



Allelopathic Potential of Rose Apple (*Syzygium jambos*) Extract against Mung Beans (*Vigna radiata*) in a Soil Sample from Chonradsadornumrung School

Researchers: Chotiwit Suksai

Jirapat Jansurin

Jirayu Surapat

Advisors: Ms. Rawadee Meesuk

Mr. Marvin Servallos



Introduction

Numerous infrastructures have recently been constructed on campus to address the issue of a lack of classrooms as well as sports facilities to improve the students' athletic endeavors.



Demand for classrooms are increasing!



Source: TOP News

Sport fields recently constructed

Introduction

The campus's soil quality could be significantly impacted by the development, which could also have an impact on the viability of numerous plants there.

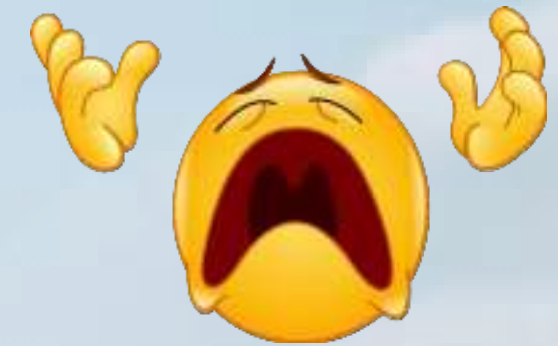
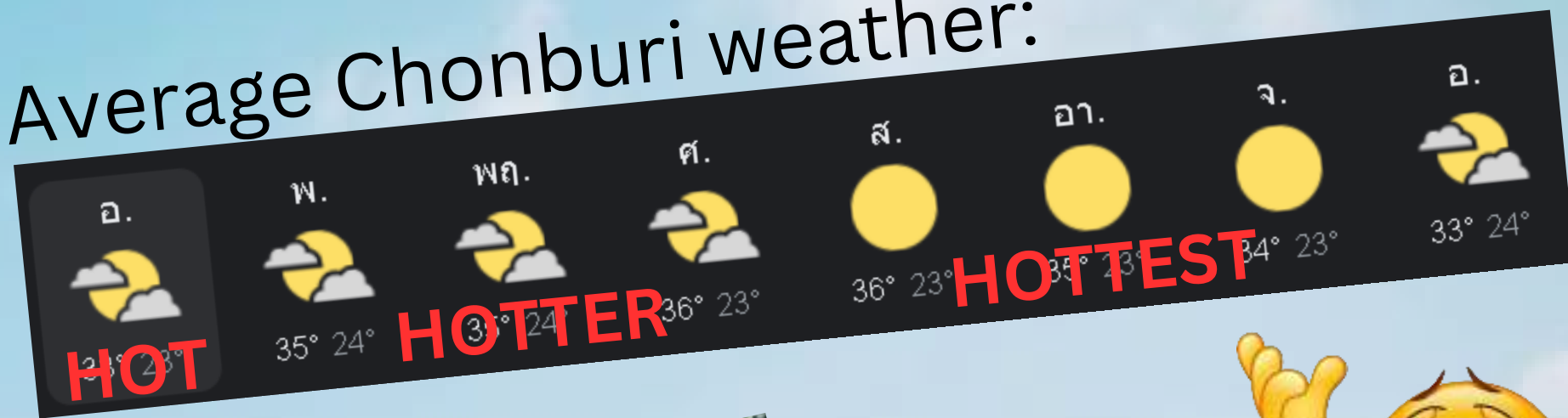


Introduction

In addition, the area where the school is located has been experiencing drought because it hasn't rained in almost three months. As a result, the ground surrounding the school is completely dry. The current soil quality inside the school must be assessed, hence soil testing is unquestionably required.



Average Chonburi weather:



Dry Soil!



Soil Testing!

Introduction

The situations prompted the researchers to conduct this environmental research entitled “Allelopathic Potential of Rose Apple (*Syzygium jambos*) Ethanolic Extract against Mung Beans (*Vigna radiata*) in Soil Sample from Chonradsadronumrung School.



Allelochemicals



Collected and Tested



Research Questions

1. Is there a significant difference in various soil parameters measured for four times at Chonradsadornumrung School?



2. Do Rose Apple (*Syzygium jambo*) ethanolic extract possess allelopathic potential?



3. What phytochemical constituents are present in the ethanolic extract of Rose Apples (*Syzygium jambos*)?

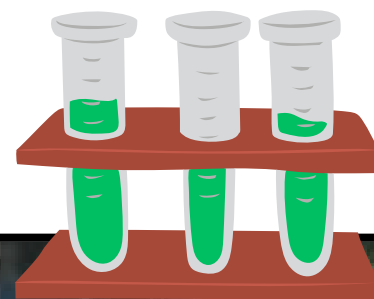


Objectives

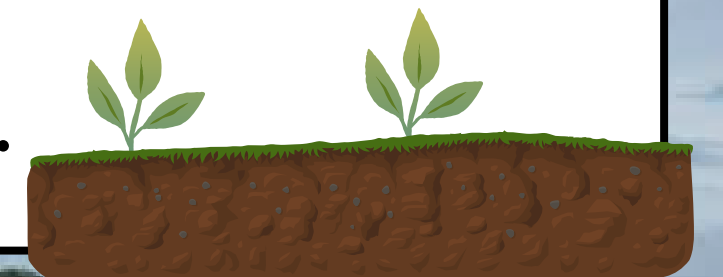
1.To find out whether there is significant difference in soil parameters measured for four times at Chonradsadornumrung School.



3.To determine the secondary compounds possessed by the extract of Rose Apple (*Syzygium jambos*).



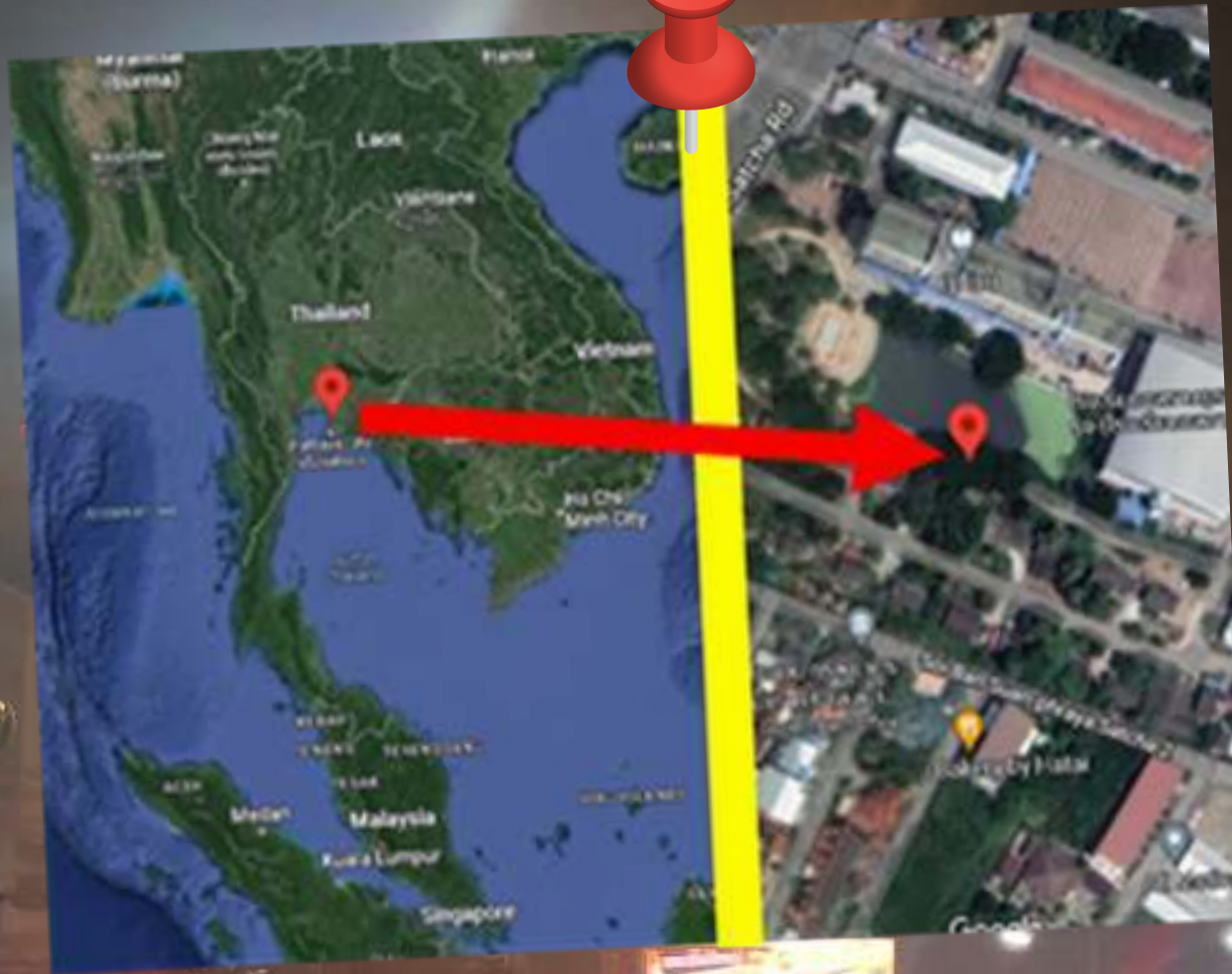
2.To evaluate the allelopathic potential of Rose Apple (*Syzygium jambos*) ethanolic extract using the soil sample from Chonradsadornumrung School.



Hypotheses

Alternative: There is a significant difference in various soil parameters measured at Chonradsadornumrung School and the extract of Rose Apple (*Syzygium jambos*) has allelopathic activity. ✓

Null: There is no significant difference in various soil parameters measured at Chonradsadornumrung School and the extract of Rose Apple (*Syzygium jambos*) has no allelopathic activity. ✗



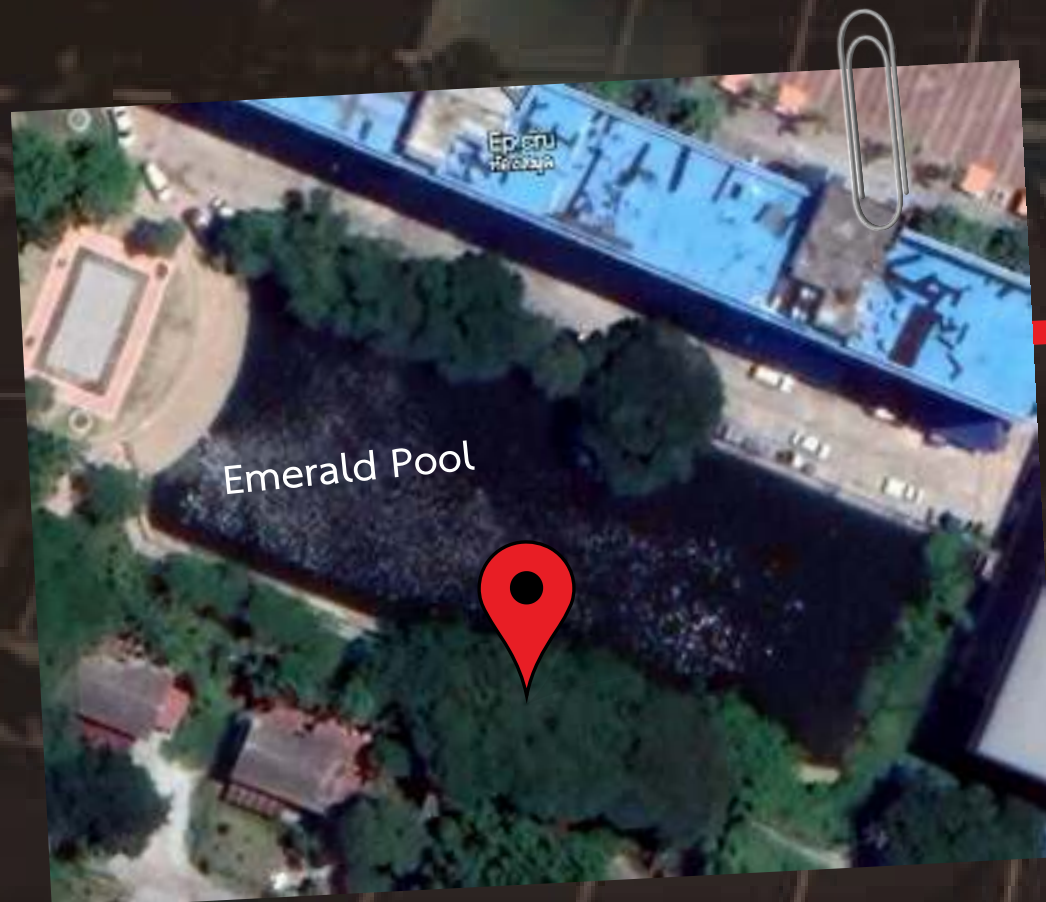
Study Site

The study site is located at Bansuan, Chonburi Coastal Area.

Latitude $13^{\circ}20'59.9''\text{N}$

Longitude $100^{\circ}58'33.0''\text{E}$

Survey and Preparation of Materials



The researchers conducted a survey around Chonradsadornumrung School, a government school located in Bansuan, Chonburi, Thailand. The soil near the Emerald pool was chosen as the study site because it is an ideal location for soil testing and soil sample collection.

Some of the material



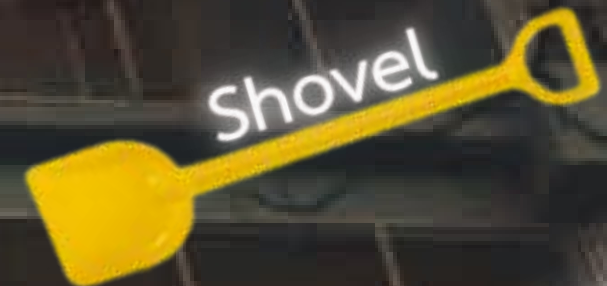
Meterstick



pH Meter



Vernier Caliper



Shovel



Hand Fork



Thermo
Hygrometer

To determine the soil pH, the following steps were carried out: 40 g of dried and sieved soil with 40 mL of distilled water (or other amount in a 1:1 soil to water ratio) was mixed in a beaker using the stirring rod, the mixture was allowed to settle until a supernatant formed, the pH of the supernatant was measured using the pH meter. The same steps were followed for the 2 soil samples in separate beakers taken from the same site and soil horizon.



Soil Quality Testing

Various soil parameters were considered in assessing the quality of soil



Assesing Soil pH

Soil Consistency

Soil pH

Soil Temp

Moisture

Soil Texture

Soil Fertility

Screening for the Allelopathic Potential



Phytochemical Screening

Phytochemical screening procedures from the book of Guevarra et.al., 2005 were applied to evaluate the presence of the secondary compounds responsible for various biological activities of the plants



Alkaloids

Tannins

Leucoanthocyanins

phenolic

Saponins

Compound

Flavonoids

Past Observations for Air Temperature 1-Day

From 2022-12-16 To 2023-01-31

Measured at time in UTC

- 1 2022-12-23 15:00 UTC
- 2 2023-01-03 14:50 UTC
- 3 2023-01-05 15:02 UTC
- 4 2023-01-19 15:00 UTC

Past Observations for Integrated Atmosphere (1-Day)

From 2022-12-16 To 2023-01-31

Measured at time in UTC

- 1 2022-12-23 15:00 UTC
- 2 2023-01-03 14:50 UTC
- 3 2023-01-05 15:02 UTC
- 4 2023-01-19 15:00 UTC

Past Observations for Soil Temperature

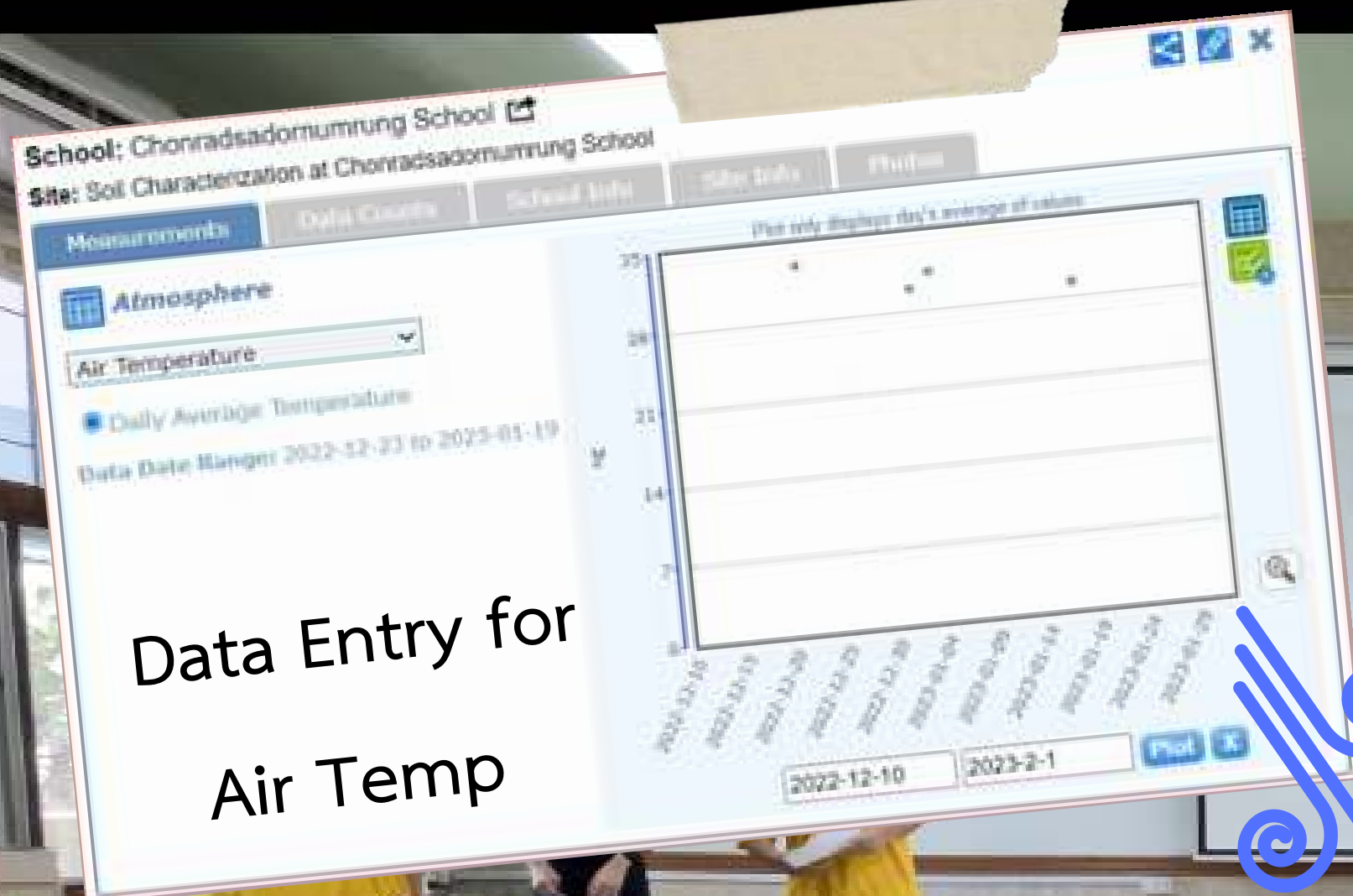
From 2022-12-16 To 2023-01-31

Measured at time in UTC

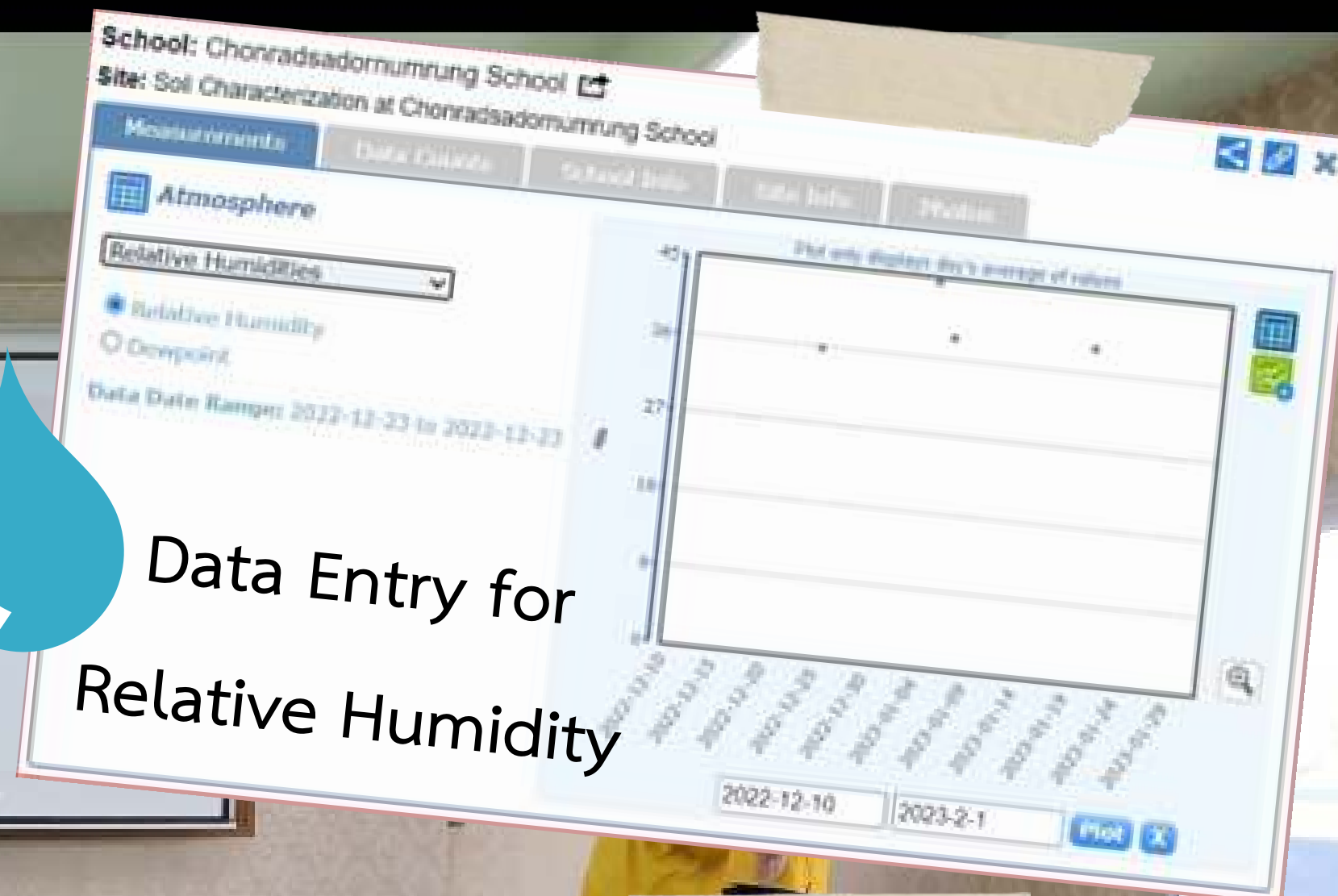
- 1 2022-12-23 15:00 UTC
- 2 2023-01-03 15:00 UTC
- 3 2023-01-05 15:02 UTC
- 4 2023-01-19 15:00 UTC

Globe Data Entry that has been entered from

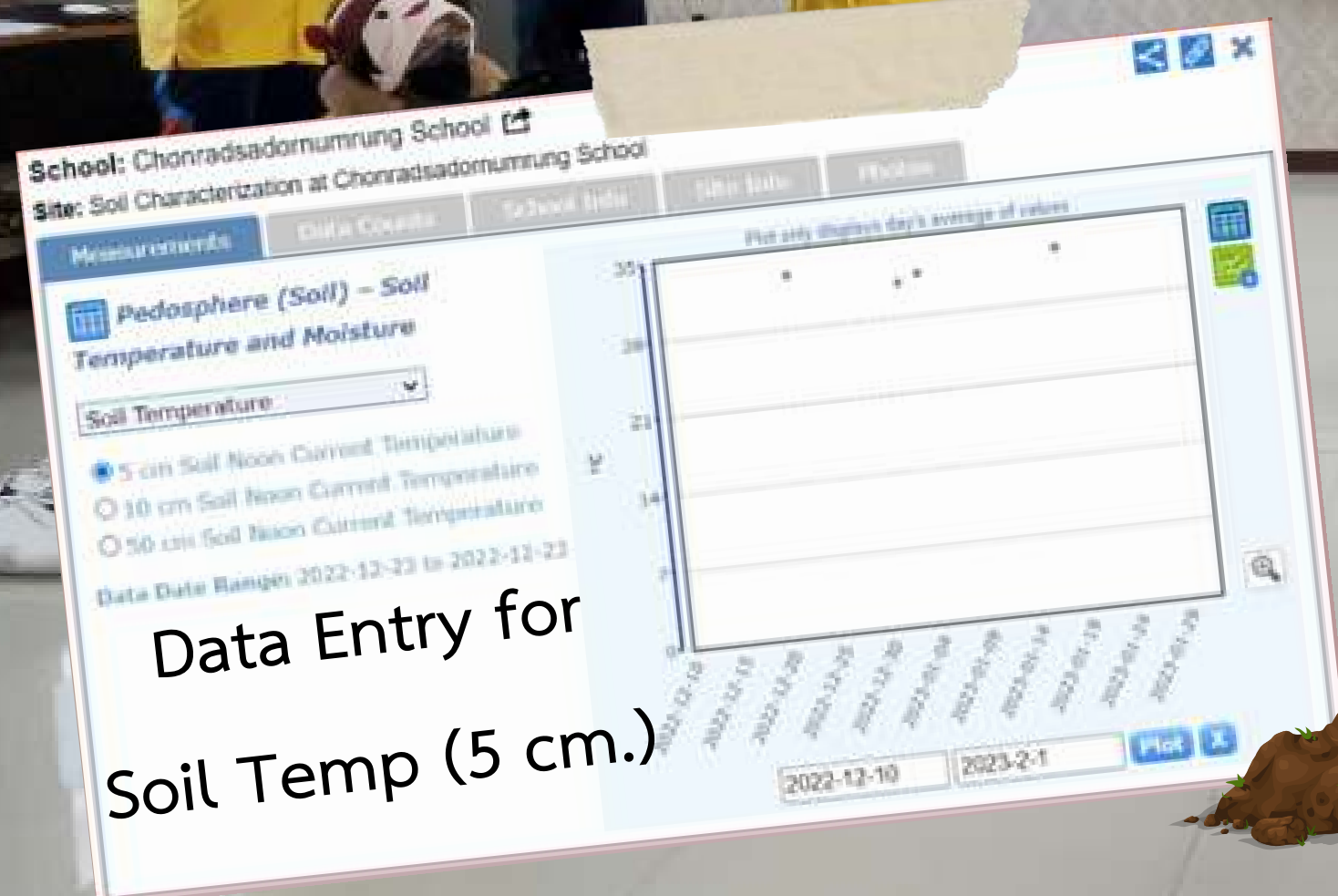
December 23, 2022 - January 19, 2023



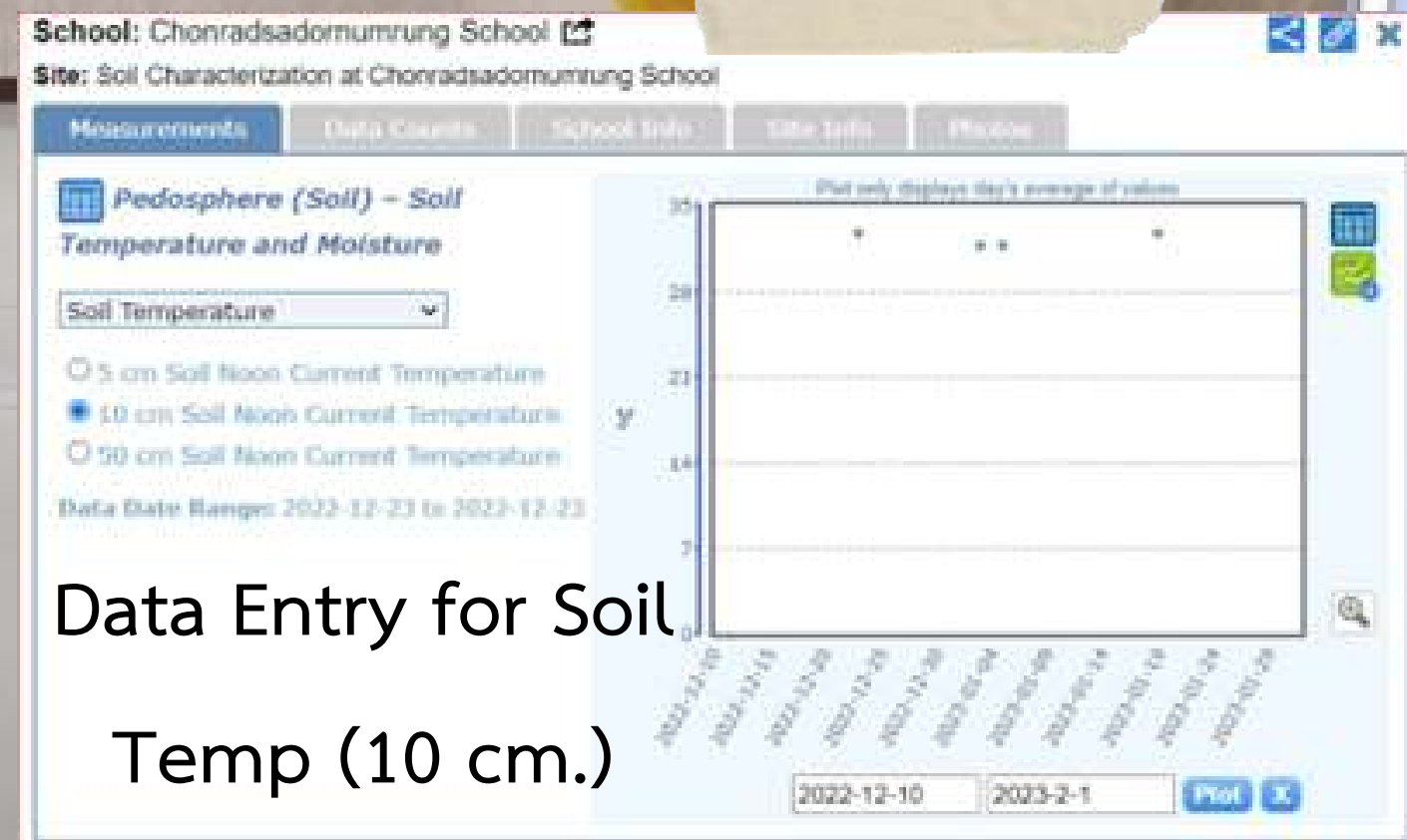
Data Entry for
Air Temp



Data Entry for
Relative Humidity



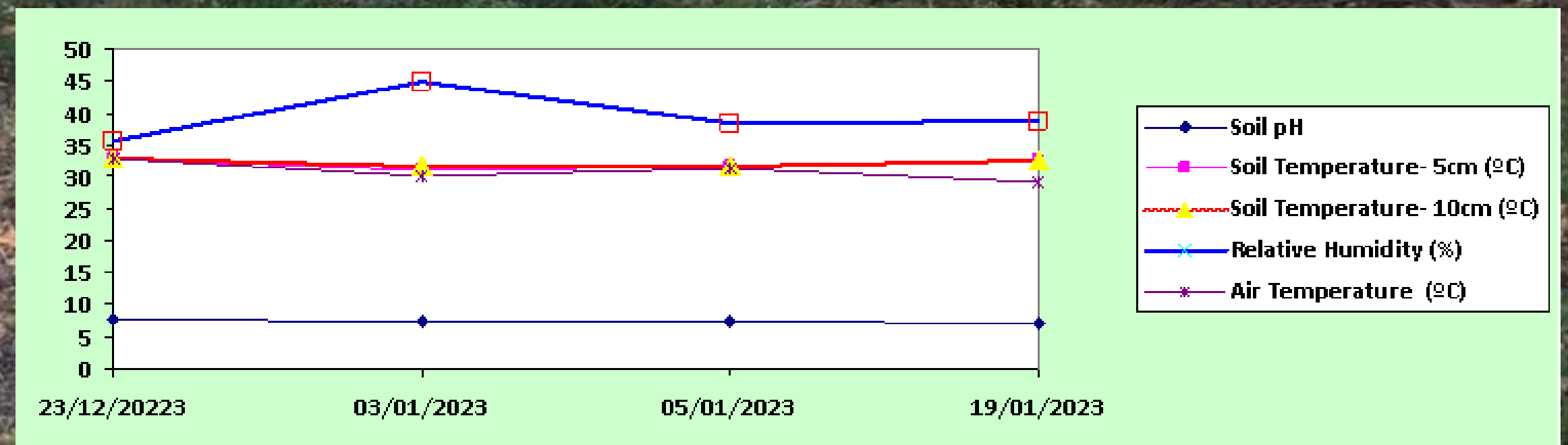
Data Entry for
Soil Temp (5 cm.)



Data Entry for Soil
Temp (10 cm.)

Parameters	23 Dec. 2022 (3:00 PM)	3 Jan. 2023 (2:50 PM)	5 Jan. 2023 (3:00 PM)	19 Jan. 2023 (4:30 PM)
Soil pH	7.57	7.5	7.5	7
Soil Temperature (5 cm)	32.67	31	31.67	32.66
Soil Temperature (10 cm)	32.67	31.67	31.67	32.66
Relative Humidity (%)	35.67	44.67	38.33	38.67
Air Temperature (°C)	32.9	30.33	31.3	29.23
Soil Color	Grayish brown	Grayish brown	Grayish brown	Grayish brown
Soil Structure	Granular	Granular	Granular	Granular
Soil Texture	Sandy clay loam	Sandy clay loam	Sandy clay loam	Sandy clay loam
Soil Consistency	Loose	Loose	Loose	Loose
Soil Moisture	Dry	Dry	Dry	Dry

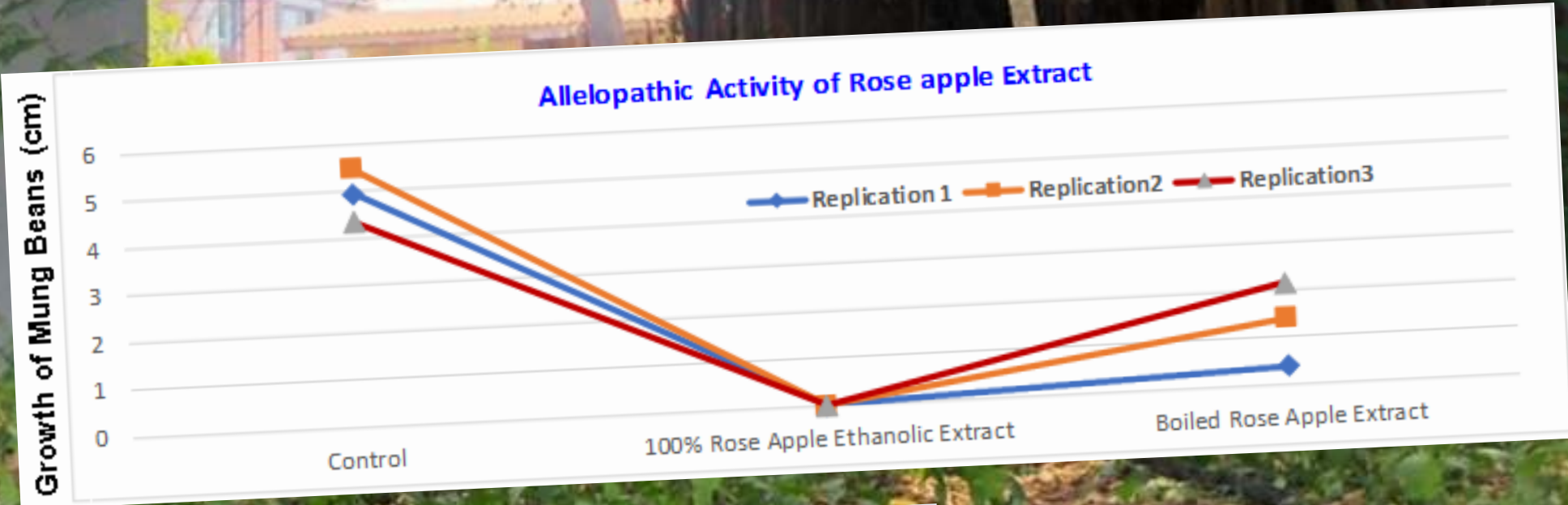
Average results of soil parameters measured at Chonradsadornumrung School



Treatments	Replications	Seedlings (Length of the Root and Shoot)						
		1 (cm)	2 (cm)	3 (cm)	4 (cm)	5 (cm)	Total (cm)	Mean (cm)
Control (Distilled Water)	1	5.21	6.89	4.81	3.5	4.30	24.71	4.94
	2	8.14	4.98	8.14	4.81	1.26	27.33	5.47
	3	5.6	2.7	4.2	4.6	4.6	21.7	4.34
100% Rose Apple Ethanolic Extract	1	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0
Boiled Rose Apple Extract	1	0.8	0	0	0	1.05	1.85	0.37
	2	1.4	1.9	1.05	1.5	1.1	6.95	1.39
	3	2.3	1.55	1.5	2.65	2.7	10.7	2.14

In vitro Allelopathic Screening results on the growth of Mung Beans (*Vigna radiata*) 🌱

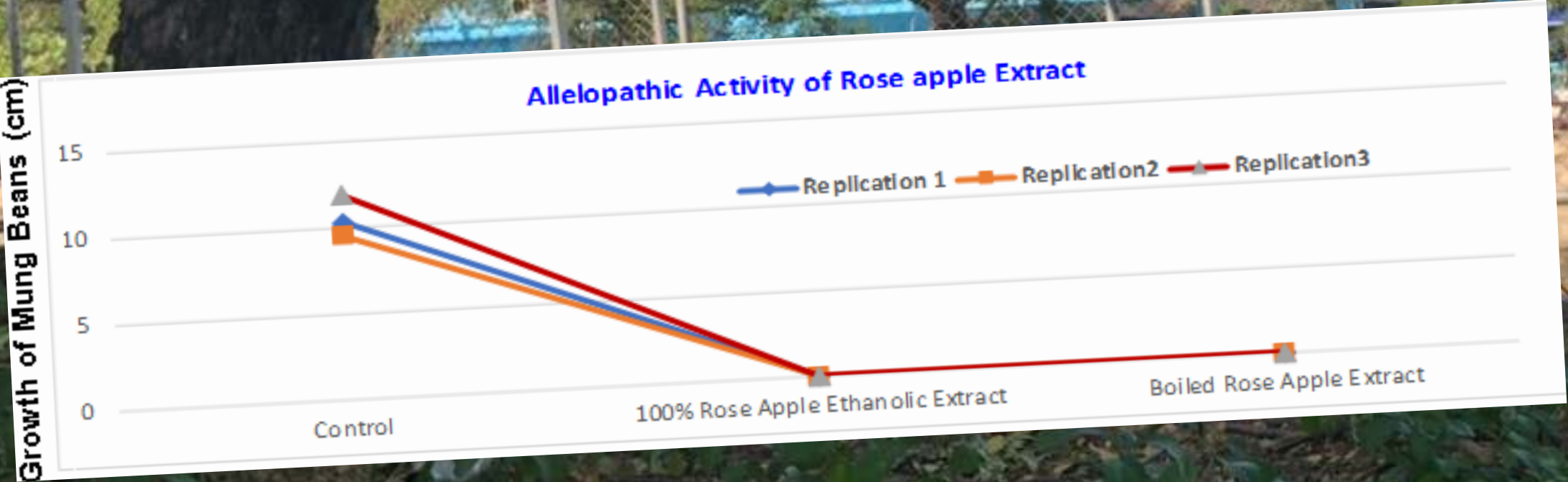
Results of the Allelopathic Screening on the growth Mung Beans (*Vigna radiata*)



Results of Allelopathic Test after 5 days observation

Allelopathic Screening results on the growth of Mung Beans (*Vigna radiata*) planted in soil sample from Chonradsadornumrung School

Treatments	Replications	Seedlings (Length of the Root and Shoot)				
		1 (cm)	2 (cm)	3 (cm)	Total (cm)	Mean (cm)
Control (Distilled Water)	1	10.5	9.80	10.45	30.75	10.25
	2	9.60	9.20	9.70	28.5	9.5
	3	13.20	12	10.40	35.60	11.87
100% Rose Apple Ethanolic Extract	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0
Boiled Rose Apple Extract	1	0	0	0	0	0
	2	0	0	0	0	0
	3	0	0	0	0	0



Results of the Allelopathic Screening on the growth Mung Beans (*Vigna radiata*)

Results of Allelopathic Test after 5 days observation. C- Control group, RA- Rose Apple Ethanolic Extract, RAW- Boiled Ethanolic Extract of Rose Apple



Phytochemicals	Rose Apple (<i>Syzygium jambos</i>)
Alkaloids	+
Saponins	-
Tannins	+
Phenolic Compounds	+
Flavonoids	+
Leucoanthocyanins	+



OMG! It's Rose Apple Man!

Phytochemical constituents of
Rose Apple (*Syzygium jambos*)



This Is My
SeCoNdArY
cOmPoUnD!

Conclusion

There are significant differences in soil pH, relative humidity, and air temperature, except for soil temperature measured at 5 cm and 10 cm depth. Additionally, the ethanolic and boiled extracts of Rose Apple (*Syzygium jambo*) possess an allelopathic potential because it can inhibit the growth of Mung beans (*Vigna radiata*). Lastly, the extract of the plant contains secondary compounds such as alkaloids, tannins, phenolic compounds, flavonoids, and Leucoanthocyanins. 

This is Art, Mr White

Well, actually it's
just basic science...

Recommendation

For the improvement of the study, more research should be done to test the other soil properties in the sampling site such as the soil fertility also the allelopathic activity of Rose Apple (*Syzygium jambo*) against other plants aside from Mung beans. Moreover, various types of soil sample from Chonradsadornumrung School will be used to determine the allelopathic activity of the experimental plant





Internet

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Thank you

