Oakland CUSD #5

Landscaping

April 13-17, 2020

Jeff Coon

Week of April 13-20, 2020

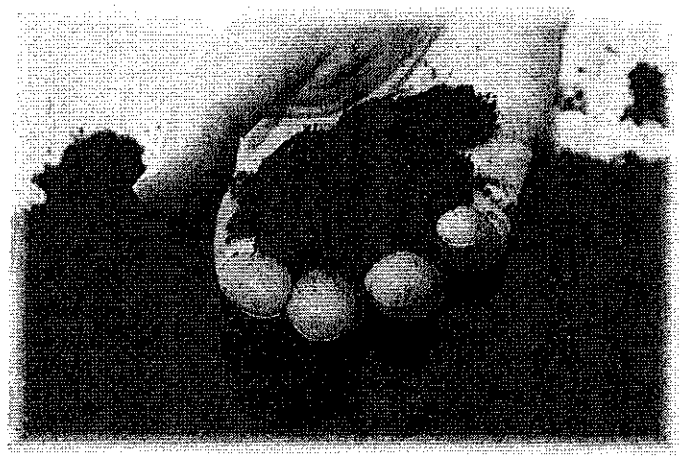
All of these assignments are on google classroom. You must pick one of the 3 listed and complete by next Monday April 20 for credit. If you would like to use google docs to complete the work that would be most efficient, just remember to start a new copy with your own work please. Paper copies can be returned to the school.

Class	Choice 1	Choice 2	Choice 3 (Enrichment)
Ag Science	Animal Cell	Heredity and DNA	FFA journal
Ag Business Mang	Managing Employees	Employee benefits	Chart work experiences
BSAA	Animal Cell Structure	Animal Growth factors	Animal Nutrition 2
Landscape Design	Soil Texture	Water Holding Capacity	Landscape pests
Intro To Ag	FFA official dress	FFA opportunities	Ag Commodities
Ag Mech.	Surveying Equipment	Fuels	Lubricants

Land Des April 13-17 Choice 1

Understanding Soil Texture and Structure

HAVE YOU EVER MADE sand castles and mud pies? If so, think back at how the sand and mud were alike or different. What did they feel like? What happened when they dried? Both had unique properties that will be discussed in this unit.



Objectives:

1. Describe soil texture and soil characteristics related to texture.
2. Explain soil structure and various types of soil structure.

Key Terms:

aggregates
clay
clods
mineral matter
peds
permeability
ribbon method
sand
silt
soil structure
soil texture
soil workability
textural triangle
water-holding capacity

Soil Texture

The inorganic material in soil is called **mineral matter**. Mineral matter began as rock that was weathered into small particles. Most soils have different sizes of mineral particles. These particles are labeled sand, silt, or clay, based on their size.

Sand is the largest of the mineral particles. Sand particles create large pore spaces that improve aeration. Water flows through the large pore spaces quickly. Soils with a high percentage of sand are generally well drained. Sandy soils lack the ability to hold nutrients and are not fertile. Sandy soils also feel gritty to the touch.

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Silt is the mid-size soil particle. Silt has good water-holding ability and good fertility characteristics. It feels like flour when dry and smooth like velvet when moist.

Clay is the smallest size soil particle. Clay has the ability to hold both nutrients and water that can be used by plants. It creates very small pore spaces, resulting in poor aeration and poor water drainage. Clay forms hard clumps when dry and is sticky when wet.

TABLE 1. Characteristics of Sand, Silt, and Clay

Characteristics	Sand	Silt	Clay
Looseness	Good	Fair	Poor
Air space	Good	Fair to good	Poor
Drainage	Good	Fair to good	Poor
Tendency to form clods	Poor	Fair	Good
Ease of working	Good	Fair to good	Poor
Moisture-holding ability	Poor	Fair to good	Good
Fertility	Poor	Fair to good	Fair to good

TEXTURAL CLASSES

Soil texture describes the proportion of three sizes of soil particles and the fineness or coarseness of a soil. Soil texture may be determined in one of two ways. The percentages of sand, silt, and clay may be tested in the lab. Once tested, the textural class of the soil can be determined by referring to the **textural triangle**. Soils with different amounts of sand, silt, and clay are given different names. For instance, a soil containing 40 percent sand, 40 percent silt, and 20 percent clay is called loam soil. The relative amounts of sand, silt, and clay may also

UNDER INVESTIGATION...

LAB CONNECTION: Sedimentation Test of Soil Texture

A simple activity can be performed to determine the percentages of sand, silt, and clay in a given soil sample. Place about 2 cups of soil in a tall, straight-sided quart jar. Add 5 tablespoons of 8 percent Calgon water-softening solution and enough water to almost fill the jar. Tighten the lid and shake vigorously for five minutes. After 40 seconds, measure the depth of the settled soil and record it as the sand depth. Do not shake the jar again. In 30 minutes, measure the depth of the settled soil. Subtract the depth of the sand from the measurement to get the silt depth. The next day measure the soil depth and subtract the sand and silt depths to get the clay depth. Also, measure the total depth of the settled soil. Determine the percentage of each soil particle by dividing the particle depth by the total soil depth and multiplying by 100.

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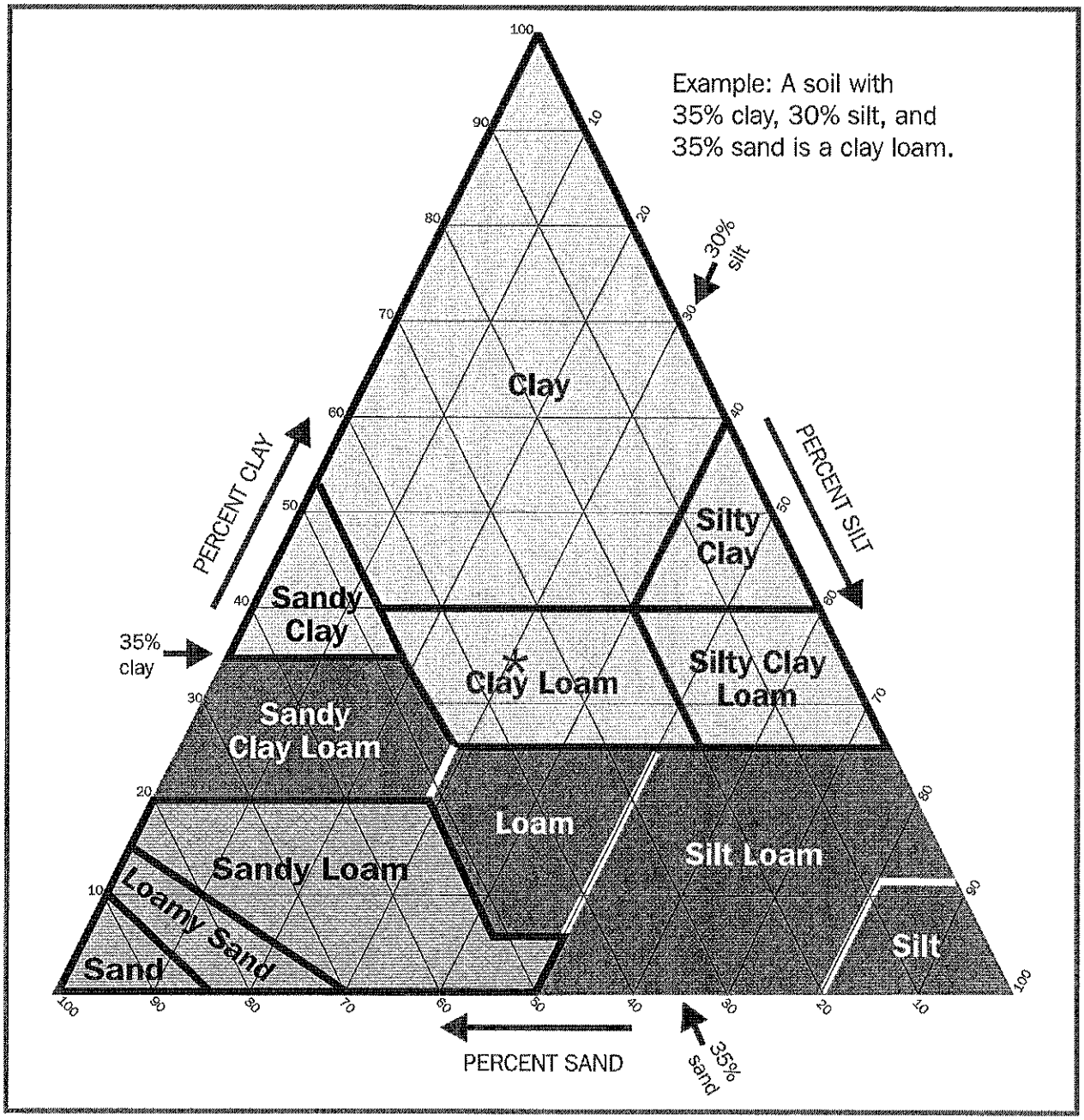

FIGURE 1. The textural triangle is used to classify soils.

be determined in the field using the **ribbon method**. Five textural classes may be determined using the ribbon method.

- **Fine textured**—A ribbon forms easily and remains long and flexible.
- **Moderately fine textured**—A ribbon forms but breaks into pieces $^3/_4$ to 1 inch long.
- **Medium textured**—No ribbon forms. The sample breaks into pieces less than $^3/_4$ inch long. The soil feels smooth and talc-like.

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TABLE 2. Soil Textural Classes

Sand	• Dry—Loose and single grained; feels gritty. • Moist—Will form very easily crumbled ball. • Sand: 85–100%, Silt: 0–15%, Clay: 0–10%
Loamy Sand	• Dry—Silt and clay may mask sand; feels loose, gritty. • Moist—Feels gritty; forms easily crumbled ball; stains fingers slightly. • Sand: 70–90%, Silt: 0–30%, Clay: 0–15%
Sandy Loam	• Dry—Clods easily broken; sand can be seen and felt. • Moist—Moderately gritty; forms ball that can stand careful handling; definitely stains fingers. • Sand: 43–85%, Silt: 0–50%, Clay: 0–20%
Loam	• Dry—Clods moderately difficult to break; somewhat gritty. • Moist—Neither very gritty nor very smooth; forms a ball; stains fingers. • Sand: 23–52%, Silt: 28–50%, Clay: 7–27%
Silt Loam	• Dry—Clods difficult to break; when pulverized, feels smooth, soft, and floury and shows fingerprints. • Moist—Has smooth or slick, buttery feel; stains fingers. • Sand: 0–50%, Silt: 50–88%, Clay: 0–27%
Clay Loam	• Dry—Clods very difficult to break with fingers. • Moist—Has slightly gritty feel; stains fingers; ribbons fairly well. • Sand: 20–45%, Silt: 15–53%, Clay: 27–40%
Silty Clay Loam	• Same as above but very smooth. • Sand: 0–20%, Silt: 40–73%, Clay: 27–40%
Sandy Clay Loam	• Same as for Clay Loam. • Sand: 45–80%, Silt: 0–28%, Clay: 20–35%
Clay	• Dry—Clods cannot be broken with fingers without extreme pressure. • Moist—Quite plastic and usually sticky when wet; stains fingers. (A silty clay feels smooth; a sandy clay feels gritty.) • Sand: 0–45%, Silt: 0–40%, Clay: 40–100%

- **Moderately coarse textured**—No ribbon forms. The sample feels gritty and lacks smoothness.
- **Coarse textured**—No ribbon forms. The sample is composed almost entirely of gritty material and leaves little or no stain.

SOIL CHARACTERISTICS RELATED TO TEXTURE

The texture of a soil is important because it determines soil characteristics that affect plant growth. Three of these characteristics are water-holding capacity, permeability, and soil workability. **Water-holding capacity** is the ability of a soil to retain water. Most plants require a steady supply of water, and it is obtained from the soil. While plants need water, they also need air in the root zone. **Permeability** is the ease with which air and water may pass through the soil. **Soil workability** is the ease with which soil may be tilled and the timing of the work.

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Soils with large percentages of sand are easier to work than soils with large percentages of clay. Clay soils tend to be tighter, making them more difficult to break up or cultivate, whereas sandy soils are looser. A clay soil also takes longer than a sandy soil to dry after a rain. Because of the better drainage, a sandy soil can be worked sooner. With a wet clay soil, the producer or gardener must wait longer for the soil to dry sufficiently.

Soil texture may limit which crops can be grown. For example, root crops, such as carrots and onions, perform best in a sandy soil because it is loose and allows the plants to expand. On the other hand, some crops may experience stunted growth in a sandy soil because the soil lacks water- and nutrient-holding ability.

Soil Structure

Sand, silt, clay, and organic-matter particles in a soil combine with one another to form larger particles of various shapes and sizes. These larger particles, or clusters, are often referred to as **aggregates**. The arrangement of the soil particles into aggregates of various sizes and shapes is **soil structure**. Aggregates that occur naturally in the soil are called **peds**, whereas clumps of soil caused by tillage are called **clods**.

Ways in which aggregates are created include freezing and thawing, wetting and drying, fungal activity, tillage, and the surrounding of the soil by plant roots that separate the clumps. Weak aggregates are cemented to make them distinct and strong. Clay, iron oxides, and organic matter often act as cements. When soil microorganisms break down plant residues, gums are produced that glue peds together.

SOIL STRUCTURAL CATEGORIES

The eight primary types of soil structure are blocky, crumb, columnar, granular, massive, platy, prismatic, and single grain. Granular is the most desirable structure type because it has the greatest proportion of large openings between the individual aggregates.

- **Blocky**—The units are block-like. They consist of six or more flat or slightly rounded surfaces.
- **Crumb**—The aggregates are small, porous, and weakly held together.
- **Columnar**—The units are similar to prisms and are bounded by flat or slightly rounded vertical faces. The tops of columns are very distinct and normally rounded.
- **Granular**—The units are approximately spherical or polyhedral. The aggregates are small, nonporous, and held strongly together.
- **Massive**—There is no apparent structure. Soil particles cling together in large uniform masses.
- **Platy**—The units are flat and plate-like. They are generally oriented horizontally. Plates overlap, usually causing slow permeability.

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- **Prismatic**—The individual units are bounded by flat to rounded vertical faces. Units are distinctly longer vertically. The tops of the prisms are somewhat indistinct and normally flat.
- **Single grain**—There is no apparent structure. Soil particles exist as individuals and do not form aggregates.

THE IMPORTANCE OF SOIL STRUCTURE

Soil structure is important for several reasons. Soil structure affects water and air movement in a soil, nutrient availability for plants, root growth, and microorganism activity. The pore spaces created by peds are larger than those between individual particles of sand, silt, or clay. This allows for greater air and water movement and better root growth. The larger spaces make passageways for organisms. The aggregates are also better able to hold water and nutrients.

Soil Structure Damage

Soil structure can be destroyed. A major cause of damage is driving heavy equipment over wet soil. Damage is also caused by working soil when it is either too wet or too dry. Either condition leads to the clay particles clogging the pore spaces. The soil becomes compacted and very dense; and when it dries, it becomes very hard. It is extremely difficult for most plants to survive in a soil whose structure has been destroyed.

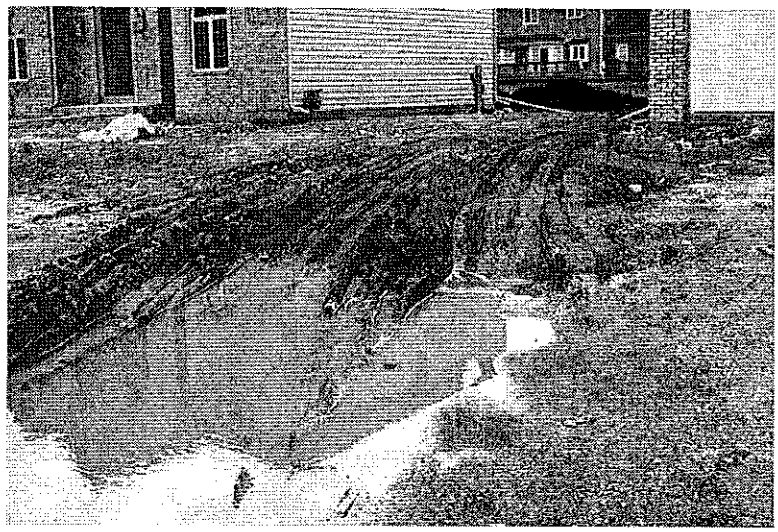

FIGURE 2. Heavy equipment on construction sites often destroys soil structure, resulting in poor water drainage.

Summary:

Most soils have different sizes of mineral particles called sand, silt, and clay. Sand is the largest of the mineral particles. Silt is the mid-size soil particle. Clay is the smallest size soil particle. Soil texture describes the proportion of the soil particles and the fineness or coarseness of a soil.

The texture of a soil determines soil characteristics that affect plant growth. Three of these characteristics are water-holding capacity, permeability, and soil workability.

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Sand, silt, clay, and organic-matter particles in a soil combine with one another to form larger particles of various shapes and sizes. Soil structure is the arrangement of the soil particles into aggregates. The eight primary types of soil structure are blocky, crumb, columnar, granular, massive, platy, prismatic, and single grain.

Soil structure affects water and air movement in a soil, nutrient availability for plants, root growth, and microorganism activity.

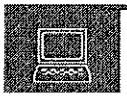
Checking Your Knowledge:

1. How do sand, silt, and clay differ?
2. What is soil texture?
3. How is soil texture determined?
4. What is soil structure?
5. Why is soil structure important?

Expanding Your Knowledge:

Explore the soil around your home. Dig up some soil and squeeze it, crumble it, and feel it. Is the texture gritty or smooth? Does the soil form a ball that easily crumbles? See if you can determine the texture and the type of soil structure.

Web Links:



Soil Texture and Structure
http://www.public.iastate.edu/~arossi/page%202.htm

Soil Properties
http://www.uwsp.edu/geo/faculty/ritter/geog101/textbook/soil_systems/soil_development_soil_properties.html

Soil and Water
http://www.fao.org/docrep/R4082E/r4082e03.htm#2.1.3%20soil%20texture

Agricultural Career Profiles
http://www.mycaert.com/career-profiles

Choice 1

Landscape design Mr. Coon April 13 Name

Checking Your Knowledge:

1. How do sand, silt, and clay differ?

2. What is soil texture?

3. How is soil texture determined?

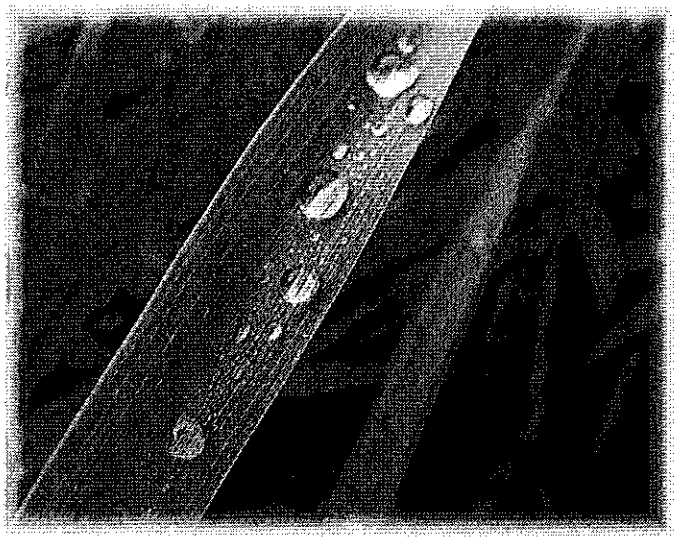
4. What is soil structure?

5. Why is soil structure important?

Land Des. April 13-17 Choice 2

Understanding Moisture-Holding Capacity

ONE THING a good soil provides to plants is moisture. Soils that have the ability to hold plenty of moisture for plants are valued. Those that lack the water-holding ability are deemed less valuable. Why is it some soils hold moisture and others don't?



Objective:

Describe moisture-holding capacity.

Key Terms:

available soil moisture
available water-holding capacity
capillary moisture
gravitational moisture
hygroscopic moisture
infiltration
leaching
moisture-holding capacity
percolation
permeable
soil-moisture tension
unavailable soil moisture

Moisture-Holding Capacity

A soil with good texture and structure will absorb a great deal of rainfall. The process of the water soaking into the soil is known as **infiltration**. Once in the soil, the water moves downward. The downward movement of water through the soil is known as **percolation**. A soil that allows water movement by infiltration and percolation is said to be **permeable**. In a heavy rainfall, the pore spaces of soil fill up more quickly than water can drain through the soil. When all the pore spaces are filled with water, the soil is considered saturated. Additional rainwater forms puddles or flows downhill on the surface of the soil as runoff.

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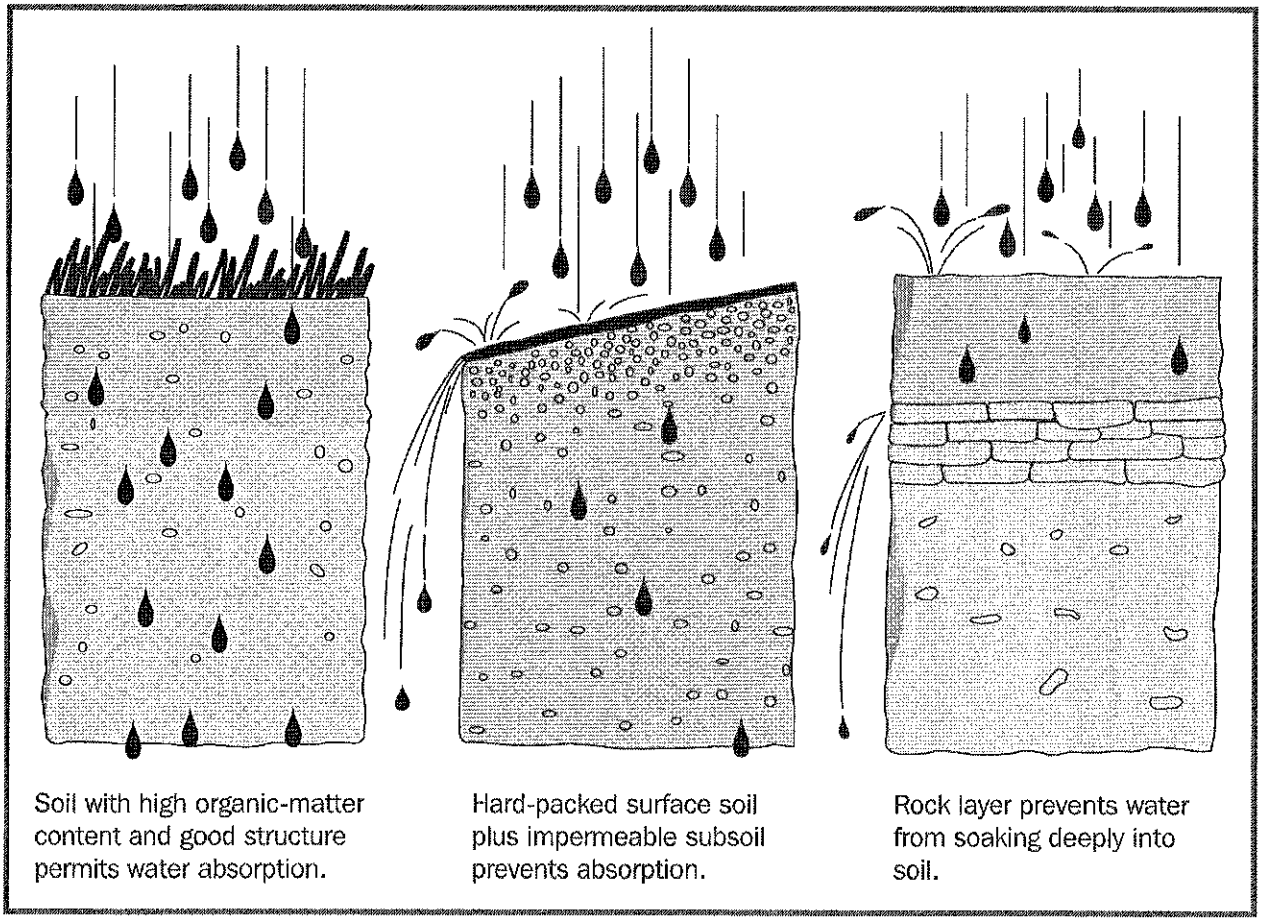

FIGURE 1. Permeable soil allows water to infiltrate and percolate.

Typically, water accounts for about 25 percent of a soil. The percentage is higher after rainfall and lower during dry periods. The ability of soil to retain water is called **moisture-holding capacity**.

TYPES OF SOIL MOISTURE

Water found in soil is one of three types: gravitational moisture, capillary moisture, or hygroscopic moisture.

Gravitational Moisture

After a rain, much of the water drains down through the pore spaces of the soil. This is called **gravitational moisture** because the force of gravity pulls the water down. The water ends up in the groundwater below the soil surface. Gravitational moisture flows quickly through sandy soils that have large pore spaces and more slowly through clay soils that have tiny pore spaces. It is also available for plants to use.

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As gravitational moisture moves through the soil, it carries with it dissolved minerals, chemicals, and salts. This process is known as **leaching**. The soil texture will determine how quickly minerals, chemicals, and salts are leached, or washed, through a soil. Because of leaching, crops grown on sandy soils need more frequent fertilizer applications.

Capillary Moisture

Capillary moisture is a second type of soil water. It is also the water that plants are most able to use. **Capillary moisture** is the water held between the soil particles against the force of gravity. This water can move upward or sideways through a soil by capillary action. As surface soil dries out, some water moves up into the open pore spaces by capillary action. Clay soils have a great many more pore spaces than sandy soils; therefore, they hold more capillary water. Capillary moisture is available to plants.

Hygroscopic Moisture

A third type of soil water is called hygroscopic moisture. **Hygroscopic moisture** is the water that forms a thin film around individual soil particles. Even the driest soils have hygroscopic moisture. Plants are unable to absorb and use this type of water because it is held so tightly to the soil particles.

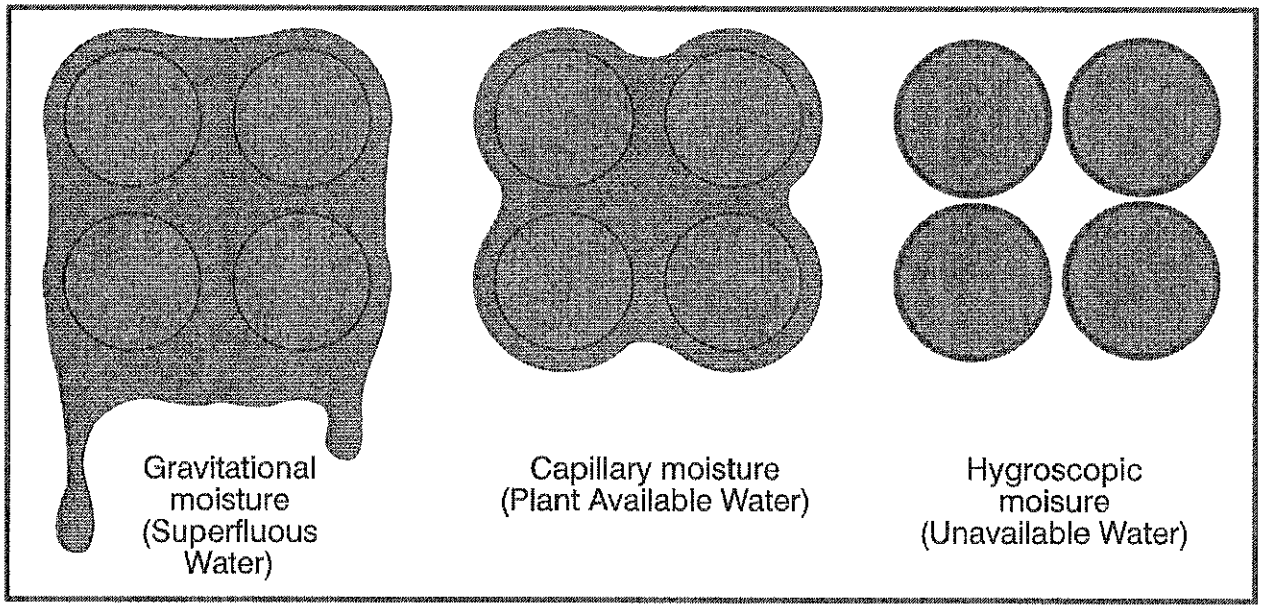

FIGURE 2. Three types of moisture found in soils.

Available or Unavailable Moisture

Often soil moisture is referred to as being available for plant use or unavailable for plant use. **Available soil moisture** is the water in the soil that can be used by plants. When the moisture level is high, plants can easily extract moisture from the soil. As the water is used,

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soil-moisture tension increases. **Soil-moisture tension** is the force by which soil particles hold on to moisture. Hygroscopic moisture has high soil-moisture tension. Although the water is present in the soil, it is considered to be **unavailable soil moisture** for plant use.

MOISTURE-HOLDING CAPACITY AND SOIL TEXTURE

Moisture-holding capacity is determined primarily by the soil's texture. As a rule, the finer the texture of the soil, the more moisture it will hold. A soil with a high percentage of sand holds less water than one with a low percentage of sand. Water percolates rapidly through the large pore spaces created by sand. Plants growing in sandy soils experience water stress more quickly than those growing in loam and clay soils. A soil with a high percentage of clay holds water and keeps it from percolating out of the root zone. However, some of the water is held too tightly for plant use. This means less water is available to plants than if silt were present. A silt loam soil holds the most moisture available for plants.

Available Water-Holding Capacity

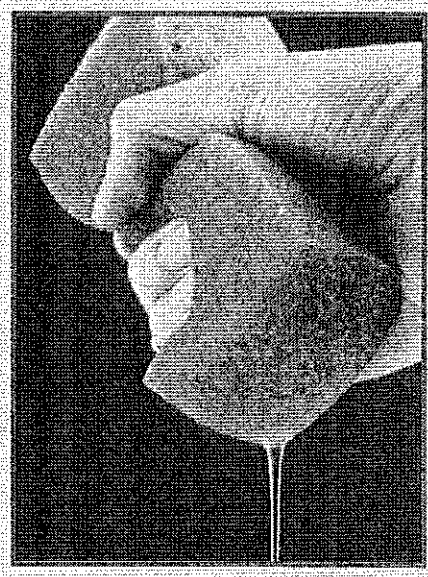
The amount of moisture the soil can hold for plants is referred to as **available water-holding capacity**. Available water-holding capacity depends on the depth of the soil profile and the type of soil texture found throughout the soil profile.

UNDER INVESTIGATION...

LAB CONNECTION: Sponge Model

A sponge can be used to demonstrate the types of water in a soil. Soak the sponge in a container of water. Once the sponge is soaked, all the pores are filled with water. Remove the sponge and hold it flat. Water drains quickly at first, then stops. Turn the sponge on its side. Water once again drains from the sponge. The water lost is gravitational water. Turn the sponge to a vertical position. Note that the pores at the bottom of the sponge fill with water as gravity pulls the water down. The only difference in the three positions is the distance over which gravity could work.

The water that remains in the sponge is capillary water. Squeeze the sponge to extract the capillary water. When no more moisture can be extracted, the capillary water has been removed. Moisture left in the sponge represents hygroscopic moisture. Although the sponge feels damp, the water cannot be extracted.



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On average, each of the following textures will hold the designated amount of moisture per inch of soil:

- **Fine textured**—0.20 inch of water
- **Moderately fine textured**—0.25 inch of water
- **Medium textured**—0.30 inch of water
- **Moderately coarse textured**—0.20 inch of water
- **Coarse textured**—0.10 inch of water

To determine the available water-holding capacity for a given area, multiply the depth of each horizon, to a maximum depth of 60 inches, by the amount of water the texture within that horizon can hold. Add the totals for all the horizons to calculate total water-holding capacity.

Summary:

The process of the water soaking into the soil is known as infiltration. The downward movement of water through the soil is known as percolation. A soil that allows water movement by infiltration and percolation is said to be permeable. The ability of soil to retain water is called moisture-holding capacity.

Soil moisture is one of three types. Gravitational moisture is water that drains down through the pore spaces of the soil. Capillary moisture is the water held between the soil particles against the force of gravity. Hygroscopic moisture is the water that forms a thin film around individual soil particles. Soil moisture may be available for plant use or unavailable for plant use.

Moisture-holding capacity is determined primarily by the soil's texture. The amount of moisture the soil can hold for plants is referred to as available water-holding capacity.

Checking Your Knowledge:

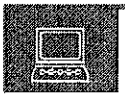
1. What are the meanings of infiltration, percolation, and permeable?
2. What is moisture-holding capacity?
3. How do the three types of soil moisture compare?
4. Why is some soil moisture unavailable for plant use?
5. What is the main factor in a soil's ability to hold water?

Choice 2

Expanding Your Knowledge:

Try growing plants in different types of media using the same size pots. Use soil from the garden, plain sand, and a greenhouse growing medium. Observe the soil, the plant growth, and the water drainage over a period of weeks. What results do you expect?

Web Links:



Soil Water-Holding Capacity
http://www.bettersoils.com.au/module2/2_1.htm

Soil and Water Relationships
http://www.noble.org/ag/Soils/SoilWaterRelationships/Index.htm

Infiltration and Soil Water Storage
http://www.physicalgeography.net/fundamentals/8l.html

Agricultural Career Profiles
http://www.mycaert.com/career-profiles

Choice 2

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Checking Your Knowledge:

1. What are the meanings of infiltration, percolation, and permeable?

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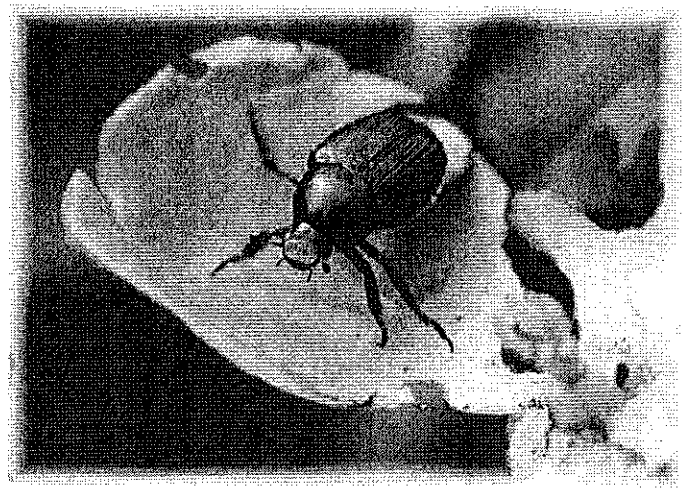
Land Des. April 13-17 Choice 3

Identifying and Managing Plant Pests in the Landscape

HEALTHY LANDSCAPES are relatively pest free. However, even the healthiest and best cared for landscape plants will have occasional problems with pests. Knowing how to identify landscape pests and manage the problem is essential for those working in the landscape and turfgrass industries.



Objective:

Discuss the management of major pests in the landscape.

Key Terms:

anthracnose
aphids
Asian longhorned beetle
bronze birch borer
canker
cankerworms
defoliators
Dutch elm disease
eastern tent caterpillars
emerald ash borer
euonymus scale
fireblight
gypsy moths
infection
infestation
Japanese beetles
leaf diseases
leaf spots and blights
leafhoppers
mites
mulching
oystershell scale
postemergent herbicides
powdery mildew
preemergent herbicides
root rots
rusts
sap-feeding insects
scab
scale insects
sod webworms
vascular diseases
verticillium wilt
weed
white grubs
wood-destroying insects

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Pests of Landscape Plants

Insects and diseases can severely injure or kill landscape plants. To control a landscape pest, one must first observe it keenly for proper identification.

INSECTS

Insect damage is usually more of a nuisance than a threat to the life of landscape plants. The balance of nature provided by birds, insects, and other organisms keeps most plant-damaging insects in check. Occasionally, an insect **infestation**, or the presence of a large number of pest organisms in an area or field, becomes severe enough that management of the pest population is necessary.

In diagnosing an insect problem, it is important to note that two insect groups cause the most damage to landscape plantings. They are chewing insects and sucking insects. Insect pests are also classified as defoliators, sap-feeding insects, and wood-destroying insects.

Defoliators

Defoliators injure landscape plants by eating all or part of the leaves. Under severe conditions, they can defoliate an entire plant.

Cankerworms feed on the leaves of elm, honeylocust, and many other trees in the spring. Inchworms, or loopers, are about 1 inch long. Adult cankerworms are wingless moths.

Eastern tent caterpillars feed on crab apples, hawthorns, and other trees. They live in colonies protected by dense webbing found in the crotches of tree branches. The eastern tent caterpillar has a yellow stripe down its back.

Gypsy moths feed on oaks and many other trees. The moths have caused extensive damage to forests in the eastern United States.

Japanese beetles are metallic green insects. They are present from early July until mid-August. The adults feed on more than 250 landscape species, and the larvae feed on turf.

Sap-Feeding Insects

Sap-feeding insects damage plants by sucking sap from the leaves. Leaves damaged by sucking insects usually turn yellow.

Aphids are pear-shaped, soft-bodied, usually wingless insects. They are often green or yellowish. Aphids have the ability to reproduce very rapidly. Astonishingly, live young are born pregnant! Aphids use their mouthparts to pierce plants and suck out juices. Aphids feed on many landscape plants.

Leafhoppers feed on many landscape plants. Depending on the species, they may be green to brown and are about $1/8$ inch long. They cause curling and browning of leaves and transmit diseases, such as aster yellows.

Scale insects have flat, oval, often brown bodies. They may or may not be covered with armored shells. Scale insects pierce plant leaves and stems and then suck juices. They cause

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dieback, and death occurs with heavy infestations. The **euonymus scale** infests primarily euonymus plants. The **oystershell scale**, which is shaped like an oyster shell, feeds on many different landscape plants.

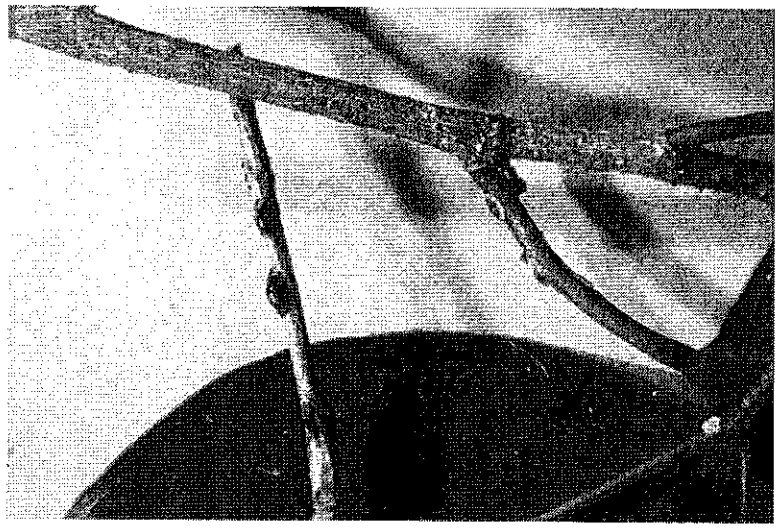


FIGURE 1. Scale on a ficus plant.

Wood-Destroying Insects

Wood-destroying insects bore through the wood of trees and shrubs.

The **Asian longhorned beetle** tunnels through the branches of maple, poplar, elm, ash, and other species. The adult is 1 to 1¼ inches long with long white-banded antennae. Its body is shiny black with white spots.

The **emerald ash borer** has killed millions of ash trees since arriving from Asia. The adult beetle is metallic green and about ½ inch long.

The **bronze birch borer** feeds mostly on white-barked birch. The larva leaves a D-shaped exit hole about ⅛ inch wide. Damage to the tree begins with the death of upper limbs.

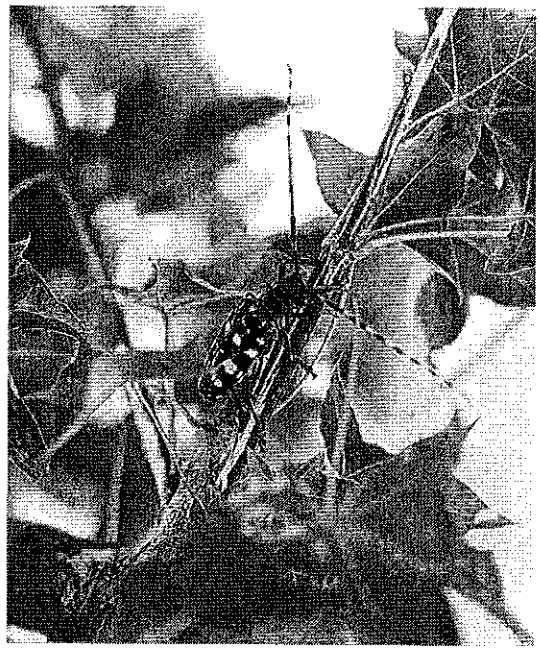


FIGURE 2. Asian longhorned beetle. (Courtesy, Agricultural Research Service, USDA)

Turfgrass Pests

Turfgrass pests include root feeders and grass blade feeders.

White grubs are the larval stage of ½-inch-long June beetles or Japanese beetles. A white grub larva is C-shaped and 1 inch long, with a brown head and six legs. Damage to turfgrass occurs from August until October. The larvae feed on grass roots, and severe infestations cause the grass to turn brown.

Sod webworms are the larvae of a tan moth. The caterpillars remove grass blades. The damage is caused from July until August.

MITES

Mites are tiny organisms related to spiders. They often look like specks

on a leaf. Conifer-feeding mites are populous during cool weather. Other mites are numerous during hot, dry weather. Mites suck sap from the leaves of plants, leaving a yellow-speckled appearance to the leaves and, in severe cases, defoliation. Two-spotted and red spider mites are among the most common mites. Two-spotted mites have two dark spots on their backs.

DISEASES

Diseases affect roots, leaves, stems, and flowers of landscape plants. Fungi, bacteria, and viruses cause infections. An **infection** is the result of an organism entering a plant and causing disease.

Leaf Diseases

Leaf diseases damage leaf tissues.

Powdery mildew is a fungal disease. Characteristic symptoms include a white dusty coating to leaves and flowers. Infected plants can become stunted. High humidity contributes to powdery mildew problems.

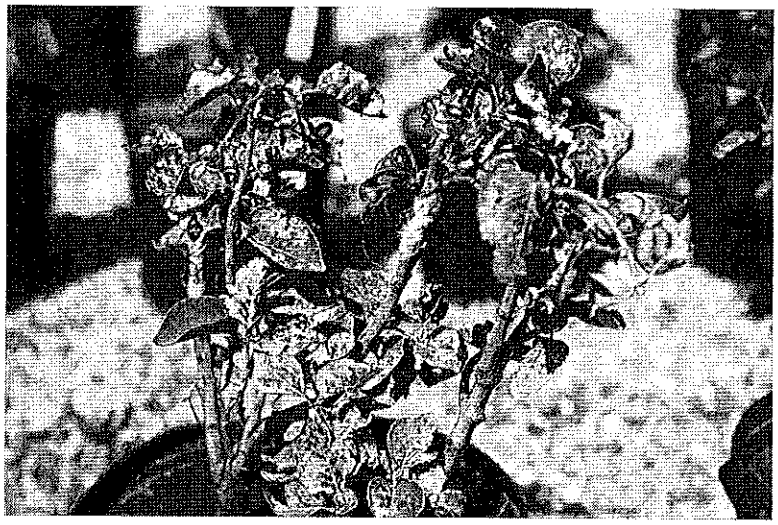


FIGURE 3. Powdery mildew on roses.

Anthracnose is fungal disease of ash, elm, maple, sycamore, and other trees. Sycamore trees are particularly susceptible to anthracnose. The disease appears as small, round, irregular spots that expand to large blotches. Young leaves die and fall. In severe cases, trees can lose all their leaves.

Rusts are fungal diseases of apple, hawthorn, juniper, and other species. Symptoms of rust are bright yellow, orange, orange-red, reddish-brown, dark brown, or black powdery raised pustules on leaves, stems, and fruit. Leaves may wither and die, and plants may be stunted.

Scab is a fungal disease common to crab apples and apples, but other species are also affected. Initially, small light brown to olive-green lesions appear on the undersides of leaves. The spots turn black; the leaves may curl; and if the petioles are infected, the leaves drop.

Leaf spots and blights are caused by fungi and bacteria. Most leaf spot diseases appear as small, scattered, round to oval dead areas.

Cankers

Cankers have a variety of causal agents. A **canker** is a localized dead area in the cambium and bark of a branch or trunk. Cankers may appear sunken, flat, or swollen. They are typically discolored. A canker can enlarge and girdle the stem, resulting in the death of all tissue beyond the infection.

April 13-17 Choice 3

Fireblight is a disease of plants in the rose family, including apple, serviceberry, and mountain-ash. It is caused by a bacterium. Flowers, shoots, and branches may be attacked. Symptoms are leaves that wilt and turn brown, giving the plants a scorched look.

FIGURE 4. The brown leaf is a symptom of fireblight. (Courtesy, Agricultural Research Service, USDA)

Vascular Diseases

Vascular diseases are diseases that attack the xylem and phloem within plant stems.

Verticillium wilt is caused by fungi. It infects elms, maples, magnolia, and hundreds of other species. Leaves on a branch wilt and turn brown, and individual branches die back. The sapwood is discolored and has a dark streaking.

Dutch elm disease is a fungal disease of the American elm tree. Leaves of an infected elm wilt, curl, and turn yellow then brown. Branches die back, and the entire tree can die in a short time. The disease is often carried from infected trees to healthy trees by elm bark beetles.

Root Rots

Root rots are caused mostly by *Pythium, Phytophthora, Rhizoctonia,* and *Fusarium* fungi. When plant roots and stems rot, plant growth becomes stunted, and the plant wilts easily. Root rots are most common with annuals and perennials.

DISEASE CONTROL METHODS

Landscapers have a number of different disease control methods at their disposal.

FURTHER EXPLORATION...

ONLINE CONNECTION:
The Asian Longhorn Beetle and the Emerald Ash Borer

Two insect pests introduced to the United States in recent years, the Asian longhorn beetle and the emerald ash borer, have caused the death of millions of trees. As they spread across the country, they will cause the death of millions more.

Research the Internet for information about these insects. Research their place of origin and the time they are believed to have arrived. Find out about the damage they cause and the plant species they affect. Describe their appearance, their life cycles, and their feeding patterns. Also, investigate management programs to keep them in check. Report your findings to the class.

April 13-17 Choice 3

Landscapers should select and plant disease-resistant varieties of trees and shrubs. By doing so, they can reduce problems in the landscape caused by diseases.

Landscapers should select plant materials adapted to the soil type and environmental conditions at a given site.

Landscapers should care for landscape plants. Watering practices and fertilizing can reduce plant stress that makes plants more susceptible to pest problems. Mulching reduces competition from weeds, keeps the soil moisture uniform, and helps prevent damage to the trunks of trees by lawnmowers and string trimmers.

Landscapers should monitor the landscape plants for disease and insect problems. Early diagnosis of problems can lead to treatments that reduce damage and loss.

Dead and diseased limbs should be removed from trees. Proper pruning can increase light penetration to the foliage and inhibit disease development. It can also improve air circulation around shrubs and reduce plant diseases.

Chemical pesticides can be applied as preventive measures to manage existing pests.

WEED CONTROL

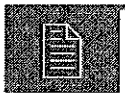
A **weed** is any plant growing out of place or any unwanted plant. Weeds generally grow faster than desirable landscape plants because of a difference in their rate of photosynthesis. Weeds can destroy the beauty of the landscape and rob water and necessary nutrients from landscape plants.

Weed growth can be reduced by mulching the planting beds. **Mulching** is the application of organic materials, such as wood chips, or inorganic materials on the surface of the soil. Landscape fabric, which consists of woven plastic sheets, can be placed under mulch to inhibit weed growth. Landscape fabric allows moisture and air to enter the soil but does not allow plants to grow through it.

Weeds can be controlled by hand pulling or hoeing. This is a very low cost and effective control method. However, it is very labor intensive.

Herbicide applications involve the use of chemical pesticides that prevent weed germination or kill actively growing weeds. Herbicides can be divided into several major groups, depending on how and when they kill weeds. **Preemergent herbicides** are applied before weed seeds germinate and stop or prevent the germination process. **Postemergent herbicides** kill actively growing weeds. These chemicals require careful application to prevent the killing of desirable plants.

Summary:



Insects and diseases can severely injure or kill landscape plants. Insect pests are classified as defoliators, sap-feeding insects, and wood-destroying insects. Turfgrass pests include root feeders and grass blade feeders. Mites are tiny organisms related to spiders that suck sap from the leaves of plants.

April 13-17 Choice 3

Diseases affect roots, leaves, stems, and flowers of landscape plants. Fungi, bacteria, and viruses cause infectious diseases. Diseases are classified as leaf diseases, cankers, vascular diseases, and root rots.

Landscapers should select disease-resistant plant varieties and materials adapted to a given site. They should water, fertilize, and mulch plants. Landscapers should monitor the landscape plants for disease and insect problems. Dead and diseased limbs should be removed from trees and shrubs. Chemical pesticides can be applied as preventive measures to manage existing pests.

A weed is any plant growing out of place. Weed growth can be controlled by mulching, by hand pulling or hoeing, and with chemical pesticides.

Checking Your Knowledge:

1. What are three classifications of insect pests in the landscape?
2. How do mites damage landscape plants?
3. What are four classifications of diseases in the landscape?
4. What can landscapers do to limit pest problems in the landscape?
5. How can weeds be controlled?

Expanding Your Knowledge:

Scout your neighborhood for insect pests and diseases. Keep a list of the plants on which problems found. Identify the insects and diseases with the help of reference materials and the Internet. How would you rate the severity of the problems, and would you recommend a control?

Web Links:

Scout for Pests on the Landscape
http://www.thisland.uiuc.edu/57ways/57ways_9.html

Landscape & Turf
http://www.ipm.uiuc.edu/landturf/

Landscape Insects
http://www.uky.edu/Ag/Entomology/entfacts/eftrees.htm

Control of Common Pests of Landscape Plants
http://pubs.caes.uga.edu/caespubs/pubcd/B1074.htm

Agricultural Career Profiles
http://www.mycaert.com/career-profiles

Choice 3

BSAA Mr. Coon April 13 Name

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