UNIT IV - IDENTIFYING AND SELECTING CROPS AND SEEDS

Lesson 3: Crop Seed Selection

**Competency/Objective:** Utilize seed tag information to select quality seed.

**Study Questions**

1. What are the characteristics of quality seeds?
2. What information is included on a seed tag?
3. What factors determine optimum seeding rates?
4. How does the seeding rate determine equipment calibration?
5. What are the availability options for seed?
6. How do plant patents affect seed availability?
7. What are the advantages and disadvantages of using certified seed?

**References**

1. *Advanced Crop Science* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 2000, Unit IV.
4. Transparency Master
   a) TM 3.1: Seed Tag
5. Activity Sheets
   a) AS 3.1: Seed Information and Germination Test
   b) AS 3.2: Identify Plant Seeds
UNIT IV - IDENTIFYING AND SELECTING CROPS AND SEEDS

Lesson 3: Crop Seed Selection

TEACHING PROCEDURES

A. Review

Previous lessons have discussed identification of weed plants and seeds. Selection of seeds requires an understanding of the information provided on the seed tag, seeding rates, and available options for seeds.

B. Motivation

1. Ask students to bring to class seed tags from home or a local seed dealer. Compare label information between crop seed varieties.

2. Invite a local seed dealer to visit the class to explain how seed is acquired and marketed.

C. Assignment

D. Supervised Study

E. Discussion

1. To ensure an adequate crop stand, quality seed should be used when planting the crop. Crop yields can be affected by the seed used. Agronomists estimate the yields from using good seed to be 10 to 20% greater than yields resulting from poor quality seed. Discuss the characteristics of quality seeds. Refer to the MFA Agronomy Guide for information on seed selection.

What are the characteristics of quality seeds?

a) Good genetic potential
b) Good germination
c) Proper size and development
d) Uniformity in size and shape
e) Absence of seedborne diseases and insects
f) Absence of prohibited, noxious, and other weed seeds
g) Absence of other crop seeds and other varieties
h) Absence of inert materials

2. Explain to the students that state law requires seed to be labeled with the name, complete address and zip code of the labeler, along with the quality components listed below. TM 3.1 shows an example of a seed tag containing the seed quality information.

What information is included on a seed tag?

a) Percent pure seed
b) Percent inert matter
c) Percent other crop
d) Percent weed seed
e) Percent germination
f) Percent hard seed
g) Percent total germination  

h) Net weight  

i) Lot number  

j) State of origin  

k) Test date  

l) Kind and number of noxious weeds  

m) Other possible components  
   1) Seed count  
   2) Treated seed (fungicide) - labels required by law

3. Proper stand establishment will increase the chances of a good yield if the weather is conducive to proper plant growth. The desired plant population depends on several factors, one of which is the seeding rate.

What factors determine optimum seeding rates?

a) Type of crop  

b) Use of crop  

c) Pure live-seed ratio or percent  
   1) Ratio of weight of the viable seed of the cultivar being seeded to the total weight of the seed stock  
   2) May include nonviable seeds, weed seeds, and inert matter

d) Seed quality  
   1) Based on germination rate and other factors  
   2) Low seed quality - increase rate of seeding

e) Time of seeding  
   1) Climatic conditions can reduce stand if planted after optimum time.  
   2) Increase seeding rates if planting before or after optimum planting dates.

f) Soil moisture and productivity  
   1) Productive soils sustain recommended seeding rates.  
   2) Excessive moisture retards germination and may cause rotting.

g) Method of seeding  

h) Row width

4. Discuss with students how the seeding rate will determine how equipment is calibrated. Have available a copy of an owner manual for a planter that explains how to set calibration.

How does the seeding rate determine equipment calibration?

a) Calibrate planting equipment  
   1) Varies with type and brand of equipment  
   2) Owner manual guidelines  
      (a) Adjust to achieve desired seed rate  
      (b) Planter’s maximum speed for given planting rate

b) Check for worn parts  

c) Check calibration before going to planting field  

d) Check calibration in the planting field

5. Certified seed is sold to producers with strict production guidelines to ensure genetic quality. Discuss certified seed and the four classes. Using the seed tags brought in for the motivation, identify the seed class for each example.

What are the availability options for seed?
a) Criteria for certified seed
   1) Seed must be grown from registered or certified seed stock.
   2) Crops produced must pass inspection for mixtures, weeds, and diseases.
   3) Harvested crop must attain standard of perfection set by seed association.

b) Seed dealers
   1) Breeder seed - used to produce foundation seed
      (a) Seed trade is conducted only between the breeder and the company.
      (b) Small quantities are produced by commercial seed companies.
   2) Foundation seed - the parent line for registered seed and/or certified seed
      (a) Seed trade conducted only between the breeder and the company
      (b) Requires a white identification tag
   3) Registered seed - produced from foundation seed
      (a) May be used to produce certified seed or is sold directly to producers
      (b) Usually grown by producers for a company
      (c) Requires a purple identification tag
   4) Certified seed - produced from foundation or registered seed
      (a) Sold directly to producers by a seed dealer
      (b) Requires blue identification tag

c) Exported seed
   1) Organization for Economic Cooperation and Development (OECD) sets requirements.
   2) Seed must meet minimum requirements to be tagged with OECD tag.

d) Local producers (only if permissible under Plant Variety Protection Laws)
   1) Practice is limited due to plant patents.
   2) Saved seed allows premiums above market price.
   3) Brown bag seed (NVS - no value stated) has a generic label with no quality or performance data.

6. A patent is an exclusive property right to an invention issued by the Commissioner of Patents and Trademarks, U.S. Department of Commerce. The rights granted are limited to the claims of the patent. Plant patents are granted for 17 years for plants when they are asexually reproduced with the exception of tuber-propagated plants or plants found in an uncultivated state. Patentable plants must have been reproduced by means other than seeds, such as by the rooting of cuttings or by grafting. Plant patents limits a producer’s options for seed selection.

How do plant patents affect seed availability?

a) Eliminates the option of saving seed from genetically superior seed
b) Requires new seed purchases yearly
c) May require contract agreements in specific production and marketing programs

7. Research has shown marked benefits from using certified seed. Many say the cost of purchasing new seed each year is a disadvantage, but considering the improved performance of certified or professionally grown seed over brown bag or saved seed, it is really an advantage.

What are the advantages and disadvantages of using certified seed?

a) Advantages
   1) Guaranteed to be the variety advertised
   2) Guaranteed minimum germination rate
   3) Guaranteed to meet weed, disease, and insect contamination standards
b) Disadvantages - cost

F. Other Activities
1. Have students research various seed companies.
2. Develop seed judging activities for the students.
G. **Conclusion**

Each crop grown will have its own challenges regarding seed selection. The producer needs to be aware of all options available to make the best decision regarding the use of certified seed. Seeding rates can increase potential yield and affect the profit levels of the operation.

H. **Answers to Activity Sheets**

AS 3.1

Answers will vary.

AS 3.2

Answers will vary.

I. **Answers to Evaluation**

1. e
2. h
3. b
4. i
5. c
6. j
7. d
8. f
9. g
10. a
11. .90 x .95 = 86%
12. 8 / .86 = 9.3 lb/acre
13. Read the owner manual
14. U.S. Department of Commerce (Bonus: Commissioner of Patents and Trademarks)
15. Any five of the following:
   a) Good genetic potential
   b) Good germination
   c) Proper size and development
   d) Uniformity in size and shape
   e) Absence of seedborne diseases and insects
   f) Absence of other crop seeds and other varieties
   g) Absence of inert materials
EVALUATION

Match the definition of the left to the term on the right.

1. _____ Seed produced from foundation or registered seed and sold to producers
   a. Soybean seed

2. _____ The parent line for registered or certified seed
   b. Breeder seed

3. _____ Seed used to produce foundation seed
   c. Plant patents

4. _____ Seed sold in brown bags with no seed tags
   d. Seeding rate

5. _____ Requires the producer to purchase new seed yearly
   e. Certified seed

6. _____ Requires labeling by law
   f. Corn seed

7. _____ The amount of seed planted in a given area
   g. Pure live seed

8. _____ Planted at populations of 18,000 to 32,000
   h. Foundation seed

9. _____ The weight of the viable seed compared to the weight of the seed stock
   i. No variety stated

10. _____ Planted at populations of 130,000 to 170,000
    j. Treated seed

Answer the following short answer questions.

11. If a seed tag stated percent germination at 90% and the purity at 95%, what is the pure live-seed ratio?

12. If the recommended seeding rate is based on 100% pure live-seed at 8 pounds per acre, what is the appropriate seeding rate using the seed in question 11?

13. What is the first and most important step in setting the seeding rate and equipment calibration?

14. What agency within the U.S. government issues plant patents?
15. List five characteristics of quality seeds.

a.
b.
c.
d.
e.
Seed Information and Germination Test

Objective: Students will determine actual germination percentages with germination percentages listed on the seed tag.

Materials:
- Tin pie plate
- Two paper towels
- 20 seeds (variety determined by instructor)
- Information from seed tag
- Masking tape

Procedure:
1. Transfer information from seed tag onto the table below.
2. Label your pie plate by placing a piece of tape with your name on it on the pie plate.
3. Place one paper towel into the pie plate.
4. Place the 20 seeds in a rectangular pattern on the paper towel in the pie plate.
   Example:
   
5. Place second paper towel over seeds and gently dampen towels until completely damp.
6. Check pan daily (once or twice daily) to ensure that proper moisture is maintained.
7. After five (5) days, check seeds for germination.
8. After 10 days, count the number of seeds germinated. Place in the box titled “% Test Germination” the percentage that germinated out of the 20 seeds tested.
9. Compare test germination percentage with stated germination percentage.

Note: This activity can be repeated with different varieties.
Identify Plant Seeds

**Objective:** Students will identify plant seeds.

**Directions:** The instructor will provide seeds for identification. Identify the seeds by their size, shape, color, surface markings, and common name of the plant seed.

<table>
<thead>
<tr>
<th>Seed #</th>
<th>Size</th>
<th>Shape</th>
<th>Color</th>
<th>Surface Markings</th>
<th>Name of Plant Seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>