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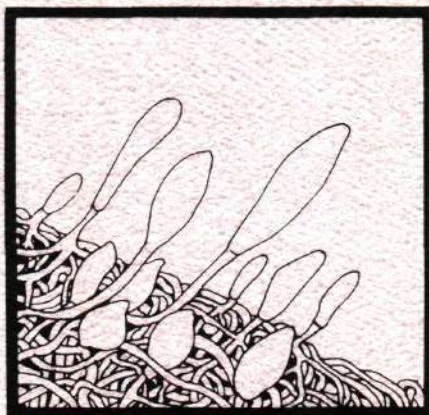
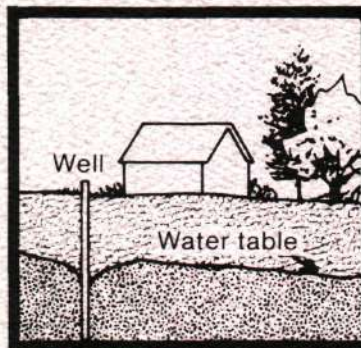
Commercial and Private Pesticide Applicator Core Manual Workbook
Michigan State University Extension Service
Dr. Frank L. Brewer, Dr. Larry G. Olsen, Joy N. Landis, Julie Stachecki
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Commercial and Private Pesticide Applicator Core Manual Workbook

To be used as an optional study guide with Extension Bulletin E-2195



Extension Bulletin E-2468
New, November 1993
Michigan State University Extension

Forward

This workbook is a preparatory guide for persons desiring to complete requirements for private and commercial pesticide certification.

The format is quite simple. Each section of the workbook contains relevant information taken from the Core manual (E-2195) and written in the form of questions. The chapter and page of the Core manual from which the questions are developed is referenced with the answers. Answers to the questions can be found after every chapter of the workbook.

You are encouraged to move through the questions at your own pace using the Core manual references only if you cannot understand how an answer was obtained.

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Introduction and Chapter One Questions

1. Why do you have to be certified to apply pesticides?
 - a. to protect you and the environment
 - b. it's the law
 - c. to buy "restricted use" pesticides
 - d. to show you have a baseline knowledge of safe pesticide use
 - e. all of the above.
2. Any person applying a general or "restricted use" pesticide in the course of his or her employment on someone else's property, must be either a registered technician or commercial certified applicator, unless the pesticide is in a ready-to-use form.

True	False
------	-------
3. All insects are pests.

True	False
------	-------
4. Pesticides can protect our food, ourselves, our homes, pets and livestock.

True	False
------	-------
5. Michigan State University enforces the law that requires individuals using restricted use pesticides to be certified.

True	False
------	-------
6. To become certified as a commercial applicator in Michigan, you are required to successfully complete a minimum of ____ written exams?
 - a. one
 - b. two
 - c. three
 - d. none
7. How often are you required to be recertified in Michigan?
 - a. every year
 - b. every three years
 - c. every four years
 - d. You're not. Certification is good for life.
8. If you apply pesticides only to agricultural crops on property you own or rent, you are considered which under Michigan law:
 - a. a private applicator
 - b. a commercial applicator
 - c. a pest management specialist
 - d. a tenant farmer.

Introduction and Chapter One Questions

9. Integrated Pest Management (IPM) is the use of all available strategies to manage pests. IPM permits quality food to be grown economically with minimal damage to the environment. True False
10. An organism should not be classified or treated as a pest until_____.
- a. it is mature
 - b. it is present throughout the field
 - c. it has proven to be one
 - d. it has been identified
11. Pest monitoring techniques include:
- a. scouting
 - b. insect traps
 - c. monitoring weather
 - d. recording temperature
 - e. all of the above
12. Natural controls are those that check or destroy pests without dependence upon humans. True False

1. **F** Page 5
2. **T** Page 6
3. **F** Page 7 Some insects are beneficial organisms, i.e. ladybird beetles feed on aphids.
4. **T** Page 5
5. **F** Page 6 The Michigan Department of Agriculture is the regulatory and enforcement agency in Michigan.
6. **B** Pages 5 Two exams; one on general standards and a second in a category or subcategory.
7. **B** Page 6
8. **A** Page 5
9. **T** Page 7
10. **C** Page 8
11. **F** Page 8
12. **T** Page 9

Chapter Two Questions

1. Accurately indentifying a pest is extremely important because different species of pests respond to different types of control. True False
2. Which of the following can be classified as a weed: a. corn
b. ragweed
c. wheat
d. ivy
e. all of the above.
3. Underground stems with nodes capable of generating new shoots are called: a. bulbs
b. perennials
c. rhizomes
d. nematodes.
4. Match the following:
- _____ Plants that complete their life cycle in one year or less a. Biennials
- _____ Plants having a two-year life cycle b. Perennials
- _____ Plants living three or more years c. Annuals
5. The body of an adult insect has three regions; the head, the thorax and the abdomen. True False
6. A Colorado potato beetle is an example of: a. defoliator
b. subterranean feeder
c. structural pest
d. plant-sucking pest
e. stem borer.
7. A leaf hopper is an example of a: a. defoliator
b. structural pest
c. plant-sucking pest
d. stem borer.
8. Viruses are the most common plant pathogen. True False

Chapter Two Questions

9. Plant disease management should not be attempted until the plants are infected and symptoms appear. True False
10. Foliar diseases caused by bacteria are often spread by blowing, splashing rain. True False
11. Viruses can be spread by:
- a. insects
 - b. fungi
 - c. nematodes
 - d. all of the above
12. _____ are microscopic, unsegmented, worm-like animals.
- a. nematodes
 - b. rhizomes
 - c. spores
 - d. borers
 - e. thorax
13. Mechanical controls are alternatives to chemical toxicants for pest management. True False

1. **T** Page 12
2. **E** Page 12 A weed is any plant that grows where it is not wanted.
3. **C** Page 13
4. **C A B** Pages 12-13
5. **T** Page 13
6. **A** Page 15
7. **C** Page 15
8. **F** Page 17 Fungi

9.  Page 18

10.  Page 17

11.  Page 17

12.  Page 17

13.  Page 19

Chapter Three Questions

1. A pesticide may be defined as any chemical used to:
- a. directly control pest populations
 - b. prevent pest damage
 - c. reduce pest damage
 - d. all of the above.
2. Match the following:
- | | |
|--|--------------------|
| _____ Pesticide applied to prevent pest establishment. | a. Broad-spectrums |
| _____ Pesticide rendering pests incapable of reproduction. | b. Contacts |
| _____ Pesticide controlling two or more pests. | c. Protectants |
| _____ Pesticide that kills by contact. | d. Steriliants |
| _____ Pesticide that kills by giving off a gaseous vapor. | e. Fumigant |
3. FIFRA extends the legal definition of a pesticide to include:
- a. plant growth regulator
 - b. defoliants
 - c. desiccants
 - d. all of the above
4. Pesticides containing carbon are called:
- a. organic pesticides
 - b. inorganic pesticides
 - c. synthetic pesticides
 - d. these don't exist
 - e. carbonic pesticides.
5. The component of the pesticide controlling the target pest is called the inert ingredient:
- True False
6. An emulsifiable concentrate (EC) is a _____ formulation of a pesticide which can be mixed with another _____ to form an emulsion.
- a. dry, dry
 - b. liquid, dry
 - c. liquid, liquid
 - d. dry, liquid
 - e. none of the above.

Chapter Three Questions

- | | | |
|---|------|-------|
| 7. The component of a pesticide controlling the target pest is called the active ingredient. | True | False |
| 8. All pesticides can be combined in a spray tank if they are added after filling the tank half full. | True | False |
| 9. Physical incompatibility occurs when two or more pesticides are mixed together and the result is an unsprayable mixture. | True | False |
| 10. Pest resistance to pesticides is becoming common. | True | False |

1. **D** Page 21
2. **C D A B E** Pages 21-22
3. **D** Page 21
4. **A** Page 22
5. **F** Page 23
6. **C** Page 23
7. **T** Page 23
8. **F** Pages 26-27 Some pesticides cannot ever be mixed together.
9. **T** Page 27
10. **T** Page 28

Chapter Four Questions

1. Many of the activities that we have taken for granted are now being carefully evaluated for potential damage to the environment. True False
2. Pesticide adsorption is greatest in coarse, sandy soils. True False
3. The airborne movement of a pesticide from the target area occurs only during application and is clearly visible when it occurs. True False
4. The vapor pressure rating of the pesticide may indicate its volatility. The higher the vapor pressure, the _____ volatile the pesticide. a. less
b. more
c. vapor pressure has nothing to do with volatility.
5. a. (Fill in the blank): _____ occurs when water moves on the soil surface.
b. (Fill in the blank): _____ occurs when water carries pesticides downward through the soil.
6. Crop removal can be a pesticide transfer process. True False
7. Which pesticide application practice can reduce groundwater contamination: a. use of integrated pest management programs
b. selecting pesticides carefully
c. following label directions
d. calibrating accurately
e. all of the above.
8. Chemical degradation is the breakdown of of the pesticide by the action of sunlight. True False
9. Groundwater can be defined as the water beneath the earth's surface in a saturated zone. True False
10. The best way to avoid injury to beneficial insects and microorganisms is to minimize pesticide use. True False









- | | | | |
|-----|--------------------------|---------|--|
| 1. | F | Page 30 | |
| 2. | F | Page 30 | |
| 3. | F | Page 30 | |
| 4. | B | Page 30 | |
| 5. | a. Runoff
b. Leaching | Page 31 | |
| 6. | T | Page 31 | |
| 7. | F | Page 33 | |
| 8. | F | Page 31 | Photodegradation is breakdown by sunlight. |
| 9. | T | Page 32 | |
| 10. | T | Page 34 | |








Chapter Five Questions

1. Routes through which a pesticide can enter the human body are:
 - a. skin
 - b. lungs
 - c. mouth
 - d. b and c
 - e. all of the above.
2. Even a small amount of chemical absorbed into the body can poison. True False
3. Dermal absorption of pesticide residues through the head is 2 to 3 times the rate of the hands and forearms. True False
4. Children under 10 years of age are the victims in more than 50% of the accidental deaths from pesticides. True False
5. The mouth is a good way to clear a spray line or begin siphoning a spray. True False
6. Which LD50 is representative of a highly toxic pesticide?
 - a. 640 mg/kg
 - b. 5,800 mg/kg
 - c. 12,840 mg/kg
 - d. 380 mg/kg
 - e. 46 mg/kg
7. **Peligro** is the Spanish word for:
 - a. pesticide
 - b. toxicity
 - c. danger
 - d. food
8. Which **signal word(s)** would indicate the product is least toxic to the applicator:
 - a. DANGER
 - b. CAUTION
 - c. WARNING
 - d. DANGER-POISON
 - e. SKULL and CROSSBONES

Chapter Five Questions

9. Which of the following indicates a highly toxic pesticide:
- a. Danger
 - b. Poison
 - c. Skull and Crossbones
 - d. Peligro
 - e. all of the above.
10. Toxicity is the only risk factor of pesticides to humans. True False
11. Never induce vomiting in a pesticide-poisoned victim if:
- a. the victim is a child
 - b. the victim is unconscious and having convulsions
 - c. the pesticide involved is corrosive
 - d. all of the above
 - e. b and c only
12. Respiratory protective devices should be stored with pesticides to make sure they are available when needed. True False
13. Lined rubber gloves are the safest to use when handling most pesticides. True False
14. To reduce risk, choose a pesticide with lower toxicity and reduce exposure. True False
15. Bleach and ammonia can be mixed to clean spray clothing. True False

- | | | |
|----|---|---------|
| 1. |  | Page 36 |
| 2. |  | Page 36 |
| 3. |  | Page 36 |
| 4. |  | Page 37 |
| 5. |  | Page 37 |
| 6. |  | Page 38 |
| 7. |  | Page 38 |
| 8. |  | Page 38 |

9.  Page 38
10.  Page 41 Exposure and Toxicity = Risk
11.  Page 40
12.  Page 42 **NEVER** store respirators with chemicals
13.  Page 41
14.  Page 41 Risk equals toxicity times exposure.
15.  Page 43 **NEVER** mix bleach and ammonia. They can react and produce fatal chlorine gas.

Chapter Six Questions

1. One safe way to open a bag containing pesticides is to tear it open. True False
2. Spraying is the most hazardous activity involving the use of pesticides. True False
3. When pouring from a container, keep the container at or below eye level and avoid splashing or spilling. True False (See answer key)
4. When mixing pesticides always stand:
 - a. upwind
 - b. downwind
 - c. it doesn't matter as long as you are careful
 - d. near open water
5. Never leave a pesticide sprayer unattended while it is being filled unless it has a back-siphoning device. True False
6. Pesticides should be stored:
 - a. in any convenient container
 - b. only in their original containers
 - c. in containers too heavy for children to handle
 - d. in any container as long as it is tagged with the name of the contents
 - e. none of the above
7. Seed with coloring on it indicates that it is safe to handle and does not need to be stored in a locked storage facility. True False
8. Liquid formulations and small containers of dry formulations should be stored on metal shelving since metal will not absorb spilled pesticides and is easier to clean than other surfaces. True False (See answer key)

Chapter Six Questions

9. Most serious pesticide poisonings affecting children could be prevented if the pesticides were stored in their original containers and kept out of the reach of children. True False
10. Contaminated materials used to clean up spills should be:
- a. buried
 - b. considered hazardous waste and disposed as such
 - c. recycled
 - d. none of the above.
11. Triple rinsing or power rinsing should be used on which type of pesticide containers:
- a. metal
 - b. plastic
 - c. glass
 - d. a and c
 - e. all of the above.
12. In the event of a fire, the first thing to do is:
- a. call the fire department
 - b. move all the personnel in the area to a safe location
 - c. notify the Michigan Department of Agriculture
 - d. start an overhead sprinkler system.

1. **F** Page 45
2. **F** Page 45 Mixing and loading concentrates are the most hazardous activities.
3. **T** Page 45
4. **A** Page 45
5. **F** Page 46
6. **B** Page 47
7. **F** Page 46
8. **F** Page 47

9.**T****Page 46****10.****B****Pages 47-48****11.****F****Page 48** These techniques can even be applied to some heavy paper containers.**12.****B****Page 49**

Chapter Seven Questions

- | | | |
|--|---|-------|
| 1. Companies may put anything they determine on pesticide labels if they have research to support the claim. | True | False |
| 2. Regardless of the signal words they bear, ALL pesticide labels must bear the words, "Keep Out of Reach of Children." | True | False |
| 3. The skull and crossbones symbol is a trademark that can only appear on herbicide labels. | True | False |
| 4. Which signal word(s) on a pesticide label would indicate the product is highly toxic. | a. "WARNING"
b. "CAUTION"
c. "KEEP OUT OF REACH OF CHILDREN"
d. "DANGER-POISON"
e. "POISON" | |
| 5. Labels should be removed from pesticide containers and kept in a notebook so they remain clean and legible. | True | False |
| 6. A certain active ingredient has only one technical chemical name and only one accepted common chemical name, but it may be in products with several different trade/brand names. | True | False |
| 7. Every pesticide product is classified by EPA as either restricted use or unclassified/general use. | True | False |
| 8. Reentry statements tell applicators how long before they can respray the same field. (See No Pest label in Core manual, p.56) | True | False |
| 9. If a person filling a spray tank accidentally swallows several mouthfuls of "No Pest" concentrate, should he or she be immediately administered Syrup of Ipecac to induce vomiting? | Yes | No |

Chapter Seven Questions

10. Regardless of the container material (glass, metal, plastic), all empty "No Pest" containers should be:
- a. burned
 - b. punctured
 - c. saved
 - d. triple rinsed
11. In case of a spill, wash the storage area with lots of water to dilute the chemicals.
- True False
12. Should "No Pest" be applied to a coarse soil with a water table close to the surface?
- Yes No
13. "No Pest" is composed of what percent of active ingredient?
- a. 100%
 - b. 75%
 - c. 50%
 - d. 25%
14. Match the following signal words with their toxicity.
- | | |
|----------------------------|-------------|
| _____ Danger-Poison | a. High |
| _____ Warning | b. Moderate |
| _____ Skull and Crossbones | c. Low |
| _____ Caution | |

1. **F** Page 52 Labels are legal documents
2. **T** Page 53
3. **F** Page 53
4. **D** Page 53
5. **F** Page 47
6. **T** Page 52
7. **T** Page 52
8. **F** Pages 54-55
9. **NO** Page 56
10. **D** Page 56

11. **F** See "No Pest" label
12. **NO** Page 56
13. **C** See "No Pest" label
14. **A B A C** Page 53

Chapter Eight Questions

1. Match the following:

- | | |
|--|------------------|
| _____ is the heart of the spraying system | a. control valve |
| _____ is a quick-acting positive shut-off | b. nozzle |
| _____ is a steel pipe with nozzles | c. boom |
| _____ is the most critical part of the sprayer | d. pump |

2. Match the following nozzle types:

- | | |
|--|----------------|
| _____ controlled drople applicator | a. flat fan |
| _____ nozzle making a fine mist | b. solid cone |
| _____ wide flat fan pattern | c. hollow cone |
| _____ circular with little center spray | d. atomizing |
| _____ circular pattern with large droplets | e. rotary |

3. Drift can be defined as the movement of pesticides through the air to non-target areas. True False

4. Vapor drift can affect sensitive areas for up to:
- | |
|-----------------------|
| a. 100 yards |
| b. 800 yards |
| c. 1 mile |
| d. more than one mile |

5. Match the drift control agents:

- | | |
|---------------------------------------|---------------------|
| _____ water droplets dispensed in oil | a. foams |
| _____ cellulose, gels or polymers | b. invert emulsions |
| _____ foam particles produced | c. thickeners |

6. It is often best to apply pesticides:
- | |
|-------------------------|
| a. in the early morning |
| b. during mid-afternoon |
| c. in the late evening |
| d. a and c |

1. D A C B

Page 61

2. E D A
C B

Pages 61-62

3. T

Page 62

4. D

Page 62

5. B C A

Page 63

6. D

Page 63 Early morning and later evening are the best application times because there is generally less wind, and the difference in temperature between the ground and the air is less.

Appendix A Questions-Private Applicators Only

- | | | |
|---|------|-------|
| 1. Is there a difference between calibrating a sprayer to apply a broadcast spray or to apply narrow bands? | Yes | No |
| 2. Once a sprayer has been test calibrated, there is no need to monitor the application rate in the field. | True | False |

CALCULATION PROCEDURES

- | | |
|---|---|
| 3. How many acres per tankful could be treated with a sprayer that delivers 15 gallons per acre and has a 200-gallon tank? | a. 13.3
b. 15
c. 25 |
| 4. After calibrating your spray, loading the tank, and spraying, you run out of material just before you complete the field. What would you do to fine tune the sprayer on the next tankload? | a. increase pump pressure
b. decrease tractor speed
c. increase tractor speed |
| 5. A recommendation of 2 pounds active ingredient per acre is given for atrazine. The sprayer has a 500-gallon tank and is calibrated to apply 20 GPA. Determine the amount of active ingredient to be added to the tank. | a. 2
b. 20
c. 50
d. 200 |

HINT: Acres per tankful = $\frac{\text{tank capacity}}{\text{GPA}}$

- | | |
|---|---|
| 6. How many gallons of emulsifiable concentrate would be needed to treat 80 acres at the recommended rate of 1 pint of formulated product per acre? | a. 5 gallons
b. 10 gallons
c. 20 gallons
d. 32 gallons |
|---|---|

1. NO Page 65

2. F Page 65

3. A Page 67

4. C Page 67

5. C Page 67

$$\begin{array}{l} \text{Acres per tankful} = 25 \\ \frac{500 \text{ gallon tank}}{20 \text{ gallons/acre}} \end{array}$$

$$\begin{array}{l} \text{Pounds product/acre} = 2 \\ \text{Pounds per tank} = 50 \\ [(25 \times 2) = 50] \end{array}$$

6. B Page 66

$$\begin{array}{l} (8 \text{ pints} = \text{one gallon}) \\ 80 \text{ acres} \div 8 \text{ pints} = 10 \text{ gal} \end{array}$$

Chapter Nine Questions

1. Increased pesticide use requires state and federal laws to _____.
- a. remain the same
b. regulate safe and proper pesticide use
c. allow applicators flexibility in determining how to use them.
2. The federal law regulating pesticides is:
- a. Environmental Protection Agency
b. Federal Insecticide, Fungicide & Rodenticide Act
c. Right To Know Act.
3. Misuse is defined as the use of any pesticide in a manner inconsistent with its label.
- True False
4. _____ is the concentration of a pesticide allowed at harvest.
- a. Residue
b. Dosage
c. Tolerance
d. Application rate
5. Which state agency investigates complaints of pesticide misuse?
- a. Michigan Health Department
b. Michigan Department of Agriculture
c. Michigan Department of Commerce
d. Michigan Waste Management Division.
6. All employees of golf courses, hospitals, schools, municipalities and licensed pesticide application businesses who apply pesticides that are not ready to use must be either certified or registered.
- True False
7. Restricted use pesticides can be sold only to:
- a. adults
b. certified pesticide applicators
c. individuals who have studied about pesticides
d. bonded individuals.
8. Restricted use pesticides can be used by any person, at any time, as long as they are purchased by a certified applicator.
- True False

Chapter Nine Questions

9. Endangered species of plants and animals are protected from pesticides by product labels indicating which specific pesticide applications are prohibited within endangered species habitat ranges. True False
10. What is the major reporting requirement of SARA Title III?
a. to report inventories of specific pesticides
b. to check on application certification
c. to reduce hazard waste inventories
d. to restrict workers' pesticide use.
11. Pesticide containers may be placed in a licensed Type II sanitary landfill only if they have been triple rinsed or power rinsed. True False
12. Commercial applicators do not include:
a. persons who apply pesticides on a for-hire basis
b. homeowners who use restricted use pesticides
c. persons who apply general use pesticides to their own property
d. b and c
e. all of the above.
13. All commercial applicators must obtain an annual license and provide proof of insurance. True False
14. A business must employ a certified commercial applicator before applying for a commercial pesticide applicator license. True False
15. Commercial applicators are subject to criminal and civil penalties for unlawful conduct under the Michigan Pesticide Control Act. True False

1. **B** Page 70

2. **B** Page 70

3. **T** Page 70

4. **C** Page 71

5. **B** Page 72

6. **T** Page 72

7. **B** Page 70

8. **F** Page 70

- | | | |
|-----|---|-------------|
| 9. | T | Pages 70-71 |
| 10. | A | Page 71 |
| 11. | F | Page 74 |
| 12. | C | Page 72 |
| 13. | F | Pages 72-73 |
| 14. | T | Page 73 |
| 15. | T | Page 73 |

