A COMPARATIVE STUDY OF SOIL QUALITY AND DIVERSITY OF SOIL MACROFAUNA IN OIL PALM PLANTATIONS, NA KHAO SIA SUBDISTRICT, NA YONG DISTRICT, TRANG PROVINCE

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Introduction

Soil quality is vital for oil palm productivity in Southern Thailand, as it regulates nutrient absorption and water retention. Soil macrofauna, such as earthworms and ants, enhance these conditions by decomposing organic matter and improving soil structure. Consequently, the diversity and abundance of these organisms serve as key biological indicators of agricultural health and soil fertility.

Research Questions

1. What are the characteristics of soil quality in oil palm plantations using bio-fertilizers in Na Khao Sia Subdistrict, Na Yong District, Trang Province, and do they differ across different plots?
2. How does the application of bio-fertilizers affect the diversity and types of soil macrofauna in oil palm plantations in Na Khao Sia Subdistrict, Na Yong District, Trang Province?

Research Hypotheses

1. Oil palm plantations using bio-fertilizers will exhibit better soil quality compared to those that do not use bio-fertilizers.
2. Oil palm plantations using bio-fertilizers will have a greater diversity and abundance of soil macrofauna than those that do not use bio-fertilizers.

2. Research Methodology

2.1 Study Area Selection This research was conducted in oil palm plantations located in Na Khao Sia Subdistrict, Na Yong District, Trang Province, at coordinates 7.537514744309354 N and 99.72731313802555 E.

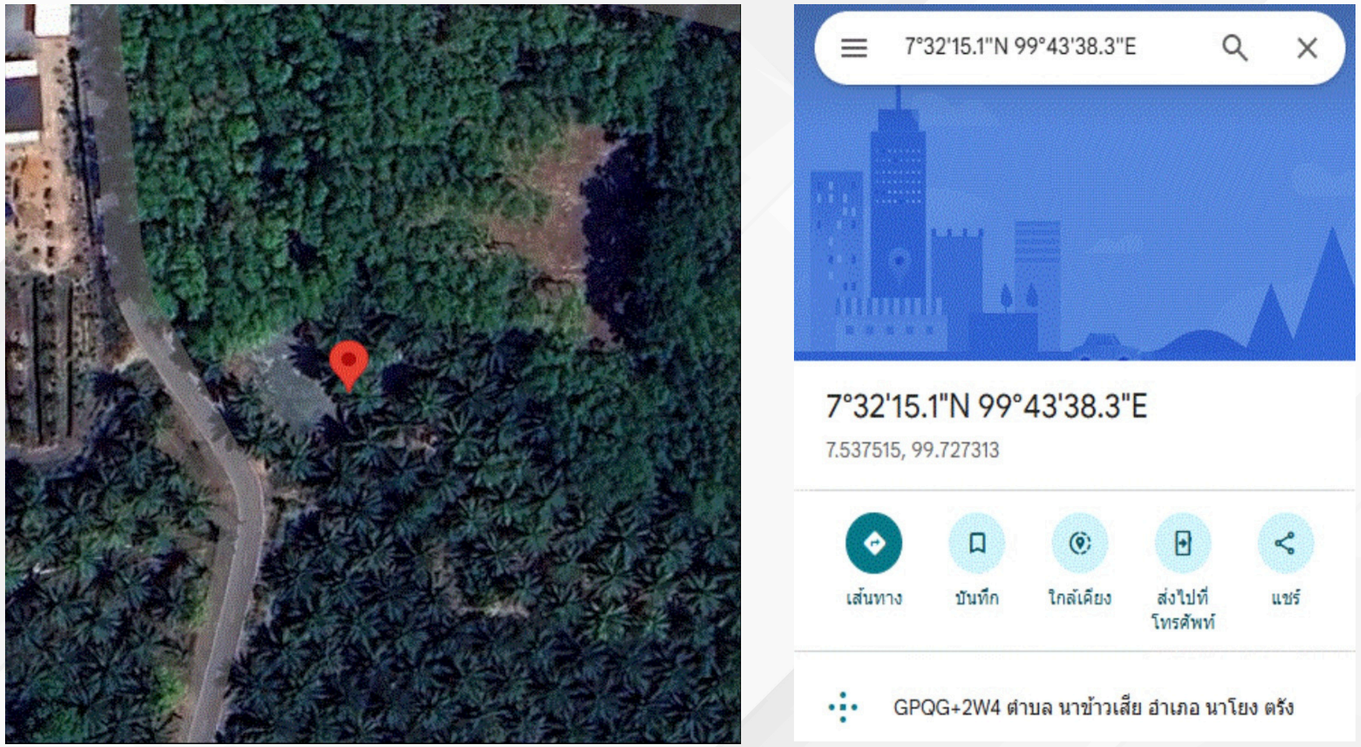

Figure 1: Study site within oil palm plantations in Na Khao Sia Subdistrict, Na Yong District, Trang Province. Source: Google Maps.

Soil samples were randomly collected from three points per site at oil palm plantations in Na Khao Sia, Trang. Initial measurements of moisture, pH, and temperature were taken at a 6 centimeters depth. The samples were then sun-dried for three days before final recording and analysis.

Figure 2: Three sampling points where soil samples were collected and stored in plastic bags. Source: Google Maps.

2.3 Analysis of Soil Physical Properties

2.3.1 Soil Texture Soil samples were collected from three randomized points, with each sample stored separately in plastic bags for further analysis.
2.3.2 Soil Moisture Content Soil moisture was measured using a JEDTO soil moisture meter. The probe was inserted into the soil at a depth of 6 centimeters for a single reading per point, after which the data was recorded.
2.3.3 Soil pH Level The soil pH level was determined using the JEDTO soil meter. The device was inserted to a depth of 6 centimeters for a single measurement, and the results were recorded.
2.3.4 Soil Temperature Soil temperature was measured using a soil thermometer. The thermometer was inserted into each soil sample at a depth of 5 centimeters. The readings were then taken and recorded.

Research Materials and Equipment

1. Beakers
2. Plastic bags
3. Soil thermometer
4. JEDTO soil moisture meter

3. Research Results

3.1 Soil Quality Analysis (Post-Sampling)

Table 1: Analysis of Soil pH Levels in Oil Palm Plantations, Na Khao Sia Subdistrict, Na Yong District, Trang Province.

Soil Sample	Trial 1	Trial 2	Trial 3
1	7.0 - 8.0	7.0 - 8.0	7.0
2	7.0	7.0	7.0
3	7.0 - 8.0	8.0	8.0

Table 2: Analysis of Soil Moisture Levels in Oil Palm Plantations, Na Khao Sia Subdistrict, Na Yong District, Trang Province.

Soil Sample	Trial 1	Trial 2	Trial 3
1	Level 8	Level 7	Level 7
2	Level 7	Level 8	Level 8
3	Level 3	Level 2	Level 2

Table 3: Analysis of Soil Temperature in Oil Palm Plantations, Na Khao Sia Subdistrict, Na Yong District, Trang Province.

Soil Sample	Trial 1 (˚C)	Trial 2 (˚C)	Trial 3 (˚C)
1	27 -28˚C	27 -28˚C	28˚C
2	26 -27˚C	26˚C	26˚C
3	36 - 38˚C	38˚C	38˚C

Conclusion

This study compared soil quality and macrofauna diversity in Trang Province oil palm plantations following bio-fertilizer application. Results showed favorable conditions for cultivation, with a neutral to slightly alkaline pH (7.0–8.0) and varying moisture levels. These environmental factors significantly influenced the distribution and survival of soil surface fauna, indicating that bio-fertilizer supports a functional soil ecosystem.

Reference

Kantapitcha Kunrojsiri, Chayada Chaosuan, and Rosminee Malinee. (2017).
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Data Entry

Soil pH	
Measured Date:	2025-11-20
Organization Name:	Sawat Rattanapimuk
Site ID:	409360
Site Name:	Nakhawsea Sub-distric, Nayong Distric
Country Name:	Thailand
Country Code:	THA
Latitude:	7.53754
Longitude:	99.72731
Elevation:	37.7m
Collected On:	2025-11-20T00:00:00
pH:	7.3
Horizon Top Depth:	0 cm
Horizon Bottom Depth:	10 cm
Horizon Number:	1
Reference Depth Level5cm:	true
Reference Depth Level10cm:	true
Ph Method:	meter
Comments:	3 places

THANK YOU

FOR YOUR ATTENTION