

The Role of Soil Quality on Equine Pasture Quality

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Background

Farm lands and agricultural practices have a vital role in mitigating the harmful effects of Climate Change. 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 understand what is the ideal pH level for the plants in the farm. All plants have an ideal range in which they grow optimally.

Methods

- Soil samples from three paddocks were chosen.
- Paddock 5 - Close the pond, near a hill
- Paddock 6 - Northeast-east of Paddock 5, near a hill
- Paddock 8 - Northeast of Paddock 5 and located on a hill.

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.

Measures

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; N0 - 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, hardness, 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).

Experimental Method

Materials Used:

1. Hula hoop
2. Showel
3. Plastic bag to collect soil sample.
4. Soil samples(2 per paddock)

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:

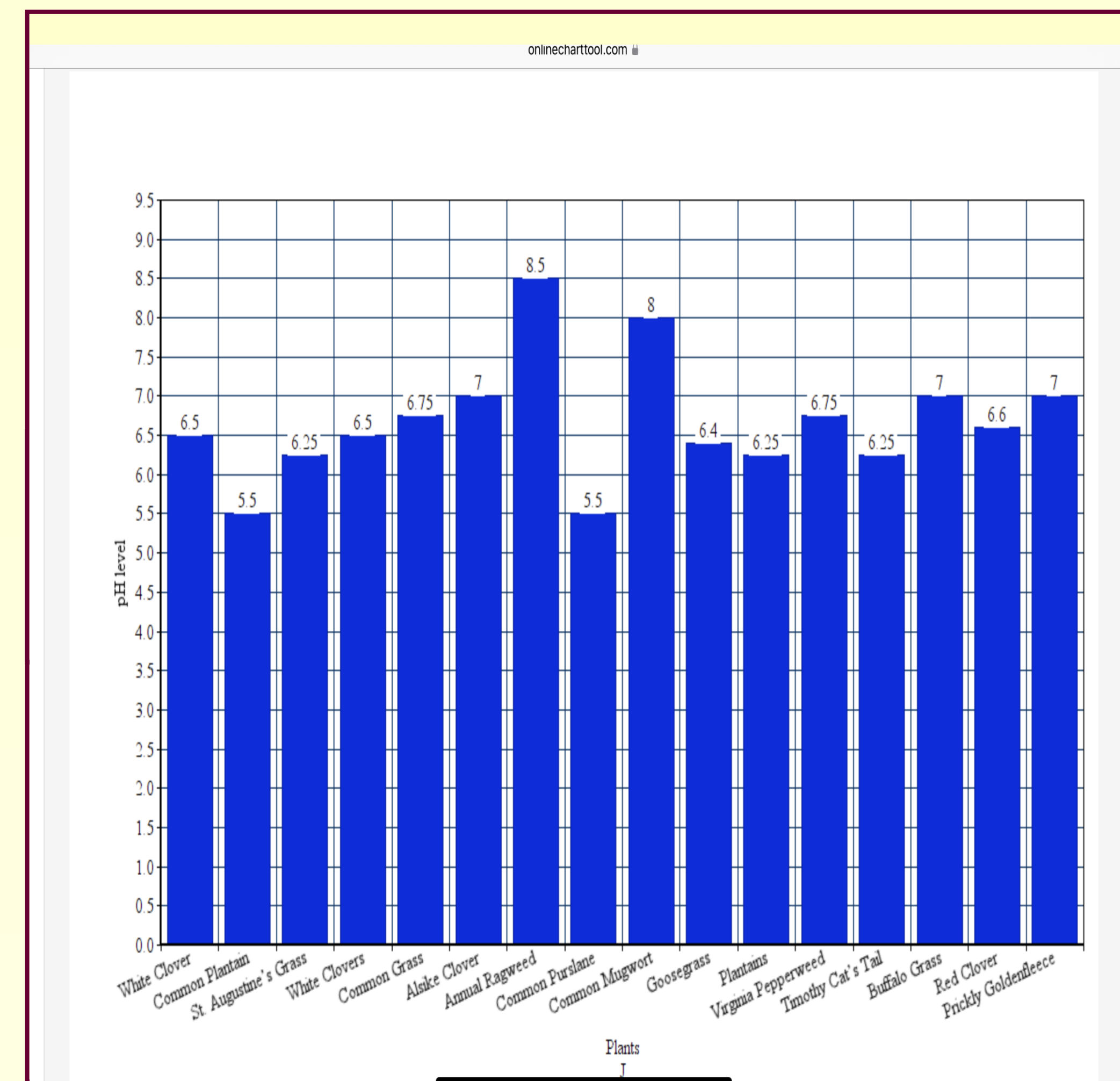
1. Fill the given test tube with the water sample(soil mixture or pond water) using the given pipette.
2. Insert the 16 in 1 water testing strip into the test tube for 2 seconds and take it out.
3. Remove excess water and lay the strip horizontally for 30 seconds.
4. Using the color chart provided match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

Results

- This shows the ideal pH for the plants found in the paddocks.

Plants found in the paddock and their ideal pH values. →

In the paddocks, the pH values for 5, 6, and 8 were 6.0, 6.0, and 6.0, respectively, before the rain. After the rain, it was 6.0, 6.5, 6.5 respectively. As you can see in the graph, the ideal pH for most of the plants is between 6.0 and 7.5. This means that the paddocks provide an adequate place for the plants to grow and thrive.



Conclusion

After observing the results, it can be concluded that the following plants are in their ideal level of pH to grow properly:

- Common Plantain
- St. Augustine's Grass
- White Clover
- Common Grass
- Alsike Clover
- Common Purslane
- Common Mugwort
- Goosegrass
- Plantains
- Virginia Pepperweed
- Timothy Cat's Tail
- Buffalo Grass
- Red Clover
- Prickly Golden Fleece

However, there is one plant, Annual Ragweed, which prefers higher pH levels. This can be reflected in the ratio of it to the other plants. The Ragweed had the lowest number of plants in the hula-hoop that was tested. However, it seems to be thriving even though it needs higher pH levels.

Discussion

According to Novascotia.ca, horse manure is not expected to change the pH of the soil. Even though it may seem like we should slightly raise the pH to sustain all types of plants, Annual Ragweed is not that nutritious for horses. Another plant that we should consider planting is the Black Hawthorn Shrub. It is nutritious for horses, can provide shade for horses, and prevent soil erosion. 2

References

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2. Second reference here
3. So on and so forth