

**MID-ATLANTIC REGION
CERTIFIED CROP ADVISER**

PERFORMANCE OBJECTIVES

INTEGRATED PEST MANAGEMENT COMPETENCY AREAS

April 2010

**MID-ATLANTIC CERTIFIED CROP ADVISER (CCA) PROGRAM PERFORMANCE OBJECTIVES
INTEGRATED PEST MANAGEMENT (IPM) COMPETENCY AREAS:**

- I. Management of weeds
- II. Management of plant diseases
- III. Management of insects and other invertebrates
- IV. Integrated pest management principles

Competency Area I - Management of weeds

1. Identify the following weeds by common name at the first true-leaf stage and at plant maturity, and classify each by life cycle. Be able to distinguish among rhizomes, stolons, aerial bulblets, and nutlets.
 - a. Bermudagrass
 - b. Crabgrass, large
 - c. Foxtail, giant
 - d. Johnsongrass
 - e. Panicum, Fall
 - f. Ryegrass, annual (Italian)
 - g. Garlic, wild
 - h. Nutsedge, yellow
 - i. Chickweed, common
 - j. Cocklebur, common
 - k. Henbit
 - l. Horsenettle
 - m. Horseweed
 - n. Jimsonweed
 - o. Lambsquarter, common
 - p. Milkweed, common
 - q. Morningglory, common
 - r. Morningglory, pitted
 - s. Mustard, wild
 - t. Nightshade, eastern black
 - u. Pigweed, smooth
 - v. Pokeweed, common
 - w. Ragweed, common
 - x. Smartweed, Pennsylvania
 - y. Thistle, Canada
 - z. Velvetleaf
2. Describe factors that influence performance of soil applied herbicides.
3. Describe the factors that influence performance of postemergence herbicides
4. Differentiate between the factors that cause herbicide drift versus volatility for soil-applied and postemergence herbicides
5. Describe how the following factors influence herbicide persistence and/or carryover
 - a. soil texture
 - b. soil moisture
 - c. soil pH
 - d. temperature
 - e. cation exchange capacity
 - f. organic matter
 - g. herbicide rate
 - h. herbicide family
 - i. tillage
 - j. crop rotation
 - k. sludge application
 - l. sunlight
6. Recognize factors contributing to the development of herbicide resistant weeds.

7. Classify herbicides by mode of action.
8. Recognize crop and weed injury based on herbicide mode of action.
9. Describe the effect of tillage systems on weed populations.
10. Understand what factors of weed biology contribute to a weed's competitiveness.
11. Recognize factors that influence herbicide contamination of ground and surface water.
12. Distinguish control approaches for annual versus perennial weeds.
13. Describe how adjuvants affect herbicide activity.
14. Understand the factors that go into making a herbicide recommendation.
15. Distinguish characteristics and abbreviations for the following pesticide formulations

a. wettable powder	f. dusts
b. emulsifiable concentrate	g. pellets
c. liquids	g. granules
d. water dispersible granules	h. flowable
e. soluble powder	i. dry flowable
16. List proper mixing order for formulations listed in # 19 when adding materials to a spray tank.
17. Describe situations where you'd utilize Liberty-Link versus Roundup-Ready crops
18. Understand how spray volume influences weed control
19. Be able to define invasive and noxious weeds

Competency Area II - Management of plant diseases

20. Be able to identify via signs and symptoms the following diseases and know whether the cause of the disease is a fungus, bacteria virus or nematode.

Corn

- a. Stalk rot
- b. Ear rot
- c. Gray leaf spot
- d. Southern corn leaf blight
- e. Common rust

Alfalfa

- f. Damping-off
- g. Leaf spots
- h. Spring black stem and leaf spot
- i. Sclerotinia crown and stem rot
- j. Verticillium wilt

Wheat

- k. Powdery mildew
- l. Leaf rust
- m. Stripe rust
- n. Scab
- o. Septoria blotch
- p. Stagonospora blotch

Soybean

- u. Soybean rust
- v. Brown spot
- w. Downy mildew
- x. Charcoal rot
- y. Soybean cyst nematode
- z. Root-knot nematode

- q. Barley yellow dwarf
- r. Wheat spindle streak
- s. Soil-borne wheat mosaic
- t. Take -all
- aa. Pod and stem blight

21. For each of the diseases listed above know the environmental conditions and cropping practices that favor disease development.
22. Be able to determine what are the best management practices from cultural through chemical for economic management of the diseases listed above.
23. Be able to distinguish between protectant, systemic and eradivative fungicides.

Competency Area III - Management of insects and other invertebrates

24. Identify immature and adult stages of the following pests.

Corn

- a. True armyworm
- b. Slugs
- c. Northern corn rootworm
- d. Western corn rootworm
- e. European corn borer

- f. Cutworms
- g. Seedcorn maggot
- h. Wireworms

Soybean

- i. Grasshopper
- j. Green cloverworm
- k. Spider mites
- l. Mexican bean beetle
- m. Corn earworm
- n. Stinkbug
- o. Bean leaf beetle
- p. Soybean aphid

Wheat

- q. Aphids
- r. True armyworm
- s. Cereal leaf beetle
- t. Grass sawfly

Forage Grasses

- u. Cereal rust mites
- v. Billbugs

Alfalfa

- w. Alfalfa weevil
- x. Potato leafhopper

25. Know the type of injury and the crop stage when each pest in # 25 causes economic damage
26. Be able to determine what are the best management practices from cultural through chemical for economic management of the insects listed above.
27. Recognize how the following factors influence insect management decisions
 - insect life cycles
 - crop growth stage
 - cultural practices
 - beneficial organisms
 - environmental factors
 - economic factors (crop value, control costs)
28. Describe the role played by beneficial insects (predators and parasites) and fungal pathogens in pest management systems.
29. Identify the immature and adult stages of the following beneficial insects from a photo: ladybug, lacewing, syrphid, nabid, minute pirate bug.

30. Classify insecticides by their mode of action.
31. Describe factors that influence the development of insecticide resistance.
32. Explain the underlying principles of the following resistance management approaches: rotation of chemical modes of action; high dose/refuge; adherence to treatment thresholds coupled with non-chemical tactics.

Competency Area IV - Integrated pest management principles

33. Recognize the key strategies used in the implementation of an IPM program.
34. Describe how economic thresholds are used to make pest management decisions.
35. Explain the importance of sampling pest populations and the need for using adequate sample size to estimate an organisms numbers.
36. List types of pest monitoring methods and the advantages and disadvantages of each.
37. Develop a scouting plan for a crop using
 - a. critical periods for crop yield loss
 - b. identification of the pest complex
 - c. information on how the crop will be marketed
 - d. average crop price per unit
38. Recognize the various elements involved in making IPM recommendations: economic, environmental, health, and social.
39. Describe the importance of field history in pest management decisions.
40. List the limitations and strengths of the integrated pest management approach.