

**MID-ATLANTIC REGION
CERTIFIED CROP ADVISER**

PERFORMANCE OBJECTIVES

INTEGRATED PEST MANAGEMENT COMPETENCY AREAS

2015

Copyright 2015 – The American Society of Agronomy

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	o. Lambsquarter, common
b. Crabgrass, large	p. Milkweed, common
c. Foxtail, giant	q. Morningglory, common
d. Johnsongrass	r. Morningglory, pitted
e. Panicum, Fall	s. Mustard, wild
f. Ryegrass, annual (Italian)	t. Nightshade, eastern black
g. Garlic, wild	u. Palmer amaranth
h. Nutsedge, yellow	v. Pigweed, smooth
i. Chickweed, common	w. Pokeweed, common
j. Cocklebur, common	x. Ragweed, common
k. Henbit	y. Smartweed, Pennsylvania
l. Horsenettle	z. Thistle, Canada
m. Horseweed	aa. Velvetleaf
n. Jimsonweed	

2. Describe factors that influence performance of soil applied herbicides.
3. Describe the factors that influence performance of herbicides:
 - a. soil texture.
 - b. organic matter.
 - c. soil pH.
 - d. size of weeds to be controlled.
 - e. stage of growth crop to be to be treated.
 - f. rotational restrictions for following crops.
 - g. seasonal soil moisture levels (rainfall).

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	g. herbicide rate
b. soil moisture	h. herbicide family
c. soil pH	i. tillage
d. temperature	j. crop rotation
e. cation exchange capacity	k. sludge application
f. organic matter	l. sunlight

6. Recognize factors contributing to the development of herbicide resistant weeds.
7. Describe the role and importance of herbicide resistant crops in weed management decisions.
8. Classify herbicides by mode of action.
9. Recognize crop and weed injury based on herbicide mode of action.
10. Describe the effect of tillage systems on weed populations.
11. Understand what factors of weed biology contribute to a weed's competitiveness.
12. Recognize factors that influence herbicide contamination of ground and surface water.
13. Distinguish control approaches for annual versus perennial weeds.
14. Describe how adjuvants affect herbicide activity.
15. Understand how spray volume influences weed control.
16. Be able to define invasive and noxious weeds.

Competency Area II - Management of plant diseases

1. 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. Gray leaf spot
- c. Southern corn leaf blight
- d. Northern corn leaf blight
- e. Common rust

Alfalfa

- a. Spring black stem and leaf spot
- b. Sclerotinia crown and stem rot
- c. Verticillium wilt

Wheat

- a. Powdery mildew
- b. Leaf rust
- c. Stripe rust
- d. Scab
- e. Septoria blotch
- f. Stagonospora blotch
- g. Barley yellow dwarf
- h. Wheat spindle streak
- i. Soil-borne wheat mosaic
- j. Take-all

Soybean

- a. Soybean rust
- b. Brown spot
- c. Downy mildew
- d. Charcoal rot
- e. Soybean cyst nematode
- f. Root-knot nematode
- g. Pod and stem blight
- h. Frog eye leaf spot

2. For each of the diseases listed above know the environmental conditions and cropping practices that favor disease development.
3. Be able to determine the best management practices for economic management of the diseases listed above including:
 - a. cultural: sanitation, crop rotation, and host eradication.
 - b. mechanical: tillage.
 - c. chemical: foliar and soil applied fungicides; seed treatments.
4. Describe the role and importance of disease resistant crops in disease management decisions.
5. Understand the factors related to the development of mycotoxin and aflatoxin problems in field crops:
 - a. environmental (temperature and moisture).
 - b. crop susceptibility.
 - c. mechanical damage.
 - d. residue management.

Competency Area III - Management of insects and other invertebrates

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

Corn

- a. True armyworm
- b. Slugs
- c. rootworm
- d. European corn borer
- e. Cutworms
- f. Seedcorn maggot
- g. Wireworms

Soybean

- a. Grasshopper
- b. Green cloverworm
- c. Spider mites
- d. Mexican bean beetle
- e. Corn earworm
- f. Stinkbugs
- g. Bean leaf beetle
- h. Soybean aphid
- i. slugs
- j. Kudzu bugs

Wheat

- a. Aphids
- b. True armyworm
- c. Cereal leaf beetle
- d. Grass sawfly

Forage Grasses

- a. Cereal rust mites
- b. Billbugs

Alfalfa

- a. Alfalfa weevil
- b. Potato leafhopper

2. Know the type of injury and the crop stage when each pest in # 1 above causes economic damage.
3. Be able to determine what the best management practices from for economic management of the insects listed above including:
- a. cultural: sanitation, crop rotation, and host eradication.
 - b. mechanical: tillage.
 - c. chemical: foliar and soil applied insecticides; seed treatments.
4. Recognize how the following factors influence insect management decisions:
- a. insect life cycles.
 - b. beneficial organisms.
 - c. crop growth stage.
 - d. environmental factors .
 - e. cultural practices .
 - f. economic factors (crop value, control costs).
5. Describe the role played by beneficial insects (predators and parasites) and fungal pathogens in pest management systems.
6. Identify the immature and adult stages of the following beneficial insects from a photo: ladybug, lacewing, syrphid, nabid, and minute pirate bug.
7. Classify insecticides by their mode of action.
8. Describe factors that influence the development of insecticide resistance.

9. 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.
10. Describe the role and importance of insect resistant crops in disease management decisions.

Competency Area IV - Integrated pest management principles

1. Recognize the key strategies used in the implementation of an IPM program.
2. Describe how economic thresholds are used to make pest management decisions.
3. Explain the importance of sampling pest populations and the need for using adequate sample size to estimate an organism's numbers.
4. List types of pest monitoring methods and the advantages and disadvantages of each.
5. Recognize the various elements involved in making IPM recommendations: economic, environmental, health, and social.
6. Describe the importance of field history in pest management decisions.