Notes for Soils Module

Soil Formation

Identify the five factors in soil formation that give soil its characteristics.

1.
2.
3.
4.
5.

Physical Properties of Soil

Define the following physical properties of soil.

Texture:

Soil Structure:

Soil Color:

Soil profile:

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Chemical Properties of Soil

For each of the primary plant nutrients, describe the function they support in the plant.

Nitrogen:

Phosphorus:

Potassium:

Soil Fertility

Define the Cation Exchange Capacity.

Organic Matter

How does organic matter improve sandy soils?

How does organic matter improve clay soils?

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Acidity

Define soil pH.

How does soil pH influence plant growth?

Soil Sampling

This is an example of how to calculate lime and fertilizer application rates based on the soil test result from the manual for B. A. Gardener.

We will assume B.A. Gardener's vegetable garden is 10 ft x 15 ft. To find the square footage of his garden, you multiply the width and length.

10x15= 150 ft²

B.A. Gardener's soil test result recommends adding 13.6 lbs of lime per 100 ft². His garden is 150 ft². How much lime should he apply? There are two ways to solve this problem.

Since B.A. Gardener's garden is 150 ft², we can divide 13.6 lbs of lime per 100 ft² in half.

$$\frac{13.6 \text{ lbs of lime per } 100 \text{ ft}^2}{2} = 6.8 \text{ lbs of lime per } 50 \text{ ft}^2$$

This will give us the amount of lime to apply to 50 ft². We can then add that amount to the rate at 100 ft².

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6.8 lbs of lime per 50 ft^2

\+ 13.6 lbs of lime per 100 ft^2

20.4 lbs of lime per 150 ft^2

B.A. Gardener should apply 20.4 lbs of lime to his 150 ft^2 vegetable bed.

We can also calculate the rate using algebra. This is helpful when the square footage is a number that is not as easily divided.

(13.6 lbs lime) (150 ft^2) = X lbs (100ft^2)

2040 lbs/ft^2 = 100X lbs/ft^2

$$\frac{2040 \text{ lbs/ft}^2}{100 \text{ ft}^2} = \text{X lbs}$$

20.4 lbs = Xlbs

Using algebra, we get the same rate, 20.4 lbs of lime per 150 ft^2.

Next let's tackle the fertilizer application rate. From the soil test results:

Nitrogen: Needed nitrogen will be supplied with the phosphate and/or potash recommendations below.
Phosphate: No phosphate fertilizer needed.
Potash: Apply 2.5 lbs of winterizer turf fertilizer per 100 ft^2 annually for 2 years.

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Let's assume B.A. Gardener would like to use an organic source of potash, kelp meal.

How many pounds will he need to apply to his 150 ft² vegetable garden? We will use the following formula to calculate the amount of potash he needs to add.

$$\text{Pounds of Product to Apply} = \frac{\text{Nutrient Need}}{\text{Percent Nutrient in the fertilizer as a decimal}}$$

$$\text{Pounds of Poseidon's Yields Kelp Meal} = \frac{1.0 \text{ lbs potash}}{0.02}$$

Pounds of Poseidon's Yields Kelp Meal = 50 lbs per 100 ft².

Since B.A. Gardener's vegetable bed is 150 ft², he'll need to add 75lbs of Poseidon's Yields Kelp Meal.

Note: the soil test recommendation of a traditional turf winterizer fertilizer was only 2.5 lbs per 100ft² . This is because the winterizer's recommended analysis of 10-20-30 has 30% potassium, whereas Poseidon's Yields Kelp Meal only has 2% potassium.

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pH Adjustments

What types of materials could you use to increase your soil's pH?

What types of materials could you use to lower your soil's pH?

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