

Knowledge Expectations for Certified IPM Practitioner

I. Knowledge of the Branch 2 Structural IPM *Standards*

1. Be familiar with the *Standards* and be able to answer questions using a copy of the *Standards*

II. General Pest Knowledge

1. Understand that animals are scientifically classified into Kingdom, Phylum, Class, Order, Family, Genus, and Species, that the Latin names of pests in pest management and scientific literature will be written with the name of the genus first and the name of the species following, e.g., *Rattus rattus* (roof rat) or *Rattus norvegicus* (Norway rat), and that the most important classifications for a pest manager to know are the genus and species so you can look up information about pest biology
2. Describe the benefits of knowing both common and scientific names of pests
3. Describe the importance of proper pest identification and proper identification of signs of pests when selecting management strategies.
4. Identify the drawbacks of relying only on symptom identification for pest identification.
5. Know the Latin and common names for the following classes of animals: Class Insecta (insects), Class Arachnida (spiders, ticks, and mites), Class Diplopoda (millipedes), Class Chilopoda (centipedes)
6. Identify the listed pests to class and order when given a name, specimen or photo of the adult or immature forms
7. Describe basic biology (food requirements, life cycle, habitat, reproduction, and damage symptoms) for the listed pests
8. Explain pest status (why they are considered pests) for the listed pests
9. Describe the major components of an IPM program, in given sites or situations, for each listed pests with an asterisk
10. Know where to access (books, websites, people) information on pest identification and pest biology

The Certified IPM Practitioner must be familiar with the following pests (class, order, basic biology, pest status and for those with asterisks, major components of an IPM program for the pest):

Biting and Stinging Pests

Class Insecta

1. Bed bugs (Order Hemiptera, *Cimex* spp.)*
2. Cat flea, (Order Siphonaptera, *Ctenocephalides felis*)
3. Social wasps and bees (Order Hymenoptera)
 - a. Honey bee, *Apis mellifera*
 - b. Yellowjacket wasps, *Vespula* and *Dolichovespula* spp.
 - c. Paper wasps, *Polistes* spp.

Class Arachnida

4. Tropical rat mite (*Ornithonyssus bacoti*)
5. Black widow (hourglass) spiders (*Latrodectus* spp.)
6. Brown dog tick (*Rhipicephalus sanguineus*)

Flies (class Insecta, order Diptera)

7. Drain (moth, filter, sewer) flies (family Psychodidae)
8. Fungus gnats (families Fungivoridae and Sciaridae)
9. Blow flies (family Calliphoridae)
10. Cluster fly (*Pollenia rudis*)

Ants (class Insecta, order Hymenoptera, family Formicidae)

11. Argentine ant (*Linepithema humile*)*
12. Pharaoh ant (*Monomorium pharaonis*)*
13. Carpenter ant (*Camponotus* spp.)

Cockroaches (class Insecta, order Blattaria)

13. German cockroach (*Blattella germanica*)*
14. Field cockroach (*Blattella vaga*)
15. American cockroach (*Periplaneta americana*)*
16. Oriental cockroach (*Blatta orientalis*)*

Stored product and fabric pests

Class Insecta, order Coleoptera

17. Carpet beetles (*Anthrenus* and *Attagenus* species)
18. Cigarette and drugstore beetle (*Lasioderma serricorne* and *Stegobium paniceum*)

Class Insecta, order Lepidoptera

19. Indian meal moth (*Plodia interpunctella*)
20. Angoumois meal moth (*Sitotroga cerealella*)

Other common commensal pests (non-arthropod)

1. Rodents (class Mammalia, order Rodentia)
 - a. Roof rat* (*Rattus rattus*)
 - b. Norway rat* (*Rattus norvegicus*)
 - c. House mouse* (*Mus musculus*)
2. Birds (class Aves)
 - a. Pigeon (rock dove) (*Columba livia*)
 - b. Cliff swallows (*Hirundo pyrrhonota*)

III. Insect Biology and Morphology

1. Demonstrate a basic understanding of insect development (stages of development and types of metamorphosis)
2. Identify basic morphological features and terms used to describe the body parts of insects and spiders
3. Define: invertebrate, vertebrate, arthropod, molt, metamorphosis, exoskeleton, nymph, larva, pupa

IV. The Integrated Pest Management Concept

1. The Purpose of Pest Management
 - a. Compare/contrast preventive, suppressive, and eradicated approaches to pest management
 - b. List the factors to be considered in pest management decision-making
 - c. Recognize that pest species can exist at tolerable levels
2. What Is Integrated Pest Management?
 - a. Define: integrated pest management

- b. Compare/contrast traditional pest control with IPM
- c. Describe/define the major categories of control strategies in IPM and give examples of each: habitat modification, biological control, cultural control, mechanical/physical control, and chemical control
- d. Recognize the relationship between pest population levels and damage
- e. Explain the concept of injury level and describe the 3 types of injury in IPM, economic injury, medical injury, and aesthetic/nuisance injury
- f. Explain the relationship between injury level and action level
- g. Recognize the relationship between personal preferences and aesthetic/nuisance injury levels and their effect on pest management decisions
- h. Understand the factors affecting aesthetic/nuisance injury levels:
 - i. The pest species and its appearance and/or damage it causes
 - ii. The customer
 - iii. Individual pest tolerance
 - iv. The specific urban environment
 - v. The type of business or structure
 - vi. The specific area within the structure
- i. Explain the importance to successful pest management of developing a partnership with the customer
- j. Explain the idea of a “systems approach” to pest management
- k. Identify the uses and application methods of the following types of monitoring techniques or tools:
 - i. Visual inspections
 - ii. Night inspections
 - iii. Light traps
 - iv. Sticky traps
 - v. Pheromone traps
 - vi. Mirrors
 - vii. Binoculars
 - viii. Moisture meters
 - ix. Digital cameras
 - x. Hand lenses
 - xi. Spatulas/thin-bladed knife
 - xii. Motion detectors
 - xiii. Infrared video
- l. Explain the importance of a thorough site inspection
- m. List the information that should be recorded on a site inspection
- n. Explain the importance of a written IPM plan for the site
- o. Differentiate between site inspection and monitoring and explain the importance of monitoring in an IPM approach
- p. List the main objectives for monitoring in a pest management program
- q. Explain the importance of recordkeeping in an IPM approach
- r. List the information that should be recorded when monitoring a site after the initial inspection

3. Treatment Strategies in IPM

- a. Explain why integrating a number of treatment strategies into a comprehensive IPM program can be more effective than relying on a single treatment
- b. Define and describe the principles behind the following non-chemical IPM tactics:
 - i. Sanitation
 - ii. Exclusion or pest proofing
 - iii. Denial of harborage
 - iv. Environmental manipulation
 - v. Trapping
 - vi. Monitoring
 - vii. Vacuuming
- c. List factors of the physical environment that impact pest populations
- d. Describe prevention methods for each listed pest with an asterisk
- e. Biological control
 - i. Understand that biological control has, to date, had limited application in structural IPM, but is used extensively in agricultural IPM and is a natural phenomenon occurring outside every day
 - ii. Define: natural enemies, parasitoid, predator
 - iii. Understand the importance of conserving or enhancing the activities of beneficial arthropods, especially those that feed on honeydew producing insects
 - iv. Describe how the following practices can be used to conserve or enhance the activities of beneficial insects (bees and insect natural enemies):
 1. Selection of pesticide
 2. Timing of application of pesticide
 3. Placement of pesticides
 4. Ant control
- f. Mechanical and Physical control
 - i. Explain the appropriate uses and advantages and disadvantages of the following traps for rats and mice:
 1. Snap traps
 2. Glue boards
 3. Live traps
 - ii. Describe the uses of a vacuum in pest management
 - iii. Describe the uses of barriers in managing pests
- g. Chemical control
 - i. Understand that in IPM, chemical controls are applied
 1. Only after visual inspection or monitoring devices indicate the presence of pests in that specific area, the pest numbers have exceeded the action threshold, and adequate control cannot be achieved with non-chemical methods within a reasonable time and for a reasonable cost; and
 2. With the most precise application technique, in the smallest area, and using the minimum quantity of pesticide necessary to achieve control.
 - ii. Understand that regular, calendar scheduled perimeter treatments are not a part of IPM
 - iii. List the information you may need when making a pesticide recommendation that may not be found on the label.

- h. Describe how the following can help reduce your potential liability: using IPM strategies, the pesticide label; the MSDS, back-up documentation; knowledge of hazards around the property; local regulations and restrictions; state and federal regulations

V. Pesticides and Water Quality

1. Understand that the effects of pesticides on humans and on other creatures and the environment can be completely different. Substances that are relatively non-toxic to humans can be quite toxic to aquatic organisms.
2. Understand that the nature of the surface to which the pesticide is applied affects how much pesticide washes off when it rains. If all factors are equal, the amount that can wash off a solid “impervious” surface, like a sidewalk or driveway, is substantially greater than the amount that can wash off a landscaped area or farm field.
3. Understand that only a tiny fraction of the pesticide used in an urban area needs to wash off into creeks or storm drains or contaminate water that flows into sewage treatment plants to cause water quality problems.
4. Understand that the formulation of a pesticide affects how much washes off with irrigation or rain.
5. Understand that the location of the application affects how much pesticide washes off.
6. Describe where the water in a storm drain flows.
7. Describe where the water in a sewer flows. Understand that pesticides can get into sewers from application, cleanup, and washing of treated surfaces.
8. Understand that sewage treatment plants are not designed to treat pesticides. Understand the consequences of pesticide contamination of water flowing into sewage treatment plants.
9. Describe how to find out if a pesticide is a water quality concern.
10. List the water quality problems pesticides can cause in a creek, river, lake or bay.
11. Understand that gaps in EPA and state regulatory procedures allow pesticides to be registered that can cause water quality problems.