UNIT IX - FORAGE PRODUCTION

Lesson 4: Scouting and Maintaining the Crop

**Competency/Objective:** Identify the principles for managing and maintaining forages.

**Study Questions**

1. What pests are associated with forage production?
2. What pest control options are available?
3. What methods of brush control are available?
4. What methods of maintaining or renovating a forage system are available?
5. What are fertilizer requirements for an established stand?

**References**

1. *Advanced Crop Science* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 2000, Unit IX.
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Lesson 4: Scouting and Maintaining the Crop

TEACHING PROCEDURES

A. Review

Previous lessons have discussed evaluating local growing conditions and selecting an appropriate species. Selecting the tillage and planting method for forages was also discussed. This lesson will review the proper methods for scouting and maintaining the forage crop.

B. Motivation

Bring photos of different forage systems to class. Have examples of those systems that provide obvious examples of brush management problems. This could include forage systems that have not been maintained, systems with nutritional deficiencies, and systems with obvious weed and/or insect infestations. Have students discuss how these forage crop systems would impact quality, production, and economic viability to the producer.

C. Assignment

D. Supervised Study

E. Discussion

1. Bring in samples of local weed species (live or mounted) and forage insect mounts. Have students reflect upon the impact these species have in forage production.

What pests are associated with forage production?

a) Biennial and perennial weeds
   1) These weeds produce seed each year, potentially starting new infestations.
   2) Perennials reproduce underground roots or rhizomes.
      (a) Survive several years in the soil
      (b) Often unaffected by occasional mowing or livestock grazing

b) Insect identification and management
   1) Alfalfa weevil
      (a) Adult weevils lay eggs in older alfalfa stems in late fall and early spring.
      (b) Larva mainly damage first cutting.
   2) Potato leafhoppers
      (a) Migrate to Missouri in June from southern states
      (b) At immature or nymph stage stunting of plants and yellows leaves
      (c) Lowers yield and protein content by sucking juices from young upper stems
   3) Grasshoppers
      (a) Sporadic infestations and generally cause more damage in dry years
      (b) Most common species in Missouri
         (1) Differential grasshopper
         (2) Redlegged grasshopper
      (c) Large, irregular holes extending from the margin to the center of the leaf
      (d) Damaged tips of alfalfa and other plants
   4) Blister beetle
      (a) Cause limited plant damage
(b) Sick or dead livestock if insect is ingested  
(c) Common in alfalfa harvested during July or August

2. Discuss the various pest control options available for the specific pest to be controlled.

**What pest control options are available?**

a) Forage condition
   1) Healthy, properly maintained forage systems  
      (a) Less likely to be susceptible to encroachment of weeds  
      (b) Able to withstand minor insect damage  
   2) Without proper management  
      (a) Broadleaved weeds can directly compete with forage grasses or pasture to reduce nutritional value and quality.  
      (b) Weeds can replace desirable grass species.  
      (c) Plants that have toxic properties can cause livestock injury or loss.

b) Forage monitoring
   1) Regular inspection of forage areas that pose a concern for pest populations  
      (a) Fencerows  
      (b) Near waterways  
      (c) Areas where pests have been a problem in the past  
   2) Monitoring programs  
      (a) Determine economic injury level: the lowest pest population density at which economic impact is felt  
      (b) Determine economic/action threshold: the pest population density at which control measures should be enacted  
   3) Conducting monitoring programs  
      (a) Walk-through inspections of forage systems  
      (b) Use of insect traps located throughout the forage system

c) Methods of pest control
   1) Mechanical  
      (a) Tilling  
      (b) Mowing  
      (c) Pulling of weed species  
      (d) Best for small infestations, easily controlled infestations  
   2) Cultural control  
      (a) Manipulation of the environment to reduce a favorable climate for pests  
      (b) Crop rotation  
      (c) Trap crops  
      (d) Controlled burn  
   3) Pesticides - chemical or organic mixtures developed with the intention of controlling pests

3. The use of brush control management strategies are meant to restore the balance of the forage species used, either in a pasture or harvest situation. Brush plants utilize three to five times more water and nutrients than forage plants for growth and production. Brush plants also compete for sunlight energy with forages and tend to choke out slower growing forage species.

**What methods of brush control are available?**

a) Control methods
   1) Mechanical methods: effective but can be costly in equipment and labor hours  
      (a) Mowing  
      (b) Chain sawing
2) Chemical methods: effects vary
   (a) Depending upon application of correct herbicides at the correct rate
   (b) Must be under favorable weather conditions
   (c) Must be when the brush species is at its weakest stage of growth
   (d) Various reactions to herbicides

3) Grazing management - healthy forage ecosystems choking out encroaching brush plants
   (a) Rotational grazing restricts animals from overgrazing.
   (b) Stressed forage systems are open to brush and weed infestations.

b) Combination of methods - best option
   1) Tailor a control program based on extent of problem.
   2) Plan and expect long-term results.

4. Ask students ways of maintaining or renovating a forage system. Discuss the need to renew pastures and fields with desired forage species to improve forage yield and animal production.

**What methods of maintaining or renovating a forage system are available?**

a) Testing the soil and amending it
   1) Spreading fertilizer - based on soil tests and prescribed nutrient requirements for those forage species present
   2) Liming - amends and adjusts pH of the soil
   3) Disking
      (a) Incorporates organic material into soil
      (b) Breaks up surface layer for better water and air penetration

b) Suppressing and/or destroying unwanted plant
   1) Mechanical
      (a) Mowing
      (b) Pulling
      (c) Cutting
      (d) Tilling
   2) Cultural - rotational grazing
   3) Chemical - herbicide used to destroy unwanted plant species

c) Introducing other forage species
   1) Overseeding
      (a) Broadcasting grass or legume seed into an existing forage stand that may be thinned or overgrazed
      (b) Typically done in late winter or early fall
   2) No-till planting
      (a) Places seed into the soil at the optimal depth without tillage of soil surface
      (b) Allows for lower seeding rates
      (c) Precise placement of seed
      (d) Reduction in loss of organic material and water loss from tillage
      (e) Reduction from tillage erosion
      (f) Seed in January and February on frozen ground

d) Prescribed burning
   1) Commonly used for warm-season grasses
   2) Removes previous years growth
   3) Keeps invading woody plants in check
   4) Reduces competition from invading cool-season grasses
   5) Usually conducted in the spring
6) Encourages fast and vigorous growth right after the burn by releasing nutrients locked up from previous years growth

7) Must be done with safety in mind
   (a) Procedures selected that will cool the fire
   (b) Wind conditions
   (c) Relative humidity
   (d) Air temperature
   (e) Cool, damp conditions - best
   (f) Fire barriers to stop the path of a blaze

8) Seek the advice of experienced persons

5. Plant nutrition is an important consideration in the maintenance of a forage stand. Many factors determine nutrient needs of a forage. Discuss the various types of tests that can be performed to determine nutrient status and nutritional needs of forages.

What are fertilizer requirements for an established stand?

a) Forage nutrient status and needs
   1) Plant and soil analyses- used to optimize plant yields
      (a) Based upon available nutrients
      (b) Maximizes economic and nutrient inputs
   2) Soil analysis
      (a) Typically just the surface sampled
      (b) Deeper subsoil samples taken for deep rooted perennials
   3) Plant analysis
      (a) Samples of plant tissue are analyzed to determine current plant nutrient status.
      (b) Look at more nutrients than soil tests to detect plant deficiencies.

b) Important nutrients
   1) Phosphorus
      (a) Especially critical when legumes are established
      (b) Better stands usually obtained if applied just before or at the time of seeding
   2) Potassium
      (a) Not as critical at time of establishment
      (b) Legume persistence greater if used in a topdressing program
   3) Nitrogen
      (a) Should not be used when establishing legumes in a grass sod
      (b) Increases the growth and vigor of the grass and increases the competition for the new legume seedling
   4) Boron
      (a) Important to alfalfa and should be applied in the topdress fertilizer
      (b) Toxic to alfalfa seedlings and should not be applied at seeding

c) Protecting soil and water resources
   1) Leaching and erosion of nutrients - Nitrogen and phosphorus are very soluble and tend readily move into the water table and/or streams, ponds, etc.
   2) It is important to apply correct amounts of these nutrients at the proper plant stage of growth so as to minimize losses to water movement.

F. Other Activities

1. Have a local forage extension specialist discuss the importance of scouting and maintaining forage crops to the class.
2. Tour local forage crops. Have students identify good scouting/maintenance practices and those areas needing improvement.

G. **Conclusion**

Once the forage crop is established, the producer cannot think of it as a “leave-alone” crop. Proper maintenance of the forage crop is essential to maintain a high-quality product that efficiently uses economic inputs for economic gain. A regular scouting and maintenance program will promote positive production while decreasing the amount of inputs required. Systems that are allowed to run down will require more money for repair than a system that is continually maintained.

H. **Answers to Activity Sheet**

I. **Answers to Evaluation**

1. Biennial, perennial

2. Any two of the following:
   a) Alfalfa weevil
   b) Potato leafhopper
   c) Grasshopper
   d) Blister beetle

3. Any three of the following:
   a) Less likely to be susceptible to encroachment of weeds
   b) Able to withstand minor insect damage
   c) Broadleaved weeds compete with forage grasses or pastures to reduce nutritional value and quality
   d) Prevent weeds from replacing desirable grass species
   e) Toxic plants causing injury or loss to livestock

4. Any two of the following:
   a) Regular inspection of forage areas (in fencerows, near waterways, in areas where pest occurred before)
   b) Monitoring programs to determine level of economic injury
   c) Monitoring programs to determine level of economic/action threshold
   d) Walk-through inspections
   e) Use insect traps

5. Any two of the following:
   a) Mechanical (tilling, mowing, pulling weed species)
   b) Cultural control (manipulate environment, crop rotation, trap controls)
   c) Pesticides

6. Any two of the following:
   a) To restore balance of forage systems
   b) Because brush plants use three to five times more water and nutrients and water than forage plants
   c) Because brush plants compete for sunlight energy; choke out forage species

7. Any two of the following:
   a) Mechanical (mowing, chain sawing, root plowing, bulldozing)
   b) Chemical
   c) Grazing management
d) Combination of methods

8. Any three of the following:
   a) Testing soil and amending it
   b) Suppressing and/or destroying unwanted plant
   c) Introducing other forage species
   d) Prescribed burning

9. Plant analysis and soil analysis
10. Any three of the following: phosphorus, potassium, nitrogen, boron
Complete the following short answer questions.

1. Name two types of weeds that cause the biggest problem for forage production.
   a. 
   b. 

2. Name two insects that cause damage to forage production.
   a. 
   b. 

3. List three reasons why maintaining forage condition is important to forage production.
   a. 
   b. 
   c. 

4. Describe two activities that occur during “forage monitoring.”
   a. 
   b. 

5. List two methods of pest control.
   a. 
   b. 

6. List two reasons why it is important to control brush.
   a. 
   b. 

7. List two methods of controlling brush.
   a. 
   b.
8. List three methods of maintaining/renovating forage systems.
   a.
   b.
   c.

9. List two types of analyses that can help determine forage nutrient status and nutritional needs.
   a.
   b.

10. List three important nutrients for forage systems.
    a.
    b.
    c.