Dealing with Utah Soils

Soil is made up of

- Weathered, crumbled rock 45%
- Air spaces 25%
- Water 25%
- Organic matter, average soil 5%
- Organic matter, Utah soil <1%
- Most soils contain microorganisms.

Most Utah soil is desert soil and of quite poor quality.

- High alkalinity (not enough rain to leach out salts)
- Low organic matter (not enough plants to decay in soil)
- No structure – no aggregates.
- Little loam soil - mostly clay or sand

Soil Structure

Soil structure refers to the arrangement of soil particles.

Good soil forms aggregates, in which mineral particles and organic matter are held together in tiny clumps that have air spaces between them.

Good soil structure

Good loam soil has aggregates.

Water clings to the aggregates, which allows it to store moisture for the plants.

Water drains through the spaces and allows air content in the soil, which is needed for root growth and health.

Poor soil structure

Poor soil doesn't have aggregates.

Sandy soil has large particles with air spaces, but doesn't have the organic content to form aggregates and hold water.

Clay soil has tiny particles that pack together so closely that it doesn't make aggregates; it doesn't drain well or let air in.

Soil Texture

Soil texture refers to the size of the soil particles.

Sandy soil has large particles.
Loam soil has medium sized particles.
Clay soil has tiny particles.

Sandy soil

- A damp handful falls apart when squeezed.
- Large grains
- Water runs thru it
- It dries out fast
- It doesn't hold fertilizer well

Loam soil

- A damp handful comes apart a little when poked.
- Aggregates hold loosely together with air spaces in between.
- Holds water well
- Water drains from air spaces.

Clay soil

- A damp handful stays in a lump when squeezed.
- It makes a smooth smear.
- Doesn't drain well
- Forms a crust when watered.
- Forms clods if dug when wet.

Find ratio of clay, loam, sand

- Fill a glass jar 2/3 with water
- Add 1/3 jar of soil
- Shake thoroughly
- Let settle 4 hours
- Bottom layer is sand, middle is loam, top is clay

Soil Alkalinity

The alkalinity or acidity of soil is measured by the pH scale, which goes from 0 to 14.

0-1-2-3-4-5-6-7-8-9-10-11-12-13-14

Very acid is 0, neutral is 7, and very alkaline is 14.

The scale is logarithmic, so pH 8 is ten times more alkaline than pH 7, and pH 7 is ten times more alkaline than pH 6.

Acid-loving plants

- Most acid-loving plants prefer pH 4.5 to 5.5.
- Examples are azaleas, camellias, blueberries, and rhododendrons.
- They do poorly with alkaline soil and water.

Most garden plants

- Most garden plants prefer pH 5.5 to 7.
- Examples are beans, tomatoes, and strawberries.
- Some plants will tolerate a wide pH range.

Alkaline-tolerant plants

- Alkaline-tolerant plants can take a pH of up to 8.
- Examples are bridal wreath, yucca, and honeysuckle.
- Most Wasatch front soil is 7.5 to 8.

Improving Soil

It is very difficult to find good topsoil in Utah because it doesn't really form here.

It usually works better to improve the soil you already have than to buy new topsoil.

Improve soil texture and structure by adding organic matter and gypsum.

Soil can be made less alkaline by adding organic matter and sulfur, and using special fertilizer for acid-loving plants.

Adding organic matter

- Add 2” to 4” to garden soil every year, and dig it in.
- Mulch around bushes and perennials.
- Try not to walk on improved soil; that compacts it.

Benefits of organic matter

It separates clay particles and helps form aggregates, so the soil drains better.

It holds sand particles together and helps form aggregates, so the soil holds water better.

It makes soil softer, more crumbly, and easier for roots to push through.

It contains nutrients for plant growth.

A soil test is recommended

- Get test kit from County Extension, 51 S. Univ. Ave.
- Plastic bag and cardboard mailer
- Take several soil samples from your yard, mix them.
- Send to USU

The report will tell you

- Your soil type
- The alkalinity level
- The soil nutrient levels (NPK)
- The soil nutrients you need
- The amount of fertilizer you should use.

Organic soil amendments - fresh plant material

- Takes nitrogen from soil so must add nitrogen fertlizer.
- Examples:
- dry grass clippings
- pine needles
- shredded leaves
- Sawdust
- kitchen scraps

Organic soil amendments - compost

- plant compost is acidic
- composted bark
- Composted green plants
- Composted manure is alkaline
- poultry manure
- Steer manure

Organic soil amendments – peat moss

- is acid
- sheds water when very dry
- absorbs warm water more easily than cold
- holds water and nutrients

Organic soil amendments – cover crop

Is grown for the purpose of tilling under before it is mature, and letting it decompose in place.

Is usually used on farms, not small garden plots.

Examples: ryegrass
bitter vetch
common vetch

Inorganic soil additives - vermiculite

- Expanded mica
- Very light
- Internal pore spaces hold water
- Holds fertilizer
- Holds air spaces in the soil

Inorganic soil additives - perlite

- Expanded silica
- Very light
- Holds water on its surface
- Does not hold fertilizer
- Holds air spaces in the soil

Inorganic soil additives - utelite

- Expanded shale
- Lighter weight than soil
- Holds water and nutrients
- Does not decompose
- Holds air spaces open

Inorganic soil additives - sand

- Use only a very coarse grade such as poultry grit – not play sand.
- Fine sand can turn soil into low grade cement.
- Opens up clay soil.
- Is usually added in conjuction with organic material.

Inorganic soil additives - gypsum

- From natural deposits
- Is part of glue that holds aggregates together
- Improves soil structure to hold air and water

Inorganic soil additives - sulfur

- From natural deposits
- Acidifies the soil
- Takes 6 to 8 weeks to take effect

Inorganic soil additives - lime

- From natural deposits
- Increases alkalinity in the soil
- Is used in artificial soils to balance the acidity of peat moss

Understanding and improving your soil will greatly help the plants in your garden.