

Walden Landscape Notes: Soil - Foundation of Successful Gardening

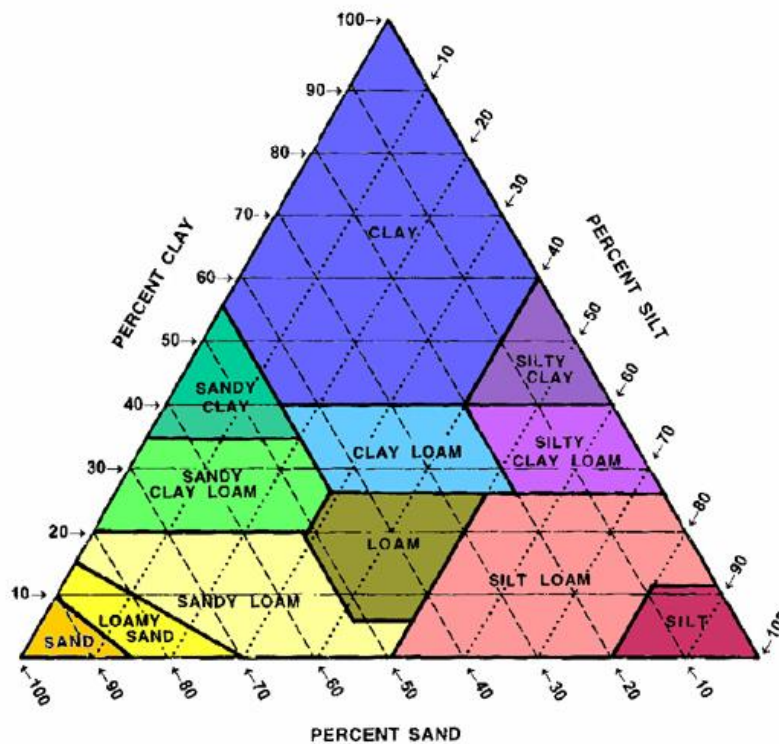
Hello Walden Homeowners. Ever want to get the Dirt on, well Dirt. In the 3rd class given by Colorado State University we talked about Dirt, or as they call it, Soil. You know this stuff. We track it into our homes, it is present in the air, and most important, our plants and grasses live and grow in it. What we will cover here are ways to improve your soil, which will make your landscaping healthier, and help ward off diseases and some pesky insects.

Our Environment

Our homes were built in a semi-arid, desert like, soil base. Yet there are some very simple things we can do to help improve its content, and conserve water. Also, most of the Colorado Front Range experiences the same type of soil structure as Walden, so when water does fall from the sky it is important that the soil is well prepared to welcome it and put it to good use. Our goal is to have a healthy, beautiful landscape system, and use what little moisture Mother Nature gives us efficiently.

What is our Soil made up of?

Soil is basically made up 47% Mineral, 3% Organic Matter, 25% Air, and 25% water. But when we look into it deeper, soil has a texture. Texture refers to the size of the particles that make up the soil, and is made up of (3) components; Clay, Sand, and Silt. The Soil Texture Triangle below shows the various combinations that can make up a typical handful of dirt.



Soil Textural Triangle - Based on the triangle, a loamy soil has 40% sand, 20% clay and 4% silt. Whereas a sandy loam has 60% sand, 10% clay and 30% silt. [Source: U.S.D.A.]

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So this leads us to a new word called 'Tilth'. Tilth is the physical condition of soil, especially in relation to its suitability for growing a crop, plant or lawn. Factors that determine tilth include the formation and stability of aggregated soil particles, degree of aeration, rate of moisture, and drainage. The tilth of a soil can change rapidly when there are frequent changes in moisture.

Soil is also a living organism. It supports good bugs, bacteria and fungi, along with a friend of ours, earthworms. Earthworms are important to plant health by aerating, increasing soil structure, fertility, and water holding capability. So instead of taking our worm friend out fishing, leave him in the ground where it will provide you a greater benefit.

Other things one can do that will benefit the soil is by adding organic matter. Watering effectively needs no explanation as does minimizing soil compaction by aerating in the spring and fall. But go to a regular nursery to find out more about your soil. There a person will ask you questions, so it is best to take a sample of the area you want to address along with you. They may want to send it out for analysis, which will have a fee associated for that service.

Another approach you can take is by sending a sample of your soil to Colorado State University for analysis. These people are the real experts. They will provide you with a detailed report on your soil condition, and recommendations on how to treat it. Then you can go to any nursery and get what you need. Places like Lowes and Home Depot are great for plants, trees, flowers, and fertilizer, but may not be good for soil analysis. More details on how to get your soil tested can be found in the closing comments section of this Landscape Note.

Remember, a soil test is the best way to check the growing potential of the soil in your area. It's like taking your dirt to the doctor. You can buy the best plants, trees, flowers, sod, or lawn seed, but they will not produce the best results if the soil lacks the proper nutrition or qualities. Poor soil conditions are 80% of a plants problem.

Nurturing your Soil using Amendments

Once you have you soil test results in hand it is now time to look at soil amendments. Soil amendments are to soil like a fiber diet is to a human, but it is not a fertilizer. Depending on your soil texture, amendments can improve aeration and drainage in clay based soils, improve water and nutrient retention in sand based soils, and increase the activity level of earthworms and other soil organisms.

Defined, a soil amendment is any material added to a soil to improve its physical properties. Its goal is to provide a better environment for root development and structure. The key word in the first sentence is "added". This can be done in one of two ways. For new areas (like an area you plan to grow grass in), mix your amendment into the soil as thoroughly as possible. If you have a small tiller like a Mantis, that will do the job. An easier way is to aerate your soil and then add your amendment. Now you can introduce your plant, sod, or seed and achieve maximum results.

Wood products like Bark Mulch or chips can tie up Nitrogen until they decompose. So if you are fertilizing a flower bed where mulch is present, water the amendment in thoroughly so the nourishment

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gets to the root structure of your plant, and does not get tied up in the mulch.

Sphagnum Peat Moss is an excellent soil amendment, especially for sandy soils. Peat will help a sandy soil retain more water. After application, peat needs to be worked into the soil thoroughly. That is why peat is great for vegetable gardens and landscaping.

The jury is still out on Biosolids which are a byproduct of sewerage treatment. Even though some cities may give it away or sell it cheaply. I do not recommend this approach because Biosolids are high in salt content and also contain heavy metal and pathogens. There are better and safer solutions out there.

Fresh manure is high in ammonia content so avoid it. If you are going to use manure, make sure it has been aged or composted for 6-months. Also I do not recommend manure use in vegetable gardens because it carries a pathogen called E. coli. We all know about the results E. coli has on humans.

One other note before I move on. A common myth to break up clay soils is to add sand. The answer to that is a resounding NO! Why? If you are making adobe bricks, what are the two main ingredients you will use? The answer is Sand and Clay. So if you are adding sand to a clay soil, you are making adobe bricks underground. Think about what your plant root would do if they came upon this underground brick. This brick would stop root penetration, retain water, and cause decay in the root structure.

There are many more recommendations on Soil Amendments in the Fact Sheet from Colorado State University, so I will give you the web address and fact sheet numbers in the closing comments of this Landscape Note. Remember, do not overdo soil amendments. Less is much better than more.

Mulches and Fertilizers

Besides making your landscape look pretty, mulches play an important role in taking care of your soil. 1.) It keeps the soil cool which reduces evaporation, thus you retain more moisture. 2.) It protects the soil from the harsh realities of the sun or snow. 3.) It allows the soil to breathe. 4.) It reduces soil compaction through the decomposition of the mulch. But let's be clear that mulch should not be used as a soil amendment. If nutrition is what your plant wants, that comes in the form of fertilizer.

A fertilizer is defined as what we provide for plant nutrition. Air and water provide carbon, hydrogen and oxygen. The soil provides primary and secondary micronutrients. And the fertilizer provides the Nitrogen, Potassium, and Phosphorus.

A plant cannot tell you what it wants, so like a Mom you have to provide it food. Nice thing is that plants are not fussy eaters. Today's lawn fertilizers have a strong nitrogen base which provides a faster feeding (days to weeks), but avoid putting it on plants. Use a plant/shrub fertilizer to feed them.

By combining today's fertilizer with an Organic amendment approach, you will create a faster "green up" with a longer, slower sustained feeding period. Organic amendments are a more natural approach and can feed over a period of months to years. Plus you may not need a faster green up in the years to follow thus saving you some "green" in your pocket. Just make sure you know what areas you applied Organic Amendments so you don't overdo things. Remember, less is better.

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Also, Organic Amendments increase soil organic matter content and offer many benefits over time. It will improve soil aeration, water infiltration, and both water and nutrient holding capacity. Organic matter contains plant nutrients and acts as an Organic Fertilizer, plus it is an important energy source for bacteria, fungi, and earthworms that live in the soil.

Closing Comments

Resource Information

Below you will find Colorado State University website information so you may access some Fact Sheets and Gardening Notes that pertain to the subject we are covering here. Once you get to the website, type in the Fact Sheet number and it will take you to a Fact Sheet you can download to a PDF format and save or print.

Fact Sheet website: WWW.ext.colostate.edu

Fact Sheet 7.212 – Composting Yard Waste

Fact Sheet 7.214 – Mulches for the Home Ground

Fact Sheet 7.235 – Choosing Soil Amendments

Fact Sheet 7.236 – Landscaping on Expansive Soils

Fact Sheet 7.246 – How to Submit a Soil Sample

Garden Notes website: WWW.cmg.colostate.edu/gardennotes

Garden Notes #214 – Estimating Soil Texture

Garden Notes #218 – Earthworms

Garden Notes #222 – Soil PH

Garden Notes #231 – Plant Nutrition

Garden Notes #233 – Calculating Fertilizer Application Rates

Garden Notes #234 – Organic Fertilizers

Garden Notes #246 – Making Compost

Garden Notes #711 – Vegetable Garden: Soil Management and Fertilization

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Getting you Soil Tested by Colorado State University

- 1.) First print out Pages 6, 7, and 8 of these Landscape Notes. You will find suggested Instructions for submitting soil samples.
- 2.) Next, collect your soil sample. Steps 1, 2, 3, and 4 will guide you through the process.
- 3.) Step 5 and 6 tells you to put your soil sample in a CSU container or a zip lock bag if you do not have a CSU container. Put the date of the sample, your name, address, phone number, and sample ID on a label and attach it to your sample. You may use Front Yard, Garden, Back Yard, etc. as your sample ID name. Repeat this process if more than one sample is being submitted.
- 4.) Step 7 tells you to fill out the forms you printed as completely as possible. If you do not know the answer, leave the space blank. The wrong answer can skew your results.
- 5.) Step 8 gives you two mailing addresses. One if you use standard mail, and the other if you use UPS or Fed X. Make sure you use the correct address or else your sample could get routed incorrectly.
- 6.) Step 9 is guidance on how to treat your sample before mailing. Do not submit a sample that has already been treated by fertilizer or other organic material. The analysis done by Colorado State needs to be done on untreated soil so the results will be an accurate profile on what action needs to be taken.
- 7.) In step 10 you pay your fee. You will select **Routine Garden and Landscape soil test**. The fee will be \$31.00 for the analysis. Colorado State will bill you if you wish, but since this is your 1st soil test submission, I recommend you send a check payable Colorado State University.
- 8.) Step 11 tells you what the analysis will not include.
- 9.) Step 12 is a number and website you can contact with any questions, or to find out the status of your sample.
- 10.) I recommend you share your results with your neighbors since their soil should be just like yours. They (neighbors) may also share part of the soil analysis expense with you.
- 11.) Keep in mind that a Soil Test is like taking a section of your yard to the doctor. By following the doctors' orders, you will get the best results for the soil and plants that live on your property.
- 12.) If you have any questions, please feel free to give me (Denny LaBandt) a call at 719-358-7858 and I will be happy to guide you through the process.

SUGGESTED INSTRUCTIONS FOR SUBMITTING SOIL SAMPLES

Taking a good soil sample is vital to obtaining useful laboratory results.

Please use the following steps to submit soil samples:

1. A soil sample may be taken at any time of the year, although spring and fall are usually the most convenient times. Avoid soil sampling within 30 days of an application of nitrogen fertilizer, compost or manure.
2. A soil sample should represent a uniform area consisting of land that is similar in slope, drainage, texture, or other characteristics that make the soil the same. Submit a separate sample for each area that receives different fertilizer, amendments and/or soil management treatments. For example, garden areas are managed differently from lawns, so the garden should be sampled separately from the lawn. Different garden beds, or different yard areas, that receive differing amounts of fertilizers, soil amendments or irrigation should also be sampled separately.
3. Use a clean, rust-free trowel, spade, soil tube or soil auger to collect your soil sample. Each sample should be a composite of 5 to 15 samples (depending on the size of the area) collected randomly throughout the chosen area. Collect these samples to a depth of 6 inches, and combine them in a clean plastic container. Try to dig straight down, rather than at an angle, so that equal amounts of soil are collected at each depth increment. Try to collect about the same amount of soil from each sampling area.
4. Mix the samples together thoroughly, removing plant debris and breaking up clods. Remove about 2 cups of soil and, if possible, air-dry it by spreading it out on paper towels. (Do not oven-dry soil samples.) We will accept moist samples if air drying isn't possible.
5. Place the soil sample into the CSU soil container (preferred), or a zipper-seal plastic bag. Seal the container and label the sample with name, address and location of the sample (for example "Vegetable Garden", "Lawn1", "Lawn2", etc.).
6. If multiple samples are being submitted for analysis, including a map of your sampling procedure would be helpful in interpreting the laboratory analyses.
7. Complete the soil sample information form as completely as possible and include it with the soil sample(s). Use a separate form for samples coming from different types of areas (e.g. lawn, vegetable garden, flower bed, etc.)
8. Mail sample(s) to the lab using the following address:
Soil, Water and Plant Testing Laboratory
Colorado State University
Room A 319 NESB
Fort Collins CO 80523-1120
For submittal by UPS/FedEx, please use:
Soil, Water and Plant Testing Laboratory
Colorado State University
200 West Lake Street
Fort Collins CO 80523-1120
9. Please keep samples cool before mailing. If samples heat up, the nitrogen readings can change dramatically. Keeping samples in the shade will help prevent excess heating.
10. You may pay in advance by including a check made out to CSU with your soil samples, or, we can bill you. If an invoice is required for an individual (rather than a business) you will need to provide all the information requested on the front side of the form. We accept either MasterCard or Visa.
11. The lab DOES NOT do herbicide or pesticide analyses.
12. If you have additional questions, please contact the lab at: (970) 491-5061, or your local county Cooperative Extension Agent (www.ext.colostate.edu , click on "County Offices").

COMMENTS:

1. The objective of the CSU soil testing lab is to provide you with suggestions that improve soil health while producing healthy garden and landscape plants.
2. Different laboratories do not always use the same soil test procedures, so the numbers from different labs will not necessarily match, nor will a numerical value obtained from one lab necessarily have the same interpretation as that same number from another lab. However, recommendations from different labs for a given soil sample will be essentially the same.
3. Your soil test results may indicate that the soil properties analyzed are normal and not a cause for problems you may have observed in your garden or landscape. Other causes for observed problems may be soil compaction, over- or under-watering, poor soil drainage, diseases, insects, weed competition, too much shade, poor plant varieties, or basic neglect.

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SOIL, WATER & PLANT TESTING LABORATORY
NESB Room A319, Colorado State University
Fort Collins CO 80523-1120
970-491-5061
www.soiltestinglab.colostate.edu

DATE: _____ Number of samples _____		CLIENT TYPE (Check one)	
Sample ID(s) _____		<input type="checkbox"/> Homeowner	<input type="checkbox"/> Operator
FULL NAME: _____		<input type="checkbox"/> Golf Course	<input type="checkbox"/> Nursery/Garden Center
ADDRESS: _____		<input type="checkbox"/> Lawn Care Co.	<input type="checkbox"/> Dealer/Distributor
City _____ State _____ Zip Code _____		<input type="checkbox"/> Consultant	<input type="checkbox"/> Regulatory Agency
PHONE # _____		<input type="checkbox"/> Extension Agent	<input type="checkbox"/> Government/School
E-mail Address _____		<input type="checkbox"/> Other _____	
		County sample is from _____	

Where did you hear about us? _____

By accepting service or goods, I agree to submit payment in full to Colorado State University upon receipt of invoice or University Billing Statement. Late Payment charges of 1.5% per month and other penalties may be assessed for late payment.

The following information will help us give you a better written explanation of the laboratory results. If submitting soil samples from different use areas (e.g. lawn, vegetable garden, flower bed), use a separate form for each area.

PLEASE CHECK ALL THAT APPLY (See page 3 for sampling instructions)

1. The soil sample is from:

☐ Lawn ☐ Vegetable Garden ☐ Flower bed ☐ Container plantings ☐ Golf Course
☐ Greenhouse ☐ Reclamation Site ☐ Other _____

2. What is currently growing on the site? For how long? _____ yrs

☐ Vegetables ☐ Flowers ☐ Turfgrass ☐ Trees ☐ Other _____

3. What do you plan to grow at the site?

☐ Vegetables ☐ Flowers ☐ Turfgrass ☐ Trees ☐ Other _____

If you are growing turf: Is this a new site to be ☐ seeded or ☐ sodded? What grass species/variety will you use? _____

Is it an existing lawn? _____ If so, how old is the lawn? _____ What type of grass? _____

4. Will this site be irrigated/watered? ☐ Yes ☐ No

If yes, which method? ☐ Sprinkler ☐ Flood ☐ Drip ☐ Other (please specify) _____

How often do you irrigate/water? ☐ Daily ☐ Once per week ☐ Twice per week

☐ Other _____

How much water do you add with each irrigation? _____

5. If possible, list the types of previous crops or plants that grew on this site: _____

6. What fertilizers or amendments (e.g. compost, manure) have you added to the soil, how much did you apply, and how long ago did you apply it? _____

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Please list specific fertilizers or amendments that you plan to add to the soil

8. Is there a specific problem with this site? ☐ No ☐ Yes

If yes, please describe the problem, what caused the problem, and why you think it was the cause.

9. If you wish to have a fertilizer recommendation based on organic fertilizers, please answer the following questions.

What is the type of material that will be used for organic fertilizer? _____

Do you know the nutrient levels in the organic fertilizer? ☐ No ☐ Yes

If yes, please supply the following information: % nitrogen _____ % phosphorus _____ % potassium _____

pH _____ Salts (mmhos/cm) _____

10. In what units do you want to receive our fertilizer recommendation?

_____ Lbs per Acre _____ Lbs per 1000 sq.ft. _____ Lbs per 100 sq.ft. _____ Kg per Hectare

PLEASE CIRCLE ANALYSES REQUESTED

Price per
Sample

Routine Garden and Landscape soil test

(pH, EC, organic matter, nitrate, phosphorus, potassium, zinc, iron, copper
manganese, boron and lime & texture estimates)

(This is a basic evaluation for characterizing the soil fertility status for growing lawns,
gardens and topsoil. Normally this test is sufficient unless a special problem is suspected.)

\$31.00

Routine Manure, Compost and Potting Soil analyses

(pH, EC, organic matter, ammonium, nitrate, phosphorus, potassium, zinc, iron,
copper, manganese, % lime, dry matter, C:N ratio, Total N)

\$40.00

Routine + Texture analysis by hydrometer

(This analysis accurately measures the percent sand, silt, and clay of
the soil to help manage plant growing conditions.)

+ \$13.00

Routine + Sodium Evaluation (SAR)

(Sodium Adsorption Ratio is the ratio of sodium to calcium + magnesium. Some
Colorado soils contain excess sodium. This test determines whether or not chemical
amendments such as gypsum or sulfur will be effective to reclaim the site and
determines the amounts of these materials needed.)

+ \$7.00

Routine + Chromium, Molybdenum, Cadmium, Lead

(In some situations, such as near mining sites or with applications of biosolids
such as sewage sludge, these metals may be found at toxic levels in the soil.)

+ \$10.00

Routine + C/N ratio

(The C/N ratio helps determine the fertilizer N recommendation for a soil that has
had high rates of compost or manure applied to it.)

+ \$27.00

MINIMUM CHARGE

\$14.00

NOTE: A 25% discount coupon for rerun analyses will be included with your test results.
For special issues and problems, a soil specialist is available for an individual phone or
email consultation (approx. 1 hr) at the cost of \$50.00.

Soil, Water & Plant Testing Lab, Campus Delivery 1120 Room A-319 NESB, Fort Collins CO 80523-1120