



**CERTIFIED  
CROP ADVISER**

CERTIFIED CROP ADVISER PERFORMANCE OBJECTIVES  
FOR THE SOUTHEAST

ALABAMA  
FLORIDA  
GEORGIA  
SOUTH CAROLINA

AUGUST 2007

## FORWARD

Performance Objectives for the Southeast Region (Alabama, Florida, Georgia, and South Carolina) were developed by members of the Alabama, Florida, Georgia, and South Carolina Certified Crop Adviser Boards, individual Certified Crop Advisers, and faculty selected from soil, crop, and plant science departments at Auburn University, Clemson University, the University of Georgia, and the University of Florida. They are reviewed periodically by practicing Certified Crop Advisers and representatives of the four Southeast Region CCA Boards to reflect changes in technology and continuing relevance.

Alabama CCA Board  
Florida CCA Board  
Georgia CCA Board  
South Carolina CCA Board

## INTRODUCTION

These Performance Objectives provide guidance to individuals preparing for the Southeast Region Certified Crop Adviser Exam. They supplement the International Performance Objectives and emphasize certain aspects of nutrient, soil and water, pest, and crop management principles that are of particular importance in the Southeast Atlantic Coastal Plain and Piedmont. Exam questions are based on these Performance Objectives and the International Performance Objectives as they apply to providing advice to crop producers in this region.

As is true of the International Performance Objectives, the Southeast Performance Objectives outline the knowledge and skill areas that Certified Crop Advisers in this region have indicated they need in order to effectively carry out their duties. Performance Objectives cover the minimum level of fundamental principles considered essential for effective crop advising. Continuing education programs pursued after individuals achieve certification expand upon these principles and cover with greater rigor the four technical areas as well as changes in science and technology, and topics important to development as a professional. Thus Performance Objectives are a first step in continuing process of professional development.

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## NUTRIENT MANAGEMENT

**COMPETENCY AREA: Nutrient transformation and mobility in soils common to the Southeast (Atlantic Coastal Plain and Piedmont)**

1. Describe how mineralization affects soil nitrogen and sulfur availability in the Southeast and the factors that affect nitrogen immobilization
2. Divide the essential elements into two groups, 1) those that are prone to leaching, and 2) those that are not likely to be leached from surface soil horizons in significant amounts
3. Describe the importance of clay content, depth to the argillic horizon (clay layer), and subsoiling in soil sampling and nutrient management of S, K, and Mg
4. Describe the how nutrient mobility can affect scheduling of nutrient applications
5. Describe the tendency for phosphorus to be moved overland into surface water
6. Describe the soil colloids that predominate in the Southeast
7. Recognize how depth of sampling is related to tillage method and/or land-use and depth to clay layer

**COMPETENCY AREA: Soil acidity issues in the Southeast**

8. List the elements that become deficient in Coastal Plain soils when the pH is raised too high
9. Describe the management of soil acidity that is appropriate for soils having an organic matter content of 10 percent or more
10. Explain the difference between active soil acidity and exchangeable acidity
11. Explain how fertilizer sources can influence soil acidity

**COMPETENCY AREA: Soil testing and plant analysis for the Southeast**

12. Identify the common soil test methods used in the region for estimating plant available nutrients and lime requirement and differentiate between the following terms as used to describe nutrient concentrations in soil
  - a. total
  - b. extractable
  - c. available
  - d. exchangeable
13. Know how to interpret soil test reports
14. Explain the use of soil pH in water and buffer pH as used in soil testing and the different forms of soil acidity they indicate
15. Describe the components of a soil testing program and the general degree of uncertainty involved in each

16. Describe the following combinations of crop and visual nutrient deficiency symptoms
  - a. corn: nitrogen, phosphorus, potassium, sulfur, and zinc
  - b. small grains: nitrogen, sulfur, and phosphorus
  - c. soybean-manganese, potassium, and magnesium
  - d. tomatoes-nitrogen, calcium, and iron
17. Recognize the importance of a soil sample in interpreting a plant tissue analysis
18. Describe what plant part to sample for plant tissue analysis of corn, tomato, and small grain

**COMPETENCY AREA:** Nutrient recommendations and scheduling applications based on soil test results in the Southeast

19. Recognize that Cu deficiency may occur with some crops when grown on soils containing 10% or more soil organic matter
20. Compare the approximate plant available nitrogen and phosphorus concentrations of the following organic sources
  - a. legumes
  - b. animal manure
  - c. biosolids
  - d. composts
21. Define and calculate agronomic rate for manure and other organic wastes based on the following parameters
  - a. nitrogen content
  - b. phosphorus content
  - c. calcium carbonate equivalent
22. Describe how nutrient mobility in soil can influence method of application, timing of application, and placement of nitrogen and phosphorus fertilizer
23. Describe the potential for crop response to nutrient application when soil test levels are Low, Medium, High, or Very High
24. Describe how crop rotations or multiple cropping affect scheduling of fertilization
25. Describe conditions that may require manure and waste application rates to be limited by phosphorus content, alkalinity, or chemical characteristics other than the material's nitrogen concentration
26. Describe how soil test results should be used to determine agronomic application rates for animal manure
27. List the considerations involved in developing a nutrient management plan for confined animal feeding operations
28. Describe the importance of maintaining crop, soil, and water management records in confirming that a nutrient management plan is functioning properly

## SOIL AND WATER MANAGEMENT

### COMPETENCY AREA: Soil management issues for the Southeast

1. Describe how soil structure affects
  - a. soil productivity
  - b. soil drainage
  - c. water storage and availability
2. Describe how tillage and cropping system affect soil structure
3. Describe how soil crusting affects water infiltration
4. Explain how tillage affects the rate of erosion by water

### COMPETENCY AREA: Water management and water quality issues for the Southeast

5. Define the term watershed
6. Describe how to use surface and subsurface water management systems and methods to control excess soil water
7. Describe how high bicarbonate concentration in irrigation water is managed in greenhouse culture
8. Describe methods for measuring soil moisture for irrigation scheduling
9. Describe how the water balance equation can be used for irrigation scheduling
10. Describe conditions influencing water use efficiency/effectiveness
  - a. need according to plant growth stage
  - b. soil and landscape characteristics
  - c. equipment calibration and adjustment
11. Describe the following irrigation methods
  - a. drip/trickle (micro-irrigation)
  - b. subsurface

## PEST MANAGEMENT

### COMPETENCY AREA: Fundamentals of pest management for the Southeast

1. Explain the benefits and limitations of the following pest management practices in the Southeast
  - c. alternating pesticides
  - d. crop rotation
  - e. use of biological controls
2. Describe pest problems associated with the following tillage systems
  - a. intensive till
  - b. minimum- or no-till
3. Describe how pest management may require modification when tillage systems are changed

4. Describe IPM methods for controlling the following pests
  - a. Johnsongrass
  - b. cocklebur
  - c. soybean cyst nematode
  - d. corn earworm
  - e. fusarium wilt
5. Describe the advantages and limitations of chemical versus cultural management of plant pests in the Southeast
6. Distinguish general resistance, race specific resistance, and tolerance
7. Distinguish systemic and non-systemic pesticides
8. Given a specific case situation, make economically and environmentally sound pest management recommendations
9. Describe the effects of soil moisture, temperature, pH, and other environmental factors on pesticide effectiveness and persistence

**COMPETENCY AREA: Weed management in the Southeast**

10. Describe how the following weed characteristics affect the ability of weeds to survive and be competitive
  - a. growth rate of crop
  - b. germination and emergence
  - c. shade tolerance
  - d. life cycle
11. Define the term "noxious weed"
12. Describe the anatomical features and growth habits that can be used to identify the following weeds
  - a. Johnsongrass
  - b. Yellow nutsedge
  - c. Redroot pigweed
  - d. Crabgrass
  - e. Wild mustard
  - f. Fall panicum
  - g. Common cocklebur
  - h. Ivyleaf morningglory
  - i. Sicklepod
  - j. Common bermudagrass
13. Classify the weeds listed above as annual, perennial, or biennial
14. List the factors affecting the performance of a postemergence herbicide
  - a. plant vigor
  - b. weed growth stage
  - c. herbicide effectiveness
  - d. plant growth stage



15. Define the mode of action for the following herbicide families
  - a. triazines
  - b. sulfonyl ureas
  - c. phenoxy
  - d. dinitroanilines
  - e. imidazolinone
16. Describe advantages and disadvantages of preplant incorporated, preemergence, and postemergence herbicide applications

**COMPETENCY AREA: Insect management for the Southeast**

17. Identify and classify by feeding habit, crops attacked, and life cycle the following pests
  - a. Mexican bean beetle
  - b. aphid
  - c. leafhoppers
  - d. European corn borer
  - e. Southern corn rootworm
  - f. soybean cyst nematode
  - g. corn earworm
  - h. cotton boll weevil
  - i. white-fringed beetle grub
  - j. fall armyworm
18. Describe the potential adverse effects of insecticides on beneficial insects

**COMPETENCY AREA: Disease management for the Southeast**

19. Identify each of the following diseases by host-plant symptoms
  - a. stalk rots
  - b. pythium
  - c. phytophthora root rot
  - d. stem rust
  - e. septoria leafspot
  - f. powdery mildew
  - g. fusarium wilt
  - h. southern corn leaf blight
20. Describe the potential for certain insects to serve as vectors for plant diseases

**COMPETENCY AREA: Pesticide application and environmental considerations**

21. Describe performance of each of the following nozzle types and explain what conditions would favor their selection for pesticide application
  - a. standard flat fan
  - b. even flat fan
  - c. hollow cone
  - d. flood tip
22. Explain how weather conditions, pesticide properties, formulation and additives affect spray drift and spray volatilization
23. Describe how soil, climatic, and antagonistic factors affect the performance of preplant incorporated, preemergence, and postemergence applied pesticides

24. Explain how the following factors interact to influence the migration of pesticides into groundwater and surface water
  - a. clay and organic matter content
  - b. pesticide persistence
  - c. potential for erosion and runoff

## **CROP MANAGEMENT**

### **COMPETENCY AREA: Basic crop science**

1. Describe the basic plant physiological processes involved in growth and development
  - a. define the function of xylem and phloem
  - b. define meristematic tissue
  - c. define photosynthesis and respiration
  - d. define physiological maturity
2. Define the factors that control seed quality

### **COMPETENCY AREA: Application of conservation tillage principles in the Southeast**

3. List the crops most useful as cover crops and conditions that favor their selection
4. Describe the factors to consider when adopting a minimum- or no-till system
5. Describe the factors to consider when changing from a wide row to a narrow row planting system

### **COMPETENCY AREA: Information specific to some crops of major economic importance in the Southeast**

6. Describe the growth and management practices from planting to harvest for the following crops when grown in the Southeast
  - a. small grains
  - b. corn
  - c. soybean
  - d. tomato
  - e. turf
  - f. peaches
7. Describe factors that influence the planting, establishment and maintenance of tall fescue, coastal bermudagrass, alfalfa, and grass-legume mixtures
8. Describe methods and equipment used for planting the following crops
  - a. cool season grasses
  - b. warm season grasses
  - c. winter legumes
  - d. small grains
  - e. corn
  - f. soybean
9. Define nutrient imbalances that can affect forage quality and animal performance

**COMPETENCY AREA: Genetically modified crops**

10. Define a genetically modified organism (GMO) and identify the most common GMO crops being grown in the Southeast
11. List the most common concerns among the general public with regards to acceptance of GMO crops
12. Explain the importance of finding alternative crops for the Southeast, and helping farmers to identify and develop a niche market