Management Practices
...to Improve Grain Quality

presented by:
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The Goal
The Puzzle
Winter soil temperatures
Low biotic activity
Slow conversion of ammonia base fertilizers.
Sulfate and phosphorus availability is reduced.
What your water is
your soil becomes

Impediments to Quality:
High pH
High in bicarbonates
High salts
Lowering pH
Adding Sulfate
Quality Milling Wheat

Nutrient Availability
- Nitrogen
- Phosphorus
- Potassium
- Sulfate
The diagram illustrates the effect of adding gypsum sulfur to soil. The left side shows soil particles containing salt, while the right side shows an improved soil structure with calcium (Ca) and sulfur. The addition of gypsum sulfur results in a more balanced and nutrient-rich soil environment.
Phosphate Groups

Adenine

Ribose

Energy Released for cell metabolism
Phosphorus Deficiency
The Impact of Sulfur on Quality Wheat

Sulfur Containing Amino Acids
Cysteine
Methionine

→ Protein Synthesis

Gluten
Gluten is the combination of:

- Gliaden is very sticky – extensible adhesive
- Glutenin large complex protein molecule
  Dough strength
  Elasticity
Properties of gluten in wheat products:
• It absorbs twice its weight in water
• It is sticky
• It is extensible; it will stretched when pulled
• It is elastic; when stretched it will return to its original size
## Field Observations

<table>
<thead>
<tr>
<th>Grain Protein</th>
<th>Comments</th>
<th>N:S</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.14</td>
<td>Tissue Test low NO3</td>
<td>9</td>
<td>P deficient, K deficient</td>
</tr>
<tr>
<td>10.71</td>
<td>Tissue Test low NO3</td>
<td>18</td>
<td>Low P and low Sulfur</td>
</tr>
<tr>
<td>13.86</td>
<td>Tissue Test high NO3</td>
<td>14</td>
<td></td>
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<tr>
<td>13.08</td>
<td>Tissue Test NO3 good</td>
<td>14</td>
<td></td>
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</tbody>
</table>
Genetics

High yield high nutrient requirement
Timing
Quantity guided by yield target
Specific nutrients determined by testing soil and plants.
Milling Wheat Fertilization Guide  \( \text{Goal} = 13\% \) Protein

- **Phosphate**
  - Preplant blend
  - Amount: Soil test recommendation

- **Ammoniacal, Urea, Blend**
  - 1/3 of total

- **Urea or UAN 32**
  - 1/3 of total

- **UAN 32, ammonium sulfate calcium nitrate**
  - 1/3 of total

- **Sulfate**
  - Amount: Soil test recommendation
  - Tissue test at tillering, boot & heading stages for nitrate
  - Nitrogen : Sulfur ratio <15:1

- **Nitrogen**
  - More nitrate nitrogen may be needed if tissue test moderate to low

- **Seasons**
  - **November**
  - **December**
  - **January**
  - **February**
  - **March**
  - **April**
  - **May**

- **Stages**
  - **Seedling**
  - **Tillering**
  - **Heading**
  - **Developing Grain**
• Soil Testing
• Tissue testing at tillering
• Water testing
The Goal