How does Horse poop effect soil quality?

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Background

Farm lands and agricultural practices have a vital role in mitigating the harmful effects of Climate Change. The presence of organic content in soil effects soil structure, water quality and the nutrients in both media. Pasture management includes maintaining the soil nutrients to enable healthy plant growth, Pastures with an average pH of 6.6 is ideal for nutrient utilization to promote pasture growth and production (Mickel, 1994).

Purpose of the Study

The purpose of this study is to investigate the effect of horse manure has on the pastures.

Variables

- Soil samples from three paddocks .
- Paddock 5 - Closest to the pond
- Paddock 6 - Middle of the paddocks
- Paddock 8 - Farthest from the pond
- Water samples from small pond and large pond

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Measures

Two samples from each paddock were taken, and mixed together. Next the soil was filtered to remove organic matter, stones such that a fine soil mix remained. 50 ml of the soil was mixed with 250 ml of distilled water. The solution was stirred for 5 minutes. The soil solution was stored for 1 hour

Rapitest Soil test

- The test uses a patented 4 chamber device called color comparators - one each for pH, Nitrogen, Phosphorus and Potash. The test involves comparing the color of the water tested to a color chart.
- **pH scale** - 7.5 Alkaline; 7.0 - neutral; 6.5 - slight acidic; 6.0 - acidic; 5.5 - acidic; 5.0 - very acidic; pH - very acid.
- **N Test -** N4- surplus; N3 - sufficient; N2- adequate; N1 - Deficient; No - Depleted.
- **P Test -** P4 - surplus; P3 - sufficient; P2 - adequate; P1 - deficient; P0 - depleted
- **K Test -** K4 - surplus; K3 - sufficient; K2 - adequate; K1 - deficient; K0 -depleted

Water Quality test: Water test strips that tested 16 items - Total alkalinity, pH, hardiness, Cyanuric acid, total chlorine, free chlorine, Bromine, Nitrate, Nitrite, Iron, Chromium, Lead, Copper, Mercury, Fluoride, and Carbonate root.

Testing conditions: Ambient temperature

Plant Etymology

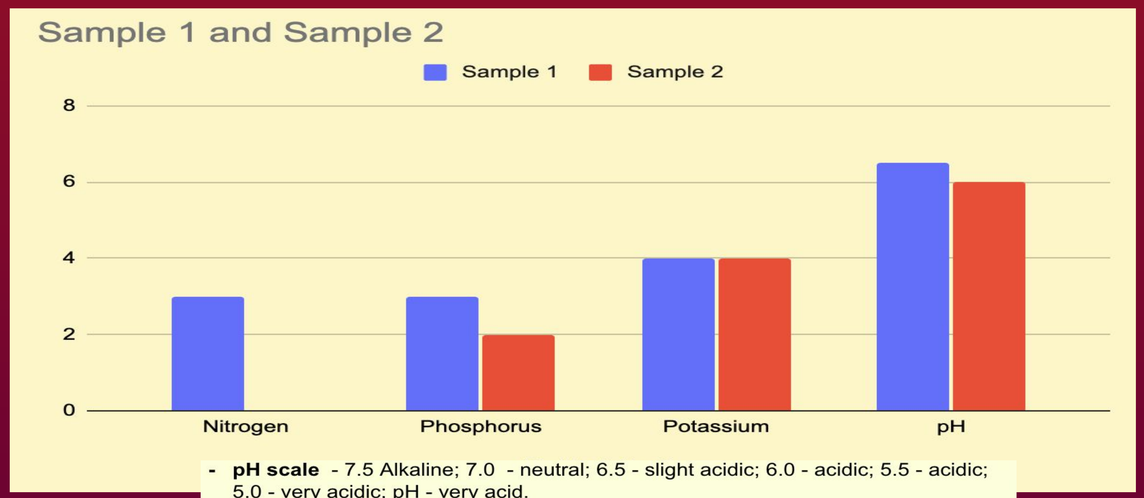
Plants in the paddock are identified using Picture this(app).

Results

Water quality results(pond)

	Center of large pond	Water fall	Center of small pond	Edge of pond	Paddock 5	Paddock 6	Paddock 8
Alkalinity	80	0	0	80	20	240	180
pH	7	6	6	7	7.3	7.5	6.5
Hardness	0	0	0	0	0	50	25
Cyanuric acid	0	0	0	0	0	0	0
Total Chlorine	0	0	0	0	0	0	0
Free Chlorine	0.5	0	0	0	0	0	0
Bromine	1.5	0	0	0	0	0	0
Nitrate	0	0	0	0	0	0	0
Nitrite	0	0	0	0	0	0	0
Iron	0	0	0	0	0	0	0
Chromium	0	0	0	0	0	0	0
Lead	0	0	0	0	0	0	0
Copper	0	0	0	0	0	0	0
Mercury	0	0	0	0	0	0	0
Fluoride	0	0	0	0	0	0	0
Carbonate Root	0	0	0	0	0	0	0

Soil



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Experimental Method

Materials Used:

1. Hula hoop
2. Showel
3. Plastic bag to collect soil sample.
4. Soil samples(2 per paddock)
5. Measuring cup
6. Test strips
7. Comparator

Phase 1 -

1.Throw a hula-hoop in each paddock. Take a picture of the plants within the hula hoop. Next take a soil sample. Repeat in another area of the paddock.

Prepare the soil sample for testing:

Place soil samples into a clean container, sift the soil and remove organic matter and stones(small and large). To test pH, add soil to fill line and add distilled water to the to the water line. For Nitrogen, Potash and Phosphorus tests, add 250 ml to 50 ml of the soil, stir the mixture and let it stand for a minimum of 30 minutes.

Testing:

Select appropriate comparator for the test. Remove the cap, using the dropper provided fill the test and reference chambers to the fill mark with the solution from the soil sample. Remove appropriate colored capsules. Hold the capsule horizontally over the test chamber and pour the powder into the test chamber. Cap the comparator. Allow color to develop for 10 minutes. Compare the color of the solution in the test chamber to the color chart.

Water Test:

1. Fill the given test-tube with the water sample(soil mixture or pond water) using the given pipette.
2. Insert the 16 in 1 water testing strip into the test tube for 2 seconds and take it out.
3. Remove excess water and lay the strip horizontally for 30 seconds.
4. Using the color chart provided match the shade of the test strip to the appropriate color chart.

Phase II

Take soil samples from the same paddocks after it rained(July 18th,22)and test for pH, Nitrogen, Phosphorus and Potassium.

Conclusion

Horse manure is a very healthy source for the soil in the ground. Horse manure includes nitrogen, phosphorus, potassium, sulfur, and micronutrients, and is high in organic matter. One of the problems is that the horse manure is not broken down and spread evenly throughout the pasture. The first sample from paddock 8 showed the Nitrogen level was sufficient. This is a clear example of horse poop fertilizing the soil. The phosphorus level was also found to be sufficient. Both of these are present in horse poop. But, when we examined the results from the second sample which was taken after it rained, the nitrogen level was completely depleted. The phosphorus level changed from N3 - sufficient to N2 - adequate which indicates some loss in phosphorus levels. The reason for Nitrogen depletion merits further inquiry. One possible avenue for further inquiry is to test the area below Paddock 8 since it is downhill and not prone to rain run off. We know it did not go in the water since the results had showed no evidence of nitrite or nitrate.

Discussion

From this experiment we realize the importance of horse manure. It needs to be spread out in order to benefit the soil. that horse poop can help alot with fertilizing the plants if it is spread out.