

Exam III

AGRY 375 Key (100 Points Possible)

May 7, 2009

- 10 pts 1. Tabular value for yield loss for corn at pollen shedding at 3 borers [1 live larvae plus (0.5 egg masses X 4 larvae per egg mass)] per plant at pollen shedding = 0.081
Control effectiveness is 0.60 for second generation European Corn Borer.

(210 Bu/Acre) (0.70 Infestation) (\$5.50/Bushel) (0.081) (0.60 Control Effectiveness) =

\$ 39.29 Preventable dollar loss per acre
- 15.00 Cost of treatment per acre
24.29 Net gain per acre if treated so treatment is advised

- 10 pts. 2. a) V 6
b) Node 5
c) Kernels mid-ear contain milky fluid or
Silks first red (on hybrids which are first white) or
Seed coat first yellow on kernels mid-ear
d) Ear fully dented
e) Approximately 40 - 45 %
- 4 pts. 3. Approximately 2.1 acre inches of water are plant-available per foot in this field capacity soil so approximately 6 to 6.3 inches of water are available in this soil at field capacity through 3 feet of the profile.
- 6 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 and are therefore able to compensate for stress during one part of flowering by retaining a higher percentage of flowers, pods, and seeds as they are formed later in the season when the stress is likely to be lessened (soybeans produce a much larger number of flowers than will ever be realized as pods).
c) Soybeans are a self-pollinating crop and are therefore less vulnerable to drought stress than corn which is open-pollinated.
- 6 pts. 5. a) Seed within 2 weeks after the Hessian Fly Free date.
In Indiana, the Fly Free date spans September 22 in the northern part of the state through October 9 in the southern part of the state. Seed within 2 weeks after the appropriate date at a given latitude. For Indiana, these dates span the period September 22 - October 6 in the North through October 6 - October 23 in the South.
- 4 pts. b) This timing allows the wheat plants to escape serious economic loss to the Hessian Fly as egg laying is much reduced by the cooler temperatures prevalent as the Fall progresses beyond the Fly Free date.
Allows sufficient time prior to winter to establish the wheat crop so it will survive the winter well and be productive the following summer. If seeded earlier the risk of infection by foliar diseases increases (e.g. Powdery Mildew) as too much Fall growth in a "matting of the leaves.
- 4 pts. 6. a) 25 to 30 plants/square foot

- 4 pts b) $144 \text{ in.}^2 / 7 \text{ in.} = 20.6 \text{ inches of row length/square foot}$
- 2 pts. 7. a) $40 + [(1.75) (100 \text{ Bu/Acre} - 50)] = 127.5 \text{ Total Lbs. N/Acre}$
- 1 pt. $127.5 \text{ Total Lbs. N/Acre} - 15 \text{ to } 30 \text{ Lbs. N at seeding} = 97.5 - 112.5 \text{ Lbs. N / Acre as top dress.}$
- 3 pts. b) $(0.63 \text{ Lbs. P}_2\text{O}_5/\text{Bu}) (100 \text{ Bu/Acre}) = 63 \text{ Lbs. P}_2\text{O}_5 / \text{Acre}$
- 3 pts. c) $[(.37 \text{ Lbs. K}_2\text{O} / \text{Bu}) (100 \text{ Bu/Acre})] + 20 = 57 \text{ Lbs. K}_2\text{O} / \text{Acre}$
- 3pts. 8. As dormancy is broken while tillering (prior to jointing)
(Two reasons required.)
- 4 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.
- 4 pts. 9. $(60 \text{ Bu/Acre}) (0.80 \text{ Lbs. P}_2\text{O}_5/\text{Bu}) = 48 \text{ Lbs. P}_2\text{O}_5/\text{Acre}$
- $[(60 \text{ Bu/Acre}) (1.40 \text{ Lbs. K}_2\text{O}/\text{Bu})] + 20 = 104 \text{ Lbs. K}_2\text{O}/\text{Acre}$
- 2 pts. 10. 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).
- 2 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.
- 2 pts. 11. a) 2 seeds per foot of row. Approximately 174,240 seeds per acre
- 2 pts. b) 3.75 seeds per foot of row. Approximately 130,680 seeds per acre
- 2 pts. c) 6 seeds per foot of row. Approximately 104,544 seeds per acre
- 3 pts. 12. a) Examples of such situations may include (one example required);
- Very late planting as in the extreme for double crop soybeans after wheat in northern Indiana,
- Planting an early variety at a given location [a Maturity Group II variety would be probably respond more positively to drill rows than would a group III variety when both are planted in central Indiana on the same date],
- Planting an adapted variety at a northern location vs. an adapted variety at a southern location [more northern location produces a stronger yield advantage for drill rows], planting a determinate variety adapted to a northern latitude [e.g. Maturity Group IV and earlier], d) soybeans grown under non-irrigated dryland conditions
- 3 pts. b) Leaf canopy closure must be accomplished by the time of early pod fill, R4 to R5 (potentially even by flowering, R1 or R2) in order to optimize light use with respect to yield potential.
- When plants are relatively short (usually because they have had a limited time for vegetative growth) going into this reproductive period of the season they are less to close the leaf canopy so plants must be spaced more closely together across row width to optimize light use.

- 8 pts. 13. a) R 2 = Flower at one of the top two developed nodes on the main stem.
- b) R 3 = Pod greater than or equal to 3/16 inch (5 mm) long at one of the top four developed leaf nodes on the main stem.
- c) R 4 = Pod greater than or equal to 3/4 inch (2 cm) long at one of the top four developed leaf nodes on the main stem.
- d) R 5 = Seed greater than or equal to 1/8 inch (3 mm) long in a pod at one of the top four developed leaf nodes on the main stem.

8 pts. 14. Diameter = 30 inches; Radius = 15 inches.

22 Plants Per Hoop.

$$\frac{43560}{(3.14)(15^2) / 144} = 8871.69 \text{ Hoop Areas Per Acre}$$

$$(22 \text{ Plants Per Hoop}) (8871.69 \text{ Hoop Areas Per Acre}) = 195177.18 \text{ Plants Per Acre}$$

5 pts. **BONUS** At V3 the third trifoliate leaf node is the uppermost main stem node with leaf margins no longer touching.

