

N%	P%	K%	Ca%	Mg%	S%	Fe ppm	Mn ppm	Zn ppm	Cu ppm	B ppm	Mo ppm	Cl%	Na%	Ni ppm	Cd ppm	Pb ppm
3.40	0.20	2.23	2.68	0.67	1.03	324	98.5	35.6	22.1	49.0			0.07			

Interpretation Indexes												Ratios			Petiole (ppm)
N	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	N:S	N:K	Fe:Mn	Nitrate N
47.4	34.4	37.4	91	70	87	78	56	57	67	58		3.30	1.52	3.29	

Actual nutrient concentrations in percentage of dry matter (N, P, K, Ca, Mg, & S) and part per million – ppm (Fe, Mn, Zn, Cu, & B)

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Interpretation Indexes:

- 50 to 74 = nutrient level is sufficient
- < 25 = nutrient deficiency
- < 50 = reduced yield possible
- > 74 = additional fertilizer provides no benefit
- > 99 = excess nutrients present; may be toxic

Standard Plant Analysis Report: Box # 4

Recommendations:

Phosphorus and potassium concentrations are below the desired ranges in your tomato sample; nitrogen is marginally low. As the fruit load increases, the concentrations of K and P in the leaf blade may decline due to nutrient reallocation from vegetative tissue to reproductive tissue. Soil P and K levels, environmental conditions, and plant maturity will determine the need for corrective action. Additionally, low K levels may also be the result of high levels of calcium (Ca). The main concern with high levels of Ca is an imbalance with the uptake of K and magnesium (Mg). Symptoms of K deficiency are interveinal chlorosis and marginal necrotic spotting or scorching on the lower, mature leaves that progesses inward and upward. Deficient P causes stunting and dark green to bronzed leaves.

The blossom end rot that you mentioned could be due to dry soil, big fluctuations in soil moisture, or high relative humidity especially since calcium concentration is very high in this sample. For further assistance, please contact Charles Mitchell at 919.562.7700.

Brenda R. Cleveland, Agronomist

Completed: June 20, 2008