Study on the relationship between environmental factors and the population density of *Azolla microphylla*

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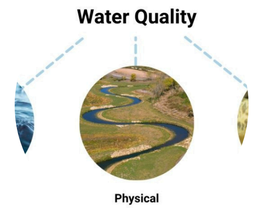
ABSTRACT

Currently, Azolla (Azolla microphylla) is popular in the field of trade, and it can be used as animal feed or consumed in households because of its low cultivation cost. However, the cultivation method is not difficult and can propagate quickly and yields high yields, but the cultivation of Azolla has some limitations, such as the uncertain increase in the amount of Azolla and pests. Acidity-base (pH), dissolved oxygen content (DO), amount of light, etc. Therefore, studying the factors that affect the increase in the number of Azolla is important for farmers who cultivate Azolla. Recognizing this importance, the organizers studied the relationship between environmental factors and the density of the Azollapopulation in 8 ponds. The average pH was 6.09, the average temperature was 27.65 °C, the average TDS was 54.83 ppm, the EC was 87.83 µs/cm, the salinity was 48 ppm, the DO was 3.9 mg/L, and the water translucency was 23.14 cm. The average pH was 5.71, the average temperature was 27.67 °C, the average TDS was 57.49 ppm, the EC was 149.8 µs/cm, the salinity was 57 ppm , the DO was 5.1 mg/L, and the water translucency was 35.18 cm. It was found that the average EC, average DO, average Salt and average water translucency in ponds with dense Azolla populations were lower than in ponds with light Azollapopulations, while the average pH, average temperature and TDS values in ponds with dense Azolla populations and ponds with light Azollapopulations were similar. Based on the estimation of the population density of Azolla by the plot-based sampling method. The Quadrat Sampling Method showed that ponds 1-4 were ponds with dense Azollapopulations with estimated population densities of 7,300, 6,900, 7,800 and9,800 plants/square meter, respectively, and ponds 5-8 were ponds with light Azolla populations with 2,575, 1,206, 331 and 672 plants/square meter, respectively. The results of the study showed that the physical properties were EC , DO, Salt and water translucency. It affects the density of the Azolla population.

RESEARCH QUESTION

1. Does the water quality affect the azolla? How?
2. Does the density of the azolla population affect the quality of water?

INTRODUCTION



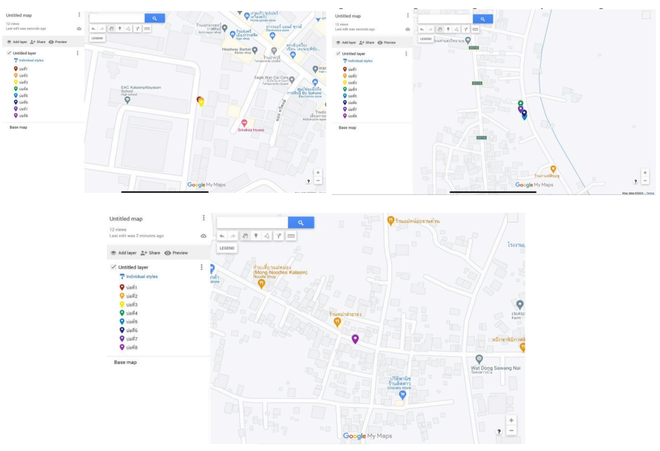
RESEARCH METHODS

Survey the water quality in the water source with red water in the area of Mueang Kalasin District.

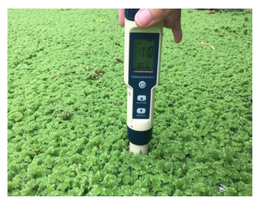
Materials and equipment : Water quality measuring instrument, dissolved oxygen measuring instrument, population counting frame

1) Map showing 20 survey locations in Mueang Kalasin District

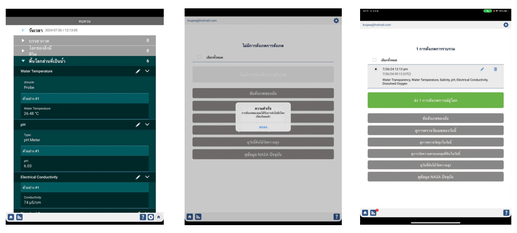
2) The survey identified eight ponds containing Azolla and map showing the survey area of ponds 1-3



3) Acidity-base values, translucency, dissolved oxygen content in water, Azolla content, TDS value, EC value, salinity and water temperature were measured in 8 ponds with Azolla



4) Bring in the measured data Globe Data Entry.



5) Estimate the population of Azolla by the Quadrat Sampling Method using a wooden frame

OBJECTIVE

To study the relationship between environmental factors and the population density of Azolla.

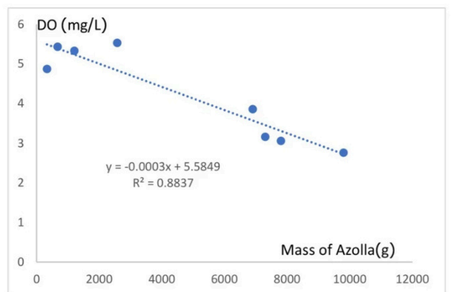
RESULTS

Table 1 shows the density and quality of the water surveyed and found 8 pounds of Azolla

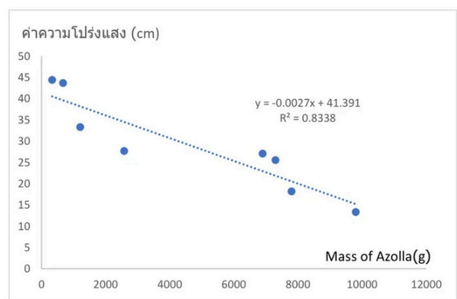
Azolla population	ponds	pH	temperature (°C)	TDS (ppm)	EC (µs/cm)	Salinity (ppm)	DO (mg/L)	Translucency (cm)	density (Tree/Sq.m.)
dense	1	6.19	27.11	34.33	73	38	3.06	18.2	7300
	2	6.03	26.48	65.33	129	64.6	2.76	13.33	6900
	3	6.16	27.1	25.33	38.66	16	3.16	27.7	7800
	4	5.98	29.94	59.33	105	59	3.86	33.33	9800
Lightweight	5	6.01	28.63	53.67	71.3	57	5.53	43.67	2575
	6	6.1	28.52	58.33	119.3	59.6	5.33	27.1	1206
	7	5.89	29.67	56	119.6	58	4.87	25.56	331
	8	5.77	27.09	56.33	289.33	56.33	5.43	44.4	672

That the environmental factors that directly impact the density of red algae include electrical conductivity (EC), dissolved oxygen (DO), and water transparency. It was observed that azolla tend to thrive in water with low electrical conductivity, low oxygen levels, and low transparency. Meanwhile, the pH and water temperature do not show a clear correlation. When analyzing the relationship between environmental factors and the increase in the number of water hyacinths, the data is presented as follows.

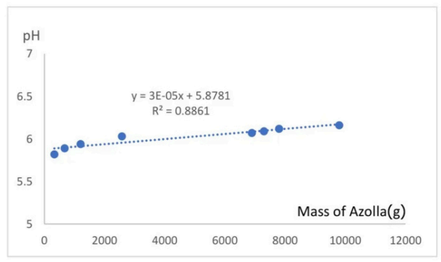
Table 2 shows the dissolved oxygen value, pH, translucency and Ec value of all 8 wells.



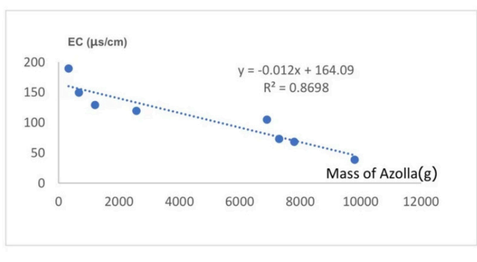
A graph showing the negative correlation between Azolla biomass (g) and dissolved oxygen (DO).



A graph showing the relationship between Azolla biomass (g) and transparency (cm).



A graph showing the positive correlation between Azolla biomass (g) and the pH value of water.



A graph showing the negative correlation between Azolla biomass (g) and the electrical conductivity (EC) of water.

DISCUSSION

Finding the relationship between environmental factors and the population density of Azolla. Areas studied from natural water sources Wastewater source and Azolla pond in Kalasin Province It was found that the acidity-base and temperature values In ponds with dense and light populations of Azolla, the values are similar. It was found that the TDS value, EC value, DO value, salinity value, and translucency value were It is related to the population density of Azolla.

In ponds with a dense population of Azolla, there is a correlation in the opposite direction to the TDS , EC, DO, salinity and translucency in ponds with light Azolla populations were correlated in the same direction with TDS , EC, DO, salinity and translucency. In conclusion, Azolla is a plant that often lives in wastewater. In line with Pantip Klomjek (2015), it was found that Azolla can be well formed in the wastewater where the Azolla is in the treatment system . It has values between 25.3-32 °C, 0.26-5.52 mg/L, 6.02-8.88 and 489.0-670.0 µs/cm, respectively.

CONCLUSIONS

This study found that Azolla thrives in environments with low electrical conductivity, low dissolved oxygen levels, and low water transparency, while pH and water temperature showed no clear correlation with its growth. Additionally, Azolla biomass exhibited a negative correlation with electrical conductivity, dissolved oxygen, and water transparency, but a positive correlation with pH. These findings suggest that Azolla may play a significant role in altering the chemical balance of aquatic ecosystems.

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