Relation between intercropping and soil quality in Hevea brasiliensis plantation affects to latex, Trang, Thailand.

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Abstract

The objective of this study is to study the relationship between the type of intercropping and soil quality in Hevea brasiliensis plantations. There are 3 study areas: Hevea brasiliensis plantations that without intercropping, Hevea brasiliensis plantations that intercrop Gnetum gnemon and Hevea brasiliensis plantations that intercrop Melastoma malabathricum by studying the physical characteristics of the soil, humidity, temperature, acidity-base, and nutrients of the soil that are indicators of the quality of the soil in each source. There is a difference between humidity, temperature, acidity, and soil nutrients in areas with intercropping and without intercropping. The physical characteristics of the soil, humidity, temperature, acidity base, and soil nutrients in areas with different types of intercropping are different. The amount of latex in Hevea brasiliensis plantations that are without intercropping and have different types of intercropping is different.

Keywords : The quality of the soil, Hevea brasiliensis, Intercropping.

Introduction

Hevea brasiliensis has been an important economic crop of Thailand for a long time. Economy Hevea brasiliensis is a plant that generates income for farmers. And in society, Hevea brasiliensis is a plant that is related to way of life, culture, community and locality. Until it can be said that Hevea brasiliensis is "Cultural plants" are currently cultivated. Widespread in all over Thailand Especially in the southern part of Thailand, where the climate is hot and humid, suitable for planting Hevea brasiliensis, Hevea brasiliensis can be planted. And high returns It has a productive life of 25-30 years and is a plant that generates income for farmers as well. As a result, farmers are interested in planting a large amount of pure rubber. Planting Hevea brasiliensis in the first 3 years. Hevea

brasiliensis has a root system. Spread not far from the tree Therefore, the area between the rubber rows Farmers are able to plant intercropping.

Therefore, the researcher is interested in studying the physical characteristics of the soil. Soil moisture, soil temperature, soil acidity, soil base, latex and soil nutrient content in the Hevea brasiliensis plantation without intercropping plants and with intercropping plants in Khok Lor Subdistrict, Muang District, Trang, Thailand to bring knowledge about relationships between types of intercropping and soil quality in Heavea brasiliensis plantations that affects the amount of Heavea brasiliensis used for Career development of Heavea brasiliensis planters in selecting intercropping crops in the garden.

Research questions

1. Physical characteristics of soil, soil moisture value, soil temperature, acidity bass of soil, and nutrients in the soil around the Hevea brasiliensis plantation with intercropping plants and without intercropping plants. Is there a difference?

2. Physical characteristics of the soil, soil moisture value, soil temperature, acidity bass of soil, and nutrients in the soil around Hevea brasiliensis plantations with different types of intercropping plants. Is there a difference?

3. Is the amount of latex in Hevea brasiliensis plantations that do not have intercropping plants and have different types of intercropping plants. Is there a difference?

Research hypothesis

1. Physical characteristics of the soil, soil moisture value, soil temperature, acidity bass of soil and the nutrients in the soil around the Hevea brasiliensis plantation with intercropping plants and have different types of intercropping plants are different.

2. The amount of latex in Hevea brasiliensis plantations with intercropping plants and different types of intercropping plants are different.

Research Objectives

1. To study the physical characteristics of the soil, soil moisture value, soil temperature ,acidity bases soil and nutrients in the soil in Hevea brasiliensis plantations that are without intercropping plants and have different types of intercropping plants.

2. To study the amount of latex in Hevea brasiliensis plantations that are without intercropping plants and have different types of intercropping plants.

Materials and methods

Materials

1. Soil color book	2. Tape measure
3. plastic rope	4. Flag
5. Soil pH test kit	6. Globe Observer Application
7. Thermometer	8. pH meter
9. NPK soil test kit	10. Vernier caliper
11. Soil Classification Manual	12. Digital soil meter
13. Multi-purpose meter	14. Multi-purpose meter

Method

The study area

This research was conducted at 3 Hevea brasiliensis plantations at Trang, Thailand. That is the Hevea brasiliensis plantations without intercropping plants. It is located at latitude 7.4985061 degrees North, Longitude 99.6127243 degrees East. Hevea brasiliensis plantations that plant Gnetum gnemon . It is located at latitude 7.4986596 degrees North, Longitude 99.6127203 degrees East.And Hevea brasiliensis plantation with Melastoma malabathricum. It is located at latitude 7.4978781 degrees North, Longitude 99.6106486 degrees East

Picture 1 shows the Hevea brasiliensis plantation without intercropping plants

Picture 2 shows the Hevea brasiliensis plantation that plants Gnetum gnemon

Picture 3 shows the Hevea brasiliensis plantation that plants Melastoma malabathricum

Operational procedures and data collection

Soil quality data collection

The soil quality was measured according to the GLOBE method by studying soil texture, soil structure, soil color, soil temperature measurement. Soil pH, Soil moisture and fertility complete in the soil from the N P K values in the soil as follows:

1.) Specify sampling points in 3 Hevea brasiliensis plantations, namely the Hevea brasiliensis plantation area without intercropping plants. Hevea brasiliensis plantation in the area where Gnetum gnemon is planted and Hevea brasiliensis plantations in areas which the natural Melastoma malabathricum. Three soil sampling sites were collected in each area, totaling 9 soil sampling sites.

2.) Study the physical characteristics of the soil by studying Soil structure using CU Smart Lens to study soil texture and soil color. By comparing with the soil color book.

3.) Measure the temperature of the soil at every point. A soil thermometer was taken to measure the soil temperature at a depth of 10 cm. The soil temperature was read and the data were collected 3 times.

4.) Measure the moisture content in the soil at every point. By bringing Soil Moisture Tester Light Lux Meter & PH Meter At the depth of 5 cm, read the soil moisture content and collect the data 3 times.

5.) Take a soil sample. at every sampling point To study soil properties according to various indices in the laboratory, including pH, N, P and K values. Soil pH values were measured using indicator paper and N, P and K values were measured using the N P K soil test kit.

Information of the amount of latex

1.) Determine the collection points for the amount of latex from the Hevea brasiliensis at every soil quality measurement point.

2.) Weigh the collected latex. Write down the information in the table.

GLOBE Protocols

Principles of soil structure classification

Principle of measurement of soil adhesion

Principles of soil acidity determination

Principles of measuring soil fertility

Data analysis

1.) Soil analysis, soil moisture content Soil temperature, acidity, soil base and soil nutrients. using mean and standard deviation

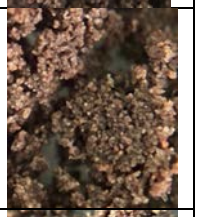
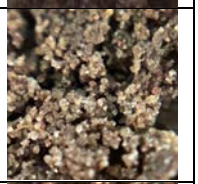
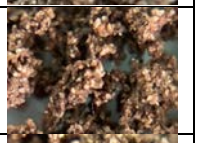
2.) Comparison of soil quality in Hevea brasiliensis plantations without intercropping and with different intercropping by using one way ANOVA.

3.) Analyze the relationship between latex content and soil quality. in the Hevea brasiliensis plantation without intercropping and with different intercropping by using Correlation Analysis and Regression Analysis.

Result

1. A study of the physical characteristics of the soil in Hevea brasiliensis plantations without intercropping plants and with different types of intercropping plants.

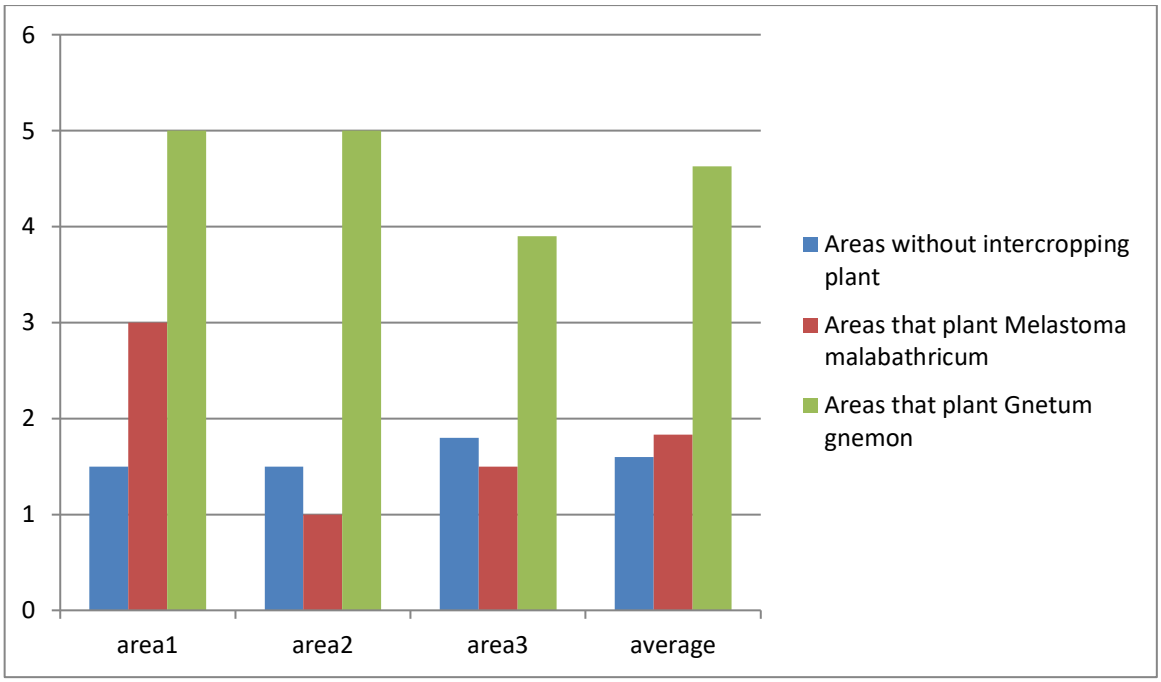
Table 1 shows the physical characteristics of the soil in Hevea brasiliensis plantations without intercropping plants and with different types of intercropping plants.

The Hevea brasiliensis plantation area studied		Soil structure	Soil color	Soil consistence	Soil texture	soil sample
Areas without intercropping plant	area1	granular	7.5R 3/2 Dusky Red	friable	sandy loam	
	area2	granular	10YR 4/4 DK.Yel.Brown	friable	sandy loam	
	area3	granular	5YR 3/4 DK.Red.Brown	friable	sandy loam	
Areas that plant Melastoma malabathricum	area1	granular	2.5YR 4/2 Weak Red	friable	silt loam	
	area2	granular	2.5YR 4/2 Dusky Red	friable	silt loam	
	area3	granular	7.5YR 4/2 Brown	friable	silt loam	
Areas that plant Gnetum gnemon	area1	granular	7.5YR 4/2 Brown	friable	sandy loam	
	area2	granular	5YR 4/3 Reddish Brown	friable	sandy loam	
	area3	granular	5YR 3/4 DK.Red.Brown	friable	sandy loam	

From Table 1. It was found that the areas without intercropping plants. The soil structure is granular, the consistency of the soil is friable and the soil texture is sandy loam. In the areas that plant Melastoma malabathricum, the soil structure is granular, the consistency of the soil is friable and the soil texture is silt loam. The areas that plant Gnetum gnemon. The soil structure is granular, the consistency of the soil is friable and the soil texture is sandy loam.

2. Study of soil moisture The Hevea brasiliensis plantations without intercropping plants and with different types of intercropping plants.

Chart 1 shows soil moisture values. The Hevea brasiliensis plantations are without intercropping plants and with different types of intercropping plants.



According to the chart, the areas the plant Gnetum gnemon is the most soil-moisture value, the areas the plant Melastoma malabathricum, and areas without intercropping plants, respectively.

3. Soil temperature study The Hevea brasiliensis plantations without intercropping plants and with different types of intercropping plants.

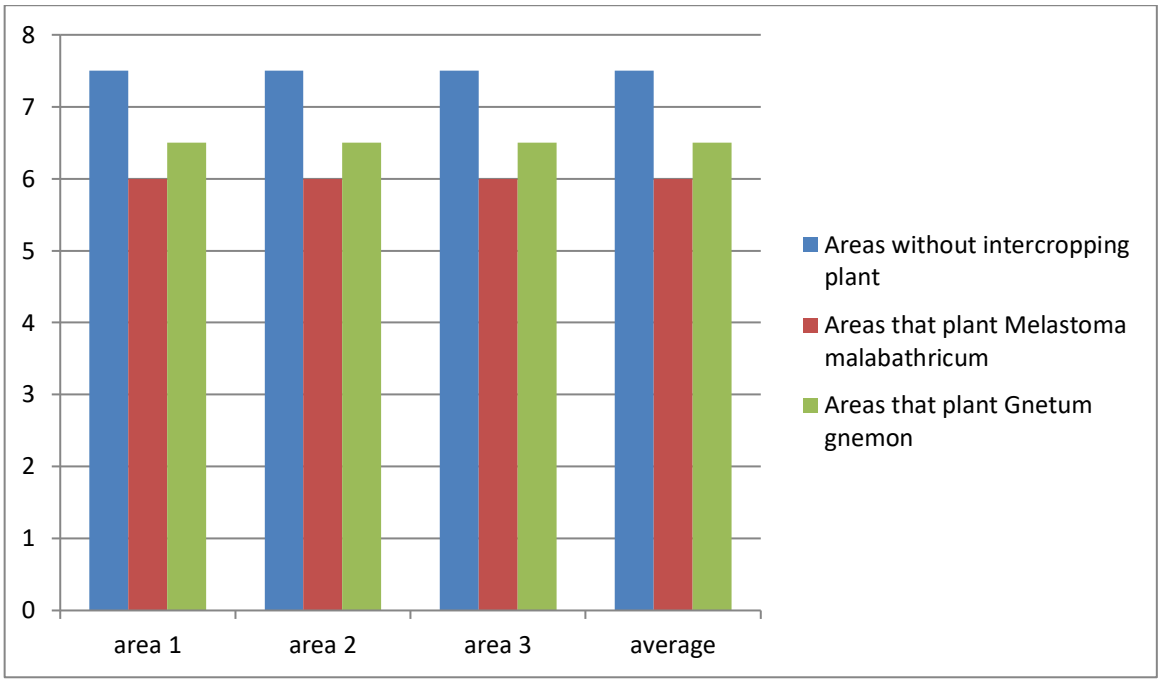
Table 2 shows the temperature of the soil. The Hevea brasiliensis plantations without intercropping plants and with different types of intercropping plants.

The Hevea brasiliensis plantation area studied	**soil temperature**			
	area 1	**area 2**	**area 3**	**average**
Areas without intercropping plant	35	36	35	35.33±0.58
Areas that plant Melastoma malabathricum	40	38	39	39±1
Areas that plant Gnetum gnemon	33	35	34	34±1

From table 2, it is found that the areas of the plant Melastoma malabathricum have the highest soil temperature, the areas without intercropping plants, and the areas that plant Gnetum gnemon, respectively.

4. The study of the acidity base of the soil in Hevea brasiliensis plantations without intercropping plants and with different types of intercropping plants.

Chart 2 shows the acidity base of the soil in Hevea brasiliensis plantations without intercropping plants and with different types of intercropping plants.



According to chart 2, the areas without intercropping plants have the highest pH, the areas that plant Gnetum gnemon, and the areas that plant Melastoma malabathricum, respectively.

5. Study of soil nutrients of the soil in Hevea brasiliensis plantations without intercropping plants and with different types of intercropping plants.

Table 3 shows the nutrients of the soil in Hevea brasiliensis plantations without intercropping plants and with different types of intercropping plants.

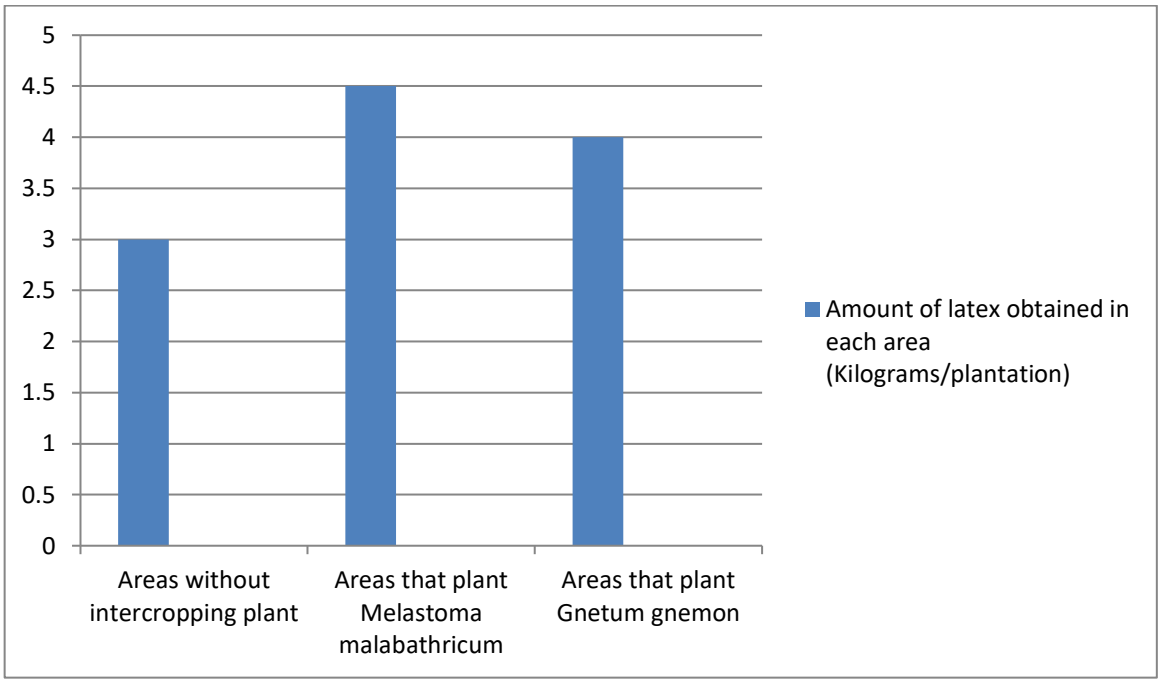
The Hevea brasiliensis plantation area studied	**N, P, K values in soil**								
	area 1			**area 2**			**area 3**		
	N	**P**	**K**	**N**	**P**	**K**	**N**	**P**	**K**
Areas without intercropping plant	2	3	1	2	3	1	2	3	1
Areas that plant Melastoma malabathricum	3	2	1	3	2	1	3	2	1
Areas that plant Gnetum gnemon	0	3	1	0	3	1	0	3	1

Note High = 3, Medium = 2, Low = 1, Trace = 0

From Table 3, it was found that all 3 areas have different soil nutrients. The areas that plant Melastoma malabathricum have the greatest nitrogen content. the areas without intercropping plants and the areas that plant Gnetum gnemon have the highest phosphorus content, and all three areas have the same potassium content.

6. To study the amount of latex in Hevea brasiliensis plantations without intercropping plants and with different types of intercropping plants.

Chart 3 to study the amount of latex in Hevea brasiliensis plantations without intercropping plants and with different types of intercropping plants.



According to this chart, The areas that plant Melastoma malabathricum has the highest amount of latex, the areas that plant Gnetum gnemonand andthe areas without intercropping plants, respectively.

Discussion

Part 1 Study the physical characteristics of soil, soil humidity, soil temperature, soil acidity-base and soil nutrient content. It was found that there is a difference between the area with intercropping and without intercropping.

From the study of soil quality In the area there are without intercropping and there are different intercropping. It was found that in areas without intercropping, Soil structure was glanular. Soil consistence was friable and soil texture was sandy loam. The area where Melastoma malabathricum is intercropping , Soil structure was glanular. Soil consistence was friable and soil texture was silt loam. The area where Gnetum gnemon is intercropping , Soil structure was glanular. Soil consistence was friable and soil texture was sandy loam. The soil moisture content of the area with Gnetum gnemon was the highest. Soil temperature in the area where the Melastoma

malabathricum was intercropping was found to be the highest. The pH in the soil without intercropping was the highest. and nutrient content in the soil. All 3 areas are difference

Part 2: Study of soil physical characteristics, soil humidity, soil temperature, soil acidity-base and soil nutrient content.It was found that in areas where there were different intercropping, the values were different.

From the study of soil quality in the areas with Melastoma malabathricum and Gnetum gnemon, it was found that the areas with Melastoma malabathricum was intercropping . Soil structure was glanular. Soil consistence was friable and soil texture was silt loam. The area with Gnetum gnemon was intercropping . Soil structure was glanular. Soil consistence was friable and soil texture was sandy loam. The soil moisture content of the area with Gnetum gnemon was higher than that of the area with Melastoma malabathricum. The pH of the soil in the Gnetum gnemon area was higher than that of the Melastoma malabathricum area and nutrient content in the soil were different in both areas.

Part 3 Studying the amount of latex in the Hevea brasiliensis without intercropping and with different intercropping.

From the study of the amount of latex in the Hevea brasiliensis without intercropping and with different intercropping. It was found that the area with Melastoma malabathricum was the highest amount of latex, areas with Gnetum gnemon and those without intercropping, respectively.

Conclusion

The study concluded that the Physical characteristics of the soil, soil moisture value, soil temperature, acidity bass of soil, and the nutrients in the soil around the Hevea brasiliensis plantation with intercropping plants and have different types of intercropping plants are different. and the amount of latex in Hevea brasiliensis plantations with intercropping plants and different types of intercropping plants are different.

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