

Rain Garden Soil Assessment

Information adapted from Rutgers University and Colorado State University Cooperative Extension

Rain garden site assessment is very important for a properly functioning rain garden. Below is a check list of what needs to be done prior to choosing a site. Fill in the lines provided with the information required to keep with your records.

1. Infiltration

Percolation rate _____ inch/hour

For instructions on how to perform an infiltration test, refer to Section I

2. Compaction Test

Wire Flag Test _____

For instructions on how to perform compaction test, refer to Section II

3. Soil Texture Test

Texture _____

Identify which method the soil will be tested

- a. Feel Test (Feel, Ball, Ribbon)
- b.. Send out a Sample
- c. Contact a soil scientist

Instructions and information about soil tests, refer to Section III

I Infiltration Test

Materials:

Shovel, Ruler, Water

Methods

1. Dig a hole 12" deep by 6" in diameter.
2. Fill hole with water and let stand until all the water has drained into the ground. This will give you saturated soil conditions. Refill the empty hole with water again. Measure the depth of the water with a ruler. Record depth in the table below.
3. Check the depth of water with a ruler every hour for at least 4 hours. Record depths for each hour in the table below.
4. Calculate the percolation rate (how many inches of water drained per hour).

Time	Depth (inches)
0 hour (before walking away)	
1 st hour	
2 nd hour	
3 rd hour	
4 th hour	
Percolation rate (inches/hour)	

RI DEM infiltration system suitability:

- Minimum soil infiltration rate of 0.5 in/hr.
- Maximum dewatering time 48 hours.
- Sites where soil infiltration rate is 8.5 in/hr or greater, rain gardens cannot be used to treat water volume but can be used as filtering systems with under drain.

Analyzing Percolation Results:

About 1.5 inches of water draining per hour is an indication of good drainage rate for a rain garden. If the drainage rate is less than 1.5 inches per hour, or the water does not drain within 24 hours, the site needs soil amendments, such as coarse sand, topsoil, and/or compost. Sometimes an infiltration test gives you a false reading of the soil conditions of a site. For example, if an infiltration test is done during drought conditions, the water in the soil may drain very quickly. A rainy season may later reveal that the soil is very clayey and that the water will not percolate through. This situation can be corrected by auguring holes in the garden and filling the holes with coarse sand to help with infiltration.

II Soil Compaction

Conduct wire flag test (poke wire flag in ground)
 Easily penetrates 6"-8" or more – Ground is not compacted and suitable for rain garden
 Difficult to insert - Ground may be compacted. Further testing required or find new location.

III Soil Texture

How to Determine Soil Texture

In the field

Soil texture can be estimated in the field by observing its physical characteristics.

- A sandy soil feels gritty and falls apart easily if formed into a ball when moist.
- A loamy soil feels somewhat gritty, yet is easy to work; it has relatively even amounts of sand, silt, and clay; if formed into a ball when moist, it holds its shape, yet still breaks apart easily when squeezed
- A silty soil breaks apart easily and has a floury appearance when dry. When moist, silty soils have a slick feel and form no ribbon when pinched between fingers and thumb.

d. A clayey soil forms large, hard clods and cracks form on the surface. Clayey soils feel sticky and are bendable when moist. A ribbon can be formed when moist by pinching soil between fingers and thumb. A longer ribbon formed before it breaks indicates a higher amount of clay.

Identifying texture by feel

Feel test – Rub some moist soil between fingers

- Sand feels gritty
- Silt feels smooth
- Clays feel sticky



The "feel METHOD" of Soil Testing

test –
of soil



Ball squeeze
Squeeze a moistened ball in the hand

- Coarse textures (sand or sandy loam) soils break with slight pressure

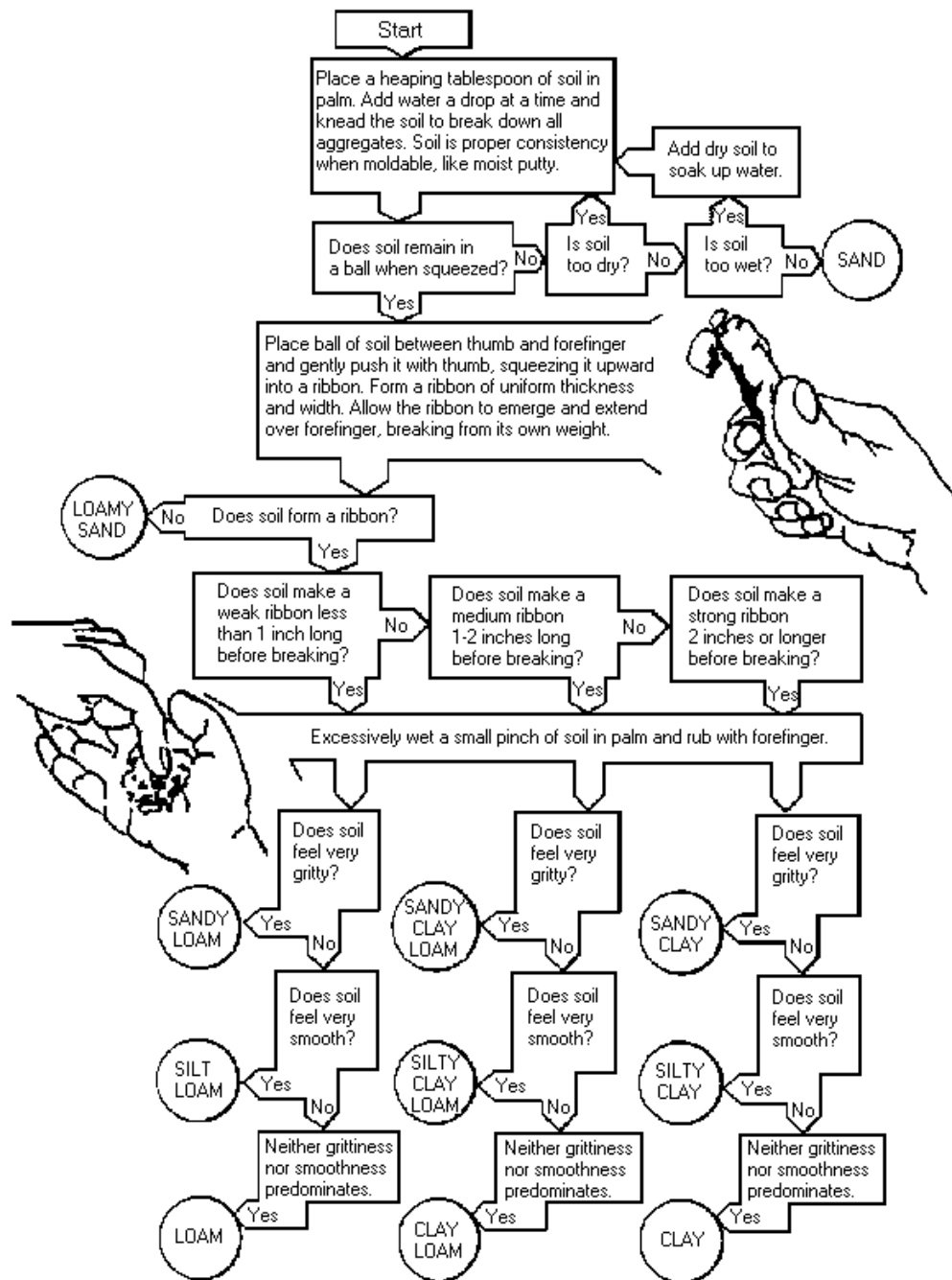
- Sandy loams and silt loams stay together but change shape easily
- Fine textured (clayey or clayey loam) soils resist breaking

Ribbon test – Squeeze a moistened ball of soil out between thumb and fingers

- Sandy or sandy soils won't ribbon
- Loam, silt, silty clay loam or clay loam soil ribbons less than 1 inch
 - Feels gritty = coarse texture (sandy) soil
 - Not gritty feeling = medium texture soil high in silt
- Sandy clay loam, silty clay loam or clay loam ribbons 1 to 2 inches
 - Feels gritty = medium texture soil
 - Not gritty feeling = fine texture soil
- Sandy clay, silty clay, or clay soil ribbons more than 2 inches
 - fine texture (clayey) soil



Note: A soil with as little as 20% clay may behave as a heavy clayey soil. A soil needs 45% to over 60% sand to behave as a sandy soil.



Thien. S. "A flow diagram for teaching texture-by-feel analysis," Journal of Agronomic Education, 1979, vol. 8, pp. 54-55

In the laboratory

The most accurate way involves submitting a sample to a soil testing laboratory for determination of the percentage of sand, silt, and clay by using either the pipette method (most accurate) or the hydrometer method (less accurate but quicker).

Soil Testing Facilities

How Do I Take Soil Samples for Lab Testing?

Collect separate samples from areas with different characterizes (example: shady vs. sunny spot, blueberry patch vs. perennial garden). Using a trowel or spade about 6-12 inches into the ground, take approximately 10 thin, vertical slices of the soil. For small areas, use fewer slices; for large areas, use more slices.



How to prepare soil sample for lab submission

Put slices of soil into a large, clean plastic container or bag and mix like samples thoroughly. Take about one cup of soil mixture and dry it at room temperature (do not dry samples in an oven or on a stove or radiator). Put the dry soil in a sandwich size "zip" type plastic bag and close tightly. Label each sample on the outside of the bag.

How to read the report

Under "Comments" it will indicate Soil Textural Classification. An example would be Sandy Loam. The first texture: Sandy is the adjective describing the primary soil texture, which is the second texture: Loam. Other textures may be Sandy, Clay or Silt.

Contact a Soil Scientist

Go to <http://nesoil.com/ssssne/> and click on "Registry" on the left hand side to find a soil scientist in your area.

Textural Class	Potential Reported Textures
Clay	Sandy Clay Clay Silty Clay
Loam	Sandy Clay Loam Clay Loam Silty Clay Loam Sandy Loam Loam Silt Loam
Sand	Sand Loamy Sand
Silt	Silt