Soil Components

pH, Phosphorus, Nitrogen, and Potassium in the Forest and the Pasture of Pu'u Pili

Purpose

- Does the quality of soil (nitrates, texture, acid, phosphorus, and potassium) differ between the pasture, the edge of the forest, and the forest?

Background

Nitrogen, phosphorus, potassium, and acidity are all very common and necessary nutrients for plant and animal life. Nitrogen is a very common element in the earth's atmosphere and is found in all living things. A colorless, odorless and "inert" element, nitrogen is essential for a plants metabolism, energy transfer, growth, development, photosynthesis and reproduction. As nitrogen is an important element of life, so is phosphorus, even though phosphorus has been used to take lives. Phosphorus can come in 5 different forms, black, violet, red, white, and yellow and is found in the crust. White phosphorus is used in bombs, explosives and is highly combustible when exposed to oxygen. However dangerous phosphorus may be, plants use it for photosynthesis, metabolism, development and reproduction.

Potassium is not found by itself. Sylvite, and carllite are both commonly found with phosphorus in ancient lake and sea beds. Potassium is a soft, silvery metal that can easily be held and cut with a knife. Potassium is put to use by plants to help photosynthesis, energy transfer through cells and development/growth. Acidity can be measured through a test called a pH test, testing the levels of acidity in the soil. Acid helps the plant by controlling light and temperature levels in the plant. Some plants like highly acidic soils while other plants like soil with more of an alkaline base.

PROCEDURE

1. Find a good spot in the forest to set out your equipment.
2. Use the instruction booklet to test for pH.
3. Repeat steps 1 - 3 for nitrogen, potassium, and phosphorus.
4. Clean test tubes and equipment.
5. Move to the edge of the forest.
6. Repeat steps 1 – 6 for the edge of the forest and the pasture.

DATA

Trial 1

pH Test

	PASTURE	EDGE OF THE FOREST	FOREST
CONCENTRATION	5.0	≤ 4.0	4.0

Nitrogen Test

	PASTURE	EDGE OF THE FOREST	FOREST
CONCENTRATION	Trace	Less than trace	No trace

Phosphorus Test

	PASTURE	EDGE OF THE FOREST	FOREST
CONCENTRATION	Trace	Less than Trace	No Trace

Potassium Test

	PASTURE	EDGE OF THE FOREST	FOREST
CONCENTRATION	Very High	Very Low	High
DROPS	8	> 20	10

Trial 2

pH Test

	PASTURE	EDGE OF THE FOREST	FOREST
CONCENTRATION	5.5	≤ 4.0	≤ 4.0

Nitrogen Test

	PASTURE	EDGE OF THE FOREST	FOREST
CONCENTRATION	Trace	Less than trace	No trace

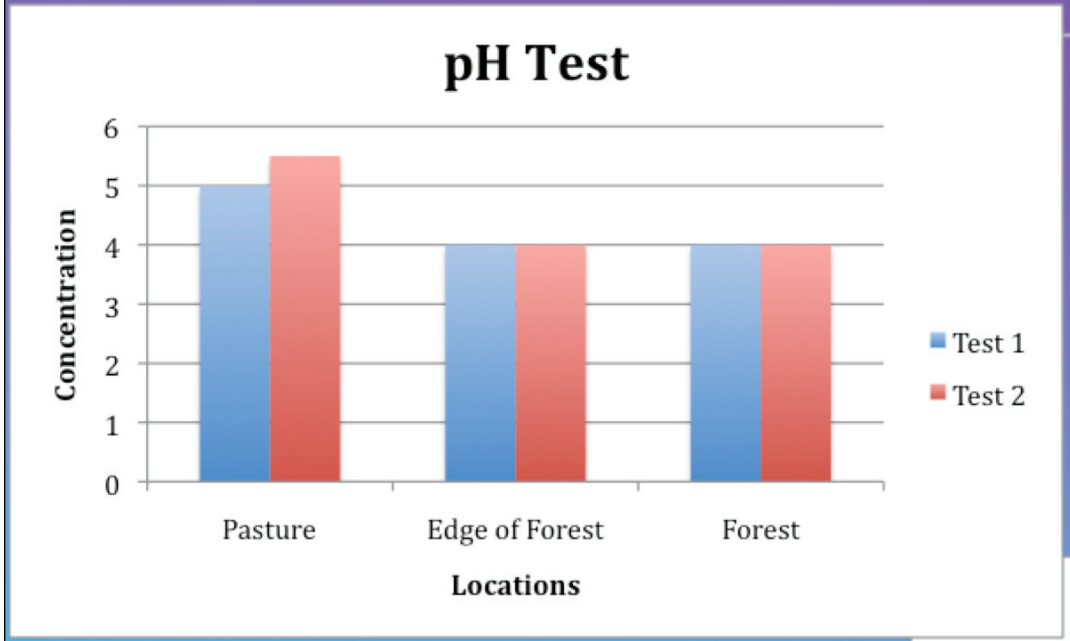
Phosphorus Test

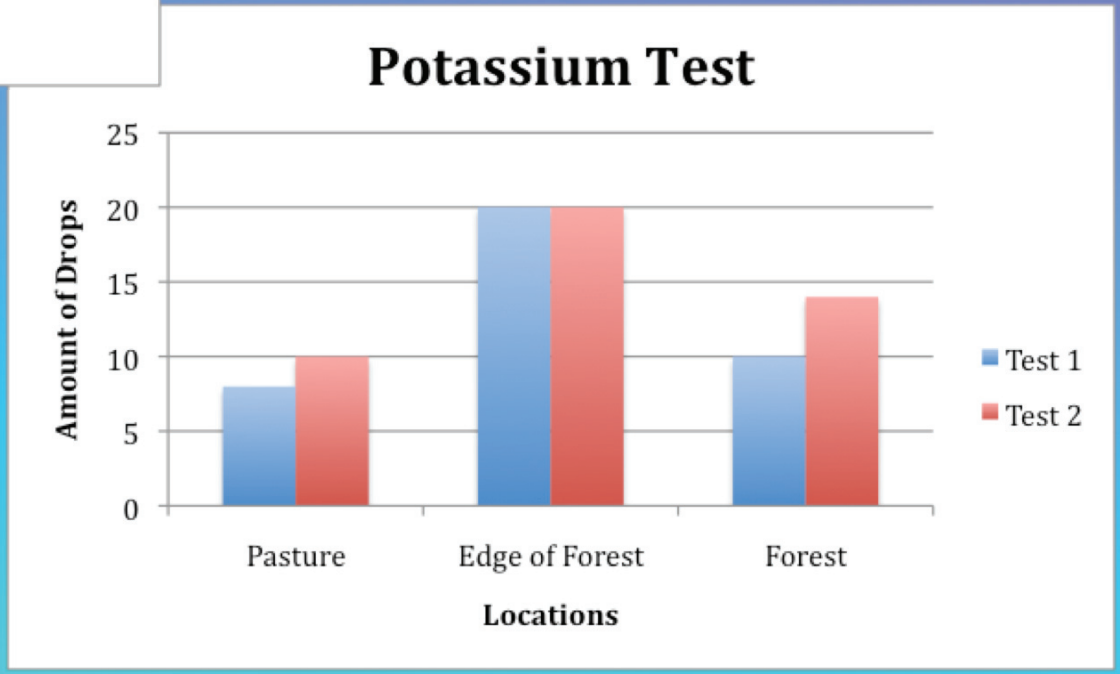
	PASTURE	EDGE OF THE FOREST	FOREST
CONCENTRATION	Trace	Less than Trace	No Trace

Potassium Test

	PASTURE	EDGE OF THE FOREST	FOREST
CONCENTRATION	Very High	Very Low	Medium
DROPS	10	> 20	14

GRAPHS


pH Test
Concentration
6
5
4
3
2
1
0
Pasture
Edge of Forest
Forest
Locations
Test 1
Test 2


Potassium Test
Amount of Drops
25
20
15
10
5
0
Pasture
Edge of Forest
Forest
Locations
Test 1
Test 2

Conclusion

Every component except for potassium was in very low concentrations in the forest, the pasture and at the edge of the forest. There was very little acidity in any of the locations prompting us to conclude that Pu'u Pili is alkaline based. Nitrogen and phosphorus were pretty much non - existent. Pu'u Pili has quite a bit of potassium.

Photo of Soil Kit

Photos of Experimentation






Things we learned during HI -MOES

- Kate- I learned that native plants don't need the same nutrients as the pasture grass.
- Lome- I learned how to test different types of soil in different habitats. As for pasture wise and forest wise.
- Amber- I learned that the soils from different elevations have different kinds of elements within them. For example, up in the forest there was more of potassium in the soil than the others, and in the pasture, there was more.

Thank you Aunty Melora

Thank you so much for all your help and for bringing the soil kit. We really enjoyed our time with you and your knowledge on soil. We hope we get to spend more time with you..