Exam III
Key
May 4, 2004
100 points possible

4 pts. 1. a) Scout the field during beetle flight during July, August, and September (or until the treatment threshold is exceeded) in 2003 (in anticipation of planting next Spring). This allows an indication of the numbers of eggs being laid which will then hatch into larvae to feed on roots in next year’s corn.

4 pts. b) The threshold for first year corn after corn (at a current year population of 26,000 plants per acre) is an average 0.5 beetles per plant. At levels of infestation equal to or greater than this, soil applied insecticide is recommended at planting for corn in this field next year.

4 pts. 2. The lowest economic control threshold may be found when young larvae are present on relatively old (e.g. V6 or older) plants. This combination presents the greatest risk as young larvae have the longest time yet to feed while plants at V6 or older have the growing point above ground where it is vulnerable.

2 pts. 3. a) V6

2 pts. b) Split base of the stalk and locate node 5 which is the node at the top of the first visibly elongated internode. Count nodes upward from that point until a node is located that is the point of attachment for a retained leaf collar. Count leaf collars upward from that point until the uppermost leaf collar is located.

2 pts. c) Mid ear kernels contain clear fluid.

Silks are generally pink.

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

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

3 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.  a) 25 to 30 plants/square foot

b) $\frac{144 \text{ in.}^2}{6 \text{ in.}} = 24$ inches of row length/square foot

c) $(2 \text{ heads per plant}) \times (18 \text{ plants per square foot}) \times (1.6) = 57.6$ bushels per acre

9 pts.  a) $40 + [(1.75) (90 \text{ Bu/Acre} - 50)] = 110$ Total Lbs. N/Acre

- N Applied At Seeding  - 20

90 Lbs. N topdressed in spring

b) $(0.63 \text{ Lbs. P}_2\text{O}_5/\text{Bu}) (90 \text{ Bu/Acre}) = 56.7$ Lbs. P$_2$O$_5$/Acre

c) $[(.37 \text{ Lbs. K}_2\text{O} / \text{Bu}) (90 \text{ Bu/Acre})] + 20 = 53.3$ Lbs. K$_2$O/Acre

6 pts.  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.

8 pts.  $(60 \text{ Bu/Acre}) (0.80 \text{ Lbs. P}_2\text{O}_5/\text{Bu}) = 48$ Lbs. P$_2$O$_5$/Acre

$[(60 \text{ Bu/Acre}) (1.40 \text{ Lbs. K}_2\text{O}/\text{Bu})] + 20 = 104$ Lbs. K$_2$O/Acre

4 pts.  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 be the group III variety).

4 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.
5 pts. 11. a) Increases  
b) Increases  
c) Increases  
d) Decreases  
e) Decreases

8 pts. 12. 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.

4 pts. 13.

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

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

   d) R5 = A seed > or equal to 1/8 inch (3mm) long in a pod at one of the top four fully developed main stem nodes.

6 pts. 15. a) 2 seeds per foot of row.
Approximately 174,240 seeds per acre

b) Soybeans planted in drill rows are much more likely to have difficulty emerging uniformly through a crust since there are only approximately 2 seeds per foot of row length in such a system. In 30 inch row spacing, 6 seeds per foot or row germinate and emerge resulting in a fissure over the row, effectively helping each other through the crust and increasing the uniformity with which the crop will emerge. Only two emerging plants per foot of drill row will have a much more difficult time emerging uniformly through the crust.

5 pts. BONUS Diameter = 28 inches; Radius = 14 inches.

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\text{22 Plants Per Hoop.} \quad \frac{43560}{(3.14)(14^2)/144} = 10201.4 \text{ Hoop Areas Per Acre}
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\[(22 \text{ Plants Per Hoop}) \times (10201.4 \text{ Hoop Areas Per Acre}) = 224430.8 \text{ Plants Per Acre}\]