

Quiz for Nutrient Management Module No. 8: Soil pH and Organic Matter
1 CEU in nutrient management and 0.5 CEU in soil & water management

1. A solution with a pH of 5 will have how many fold greater concentration of hydrogen ions than a solution with a pH of 9?
 a. 10
 b. 100
 c. 1,000
 d. 10,000

2. What factor causes many soils in Montana and Wyoming to be alkaline?
 a. humid conditions
 b. sandy textured soils
 c. presence of calcium carbonate
 d. parent material high in silica

3. More base cations will be on soil particle exchange sites in
 a. alkaline soils
 b. neutral soils
 c. acid soils
 d. flooded soils

4. Soil pH affects nutrient availability in which of the following ways?
 a. Aluminum and manganese toxicity increases at high pH.
 b. At low pH the base-forming cations (e.g., K^+) may have been lost to leaching.
 c. The metal ions (e.g., Zn^{2+}) are stuck tight and not available in low pH soils.
 d. Nitrate availability is greatly influenced by soil pH.

5. At which of the following pH levels are soluble Zn concentrations expected to be the lowest in soil solution?
 a. < 5
 b. 5-7
 c. > 7
 d. < 5 and > 7

6. Which of the following is a true relationship between crop production and soil pH?
 a. Alfalfa grows best in pH < 6.2.
 b. Potatoes like near neutral soils, but potato scab doesn't thrive at pH < 5.2.
 c. Sugar beets grow well in acidic soils.
 d. Oats and barley grow well in alkaline soils.

7. Which of the following amendments will acidify soils in the long-term?
 a. phosphorus fertilizer
 b. lime material

- c. potassium fertilizer
 - d. ammonium-based fertilizers
8. Soil acidification is becoming a problem in some crop lands. Which of the following is a management option to reverse this trend?
- a. occasional tillage in soils containing calcium carbonate in the subsoil
 - b. heavy fertilization with urea to provide residual nitrate in the soil
 - c. fertilizing with elemental sulfur
 - d. removing crop residue
9. Soil pH tests taken with portable meters in the field
- a. are valid to calculate lime rates
 - b. should be taken the same time of year to follow trends over time
 - c. need to use the Sikora or Woodruff method for our region
 - d. only provide valid measurements in the soil's top 3-inches
10. Which of the following is true about organic matter cycling?
- a. It consistently lowers soil pH.
 - b. The breakdown of organic matter by soil microorganisms releases oxygen and stores soil carbon.
 - c. Humus is the form most resistant to decomposition.
 - d. Dissolved organic matter is the largest portion and serves as the greatest long-term supply of nutrients.
11. The cold dry regions of the northern Great Plains are conducive to
- a. rapid accumulation of SOM
 - b. high soil microbial activity
 - c. rapid release of nutrients
 - d. low build-up of SOM
12. Tillage can increase SOM decomposition rates by
- a. reducing aeration and soil oxygen
 - b. moving limestone closer to the surface
 - c. exposing SOM protected in aggregates to soil oxygen
 - d. decreasing soil moisture levels
13. To increase plant uptake of metals, adding a chelating agent would be most effective in
- a. moist soils
 - b. alkaline soils
 - c. soils rich in organic matter
 - d. tilled soils
14. A cropping practice that contributes to soil carbon sequestration is

- a. reducing farm equipment emissions
- b. conventional tillage
- c. recrop
- d. increasing frequency of summer fallow

15. When collecting samples for a SOM test, duff and visible plants parts should be

- a. included
- b. excluded
- c. ground prior to analysis
- d. tested using a different method