

Troubleshooting Fields Using Plant Analysis

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Plant analysis can:

- Confirm visual symptomology
- Reveal early stages of nutrient deficiencies
- Determine the availability of nutrients
 - When a reliable soil test does not exist
 - Soil test calibration has not been completed
- Assess a crop's response to applied nutrients
 - Where different treatments applied in the same field
 - Eg. strips with and without fertilizer added

Plant analysis as a diagnostic tool

- To be useful, must follow some guidelines

1. Take good notes

- Written notes
 - Describe any visual symptomology
 - Where on the leaf and plant do symptoms occur?
 - Where in the field do symptoms occur?
 - How do the roots look?
 - Are nodules active?
 - Signs of compaction?
 - Weather conditions past & current
 - Crop management practices
 - Eg. planting date, hybrid/variety, tillage, pest management, etc.
 - Field history
 - Crop rotation, manure application, past problems, etc.

1. Take good notes

- Sketch a map of the affected area noting:
 - Drainage, topography, soil color, soil texture, and other features that might affect plant growth
- Photographs
 - Include close-ups and panoramas document a point in time
 - In panoramic photos, try to include a landmark
- Mark the affected areas
 - Flags or GPS boundaries

2. Obtain plant & soil samples from normal & abnormal areas

- Comparison may be more useful than using plant analysis sufficiency interpretation ranges alone
 - Hybrids/varieties may vary in their sufficient level
- Soil samples help determine if nutrient deficiency is a result of low soil nutrients or weather/field conditions
 - Eg. K deficiency caused by compaction



Photo credits: E. Birschbach

3. Sample appropriate plant part for given growth stage & adequate sample number

- Tissue nutrient concentration generally decreases as the crop matures
- Sufficiency ranges & DRIS indices (somewhat) developed for a specific plant part sampled at a specific growth stage
 - Sample incorrect part or incorrect stage can result in incorrect interpretation
- Collect adequate number of samples
 - Needs to be representative of area
 - Needs adequate tissue for lab to analyze

3. Sample appropriate plant part for given growth stage & adequate sample number

Crop	Growth Stage	Plant Part Sampled	# of Plants
Alfalfa	Bud to 1 st flower	Top 6"	30-40
Alfalfa	Harvest	Whole plant	15-20
Corn	12 inches	Whole plant	10-15
Corn	Pre-tassel	Leaf below whorl	15-20
Corn	Tassel to silk	Ear leaf	15-20
Corn	Ensiled/chopped	Whole plant	10-15
Soybean	Prior to or at initial flower	4 th petiole & leaflet or 4 th petiole only	20-25
Wheat	Tillering	Newest fully developed leaf	30-40
Wheat	Prior to heading	Newest fully developed leaf	30-40

4. Place sample in paper envelope & send to lab

- Plastic bags are not acceptable
- If soil has splashed onto plant bush it off
 - Do not wash
- Clearly label sample
- Fill out sample submission form completely & accurately
 - Helps insure correct interpretations
- Contact lab in advance to obtain specific info.

5. Review plant & soil analysis results in conjunction with field notes

- Do the plant analysis results make sense based on field assessment?
- If no, or not sure
 - Call UWEX Co. Agent or a soil fertility specialist for assistance

Limitations of plant analysis

- Many of the previous guidelines developed because of limitations
- Remediation of nutrient deficiency not possible
 - Deficiency may have already caused yield loss
 - Crop may not respond
 - Crop may be too large
 - Unfavorable weather
- Sometimes, plant analysis can be a decision making guide for the next season's crop

Areas for agronomists to improve when sampling for plant analysis

- Submit soil samples with plant samples
- Submit paired (normal and abnormal) samples
- Sample soybean at appropriate growth stage



Photo credits: T. Andraski

When using plant analysis to look for potential problems

- Don't over interpret data
- Assess the bigger picture
 - Economics
 - Temporal/weather patterns effect on nutrient availability

Summary

- Plant analysis a helpful diagnostic tool if used properly
 - Follow sampling guidelines AND
 - Thoroughly research field history
- Remember plant analysis is NOT a substitute for a consistent soil sampling program



Photo credits: E. Sneller