APBI 200 March 13, 2020

Practice exam session #2

GROUP 1

Wood chips and grass clippings are both used as organic amendments in gardening.

Explain how wood chips (with its C/N= 400/1) and grass clippings (with its C/N=20/1) differ in terms of their capability to release plant-available forms of N in the soil.

GROUP 2

A soil has a pH 8.0 (as determined in a 0.01 *M* $CaCl_2$).

a) What can you infer about the extent to which the exchange sites of that soil are occupied by exchangeable aluminum? Explain.

b) What can you infer about the soil's base saturation of that soil? Explain.

c) Explain how base-forming cations contribute to base (or alkaline) soil pH.

[*Hint: 1st define soil pH determined in H_2O, in $CaCl_2$ and what they measure*]

GROUP 3

What soil properties enhance sulfate (SO_4^{2-}) leaching losses from soil? Explain your answer.

GROUP 4

List and briefly describe three important roles of bacteria in the nitrogen cycle.

[Hint: consider input, transformation, and loss]

GROUP 5

(a) What is a chelate?

(b) What types of organic compounds form chelates in soils?

(c) What roles do chelates play in soils? Briefly explain importance of those roles.

GROUP 6

Recently, a soil map of the City of Vancouver (https://vancouversoils.ca/) has been developed and it includes 4 distinct soil management groups. Some of the properties of those 4 soil management groups are shown in Table 1 below.

What can you infer about capabilities of those 4 soil management groups for:

a) Nutrient supply and retention
b) Water retention
c) Drainage (i.e., movement of water through a soil profile)

Table 1. Key properties of the Ah horizons of 4 soil management groups encountered within the City of Vancouver, BC. Type of parent material on which these soil management groups have developed is also provided.

Property	Soil management group			
	Bose-Heron	**Whatcom-Scat**	**Langley-Cloverdale**	**Delta-Tsawwassen**
Textural class	Gravelly loamy sand	Silt loam	Silty clay	Silty clay loam
Soil pH	5.6–6.1	5.4–5.6	5.6–5.9	4.6–5.6
Organic matter (%)	2	7	1	1
CEC ($cmol_c/kg$)	15.3	40.1	30.4	21.5
Parent material	Ablation till & basal till	Glacio-marine	Marine	Alluvium