10 pts. 1 Tabular value for yield loss at 3 borers per plant (2 live larvae plus 0.25 egg masses per plant which equate to 1 additional live larvae per plant) at Blister (R2) = 0.055

<table>
<thead>
<tr>
<th>Plant stage</th>
<th>Percent yield loss - # borers/plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early whorl</td>
<td>5.5 8.2 10.0</td>
</tr>
<tr>
<td>Late whorl</td>
<td>4.4 6.6 8.1</td>
</tr>
<tr>
<td>Pre-tassel</td>
<td>6.6 9.9 12.1</td>
</tr>
<tr>
<td>Pollen shedding</td>
<td>4.4 6.6 8.1</td>
</tr>
<tr>
<td>Blister</td>
<td>3.0 4.5 5.5</td>
</tr>
<tr>
<td>Dough</td>
<td>2.0 3.0 3.7</td>
</tr>
</tbody>
</table>

Control effectiveness is 0.60 for second generation European Corn Borer.

\[(200)(0.20)(\$2/bushel)(0.055)(0.60) = \$2.64\] Preventable dollar loss per acre
\[-15.00\] Cost of treatment per acre
\[-12.36\] Net loss per acre if treated

DON’T TREAT!

2 pts. 2. a) 55%

2 pts. b) Mid ear seeds contain clear fluid.
Silks pink.

2 pts. c) Kernels at base of ear dented.
Cob pink.
No free moisture in kernel.

4 pts. 3. Soybeans are the more drought tolerant crop.

4 pts. (2 points for each of two reasons)
a) Soybeans sustain their photosynthetic rate under a more negative leaf water potential (e.g. down to -11 bars vs. down to -4 bars for corn).

b) Soybeans flower over a much longer period (e.g. as long as 4 to 6 weeks for Soybeans vs. approximately 1 week for Corn). Soybeans are therefore able to compensate for stress during one part of flowering by retaining a higher percentage of flowers, pods, and seeds at times of lower stress.
c) Soybeans produce a much larger number of flowers than will ever be realized as pods.

d) Soybeans are a self-pollinating crop and are therefore less vulnerable to drought stress than corn which is open-pollinated.

10 pts.  4. Excessive rainfall in the springtime often restricts planting at a critical time. However, this Spring maximum provides a useful recharge of the soil's water holding capacity. Mid-season days (e.g. July, August) are generally quite dry and may result in drought stress during the critical period of pollination. Fall precipitation may delay harvest.

Mid-season clear skies may result in stress during pollination but they also contribute the abundant, uninterrupted solar radiation necessary to produce the high corn yields typical of the U.S. Midwest.

Low temperatures early and late may restrict season length and therefore yield potential. Extreme high temperatures mid-season may result in stress during the critical pollination period. However, corn is a tropical grass species and grows most rapidly at high temperatures if it is well-watered.

2 pts.  5. a) Seed within 2 weeks after the Hessian Fly Free date for a given location.

2 pts.  b) The range of Hessian Fly Free Dates for Indiana is September 22 in the North through October 9 in the South.

6 pts. 6. a) 25 to 30 plants/square foot

   b) 144 in.² / 9 in. = 16 inches of row distance/square foot

6 pts.  7. a) \[40 + [(1.75) (100 \text{ Bu/Acre} - 50)] = 127.5 \text{ Total Lbs. N/Acre}\]

   - N Applied At Seeding \[20\]

   \[107.5 \text{ Lbs. N topdressed in spring}\]

   b) \[(0.63 \text{ Lbs. P}_2\text{O}_5/\text{Bu}) (100 \text{ Bu/Acre}) = 63 \text{ Lbs. P}_2\text{O}_5 / \text{Acre}\]

   c) \[[(.37 \text{ Lbs. K}_2\text{O} / \text{Bu}) (100 \text{ Bu/Acre})] + 20 = 57 \text{ Lbs. K}_2\text{O} / \text{Acre}\]

6 pts.  8. As dormancy is broken, while tillering (prior to jointing)

   a) N available when needed for growth as it begins in the Spring.

   b) Least foliar burn potential as exposure is limited to the first leaves.

   c) Avoids stem breakage as only leaf tissue is exposed.

   d) Maximum ability to compensate for damage done by wheel traffic or through leaf burn as tillering and leaf development continue until jointing.
3 pts. 9. Uniform wheat stand establishment at optimal density is the first line of weed control for Soft Red Winter Wheat in Indiana and is in general sufficient to control most annual and perennial weed pressure. Fall tillage often precedes seeding and contributes to weed control.

Rescue post emergence herbicides may applied to control further weed pressure when warranted.

6 pts. 10. \( \text{(55 Bu/Acre) (0.80 Lbs. P}_2\text{O}_5/\text{Bu}) = 44 \text{ Lbs. P}_2\text{O}_5/\text{Acre} \)

\[
[(\text{55 Bu/Acre}) (1.40 \text{ Lbs. K}_2\text{O/Bu})] + 20 = 97 \text{ Lbs. K}_2\text{O/Acre}
\]

3 pts. 11. a) Group II soybeans will flower sooner as they will flower in response to a slightly longer photoperiod than will the group III variety (group II would normally be adapted to a slightly more northern latitude than would the group III variety).

3 pts. b) Since the group II variety flowers first, its vegetative growth will be stopped relatively earlier than will that of the group III variety. As a result, the group II variety will be slightly shorter at maturity than the group III variety in this setting.

4 pts. 12. Diameter = 35 inches; Radius = 17.5 inches.

\[
\frac{43,560}{(3.14)(17.5^2)/144} = 6521 \text{ Hoop Areas Per Acre}
\]

\[
(30 \text{ Plants Per Hoop})(6521 \text{ Hoop Areas Per Acre}) = 195,630 \text{ Plants Per Acre}
\]

7 pts. 13. The yield advantage for narrow rows (vs. wide rows) is greater at more northern latitudes since the relatively shorter growing season length at northern latitudes means adapted varieties have fewer days for vegetative growth before flowering than adapted varieties at more southern latitudes. Plants at the northern latitudes will generally then be more compact and should be in drill rows to maximize light capture during R4-R7 (seed development) and thereby optimize yield potential.

8 pts. 14. a) \( R2 = \) A flower at one of the two uppermost developed nodes.

b) \( R3 = \) A pod \( \geq \) or equal to 3/16 inch (5 mm) long at one of the top four fully developed main stem nodes.

c) \( R4 = \) A pod \( \geq \) or equal to 3/4 inch (2 cm) long at one of the top four fully developed main stem nodes.

d) \( R5 = \) A seed \( \geq \) or equal to 1/8 inch (3 mm) long in a pod at one of the top four fully developed main stem nodes.
e) R6 = Green seeds fill the seed cavities of pods at one of the four uppermost developed nodes.

6 pts. 15. a) 2 seeds per foot of row.

Approximately 174,240 seeds per acre

b) 6 seeds per foot of row.

Approximately 104,544 seeds per acre

5 pts. BONUS

V4 Soybean Plant (A pair of unifoliolate leaves and four trifoliolate leaves with margins no longer touching.)