

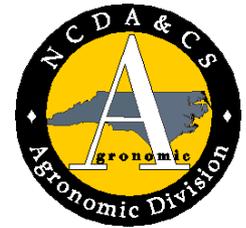


Understanding the NCD&CS Plant Tissue Report

NCD&CS Agronomic Division		Phone: (919) 733-2655		Website: www.ncagr.gov/agronomi/						
 Diagnostic Plant Tissue Report		Client: Farmer, J		c/o Nash Far						
		County: Rocky Mou		Nash						
Sampled: 07/04/2011		Received: 07/07/2011		Completed: 07/11/2011						
Farm:										
Sample Information	Nutrient Measurements									
Sample ID: T1	N (%)	P (%)	K (%)	Ca (%)	Mg (%)	S (%)	Fe (ppm)	Mn (ppm)	Zn (ppm)	Cu (ppm)
Crop: Tomato, Trellis	4.77	0.26	1.78	2.71	0.56	0.60	60.3	65.2	26.0	15.0
Growth Stage: F	Interpretation Indexes									
Week: 0	N	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu
Plant Part: M	95	57	45	92	80	74	58	62	57	15
Plant Position: U	Other Results									
Plant Appearance: Lvs cupped/curled	Na (%)	Cl (%)	C (%)	DW (g)	NO ₃ -N (ppm)	Ni (ppm)	Cd (ppm)	Pb (ppm)	Al (ppm)	Se (ppm)
	0.02									
Agronomist's Comments:										
Cupped, curled leaves for 3 weeks; hot, dry conditions; irrigated through drip tape										
Nitrogen (N) is very high and potassium (K) is marginally low. Deficient K causes marginal yellowing to scorching. Low that you have applied adequate K and that soil moisture is good. Be careful not to apply excess N as it can lead to susceptibility to disease and insect infestations; it also leads to poor fruit development and quality and poor adaptation to changing conditions. High N could both lead to curled, cupped leaves especially under the hot, dry weather that you noted. Please contact me or your local agronomist for assistance.										

NCD&CS Agronomic Division Plant/Waste/Solution/Media Section

July 2012



Report Availability

A screenshot of the NCD&CS Agronomic Services website. The header includes the NCD&CS logo and the text 'NORTH CAROLINA DEPARTMENT OF AGRICULTURE & CONSUMER SERVICES'. A navigation menu contains links for Home, Programs, Services, Divisions, Newsroom, and Search. A dropdown menu is open, showing 'NCD&CS Divisions' and a 'Go' button. The main content area features a large image of a horse's head. Below the image, the text reads 'AGRONOMIC SERVICES division'. A sidebar on the left lists various services, with 'Find Your Report (PALS)' circled in red. The main content area includes a photo of a brick building and a text box stating: 'NCD&CS Agronomic Division reports are available online. As part of our GREEN (fiscally and environmentally sustainable) policy, paper reports are no longer provided.' To the right, there is a 'Highlights' box with links for 'Registering your E-mail in PALS (New -- JAN 2010)', 'Sample information forms (New -- MARCH 2010)', 'Sample containers & info', and 'Bar-code shipping labels'.

- NCD&CS plant reports are posted online about two working days after samples are received.
- Visit www.ncagr.gov/agronomi to search.



Plant Report Data



- Can be used to monitor plant nutrient uptake
- Can be helpful in fine-tuning a fertilization program
- Can be used to diagnose whether symptoms are due to poor nutritional status



Plant Tissue Report

has five main sections

NCDA&CS Agronomic Division		Phone: (919) 733-2655		Website: www.ncagr.gov/agronomi/		Report No. FY12-P000065																																																																																			
	Diagnostic Plant Tissue Report			<i>Client:</i> Farmer, Joe c/o Nash Farms 8046 Red Hills Rd Rocky Mount, NC 27807		<i>Advisor:</i>																																																																																			
	Sampled: 07/04/2011 Received: 07/07/2011 Completed: 07/11/2011 Farm:			<i>County:</i> Nash		Links to Helpful Information																																																																																			
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Plant Tissue Report

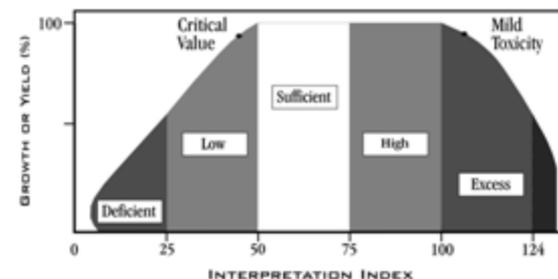
The last page of every report has explanatory information with hyperlinks to more in-depth material.

5

Understanding the Plant Report — additional information: [Tissue results for cotton](#), [Tissue results for other crops](#) & [Plant tissue analysis guide](#)

The primary purpose of tissue analysis is to measure crop levels of up to 13 essential nutrients required for normal plant growth and development. These nutrients are supplied to the plant by fertilizer and/or the soil. Primary nutrients (N, P, K) are needed in greatest quantities, secondary nutrients (Ca, Mg, S) in lesser quantities, and micronutrients (Fe, Mn, Zn, Cu, B, Mo, Cl) in very small amounts.

Concentrations of primary & secondary nutrients and Cl are measured as a percentage and other micronutrients in parts per million (ppm), all on a dry-weight basis. However, the quickest way to assess crop need for a particular nutrient is by use of interpretation indexes. Compare the index for the desired nutrient to the chart on the right to find out if the status of that nutrient is deficient, low, sufficient, high or excess.





Plant Tissue Report

Section 1: Header

Division phone #
& Web address

Grower (client) Name
& Address

Report #

NCDA&CS Agronomic Division	Phone: (919) 733-2655	Website: www.ncagr.gov/agronomi/	Report No. FY12-P000065
	Diagnostic	Plant Tissue Report	<i>Client:</i> Farmer, Joe c/o Nash Farms 8046 Red Hills Rd Rocky Mount, NC 27807
Sampled: 07/04/2011	Received: 07/07/2011	Completed: 07/11/2011	<i>Advisor:</i> Links to Helpful Information
		<i>County:</i> Nash	<i>Farm:</i>

Report
type

Relevant dates

Farm ID
(if needed)

County where sample was collected

Very useful!



Plant Tissue Report:

Section 2: Sample Information

N.C.D.A. & C.S. Agronomic Division		Phone: (919) 733-2655		Website: www.ncagr.gov/agronomi/		Report No. FY12-P000065									
	Diagnostic Plant Tissue Report			<i>Client:</i> Farmer, Joe c/o Nash Farms 8046 Red Hills Rd Rocky Mount, NC 27807		<i>Advisor:</i>									
	Sampled: 07/04/2011 Received: 07/07/2011 Completed: 07/11/2011			<i>County:</i> Nash		Links to Helpful Information									
Sample Information <i>Sample ID:</i> T1 <i>Crop:</i> Tomato, Trellis <i>Growth Stage:</i> F <i>Week:</i> 0 <i>Plant Part:</i> M <i>Plant Position:</i> U <i>Plant Appearance:</i> Lvs cupped/curled		Nutrient Measurements										Nutrient Ratios			
		N (%)	P (%)	K (%)	Ca (%)	Mg (%)	S (%)	Fe (ppm)	Mn (ppm)	Zn (ppm)	Cu (ppm)	B (ppm)	Mo (ppm)	N:S 7.89 : 1	
		4.77	0.26	1.78	2.71	0.56	0.60	60.3	65.2	26.0	15.4	53.9		N:K 2.67 : 1	
		Interpretation Indexes													
		N	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	Fe:Mn 0.93 : 1	
		95	57	45	92	80	74	58	62	57	78	60			
		Other Results													
		Na (%)	Cl (%)	C (%)	DW (g)	NO ₃ -N (ppm)	Ni (ppm)	Cd (ppm)	Pb (ppm)	Al (ppm)	Se (ppm)	As (ppm)	Li (ppm)	Cr (ppm)	Co (ppm)
		0.02													

Agronomist's Comments:

Cupped, curled leaves for 3 weeks; hot, dry conditions; irrigated through drip tape

Nitrogen (N) is very high and potassium (K) is marginally low. Deficient K causes marginal yellowing to scorching. Low K could be related to a heavy fruit load. Verify that you have applied adequate K and that soil moisture is good. Be careful not to apply excess N as it can lead to succulent vegetative growth that is easily susceptible to disease and insect infestations; it also leads to poor fruit development and quality and poor adaptation to changing environmental conditions. Excess N and low K could both lead to curled, cupped leaves especially under the hot, dry weather that you noted. Please contact me or your crop consultant if you would like further assistance



Sample Information

Sample Information

Sample ID: T1

Crop:
Tomato, Trellis

Growth Stage: F

Week: 0

Plant Part: M

Plant Position: U

Plant Appearance:
Lvs cupped/curled

This section contains identifying information provided by the client.

good detail





Plant Tissue Report: Section 3: Laboratory Results

NCDA&CS Agronomic Division Phone: (919) 733-2655 Website: www.ncagr.gov/agronomi/ Report No. FY12-P000065



Diagnostic

Plant Tissue Report

Client: **Farmer, Joe**
c/o Nash Farms
8046 Red Hills Rd
Rocky Mount, NC 27807
County: Nash

Advisor:

[Links to Helpful Information](#)

Sampled: 07/04/2011 Received: 07/07/2011 Completed: 07/11/2011 Farm:

Sample Information

Sample ID: T1
Crop: Tomato, Trellis
Growth Stage: F
Week: 0
Plant Part: M
Plant Position: U
Plant Appearance: Lvs cupped/curled

Nutrient Measurements

N (%)	P (%)	K (%)	Ca (%)	Mg (%)	S (%)	Fe (ppm)	Mn (ppm)	Zn (ppm)	Cu (ppm)	B (ppm)	Mo (ppm)
4.77	0.26	1.78	2.71	0.56	0.60	60.3	65.2	26.0	15.4	53.9	

Interpretation Indexes

N	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo
95	57	45	92	80	74	58	62	57	78	60	

Other Results

Na (%)	Cl (%)	C (%)	DW (g)	NO ₃ -N (ppm)	Ni (ppm)	Cd (ppm)	Pb (ppm)	Al (ppm)	Se (ppm)	As (ppm)	Li (ppm)	Cr (ppm)	Co (ppm)
0.02													

Nutrient Ratios

N:S 7.89 : 1
N:K 2.67 : 1
Fe:Mn 0.93 : 1

Agronomist's Comments:

Cupped, curled leaves for 3 weeks; hot, dry conditions; irrigated through drip tape

Nitrogen (N) is very high and potassium (K) is marginally low. Deficient K causes marginal yellowing to scorching. Low K could be related to a heavy fruit load. Verify that you have applied adequate K and that soil moisture is good. Be careful not to apply excess N as it can lead to succulent vegetative growth that is easily susceptible to disease and insect infestations; it also leads to poor fruit development and quality and poor adaptation to changing environmental conditions. Excess N and low K could both lead to curled, cupped leaves especially under the hot, dry weather that you noted. Please contact me or your crop consultant if you would like further assistance.



Data Accuracy

Depends largely on the sample

- Quality
 - representative of field conditions
 - collected & handled according to recommended practices
- Quantity
 - sufficient tissue for testing

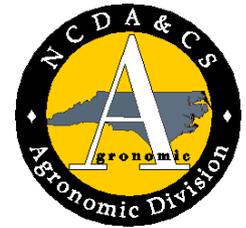




Laboratory Results: Nutrient Measurements

Nutrient Measurements												Nutrient Ratios	
<i>N (%)</i>	<i>P (%)</i>	<i>K (%)</i>	<i>Ca (%)</i>	<i>Mg (%)</i>	<i>S (%)</i>	<i>Fe (ppm)</i>	<i>Mn (ppm)</i>	<i>Zn (ppm)</i>	<i>Cu (ppm)</i>	<i>B (ppm)</i>	<i>Mo (ppm)</i>		
4.77	0.26	1.78	2.71	0.56	0.60	60.3	65.2	26.0	15.4	53.9		N:S 7.89 : 1	
												N:K 2.67 : 1	
Interpretation Indexes												Fe:Mn 0.93 : 1	
N	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo		
95	57	45	92	80	74	58	62	57	78	60			
Other Results													
<i>Na (%)</i>	<i>Cl (%)</i>	<i>C (%)</i>	<i>DW (g)</i>	<i>NO₃-N (ppm)</i>	<i>Ni (ppm)</i>	<i>Cd (ppm)</i>	<i>Pb (ppm)</i>	<i>Al (ppm)</i>	<i>Se (ppm)</i>	<i>As (ppm)</i>	<i>Li (ppm)</i>	<i>Cr (ppm)</i>	<i>Co (ppm)</i>
0.02													

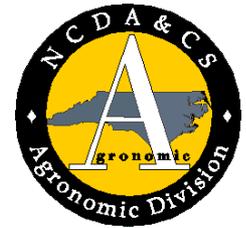
- 1) Includes concentrations of 11 of the essential plant nutrients plus sodium
 - Macronutrients as % values
 - Micronutrients as ppm



Laboratory Results: Nutrient Measurements

Nutrient Measurements												Nutrient Ratios	
<i>N (%)</i>	<i>P (%)</i>	<i>K (%)</i>	<i>Ca (%)</i>	<i>Mg (%)</i>	<i>S (%)</i>	<i>Fe (ppm)</i>	<i>Mn (ppm)</i>	<i>Zn (ppm)</i>	<i>Cu (ppm)</i>	<i>B (ppm)</i>	<i>Mo (ppm)</i>	<i>N:S 7.89 : 1</i>	
4.77	0.26	1.78	2.71	0.56	0.60	60.3	65.2	26.0	15.4	53.9		<i>N:K 2.67 : 1</i>	
Interpretation Indexes												<i>Fe:Mn 0.93 : 1</i>	
<i>N</i>	<i>P</i>	<i>K</i>	<i>Ca</i>	<i>Mg</i>	<i>S</i>	<i>Fe</i>	<i>Mn</i>	<i>Zn</i>	<i>Cu</i>	<i>B</i>	<i>Mo</i>		
95	57	45	92	80	74	58	62	57	78	60			
Other Results													
<i>Na (%)</i>	<i>Cl (%)</i>	<i>C (%)</i>	<i>DW (g)</i>	<i>NO₃-N (ppm)</i>	<i>Ni (ppm)</i>	<i>Cd (ppm)</i>	<i>Pb (ppm)</i>	<i>Al (ppm)</i>	<i>Se (ppm)</i>	<i>As (ppm)</i>	<i>Li (ppm)</i>	<i>Cr (ppm)</i>	<i>Co (ppm)</i>
0.02													

- 2) May include petiole nitrate N (NO₃-N), Mo & Cl values based on crop and/or additional fee paid



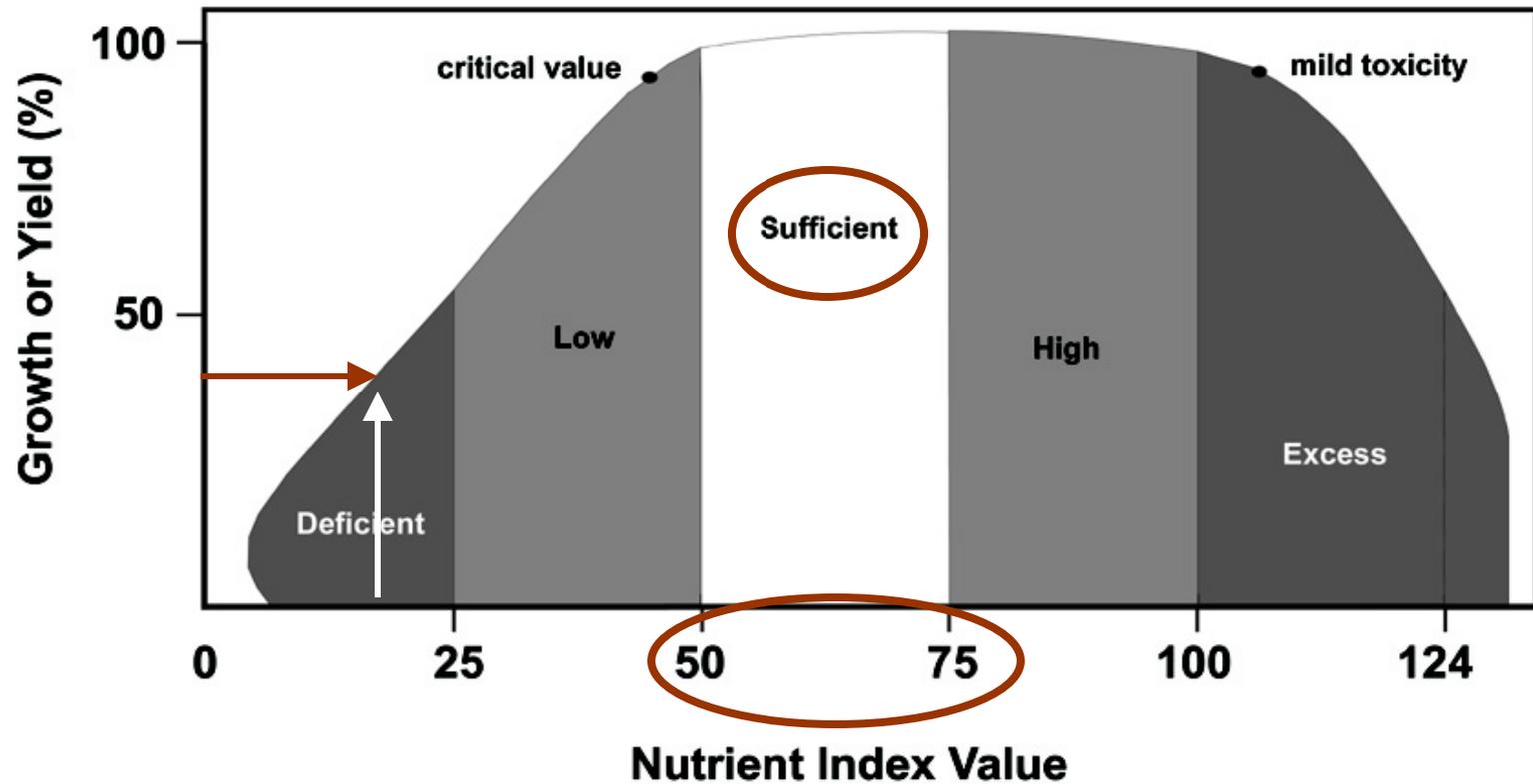
Laboratory Results: Interpretations Indexes

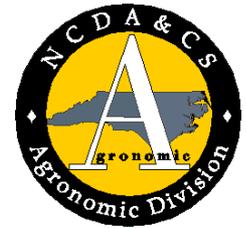
Nutrient Measurements												Nutrient Ratios
<i>N (%)</i>	<i>P (%)</i>	<i>K (%)</i>	<i>Ca (%)</i>	<i>Mg (%)</i>	<i>S (%)</i>	<i>Fe (ppm)</i>	<i>Mn (ppm)</i>	<i>Zn (ppm)</i>	<i>Cu (ppm)</i>	<i>B (ppm)</i>	<i>Mo (ppm)</i>	<i>N:S</i> 7.89 : 1
4.77	0.26	1.78	2.71	0.56	0.60	60.3	65.2	26.0	15.4	53.9		<i>N:K</i> 2.67 : 1
Interpretation Indexes												<i>Fe:Mn</i> 0.93 : 1
N	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	
95	57	45	92	80	74	58	62	57	78	60		

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



Index Values vs. Yield

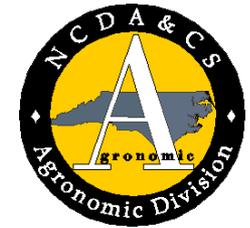




Laboratory Results: Nutrient Ratios

Nutrient Measurements												Nutrient Ratios
<i>N (%)</i>	<i>P (%)</i>	<i>K (%)</i>	<i>Ca (%)</i>	<i>Mg (%)</i>	<i>S (%)</i>	<i>Fe (ppm)</i>	<i>Mn (ppm)</i>	<i>Zn (ppm)</i>	<i>Cu (ppm)</i>	<i>B (ppm)</i>	<i>Mo (ppm)</i>	
4.77	0.26	1.78	2.71	0.56	0.60	60.3	65.2	26.0	15.4	53.9		<i>N:S</i> 7.89 : 1
<hr/>												<i>N:K</i> 2.67 : 1
Interpretation Indexes												<i>Fe:Mn</i> 0.93 : 1
N	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	
95	57	45	92	80	74	58	62	57	78	60		

- indicate relative balance between nutrients
- may indicate problems with nutrient assimilation when values are not within normal ranges



Plant Tissue Report: Section 4: Agronomist's Comments



Diagnostic

Plant Tissue Report

Client: **Farmer, Joe**
c/o Nash Farms
8046 Red Hills Rd
Rocky Mount, NC 27807
County: Nash

Advisor:

[Links to Helpful Information](#)

Sampled: 07/04/2011 Received: 07/07/2011 Completed: 07/11/2011 Farm:

Sample Information	Nutrient Measurements												Nutrient Ratios	
Sample ID: T1	N (%)	P (%)	K (%)	Ca (%)	Mg (%)	S (%)	Fe (ppm)	Mn (ppm)	Zn (ppm)	Cu (ppm)	B (ppm)	Mo (ppm)	N:S 7.89 : 1	
Crop: Tomato, Trellis	4.77	0.26	1.78	2.71	0.56	0.60	60.3	65.2	26.0	15.4	53.9		N:K 2.67 : 1	
Growth Stage: F	Interpretation Indexes												Fe:Mn 0.93 : 1	
Week: 0	N	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo		
Plant Part: M	95	57	45	92	80	74	58	62	57	78	60			
Plant Position: U	Other Results													
Plant Appearance: Lvs cupped/curled	Na (%)	Cl (%)	C (%)	DW (g)	NO ₃ -N (ppm)	Ni (ppm)	Cd (ppm)	Pb (ppm)	Al (ppm)	Se (ppm)	As (ppm)	Li (ppm)	Cr (ppm)	Co (ppm)
	0.02													

Agronomist's Comments:

Cupped, curled leaves for 3 weeks; hot, dry conditions; irrigated through drip tape

Nitrogen (N) is very high and potassium (K) is marginally low. Deficient K causes marginal yellowing to scorching. Low K could be related to a heavy fruit load. Verify that you have applied adequate K and that soil moisture is good. Be careful not to apply excess N as it can lead to succulent vegetative growth that is easily susceptible to disease and insect infestations; it also leads to poor fruit development and quality and poor adaptation to changing environmental conditions. Excess N and low K could both lead to curled, cupped leaves especially under the hot, dry weather that you noted. Please contact me or your crop consultant if you would like further assistance.

Brenda R. Cleveland, Agronomist
Completed: July 10, 2011



Agronomist's Comments

- This section may provide nutrient management advice and suggestions for corrective action.

Agronomist's Comments:

Cupped, curled leaves for 3 weeks; hot, dry conditions; irrigated through drip tape. Nitrogen (N) is very high and potassium (K) is marginally low. Deficient K causes marginal yellowing to scorching. Low K could be related to a heavy fruit load.

Verify that you have applied adequate K and that soil moisture is good. Be careful not to apply excess N as it can lead to succulent vegetative growth that is easily susceptible to disease and insect infestations; it also leads to poor fruit development and quality and poor adaptation to changing environmental conditions. Excess N and low K could both lead to curled, cupped leaves especially under the hot, dry weather that you noted. Please contact me or your crop consultant if you would like further assistance.

**Brenda R. Cleveland, Agronomist
Completed: July 10, 2011**



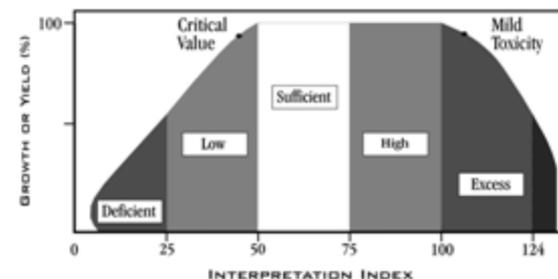
Plant Tissue Report: Section 5: Interpretation

The last page of every report has a general explanatory section called “Understanding the Plant Report” with hyperlinks to more detailed information.

Understanding the Plant Report — additional information: [Tissue results for cotton](#), [Tissue results for other crops](#) & [Plant tissue analysis guide](#)

The primary purpose of tissue analysis is to measure crop levels of up to 13 essential nutrients required for normal plant growth and development. These nutrients are supplied to the plant by fertilizer and/or the soil. Primary nutrients (N, P, K) are needed in greatest quantities, secondary nutrients (Ca, Mg, S) in lesser quantities, and micronutrients (Fe, Mn, Zn, Cu, B, Mo, Cl) in very small amounts.

Concentrations of primary & secondary nutrients and Cl are measured as a percentage and other micronutrients in parts per million (ppm), all on a dry-weight basis. However, the quickest way to assess crop need for a particular nutrient is by use of interpretation indexes. Compare the index for the desired nutrient to the chart on the right to find out if the status of that nutrient is deficient, low, sufficient, high or excess.





Things to Remember: Essential Nutrients

N P K Ca Mg S Fe Mn Zn Cu B Mo Cl C H O

- There are 16 essential plant nutrients.
- These nutrients are supplied by the soil, air, commercial fertilizers and amendments such as waste material.
- Plants take up essential nutrients in predictable concentrations.



Things to Remember: Nutrient Levels in Tissue



- Optimal concentrations (or ranges of concentrations) vary by crop.
- Tissue analysis is a tool that measures nutrient concentration and, therefore, plant uptake.
- The Plant Tissue Report indicates if concentrations are within ranges that lead to optimum growth and yield.



Things to Remember: Reasons for Monitoring



- Best way to detect hidden hunger
 - The earlier a nutrient problem is detected, the easier it is to correct.
 - The sooner a nutrient problem is corrected, the lower the subsequent drop in yield.
- Best way to obtain the information needed to help manage fertilization program more efficiently



Questions ?

Please contact

- Email: Brenda.Cleveland@ncagr.gov
- Phone: 919.733.2655
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