Abstract

Research name : Study of the water efficiency of manure that affects the growth of Azolla.

Research team: Miss Kanticha Yongcha Miss Sutinee Tanapop Miss Anuttra Kraithep

Grade level: Mathayom 5

Advisor: Miss Khwanjai Karnchanasrimak

Miss Adcharee Samhauy

School : Wichienmatu, Trang Province

Water is a basic factor that affects plant growth. Water that has nutrients and a temperature suitable for its growth will result in plants growing well. Therefore, the team of organizers studied the water efficiency of manure. The manure is goat manure and cow manure. The objective was to study the water efficiency of these two types of manure. that affects the growth of Azolla In the educational area and the Azolla farming experiment area will be at Wichian Mathu School. Mueang Trang District, Trang Province, by studying the water efficiency of manure that affects the growth of Azolla, temperature, soil pH , oxygen, number of leaves, weight, and thickness of leaves. and the branching of Azolla The growth of Azolla will be an indicator of the water efficiency of which type of manure has a better effect. The results of the study found that The highest value of water temperature is cow dung. The highest soil pH value is cow dung. The highest value of oxygen in the water is goat dung. The highest number of leaves is goat dung. The highest value of water is dung. Goat: The leaf thickness with the highest value is cow dung. The branching of Azolla with the highest value is goat dung.

Keywords : Manure, Azolla growth.

Introduction

Azolla is a small aquatic fern that floats on the surface of the water. Older plants that receive full light will turn dark red. Young plants or those that don't receive enough light will be green. Feather-like branches The root is a special root. Long on the south side of the trunk Both the tree and the branches are covered with small leaves. arranged alternately Each leaf is divided into 2 equal parts . The upper part is thick, green or red. The thin lower part is underwater, not very colourful. The lowermost leaves form a sporocrap. 2-4 on the axis of the leaf on the underside of the leaf Inside are megaspores and microspores . In the leaves of Azolla there are large cavities. Which is the habitat of Anabenae , which is a blue-green algae. Anabenae receives nutrients from Azolla. As for Azolla, it gets nitrogen from the nitrogen fixation of Anabenae . Important components include protein, fat, and cellulose. Minerals: Azolla requires important main nutrients, including phosphorus and potassium, and important micronutrients, including iron and molybdenum . Clay um , which is an important component of the enzyme nitroglycerin in nitrogen fixation. Azolla can survive at temperatures between 5 - 45 degrees Celsius. It grows best at temperatures of 20 - 30 degrees Celsius. Azolla grows best with approximately 50 - 70 percent of light. The optimum pH for Azolla to grow best is 4.0 – 5.5. Water Depth The optimum depth for Azolla to grow is about 10 centimeters.

Manure obtained from various animal droppings. in liquid and solid form Most of it is pet droppings such as cow, chicken, duck, pig, and goat droppings. It consists of animal feces and urine. which is the part of plant and animal remains from food that animals undergo decomposition from the digestive system. And it is a fertilizer that has many nutrients suitable for the growth of fertilizer plants.

Water is the raw material for photosynthesis. Water helps dissolve minerals in the soil. Helps plant roots absorb and transport minerals and nutrients within the stem. and helps adjust the temperature Helps various processes proceed. Water also provides oxygen and hydrogen to plants.

Research question

- a better effect on the growth of Azolla.

Research hypothesis

- The efficiency of goat manure juice will result in better growth of Azolla than cow manure.

Research objectives

- To want to know which type of manure water efficiency gives better growth to Azolla.

Materials and equipment and methods for conducting research

1. soil
2. Geographic measuring device
3. water
4. Photography equipment
5. Azolla
6. Notebooks and stationery
7. Beaker
8. Goat droppings
9. Soil pH measuring kit
10. Cow dung
11. weighing scale
12. Oxygen measuring device
13. thermometer
14. basin
15. Vernier Calipers

Determination of study points

Na Wong Subdistrict Study Area, Huai Yot District, Trang Province

Research methods

1. Measuring water temperature

1.1. Immerse the thermometer in water about 10 centimeters deep for about 3-5 minutes.

1.2. Read the thermometer at eye level. The thermometer bulb must still be in the water.

1.3. Submerge the thermometer in the oven. For the 2nd and 3rd measurement , change the thermometer reader.

1.4. Read the temperature in degrees Celsius. Take a total of 3 measurements .

2. Measuring the acidity (PH) of water

Pour the water sample into the beaker. Immerse the Universal Salin Decatur paper in the sample water , allowing the pH to stabilize .

Compare the measured H values, measure a total of 3 times, record the results.

3. Measuring the amount of oxygen in water

3.1. Rinse the sample container with water 2-3 times, then fill it with water. Close the lid under water so that there is no air. Be careful not to

3.2. Gently open the cap and add 2 drops of #4 solution. Drip 2 drops of #4 solution then close the cap, being careful not to let any.

3.3. Shake while closing the lid and a yellow-brown precipitate will appear, indicating that there is oxygen.

3.4. Wait for the sediment to fall about half the cylinder.

3.5. Open the cap and add 5 drops of solution #3 to the sample, then close the cap, being careful not to let air in, shake well.

Wait until all the sediment dissolves and the sample turns yellow.

3.6. Pour the sample from item 5 into a new test tube to the level of 5. milliliter

3.7.Add solution #4 drop by drop, shake well, count the number of stops used when the color of the sample starts to fade to yellow.

So drip #5 solution, 2 stops.

3.8.The sample will turn blue and continue counting the number of drops until the sample turns colorless.

3.9. Take the number of drops counted and read the results in milligrams per liter of oxygen from the table.

4. Checking the growth of Azolla.

4.1. Measure the number of leaves 5 Azolla plants from a pond mixed with goat dung and cow dung to count the number of leaves.

4.2. Measure the thickness of the leaves.FIVE Azolla plants were randomly selected from the ponds mixed with goat manure and cow manure. Come measure with vernier.

4.3. .Number of branchesfive Azolla plants were randomly selected from the ponds mixed with goat manure and cow manure. Let's count the number of trees that have branched out.

4.4 . Measure weightAzolla raised from ponds mixed with goat manure and cow manure was weighed. Come measure with a scale.

Analyze and summarize research results.

1) Analyze and compare the obtained data, including water temperature,

water pHvalue ,DO value of water , growth value of Azolla

2) Make a table showing the average of the comparative data.

3) Summary of experimental results

Research results

Geographic coordinates Conducted a study in the area of Na Wong, Na Wong Subdistrict, Huai Yot District, Trang Province.

Table 1 Geographic coordinates

zone	Geographic coordinates	
	latitude	Longitude
Nawong	7.73194 °	99.48305 °

Table 2 Water temperature

Study source	Water temperature (Celsius)			
	1st time	2nd time	3rd time	average
Cow dung	29	29	29	29
Goat droppings	29	29	29	29

From Table 2 , it can be concluded that the water temperature in both cow manure ponds and in the pond of cow dung The average is the same. 29 degrees Celsius

Table 3 pH value (PH) of water

Study source	pH value (PH)			
	1st time	2nd time	3rd time	average
Cow dung	8	8	9	8.33
Goat droppings	7	8	8	7.67

From Table 3 , it can be concluded that the average pH of goat manure is 7.67 and that of cow manure is 8.33.

As a result, the water efficiency of goat manure is better than that of cow manure.

Table 4 : Oxygen values in water

Study source	Oxygen value in water (milligrams per liter)			
	1st time	2nd time	3rd time	average
Cow dung	7	8	8	7.67
Goat droppings	6	6	7	6.33

From Table 4 , it can be concluded that the oxygen value in the water The mean value of goat manure was 6.33 and the mean value of cow manure was 7.67.

As a result, the water efficiency of goat manure is better than that of cow manure.

Table 5. Growth of Azolla.

Study source	number of weeks	Number of leaves					
		1st tree	2nd tree	3rd tree	4th tree	5th tree	average
Cow dung	1	3	4	3	3	5	3.6
Goat droppings		3	3	4	4	5	3.8
Cow dung	2	5	4	3	3	4	3.8
Goat droppings		5	5	4	4	3	4.2
Cow dung	3	4	3	5	6	5	4.6
Goat droppings		6	6	5	4	4	5
Cow dung	4	5	6	6	5	4	5.2
Goat droppings		5	5	6	7	6	5.8

Study source	number of weeks	leaf thickness					
		1st tree	2nd tree	3rd tree	4th tree	5th tree	average
Cow dung	1	2	2	2	2	3	2.2
Goat droppings		2	2	3	3	2	2.4
Cow dung	2	2	2	2	3	3	2.4
Goat droppings		2	2	3	3	2	2.4
Cow dung	3	3	3	2	2	2	2.4
Goat droppings		2	3	2	3	2	2.4
Cow dung	4	2	3	2	2	3	2.4

Goat droppings		3	3	2	3	3	2.8

Study source	number of weeks	Number of branches of the tree					
		1st tree	2nd tree	3rd tree	4th tree	5th tree	average
Cow dung	1	1	1	1	2	2	1.4
Goat droppings		2	2	1	1	1	1.4
Cow dung	2	2	2	1	2	2	1.8
Goat droppings		2	1	1	2	2	1.6
Cow dung	3	2	2	3	2	1	2
Goat droppings		3	3	2	2	2	2.4
Cow dung	4	3	3	2	3	2	2.6
Goat droppings		2	4	3	3	2	2.8

Study source	Weight (grams)				
	Week 1	Week 2	Week 3	Week 4	average
Cow dung	72	88	105	121	96.5
Goat droppings	75	94	112	130	102.75

From Table 5 , it can be concluded that by taking the information from the table into consideration, it resulted that Azolla fed with goat manure grew better than cow manure.

Summary and discussion of results

temperature in water From the study, it was found that the water in Azolla ponds in both goat and cow manure had the same value.

pH value From the study, it was found that the water in the goat manure pond had an average value of 7.67 , which was less than the water in the cow manure pond, which had an average value of 8.33.

Oxygen value in water The study found that the water in the goat manure pond had an average of 6.33 milligrams per liter.

which is less than water in cow manure ponds, which has an average of 7.67 milligrams per liter.

Azolla growth The study found that from the table it can be concluded that Azolla fed with goat manure grew better than cow manure.

Summary of research results

From studying the water efficiency of manure that affects the growth of Azolla. It can be concluded that water mixed with goat manure resulted in different growth efficiency of Azolla. and also affects the temperature pH value and oxygen values That is an important factor in plant growth.

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Organizing team

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