

Soils and Fertilizers

1. Define soil.
 - a. the minerals which form the soil texture (clay, silt and sand)
 - b. the entire complex of soil textures + soil life (organic matter) + air + water
2. Explain why good soil structure is important to gardeners.
 - a. for good tilth which includes porosity, permeability, ease of cultivation, holding capacity, soil aeration, root penetration.
3. Mark each of the following statements as True (T) or False (F). *
 - F Clay loam soil is unable to hold enough water for good plant growth.
 - T Clay loam soil remains cool and wet late into the spring.
 - T Clay loam soil stays warm late into the fall.
 - T Clay loam soil needs drainage improvement.
 - T Clay loam soil takes more lime to correct an acidity problem than would a sandy loam.
4. What is the function of soil in relationship with plants?

Soil is the medium that holds nutrients, air and water for plant growth and provides for their physical support.
5. The three soil textures are clay, silt and sand. Fill in the blanks.

sand is gritty and will not form a ribbon.
clay has the highest CEC and forms long ribbons.
silt is smooth and crusts readily.
6. A house was built on a parcel of land that previously was covered with brush. The land was cleared, and the debris and much of the topsoil were removed from the site. List two soil problems the homeowner is likely to have in this situation. *

Low organic matter
compaction
loss of topsoil
poor soil structure
possibly poor fill material
deficient soil life

What could you recommend to help with these problems? *

Till deeply, add and incorporate good fill material, use compost and cover crops to rebuild soil life, an annual grass also works well here.
7. Soil abounds with life. Why is this life important in a practical way to gardeners?
 - a. recycle nutrients
 - b. aerate and mix
 - c. extend plant root efficiency
 - d. protect from disease
 - e. maintain soil structure (peds) etc.

* You may need to use other chapters, additional reference materials, or your own experience to answer this question fully.

8. Why should you add organic matter to your garden soil?

Improve drainage, water and nutrient capacity, drives the life cycle in soil, adds fertility and tilth, etc.

9. Mark each of the following statements as True (T) or False (F). For true statements, indicate whether the statement identifies an advantage or a disadvantage of using an organic fertilizer.

F Nutrients in most organic fertilizers are quickly available to plants.

T Most organic fertilizers improve the long-term nutrient-holding capacity of soils.

T Using organic fertilizers usually involves recycling materials that otherwise would be discarded.

F Using organic fertilizers increases the risk of nitrogen leaching into the groundwater.

T Organic fertilizers usually have a low soluble nutrient content.

10. A fertilizer label reads 6-10-8. What does this mean?

6% nitrogen

10% phosphorus all soluble

8% potassium

11. What are peds and why are they important in soil structure?

Aggregations of soil particles.

Improve structure by formation of pore spaces.

12. Elements in soil suspension are (pick one):

attached to soil particles

somewhat immobile

readily available to the plants

13. What precautions would you take when using manure?

Ideally compost it first! If using raw, till into soil in the fall. Do not use manure from non-herbivores. Do not use pig, human, cat or dog manure.

14. List three ways that soil pH affects plants.

Availability of nutrients.

Availability of toxic metals.

Activity of soil life.

15. What is a perched water table and why do we care?

It is the "pooling" of water over a dissimilar or very compacted layer of soil. Can cause anaerobic conditions (drown plants).

16. Describe the interaction of soil, plant and soil life.

Soil = mineral elements = nutrient pool

Plants take "building block" nutrients in and return OM to soil.

Roots aerate and exhale CO₂ and nutrients for soil life.

Soil life runs the cycle of OM (nutrients). Affects soil structure. Interacts with plants.

17. How can a gardener increase soil pH? How can he/she decrease it?

Increase - add lime or compost or wood ash (not over 15 lbs/1000 sq ft)

Decrease - add sulfur, N bearing synthetic fertilizer (especially Ammonium sulfate or urea)

18. What is the effect of rototilling garden soil when it is too wet? (Mark the one best answer.)

(a) It destroys soil structure.

(b) It causes soil to warm up slowly.

(c) It adds organic matter to the soil.

(d) All of the above.

19. What is a good temperature range for most soil organisms to be active?

> 50° F

< 85-90° F

20. What exactly is this "Web of Life" we talk about in the soil?

The interaction of all the living elements in the soil to form a dynamic system.

21. What is the difference between raw organic matter, partially decomposed organic matter and humus in how the soil organisms react to it?

Raw OM requires nutrients from soil be used by soil life to start breakdown process. Net fertility loss in short-term.

Partly decomposed OM draws fewer nutrients and releases nutrients back more quickly.

Humus stimulates soil life with no nutrient loss, also known as finished compost so some disease suppression.