Germination Needs
1. Water
2. Temperature
3. Oxygen

Germination Processes
1. Water absorption
2. Enzyme activation
3. Cell division

Inches of Plant Available Soil Water at Field Capacity
The shaded area shows the plant available soils water holding capacity in the root zone.

Water Managed by Irrigation Scheduling
The green area shows the difference between the soils water holding capacity in the root zone and the maximum allowed soil moisture deficit.

Irrigation Scheduling
Green area shows difference between the soils water holding capacity in the root zone and the maximum allowed soil moisture deficit. The black line showing available water should stay in the green area to indicate planned moisture level for the crop.
Yield Susceptibility for Corn
(From Sudar et al., 1981)

Drought Sensitivity Coefficient
for Corn
(From Meyer et al. 1993)

Yield Susceptibility for Soybeans
(From Sudar et al., 1981)

Drought Sensitivity Coefficient
for Sorghum
(From Meyer et al. 1999)
Maximum Allowable Percent Depletion to Maintain Maximum ET Rates

Irrigation Scheduling by Crop Growth Stage

Emergence – below ground
1. Radicle (root) growth
2. Coleoptile (shoot) growth
3. Mesocotyl elongation

Emergence – above ground
1. Coleotile at surface
2. Light operus coleotile
3. First leaf emerges

North Platte - 2000
This strip had not been irrigated yet, but was fully watered for the rest of the season. The yield was 201 bu/acre with 12 inches of irrigation.

2003julycmdc24x36-009  2003julycmdc24x36-010

2003julycmdc24x36-011  2003julycmdc24x36-012
Deficit Irrigation Scheduling by Crop Growth Stage

Yield vs. ET Sorghum & Corn

- Rootworm larvae damage roots.
- Evaluate roots when first adults noticed.
- Evaluate roots on node damage.
Corn Injury & Dicamba and 2,4-D

Injury Factors
- Corn Hybrid
- Herbicide
- Environment during and after treatment
- Growth Stage

Corn Time
1. Heat Units
2. High + Low – Base
3. All Units Equal???

Growth Regulator Response
- Weakened cell walls
- Cells expand
- Bending
- Brittleness
**Dicamba vs 2,4-D**

- 2,4-D is more injurious

**Environment Affect**

- Rapid growth
- Wind/bending after treatment

**Growth Stage**

**Affect**

- 12”< height-rapid growth

**Hybrid Affect**

- Thin/weak cell walls
Herbicide Resistance

Reasons for Herbicide Resistance
- Site of action change
- Metabolism change
- Absorption/Translocation change

Management and Herbicide Resistance
- Same MOA year after year
**Is Glyphosate resistance possible?**

- Yes - marestail

**Vegetative Growth**

**Leaves and Stalk**

**Reproductive Growth**

- Tassels – Pollen
- Cobs – Silks – Kernels
- Shank Husks???

**Resistance Management**

- Rotate MOA
- Use more than 1 MOA

**Soybean Irrigation Recommendations**

1. Maximize infiltration of off-season rainfall (and snowmelt) PLUS minimize pre- & in-season evaporative loss of soil water.
2. Avoid irrigating during the vegetative period unless absolutely needed.
3. Avoid irrigating during the (R2-full) flowering stage.

4. ALWAYS irrigate during the (R3-R4) pod elongation stage.

5. Irrigate on an “as-needed” basis during the (R5-R6) seed enlargement stage.

2. Monitoring the soil water content in the root zone allows you to determine how much water to apply at any given irrigation; however, using only soil water content to also determine when to schedule irrigations ignores how the soybean plant “feels” about the “timing” of the irrigations it receives. Do you even care?

3. You have been allocated only enough ground (or surface) water for your next soybean irrigation to apply one-inch to 200 acres or two inches to 100 acres or four inches to 50 acres. Which wrong choice to you usually make?

1. If you produce both irrigated Corn and Irrigated Soybean and your Corn Yield / Soybean Yield Ratio is not equal to 3.15 (examples: 175/55.6; 200/63.5; 225/71.4; 250/79.4; 275/87.3), then you are mistreating one or the other crop. Which one do you usually mistreat?

4. A “depth of the crop root zone” parameter that increases during the growing season is employed in most irrigation scheduling models, and it is this depth of soil that is monitored for soil water depletion. The name of this parameter implies there are roots everywhere in that zone. True or False?
This poster has velcro pieces....

- Amino Acids: Plant Lives
- No Amino Acids: Plant Dies

Management Worksheet for First Generation Corn Borer

<table>
<thead>
<tr>
<th>Example Field</th>
<th>Year estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>225 bu/acre</td>
<td>bu/acre</td>
</tr>
<tr>
<td>225 bu/acre</td>
<td>bu/acre</td>
</tr>
<tr>
<td>225 bu/acre</td>
<td>bu/acre</td>
</tr>
<tr>
<td>225 bu/acre</td>
<td>bu/acre</td>
</tr>
</tbody>
</table>

Management Worksheet for Second Generation European Corn Borer

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Larval Block</td>
</tr>
<tr>
<td>B.</td>
<td>Bracket</td>
</tr>
<tr>
<td>C.</td>
<td>Border (Perimeter)</td>
</tr>
<tr>
<td>D.</td>
<td>Block</td>
</tr>
<tr>
<td>E.</td>
<td>Strip (Silage Planer)</td>
</tr>
</tbody>
</table>

Figure 1. General types of within field refuge configurations.
Vegetative Growth Problems
1. Weather – Wind, Hail, Heat
2. Pest – Weeds, Bugs, Disease
3. Management

Reproductive Growth Problems
1. 3-Leaf Stage
2. 6-Leaf Stage
3. 12-Leaf Stage
4. Silk & Tassel
5. Grain Fill
6. Pre-mature

Symptom Distribution
By assessing symptom distribution at three scales, your diagnosis will come much easier.

The first step is to determine the distribution in the field.
Symptom Distribution

By combining the distribution on the plant with the field distribution you may start to build clues as to the cause of the observed symptoms.

Distribution of plant symptoms on individual leaves will also help with your diagnosis.

Irrigation

Scheduling

Steve Melvin
Extension Educator
University of Nebraska

1998 Yield Map Elsie

Fully Watered
Water Miser BMP
Farmer
Deficit