



Unit E: Basic Principles of Soil Science

Lesson 3: Understanding Soil Color

Important Terms

- ◆ Bright-colored
- ◆ Color
- ◆ Deciduous
hardwood forest
- ◆ Dull-colored
- ◆ Humus
- ◆ Mottle-colored
- ◆ Native vegetation
- ◆ Structure
- ◆ Tall prairie grass
- ◆ Texture

What are physical features used to differentiate between soils?

- ◆ Soils have many features that are used to recognize differences between them. They include:
 - Texture coarseness or fineness of soil particles
 - Structure the way in which soil particles are held together
 - Depth of horizons the depth of each soil
 - Color refers to the darkness or lightness of the soil color

What are the colors used to describe surface soils?

- ◆ Colors associated with surface soils are dependent on the amount of organic matter found in them.
- ◆ Colors may be classified as:
 - Very Dark: approximately 5% organic matter
 - Dark approximately 3.5% organic matter
 - Moderately dark approximately 2.5% organic matter
 - Light approximately 2% organic matter
 - Very light approximately 1.5% organic matter

ORGANIC MATTER		COLOR
Average	Range	(moist soil)

5%

3½ to 7%



3½%

2½ to 4%



2½%

2 to 3%



2%

1½ to 2½%



1½%

1 to 2%



(Strong sunlight may eventually cause these colors to fade slightly.)

What factors determine the color of surface soils?

- ◆ The amount of organic matter is the factor used to determine the color of the surface soil.
- ◆ The amount of organic matter is determined by the kind of native vegetation.
- ◆ Native vegetation refers to the type of plant material that grew on the soil.

Types of native vegetation

- ◆ Tall prairie grass grasses had abundant roots, which filled the top .3 to .6 meters of the soil.
 - Only partial decay of the roots over a long period of time gave the high organic matter content to prairie soils.
 - These soils are high in humus, a type of organic matter that results from the partial decay of plants and animals.
 - They tend to be dark to very dark.

Types of native vegetation

- ◆ Deciduous hardwood forests a shallow layer of partially decayed leaves, twigs, and fallen logs accumulated on the surface.
 - Because they were on the surface, they decayed more rapidly than those of the prairie grass.
 - This left only a thin, moderately dark top layer.
 - As these soils have been worked, they have been mixed with the lighter soil underneath to produce a lighter color.

What colors are used to describe subsoil?

- ◆ Subsoil colors are associated with natural drainage of the soils.
- ◆ This is the drainage condition that existed when the soil was forming.
- ◆ Subsoil colors are classified as:
 - Bright-colored brown, reddish brown, or yellowish brown
 - Dull-colored gray or olive gray
 - Mottle-colored clumps of both bright and dull colors mixed together

What factors determine the color of subsoil?

- ◆ The color of subsoil is determined by the status of iron compounds.
- ◆ These are determined by the type of drainage found in the soil as it formed.

What factors determine the color of subsoil?

- ◆ Good drainage provides subsoil that is bright in color.
- ◆ This is because the iron found in these soils has been oxidized.
- ◆ This can be compared to metal that oxidizes or rusts when both moisture and air are present.
- ◆ Rust has a bright or orange color.

What factors determine the color of subsoil?

- ◆ Poor drainage provides subsoil that is dull or gray in color.
- ◆ This is because the iron found in those soils has not been subject to air or oxygen.
- ◆ The iron compounds do not oxidize.
- ◆ This leaves a grayish color.

What factors determine the color of subsoil?

- ◆ Somewhat poor drainage provides subsoils that are mottled.
- ◆ This is because the soil was saturated with moisture for certain periods.
- ◆ This leaves a gray color in some soil clumps.
- ◆ Since the soil was comparatively dry during other periods, it left a bright color in other soil clumps.

How do parent material, age, and slope affect the color of soil?

◆ In addition to organic matter and drainage, soil color may also be affected by other factors:

- parent material
- age
- slope

How do parent material, age, and slope affect the color of soil?

Parent Material

- ◆ The color of a soil is associated with the kind of material from which it is formed.
- ◆ Soils that are developed from sand or light-colored rock will be lighter.
- ◆ Those developed from darker materials such as peat or muck, will be darker in color.

How do parent material, age, and slope affect the color of soil?

Age

- ◆ As soils age, much of the darker color is lost due to the weathering process.
- ◆ This causes the soil to lose organic matter.

How do parent material, age, and slope affect the color of soil?

Slope

- ◆ Soil on top of hills is usually lighter in color than the soil in depressions or on level ground.
- ◆ This is partly due to the darker topsoil being washed off the hills.
- ◆ This leaves the lighter subsurface or subsoil exposed.

Slope

- ◆ Also, there tends to be moisture on lower land.
- ◆ This allows more abundant growth of plants in the lower areas, which in turn provides more organic matter and a darker color to lower soils

Summary / Review

- ◆ Identify physical features used to differentiate soils.
- ◆ Identify colors used to describe surface soils.
- ◆ Explain factors that determine surface soil colors.
- ◆ Identify colors used to describe subsoil.
- ◆ Explain factors that determine subsoil colors.
- ◆ Explain how parent material, age, and slope affect soil color.