Optimizing Plant Health Through Micronutrient Management

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Overview of Learning Objectives

• Why plant health through micronutrients?

• How application timings impact efficiencies and effectiveness

• Product Label “101”

• Tips on how to have progressive conversations with your retail sales-person
Closing the Yield Gap

**Corn**
- **Yield Winner**: *366 bu/acre*
- **National Average**:

**Soybean**
- **Yield Winner**: *87 bu/acre*
- **National Average**: 
Closing the Yield Gap

• Factors Effecting the Yield Gap
  – Climate
  – Rainfall
  – Sub-Optimal Genetics
  – Poor Plant Fertility
  – Poor Soil Health
  – Environmental Pressures
    • Insects, Diseases, Weeds

Goal is to provide producers with the right tools for effective, efficient, and sustainable agriculture!
## Micronutrient Overview

<table>
<thead>
<tr>
<th>Macronutrients (9)</th>
<th>Micronutrients (11)</th>
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</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>Iron</td>
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<tr>
<td>Hydrogen</td>
<td>Manganese</td>
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<tr>
<td>Oxygen</td>
<td>Boron</td>
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<td>Nitrogen</td>
<td>Zinc</td>
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<td>Phosphorous</td>
<td>Copper</td>
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<tr>
<td>Potassium</td>
<td>Molybdenum</td>
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<tr>
<td>Magnesium</td>
<td>Cobalt</td>
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<td>Calcium</td>
<td>Nickel</td>
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<td>Sulfur</td>
<td>Chlorine</td>
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<td></td>
<td>Sodium</td>
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<td>Silicon</td>
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</tbody>
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Plant Health Impact From Key Micronutrients

- Improvement of cold stress tolerances
- Increase drought stress tolerances
  - Mitigates intake and rate of water absorption
- Root hair formation
- Auxin production
- Key in chlorophyll production = plant growth regulation
- Phosphorous assimilation

Right Time: Multiple Application Points
**Plant Health Impact From Key Micronutrients**

- Aids in photosynthesis & respiration
- Regulates supply of growth hormones*
- Regulates uptake of other nutrients
  - *Phosphorous, Boron, Magnesium*
- Helps plant metabolize nitrogen
- Lignin formation
  - *prevent lodging in certain crops*
- Helps develop nematode tolerance
  - *Harder roots*

**Right Time: Post – Herbicide Application**
Plant Health Impact From Key Micronutrients

- Provides structure to plant cell walls
- Helps form and trans-locates proteins/sugars
- Aids in plant reproductive development & functions
  - *Plant hormones, pollination, kernel/pod fill*

**Right Time: R – Staged Applications**
Plant Growth & Development Review

Corn Growth and Development

Vegetative

Reproductive

Vegetative

Reproductive

Compass Minerals
Plant Nutrition
Right Time: Key Application Timings

- Planting
- Zinc & Manganese
- Cold Stress Tolerance Improvement
- Disease Tolerance
  - Increased # of Plants Emerged
  - Faster Emergence of All Plants
Methods of Application: Planting

- **Using chelated micronutrients in with starter program**
  - Dry soluble or liquid sources
    - Can be mixed at retailer plant or directly on the farm

- **Implementing a flow-aide + nutritional product as seed treatment**
  - Planter box treatment
  - Blended as a finishing agent by retailer on seed (soybeans)
Test & Results: Planting

Compass Seed Treatment
Size: 5.35 Acres
Average Dry Yield: 187.5 bu/ac
Average Moisture: 25.6 %

East Side Check
Size: 5.35 Acres
Average Dry Yield: 184.2 bu/ac
Average Moisture: 25.6%

+ 3.3 bu
Right Time: Key Application Timings

Herbicide Application

Zn, Mn, B, Co, Mo, Ni, S

Transient Nutrient Deficiencies

Stress Tolerances

Key growth stages impacting yield!!
Methods of Application: Herbicide Application

- Adding a foliar that aligns with needs
  - Flexibility of adding into Herbicide, Insecticide, Fungicide applications

- Maximize profitability without adding another application

- Products in the market-place that can be mixed at the retail location or loaded directly at the farm
  - Dry soluble or liquid formulations
Test & Results: Herbicide Applications

CHECK PULSE

Check Pulse
Right Time: Key Application Timings

- Fertigation or Fungicide
- K, Zn, B, Mn, Cu
- Reproduction Stages (stress management)
- Plant Hormone Supply
- Combating Diseases
- Pod Fill/Ear Fill
Methods of Application: Fertigation or Fungicide Applications

• Soluble Macro + Micro products.. add into fertigation tank
  • Mixing with straight water of 32% solutions
  • Can usually be pre-mixed at the retail location or some products can be mixed directly on farm

• Fungicide application, pairing Macro + Micro Products
  • “Hassle-Free” from farm aspect
  • Usually reasonable cost
  • Effective application, increased profitability
    • Adding into an already planned application
Test & Results: Fertigation or Fungicide Applications

Treasted  Untreated

PROACQUA™

Plant Nutrition
INS & OUTS of a Product Label

• KEY SECTIONS TO NOTE
  – Product Name & Manufacturer
  – Guaranteed Analysis
  – Directions for Usage
    • Likely different timings, crops, methods of application
  – Mixing Instructions
  – Health Hazards
    • Prevention (required PPE)
    • Response if contamination occurs
  – Storage & Disposal
Session Activity: Product Label Identification

http://www.cdms.net/LabelsSDS/home/

- What nutrients are in the guaranteed analysis?
  - Also important to look at the **derived from sources**

- What crops can this product be used on?
  - At what growth stages?

- Is there anything noted that this product can not be mixed with?
  - Is a jar test recommended?
  - What are the proper steps to conduct a jar test?

- What kind of health hazards does this product present?
  - What are the steps I can take to prevent contamination?
  - What do I do if contamination occurs?
Tips on HOW to have an Informed Discussion with Your Retail Sales-Person

• WHAT are the limiting issues on the farm?
  – Know your soil nutrient level basis
    • YOU know your farm better than anyone!

• WHAT are your budgets and proven yields
  – Setting S.M.A.R.T Goals!
    (specific, measurable, attainable, relevant and timely)

• Challenge your salesperson to become an informational source, not only a product provider

• Ask the HOW, WHAT, and WHY of products or applications
  – How do these help you reach your SMART goals for you farm & specific fields
Session Activity: Creating a SMART Goal

Specific
• Provides a clear description of what needs to be achieved.

Measurable
• Includes a metric with a target that indicates success.

Attainable
• Set a challenging target, but keep it realistic.

Relevant
• Keep your goal consistent with higher-level goals.

Timely
• Set a date for when your goal needs to be achieved.
Questions?
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