

# Soils and Fertilizers

## Chapter 2

### Answers to review questions

1) Explain why good soil structure is important to gardeners.

- Permeability (p. 40)
- Water-holding capacity (p. 40)
- Drainage (p. 40)
- Root penetration (p. 40)
- Soil aeration (p. 40)

2) Mark each of the following statements as True (T) or False (F).

F Clay loam soil is unable to hold enough water for good plant growth (p. 39).  
T Clay loam soil remains cool arid wet late into the spring (p. 39).

T Clay loam soil stays warm late into the fall.

T Clay loam soil needs drainage improvement (p. 39).

T Clay loam soil takes more lime to correct an acidity problem than would a sandy loam.

3) A client has cold, wet soil. List two problems that are likely to occur in his garden.

- The soil temperature will be slow to warm up in the spring (p. 41).
- The gardener will have to delay tilling and planting (p. 41).
- Many plants don't grow well with "wet feet" (p. 41).
- Some plants are susceptible to root diseases in wet soil (p. 41).

What would you recommend to help alleviate these problems?

- Divert runoff (p. 42)
- Avoid plants that don't like wet conditions (p. 42).
- Use raised beds (pp. 42, 145).
- Install drainage (p. 42).

\*You may need to use other chapters, additional reference materials, or your own experience to answer this question fully.

### Answers to review questions Chapter 2-8 Soils and Fertilizers page 2

4) A house was built on a parcel of land that previously was covered with brush. The land was cleared, and the debris and much of the topsoil were removed from the site. List two soil problems the homeowner is likely to have in this situation.

- Compaction of existing soil (p. 40)

- Loss of topsoil
- Poor soil structure (p. 40)
- Fill material

What could you recommend to help with these problems?

- Till deeply.
- Select good fill material.
- Incorporate fill material if possible.
- Plant something to rebuild soil structure and encourage development of biological activity.

Grass often works well for this purpose even in areas intended for landscaping and gardens. Use annual grass in these areas.

5) Soil abounds with life. Why is this life important in a practical way to gardeners?

- Soil organisms break down the remains of plants and other organisms, thereby releasing nutrients and reducing the need for added fertilizer. This process also creates beneficial organic matter (p. 42).
- Rhizobia bacteria infect legume roots and convert atmospheric nitrogen to a form plants can use (p. 43).
- Earthworms mix soil and create macro pore channels (p. 43).
- Mycorrhizae infect plant roots and increase their ability to take up plant nutrients (p. 43).

6) Why should you add organic matter to your garden soil?

- It improves drainage in fine-textured (clayey) soils (pp. 41, 54-55).
- It improves water-holding capacity in coarse-textured (sandy) soils (pp. 41, 54-55). • It reduces the amount of fertilizer needed (pp. 41, 54-55).

7) A gardener mulches her vegetable garden with straw just after planting some young transplants. A short time later, she observes that the leaves of the plants are turning yellow. What is one possible nutrient-related cause of the yellowing? How would you advise her to correct the problem?

. The straw has a high ratio of carbon to nitrogen (C:N). As soil organisms break down the straw, they remove nitrogen from the soil solution. The plant yellowing is a response to nitrogen deficiency. Adding a soluble source of nitrogen should help correct the problem. Removing the straw also might be a good idea to prevent slug damage (pp. 54-55).

· You may need to use other chapters, additional reference materials, or your own experience to answer this question fully.

## Answers to review questions Chapter 2:-Soils and Fertilizers page 3

8) Mark each of the following statements as True (T) or False (F). For true statements, indicate whether the statement identifies an advantage or a disadvantage of using an organic fertilizer ..

*F* Nutrients in most organic fertilizers are quickly available to plants.

*T* Most organic fertilizers improve the long-term nutrient-holding capacity of soils. *Advantage* (p. 48)

*T* Using organic fertilizers usually involves recycling materials that otherwise would be discarded. *Advantage* (p. 47)

*F* Using organic fertilizers increases the risk of nitrogen leaching into the groundwater. *T* Organic fertilizers usually have a low nutrient content. *Disadvantage* (p. 47)

9) A fertilizer label reads 18-46-0. What does this mean?

The material in the package contains 18% nitrogen, 46% phosphate, and 0% potassium. This material is diammonium phosphate (p. 48).

10) What are the best methods for determining how much fertilizer to use on a garden?

- Soil tests (p. 52)
  - Extension publications (pp. 52-53)
- 11) If an Extension publication (e.g., EC 1503) recommends applying 2 pounds of 16-20-0 fertilizer per 100 square feet, how many pounds of fertilizer would you put on a 20' x 15' garden?  
6 pounds [The garden is 300 square feet (20' x 15'). 2 lb per 100 square feet x 3 = 6 lb] (p. 53)
- 12 .. How much fresh cow manure could you use as a substitute for the fertilizer in # 11?  
Six 5-gallon buckets [one 5-gallon bucket of fresh cow manure per 50 square feet of garden] (p. 49)
- What precautions would you take when using manure?
- Do not use manure around root crops or low-growing crops such as lettuce or strawberries (p.50).
  - Never use dog, cat, or pig manure (p. 50).
  - Cook food grown in manured gardens. At the very least, wash and peel raw produce (p. 50).
- 13) List the three ways that soil pH affects plants .
- ' It affects the availability of plant nutrients (p. 57).
  - It affects the availability of toxic metals (p. 57).
  - It affects the activity of soil microorganisms, which in turn affect nutrient cycling and disease risk (p. 57).
- 14) What is the "ideal" soil pH range for a vegetable garden? 5.5 to 7.5 (p. 57)
- 15) What happens when soil pH is higher or lower than the ideal range?  
Plants may suffer from nutrient deficiency or metal toxicity (p. 57).

#### Answers to review questions Chapter 2-Soils and Fertilizers page 4 .

- 16) How can a gardener increase soil pH? How can he/she decrease it?
- To increase soil pH, add elemental sulfur, ammonium sulfate, or urea (p. 58).
  - To decrease soil pH, add elemental sulfur, ammonium sulfate, or urea (p. 58).
- 17) What is the effect of rototilling garden soil when it is too wet? (Mark the one best answer.) (a) It destroys soil structure (pp. 40;131).
- 18) Which of the following would help a compost pile that is not heating? (Mark all correct answers.)
- (b) Add a material with a low C:N ratio (pp. 55, 108).
  - (c) Turn the pile more frequently (pp. 55;108)
  - (e) Keep the pile moist (pp. 55;108) ..

# Your Yard and Water Quality Chapter 6

## Answers to review questions

1) Name two "point" sources of pollution.

Factories and municipal sewage plants (p. 115)

2) What is "nonpoint" source pollution? What are some examples?

Pollution that originates from many relatively small, widespread sources. Examples include soil, pesticides, oil, manure, soap, and fertilizers (p. 115).

3) Name at least two environmentally sound gardening techniques.

- Reduce the use of potentially dangerous materials around the yard (p. 117).
- Minimize water runoff (p. 117).
- Reduce soil erosion by using groundcovers, mulches, and cover crops (p. 119).
- Choose and site plants properly so they require minimal inputs of chemicals and water (pp. 117, 462-463).
- Reduce the use of chemical fertilizers (p. 118).
- Time fertilizer applications correctly (p. 118).
- Use garden wastes as a mulch or in compost (p. 119 and Chapter 5).
- Water efficiently (p. 120).
- Practice integrated pest management (IPM) (p. 121 and Chapter 20).

4) Can herbicide-treated grass be used as a mulch on a garden within a year of cutting?

No (p. 119)

5) For pest management, which of the following are considered least toxic materials? (Mark all correct answers.)

(a) *Bacillus thuringiensis* (Bt) (pp. 121, 449-450) (c) Insecticidal soap (pp. 121, 451)

(e) Horticultural oils (pp. 121, 451)

# Plant Disease

## Chapter 15

### Answers to review questions

1) What is the general term used to describe living organisms that cause plants to become diseased?

Biotic agents (p. 317)

2) What term describes nonliving causes of disease such as nutrient deficiencies or drought?

Abiotic factors (p. 317)

3) What is the largest group of plant pathogens?

Fungi (p. 320)

4) How do bacteria reproduce?

By splitting in two (p. 320)

5) Which type of plant pathogen is smallest in size?

Viruses (p. 320)

6) How do pathogenic nematodes damage plants?

Their feeding may cause lesions or galls that restrict water and nutrient movement within the host plant (p. 321).

7) Name two parasitic plants that might be found in the Pacific Northwest.

Dodder and mistletoe (p. 321)

8) Are lichen and algae parasitic?

No (p. 321)

9) What three conditions must be met before a biotic disease occurs?

- A susceptible host must be present (pp. 321-322).
- An active pathogen must be present (pp. 321-322).
- The environment must be suitable (pp. 321-322).

## Answers 10 review questions Chapter 15-Plant Disease page 2

10) What are the five basic principles of plant disease control?

- Exclusion (pp. 325-326)
- Avoidance (p. 326)
- Eradication (pp. 326-327)
- Protection (p. 328)
- Resistance (p. 329)

11) How can you avoid root rot diseases such as phytophthora?

Don't plant susceptible plants in heavy, poorly drained soils (p. 326).

12) What is the easiest means of disease control for home gardeners?

Planting resistant cultivars (p. 328)

13) Should diseased plant parts be placed in a compost pile?

Only if you are "hot" composting and the pile heats enough to destroy the disease organisms (pp. 309, 329)

# Diagnosing Plant Problems

## Chapter 16

### Answers to review questions

1) Why are symptoms alone frequently inadequate for diagnosing plant problems? .

Completely different factors may cause similar symptoms (p. 334).

2) What are the first steps in identifying the cause of a plant's problem?

- Identify the plant (p. 335).
- Compare it to a healthy plant of the same cultivar (pp. 335-336).
- Use signs and symptoms to distinguish between living and nonliving damaging factors (pp. 336-339).

- 3) Distinguish between symptoms and signs.
  - *Symptoms* are changes in a plant's growth or appearance in response to a damaging factor (p. 336).
  - *Signs* are direct evidence of the damaging factor (p. 336).
- 4) How can the distinction between uniform and random patterns of damage help you determine the cause of damage?
  - Uniform patterns of damage usually are associated with nonliving factors such as weather (p. 338).
  - Random damage more often is associated with living organisms such as insects or pathogens (pp. 337-338).
- 5) What are some of the signs and symptoms of a fungal disease?
  - The best clue to a fungal disease is the presence of fungal mycelia and fruiting bodies (pp. 339-340).
  - Leaf spots with concentric rings (p. 340)
- 6) What are some of the signs and symptoms of a bacterial disease?
  - Wet or dried slime at the edge of leaf spots or cankers (p. 341)
  - Spots that often are restricted by large veins (p. 341)
  - A foul odor (p. 341)
  - A water-soaked appearance (p. 340)
  - Galls (p. 340)

## Answers to review questions Chapter 16-Diagnosing Plant Problems page 2

- 7) Viruses are submicroscopic obligate parasites. What does this mean?
 

Microscopic means that viruses cannot be seen by an ordinary microscope. An obligate parasite can replicate only within a host's cell (p. 341).
- 8) What are some of the symptoms of viral infections?
  - The most typical symptom of a viral infection is a change from normal coloration. Examples include vein clearing, vein banding, mottled green and yellow spots, mosaic patterns, rings, and uniform yellow in normally green organs (p. 341).
  - Stunting (p. 342)
  - Distortion (p. 342)
  - Discrete necrotic areas (p. 342)
- 9) What symptoms and signs would give clues about which insect is the cause of plant damage?
  - The location and type of feeding damage are the most important clues in identifying an insect pest (pp. 307-309, 342-343).
  - Possible signs include webbing or frass (p. 342).
- 10) What information might help you distinguish among nonliving causes of plant damage?
  - History of mechanical activity in the area (pp. 344-345)
  - History of chemical use in the area (pp. 346-347)
  - Weather records (pp. 345-346)
  - Patterns of damage (p. 338)