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Termites Diversity at Different Locations of Universiti Teknologi Mara (UiTM) Jengka Campus, Pahang, Malaysia

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ABSTRACT

Termites, often considered pests, play crucial roles in ecosystems by mediating ecological processes, enhancing soil quality, and aiding decomposition. Despite the ecological importance of termites in tropical ecosystems, studies on termite diversity in Malaysia remain geographically uneven. Most published surveys have focused on specific localities such as Pulau Pangkor in Perak, Berembun Forest Reserve in Negeri Sembilan, and several sites in Sabah, while information from many areas of Peninsular Malaysia remains scarce. In Pahang, available studies are largely restricted to termite communities associated with oil palm plantations in Endau Rompin, leaving many natural and managed habitats insufficiently documented. This study focused on assessing termite diversity and population at Universiti Teknologi MARA (UiTM) Jengka Campus, Pahang, characterized by dense vegetation amidst built-up areas. Nine locations were surveyed, including the Seri Gading Forest, around the Infra Sains Teknologi (IST) area, Fast Track area, around Kolej Tok Gajah, Rumah Tamu pond, Kolej Tok Gajah lake route, hockey field, WoodTech area, and UiTM front gate hill. Data collection involved transect walks, quadrat sampling, and active searches. A total of 19 termite species from two families and four subfamilies were identified. *Microcerotermes crassus*, a species of the family Termitidae, had the highest species abundance, with 216 individuals. Meanwhile, the Seri Gading Forest is home to a high species richness of termites, with nine species identified there. Most observed termite species belonged to the wood-feeding group, with nesting preferences of arboreal, epigeal, and wood-nesting across the sampling sites. The findings offer insights into pest management strategies, particularly by understanding termite diversity, feeding habits, and habitat preferences.

1. Introduction

Termites, a social insect that feeds on cellulose and lives in nests or self-built thermograms, belong to the order Isoptera, or insect groupings with similar fore- and rear-wings [20]. Together with ants and mites, they are the most abundant arthropods in humid tropical regions. Krishna *et al.,* [18] and Mohamad Kori et al., [24] discovered 3106 extant and fossil termite species globally. Tropical,

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subtropical, and humid climates produce most of these species. The world has 2,648 termite species in seven families and 281 genera, according to Kambhampati and Eggleton [15]. Southeast Asia is noted for its termite diversity, especially Rhinotermitidae, Kalotermitidae, and Termitidae [20].

Although termites are pests that damage property, they also provide nutrients for the forest. They change soil pH and organic carbon content in tropical conditions, making them essential decomposers and soil engineers. Termites act as essential decomposers of wood, debris, and soil organic matter. Because decomposition rates vary based on species-specific feeding behaviors [37], termites are classified into wood, soil, litter, soil-wood intermediate, and micro-epiphyte feeding groups [4, 5,10].

Additionally, termites are eusocial colonial insects that divide work and care for the young, like humans and other social animals. They have castes and work divisions, distinguishable by physical traits and morphology [3] [25]. These castes collaborate to complete specific jobs, and colony growth, survival, and reproduction depend on the distribution of duties. The size of a termite colony depends on the number of invading worker castes, and the longer the colony exists, the larger it is. The termite queen produces a social pheromone, which helps them distinguish themselves and communicate with their species [28].

There is not much research on termites in Pahang since they have numerous groups distinguished by several distinctive qualities. Hence, the investigation was conducted at the UiTM Jengka Campus because of its proximity to a reserve forest. Although termite species diversity has not been the subject of any recent studies, the campus is home to various potential habitats. This research sought to understand termite diversity and dispersion in the region to determine their abundance and variety. Thus, this study sought to identify termite species, assess species richness and diversity, and determine habitat preferences based on nesting and feeding groups at Universiti Teknologi MARA (UiTM) Jengka Campus in Pahang.

2. Methodology

2.1 Diversity of Termites

2.1.1 The Study Sites

This study was conducted at UiTM Jengka Campus in Pahang, located at 3º44’57.93” N and 102º33’46.74” E in Bandar Pusat Jengka. The campus is densely vegetated, with dispersed buildings. Nine locations within the campus were selected to assess termite species diversity. Figure 1 depicts the study area’s location, characterized by diverse environmental features influencing termite population diversity.

2.1.2 Materials

All the collected termites were preserved in 75% ethanol in vials to maintain their shape and prevent mold spoilage or growth since they are fragile and soft-bodied insects. Samples were kept in laboratories until further observation. The identification of termite species is based on the external morphological characteristics of soldiers (or workers, if necessary) that were carried out using a stereo microscope, regarding the published keys and descriptions from Tho and Kirton [35], Mill [23], Kambhampati and Eggleton [15], and Kalleshwaraswamy et al., [14]. Besides, termite databases of https://www.termiteweb.com/ and https://www.rudolfscheffrahn.com/ along with previous studies were used as references for species identification [21,29,30].

Fig. 1. Location of the study area

2.1.3 Sampling method

This study used three sampling methods: transect, quadrat, and active searching. Termites were collected in the morning and evening when they are most active. A total of 9 transects were conducted across the campus (one per sampling site), yielding a cumulative transect length of 450 meters. Each 50 m transect was divided into five 10-meter sections, with each section searched by a team of two collectors for 30 minutes (amounting to 2.5 hours of search time per transect). Besides, a total of 9 main plots (5 m × 5 m) were deployed across the campus (one per sampling site). Across these 9 main plots, a grand total of 45 separate 1 m × 1 m sub-sections were randomly designated and thoroughly surveyed (5 sub-sections per site) [13]. Each 1 m × 1 m subsection was systematically searched by two collectors for approximately 15 minutes, resulting in 75 minutes of active search time per main plot and a cumulative quadrat search time of 11.25 hours for the entire study. Collected termites were picked up with an ethanol-dipped brush and stored in labeled 30 ml containers with 75% ethanol. Active searching was done outside the transects and quadrats by manually checking random spots for termites in mounds, nests, decaying wood, soil, and leaf litter. Termites found in these microhabitats were also preserved in ethanol for later identification [1].

2.2 Species Richness of Termite
2.2.1 Ecological indices calculation

The study used species diversity indices, such as the Margalef index, Shannon-Wiener index, and Simpson (1-D) index, to measure the diversity of termite species [22,32,33]. Margalef measures species richness and abundance [7], while Shannon-Wiener and Simpson's index evaluate species evenness or dominance. The diversity indices were calculated using PAST software. These indices are widely used across communities and can be classified into two types: species richness and species evenness. Margalef's index measures the effect of sample size on diversity, while Shannon-Wiener measures diversity based on species abundance. When the value of the Shannon index is equal to 0, it indicates a community that only has one species [38]. However, the Shannon-Wiener index only considers species identity and composition. On the other hand, the Simpson index emphasizes species composition and evenness, with a higher Simpson index value indicating lower diversity.

2.3 Habitat preference of termites

The feeding and nesting groups of the identified termites were analyzed by observing their nesting site regarding the previous studies [3,12,24].

3. Results and Discussion

3.1 Identification of termite species Diversity of termites

Termites were collected around UiTM Jengka Campus, Pahang, in nine different locations. The fieldwork for this study was conducted across two distinct sampling windows: April to June 2023 and February to March 2024. Field collections were systematically carried out during the early morning and late evening hours to target peak periods of termite activity. The current study successfully identified 19 species of termites from 10 genera, two families, and four subfamilies.

A total of two families were identified: Termitidae and Rhinotermitidae. Family Termitidae consists of three subfamilies: Termitinae, Macrotermitinae, and Nasutitermitinae. Subfamily Termitinae consisted of three genera: Microcerotermes, Globitermes, and Amitermes. For subfamily, Macrotermitinae consists of three genera: Macrotermes, Odontotermes and Ancistrotermes. The subfamily Nasutitermitinae consists of three genera: Nasutitermes, Bulbitermes, and Longipeditermes. Meanwhile, the family Rhinotermitidae comprised only one subfamily with one genus: Coptotermitinae.

The findings are summarized in Table 1, while Figure 2 shows all the collected termite species. Among the three methods used, active searching seems more effective in termite sampling than the quadrat and transect methods (Table 1). Active searching identified sixteen species, while the transect and quadrat methods can only find three species belonging to the family Termitidae. It is important to acknowledge certain limitations inherent to the sampling design of this study. First, the spatial scope was limited to a single institutional campus setting, and the sampling windows spanning April to June 2023 and February to March 2024 provide a baseline snapshot rather than an assessment of long-term temporal shifts. Furthermore, the collection methods introduced certain detection biases. Active searching proved to be the most productive protocol, accounting for 16 of the 19 recorded species; however, this technique naturally favors the discovery of conspicuous microhabitats such as surface logs, epigeal mounds, and visible arboreal nests. As a result, highly cryptic or strictly subterranean termite species may be under-represented in the current inventory, a factor that should be addressed in future surveys using deeper subterranean trapping methods.

Each species sampled was found in a different place according to the habitat preference of the termite species that could be seen during sampling (Table 2). Termites are renowned for their adaptability to various habitats, and they often choose their home based on factors including moisture, humidity, temperature, the availability of food, and nesting needs [16]. Termites under the families Rhinotermitidae and Termitidae prefer to inhabit decaying and damp wood, such as dead trees. These termites perform a crucial function in the natural decomposition process and the recycling of organic material. In contrast, some other species from the family Termitidae may prefer to build their habitats either in the soil or above ground in the shape of complex mound structures [16].

Table 1
Termite species recorded in Universiti Teknologi MARA (UiTM) Jengka Campus, Pahang, according to the sampling method

Family	Subfamily	Termite sp.	Methods
Termitidae	Termitinae	*Microcerotermes crassus*	T, A
		Microcerotermes serrula	A
		Globitermes sulphureus	T, A
		Amitermes dentatus	T
	Macrotermitinae	*Macrotermes gilvus*	A, Q
		Macrotermes carbonarius	A
		Macrotermes malaccensis	A
		Odontotermes sp.1	A
		Odontotermes sp. 2	Q
		Odontotermes formasanus	A
		Odonototermes javanicus	A
		Ancistrotermes sp.1	Q
		Ancistrotermes pakistanicus	A
	Nasutitermitinae	*Nasutitermes* sp.1	A
		Nasutitermes corniger	A
		Longipeditermes longipes	A
		Bulbitermes sp.	A
Rhinotermitidae	Coptotermitinae	*Coptotermes formosanus*	A
		Coptotermes curvignathus	A

Note: A (active searching), T (transect), Q (quadrat)

As in this study, most termites were found to build their nests in a mound compared to a tree, dead log, damp wood, ground, arboreal nest, and building. However, this result may be due to the sampling strategy conducted in this study. Factors such as collection methods and inadequate sampling sites influence the places where termites are found. This may result in the highest termite species found in trees recorded in this study.

3.2 Species richness and diversity

Table 3 displays samples collected from Universiti Teknologi MARA (UiTM) Jengka Campus, Pahang. Microcerotermes crassus tops the list with 216 individuals, followed by Odontotermes sp.1, Macrotermes gilvus, Coptotermes curvignathus, Odontotermes formasanus, and Odontotermes javanicus. Due to termites' social nature, the presence of one individual signifies an entire nearby colony, so occurrence data was used instead of absolute numbers. The study identified a diverse range of termite species from the family Termitidae, comprising two subfamilies with 13 species. Previous research by Arumugam et al., [2], and Mohamad Kori et al., [24] also noted Termitidae as the most common family due to its large size. Termitidae is globally prominent, encompassing 75% to 80% of all termite species. Conversely, the family Rhinotermitidae is less common, with only two species recorded in this study.

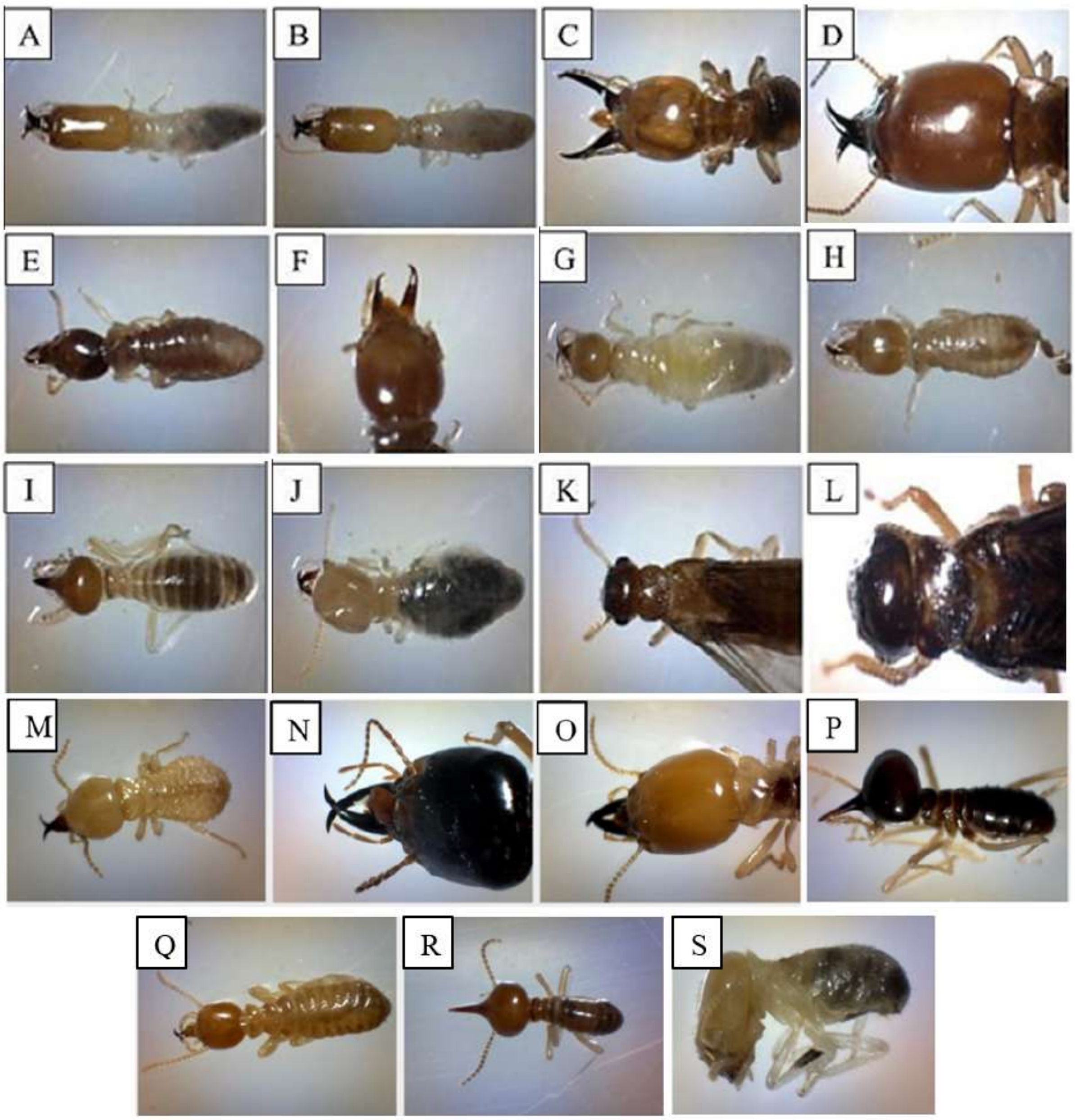

Fig. 2. Figure of termite species found from 9 sampling sites – (a) *Microcerotermes crassus*, (b) *Microcerotermes serulla*,(c) *Macrotermes malaccensis*, (d) *Macrotermes gilvus*,(e) *Odontotermes* sp.1, (f) *Odontotermes* sp.2, (g) *Globitermes sulphureus*, (h) *Ancistrotermes* sp.1, (i) *Nasutitermes* sp.1, (j) *Amitermes dentatus*, (k) *Coptotermes formosanus* (alate), (l) *Odontotermes formosanus* (alate), (m) *Coptotermes curvignathus,* (n) *Macrotermes carbonarius*, (o) *Odonototermes javanicus*, (p) *Longipeditermes longipes*, (q) *Ancistrotermes pakistanicus*, (r) *Bulbitermes sp*., (s) *Nasutitermes corniger*

Table 2
Termite species with a specific location and different habitat

Location	Longitude	Latitude	Places	Termite sp.
Kolej Tok Gajah lake route	E 102°34’2.519”	N 3°45’16.549”	Tree	*Microcerotermes crassus*
	E 102°34’2.842”	N 3°45’16.819”	Tree	*Microcerotermes serrula*
Infra Science Technology area	E 102°33’55.679”	N 3°45’27.678”	Tree	*Globitermes sulphureus*
	E 102°33’56.49”	N 3°45’24.71”	Mound	*Macrotermes gilvus*
	E 102°33’55.96”	N 3°45’25.32”	Dead log	*Coptotermes curvignathus*
	E 102°33’58.90”	N 3°45’32.73”	Dead log	*Coptotermes curvignathus*
Hockey field	E 102°33’46.974”	N 3°45’6.381”	Mound	*Amitermes dentatus*
Woodtech area	E 102°33’59.267”	N 3°45’22.277”	Mound	*Macrotermes gilvus*
UiTM front gate hill	E 102°33’39.192”	N 3°45’25.826”	Damp wood	*Microcerotermes crassus*
	E 102°33’39.312”	N 3°45’25.931”	Dead log	*Odontotermes* sp.2
	E 102°33’39.119”	N 3°45’25.931”	Tree	*Nasutitermes* sp.1
	E 102°33’39.193”	N 3°45’25.825”	Tree	*Ancistrotermes* sp.1
Seri Gading forest	E 102°34’7.726”	N 3°45’27.428”	Tree	*Microcerotermes crassus*
	E 102°34’7.485”	N 3°45’27.218”	Mound	*Macrotermes gilvus*
	E 102°34’05.79”	N 3°45’26.28”	Mound	*Nasutitermes corniger*
	E 102°34’05.81”	N 3°45’26.37”	Arboreal nest	*Odonototermes javanicus*
	E 102°34’05.99”	N 3°45’25.39”	Mound	*Macrotermes carbonarius*
	E 102°34’09.85”	N 3°45’26.57”	Dead log	*Odontotermes javanicus*
	E 102°34’09.85”	N 3°45’26.57”	Ground surface	*Macrotermes carbonarius*
	E 102°34’11.96”	N 3°45’30.96”	Ground surface	*Longipeditermes longipes*
	E 102°34’12.61”	N 3°45’32.96”	Arboreal nest	*Bulbitermes sp.*
	E 102°34’14.61”	N 3°45’38.92”	Mound	*Ancistrotermes pakistanicus*
	E 102°34’14.70”	N 3°45’38.56”	Arboreal nest	*Coptotermes curvignathus*
Kolej Tok Gajah	E 102°34’4.466”	N 3°45’9.191”	Building	*Coptotermes formosanus*
	E 102°34’5.138”	N 3°45’10.211”	Building	*Odontotermes formasanus*
Rumah Tamu pond	E 102°33’41.893”	N 3°45’29.013”	Ground	*Macrotermes malaccensis*
Fast track building area	E 102°33’55.914”	N 3°45’20.923”	Mound	*Odontotermes* sp.1

Table 3
Termite list collected at Universiti Teknologi MARA (UiTM) Jengka Campus, Pahang

Scientific name	Location									Total individuals
	KTG Lake route	IST	Hockey field	Wood-tech area	UiTM front gate hill	Seri Gading forest	Kolej Tok Gajah	Rumah Tamu pond	Fast track	
Family Termitidae										
Subfamily: Termitinae										
Microcerotermes crassus	55	-	-	-	58	95	-	-	8	216
Microcerotermes serrula	40	-	-	-	-	-	-	-	-	40
Globitermes sulphureus	-	89	-	-	-	-	-	-	-	89
Amitermes dentatus	-	-	7	-	-	-	-	-	-	7

Subfamily: Macrotermitinae										
Macrotermes gilvus	-	30	-	20	-	36	-	-	38	124
Macrotermes malaccensis	-	-	-	-	-	-	-	12	-	12
Macrotermes carbonarius	-	-	-	-	-	64	-	-	-	64
Odontotermes sp.1	-	-	-	-	-	-	-	-	156	156
Odontotermes sp.2	-	-	-	-	13	-	-	-	-	13
Odontotermes javanicus	-	-	-	-	-	90	-	-	-	90
Odontotermes formosanus	-	-	-	-	-	-	95	-	-	95
Ancistrotermes sp.1	-	-	-	-	35	-	-	-	-	35
Ancistrotermes pakistanicus	-	-	-	-	-	19	-	-	-	19
Subfamily: Nasutitermitinae										
Nasutitermes sp.1	-	-	-	-	31	-	-	-	-	31
Nasutitermes corniger	-	-	-	-	-	12	-	-	-	12
Bulbitermes sp.	-	-	-	-	-	53	-	-	-	53
Longipeditermes longipes	-	-	-	-	-	46	-	-	-	46
Family Rhinotermitidae										
Subfamily: Coptotermitinae										
Coptotermes formosanus	-	-	-	-	-	-	16	-	-	16
Coptotermes curvignathus	-	103	-	-	-	9	-	-	-	112
Total individuals (by location)	95	222	7	20	137	424	111	12	202	

Termite abundance and species richness varied across sites, with Seri Gading Forest showing the highest abundance and diversity, as indicated by the Margalef Index (1.322), Shannon-Wiener Index (1.982), and Simpson’s Diversity Index (0.8441). The stated hockey field, WoodTech area, and Rumah Tamu pond recorded Margalef, Shannon, and Simpson index values of 0 because only a single termite species was recorded at each site, indicating an absence of species diversity rather than the absence of termites.

Diversity indicates that higher species richness correlates with lower dominance (D) values. The study aligns with Sina and Zulkarnaen [34], who reported a proportional relationship between termite abundance and species richness. Environmental factors, such as vegetation cover and disturbance levels, significantly influence termite diversity. Seri Gading Forest, rich in vegetation and minimally disturbed, fosters higher diversity, whereas fragmented and human-impacted sites exhibit lower richness. Disturbance is identified as a primary driver affecting termite species composition [27, 6, 31]. The species richness recorded in Seri Gading Forest (9 species) provides valuable baseline data when compared to other habitats across Malaysia. For instance, primary forests generally exhibit higher termite diversity, such as the Belum-Temengor Forest Complex which recorded 40 species, and the Imbak Canyon Conservation Area in Sabah which recorded 31 species. Conversely, habitats subjected to geographical isolation or human modification tend to support lower species richness, as observed in Pulau Pangkor (19 species) and oil palm plantations on converted peatlands in Endau Rompin (29 species) [2,5,12].

While empirical data on environmental variables in this study were not quantitatively assessed, this higher diversity is consistent with ecological patterns documented in other tropical forest ecosystems. Previous studies have demonstrated that termite assemblages are highly sensitive to habitat disturbance, and alterations in habitat suitability often led to dramatic reductions in species abundance. Areas isolated from human activities generally maintain denser canopy covers, which in turn regulate crucial microclimate factors such as ambient temperature and soil moisture. These stabilized environmental conditions are particularly vital in determining the presence and distribution of specific functional groups, such as soil feeders, which rely heavily on soil moisture and organic content [12].

Table 4
Termite diversity indices according to location in the study area

Location	**No. of species**	**Individuals**	**Dominance (D)**	**Simpson (1-D)**	**Shannon (H)**	**Margalef**
Kolej Tok Gajah Lake Route	2	95	0.5125	0.4875	0.6806	0.2196
Infra Science Technology	3	222	0.3942	0.6058	0.9932	0.3702
Hockey Field	1	7	1	0	0	0
Woodtech	1	20	1	0	0	0
UiTM front gate hill	4	137	0.3047	0.6953	1.272	0.6098
Seri Gading Forest	9	424	0.1559	0.8441	1.982	1.322
Kolej Tok Gajah	2	111	0.7533	0.2467	0.4124	0.2123
Rumah Tamu Pond	1	12	1	0	0	0
Fast Track area	3	202	0.6334	0.3666	0.6417	0.3768

3.3 Habitat preference

All termites caught are classified into different feeding and nesting groups based on the species, type of microhabitat observed during the study, and their typical diet [9,10,19]. The nesting behavior can be used to distinguish various termite species, including wood nesters, arboreal nesters, subterranean nesters, and epigeal mound-builders [3, 17]. The feeding groups can also be used to determine their habitat preference, resulting in wood feeders, soil feeders, and litter feeders.

As in this study, wood feeders dominated termite groups, contributing to the total termite species recorded from 9 locations. The classification of their feeding group is based on previous research by Jalaludin *et al.,* [12], Mohamad Kori and Arumugam [24], Donovan *et al.,* [8], and Arumugam *et al.,* [3]. The habitats of the sampling sites were found to possess a greater quantity of decaying and decomposing wood, which potentially contributed to the higher presence of wood-feeding termites in this study. Wood serves as a food source and a dwelling place or habitat for these types of termites. Meanwhile, the least collected species are intermediate wood-soil feeders and litter feeders compared to other feeding groups, followed by fungus growers and soil feeders.

As for intermediate wood-soil feeders, this termite group was one of the least recorded in this study. Intermediate soil-wood feeders are termites that obtain nutrients from both soil and wood sources by consuming a mixture of mineral soil and crumbly decayed wood [5]. Lack of suitable wood sources and unsuitable soil types may be a factor in the presence of fewer species among the intermediate soil-wood feeders since they rely on wood and soil as a significant part of their diet.

Moreover, in terms of nesting groups, most termite species found from 9 locations are from arboreal, epigeal and hypogeal nesters compared to wood nesters (Table 5). This termite nesting group identification is based on previous research from Jalaludin *et al.,* [12], Mohamad Kori et al., [24], and Arumugam *et al.,* [3], as well as site observation by observing their nesting site. Wood-feeding termites usually construct arboreal nests on living trees [26, 36]. Hence, they would capitalize on the trees they inhabit instead of venturing into the open area for food.

The difference in the number of termites feeding and nesting groups in 9 locations at UiTM Jengka, Pahang, may be due to environmental factors found in those locations. Termites usually build their colonies and nests near their food sources. The presence and abundance of termites in certain areas may be influenced by factors such as temperature, humidity, food availability, land use, and habitat modification. As recorded in this study, wood-feeding termites are the most prevalent because most locations of wood-feeding termites are in low-disturbance and resource-rich areas.

Table 5
Termite species collected from 9 locations in UiTM Jengka and their feeding and nesting group

Species	Feeding group	Nesting group
Family Termitidae		
Subfamily Termitinae		
Microcerotermes crassus	w	a
Microcerotermes serrula	w	a/w
Globitermes sulphureus	s/i	a/w
Amitermes dentatus	i	e
Subfamily Macrotermitinae		
Macrotermes gilvus	w/l/f	e
Macrotermes malaccensis	w/l	e
Macrotermes carbonarius	f	e
Odontotermes sp.1	w(f)	e
Odontotermes sp.2	w(f)	h
Odontotermes javanicus	w	e
Odontotermes formosanus	w	h
Ancistrotermes sp.1	f	w
Ancistrotermes pakistanicus	f	e

Subfamily Nasutitermitinae		
Nasutitermes sp.1	w	a
Nasutitermes corniger	s	a
Bulbitermes sp.	s	a
Longipeditermes longipes	s	e
Family Rhinotermitidae		
Subfamily Coptotermitinae		
Coptotermes formosanus	w	h
Coptotermes curvignathus	w	h

Note: w = wood feeders, s = soil feeders, i = intermediate wood-soil feeders, f= fungus growers, l = litter feeders. Nesting groups, a = arboreal nesters, w = wood nesters, h = hypogeal/subterranean nesters, e = epigeal mound-builders

4. Conclusions

The study identified 19 termite species from 10 genera, belonging to 2 families (Termitidae, Rhinotermitidae) and 4 subfamilies, at UiTM Jengka, Pahang. The Termitidae family (Macrotermitinae subfamily) dominated the area. *Microcerotermes crassus* showed the highest species richness, while *Amitermes dentatus* had the lowest. Besides, among the 9 study sites at UiTM Jengka, Pahang, Seri Gading Forest has the greater species richness of termites, as shown by the Margalef index value of 1.322, while the lowest species richness is at the hockey field, woodtech area, and Rumah Tamu pond area with the same Margalef index values of 0. Therefore, Seri Gading Forest has the most diverse termite species among nine sampling sites in UiTM Jengka, Pahang, possibly due to environmental factors and being away from human activities. While this work offers valuable baseline data on termite ecology, a key limitation is that sampling was restricted to two specific time frames (April to June 2023 and February to March 2024), which prevents the capture of complete long-term temporal shifts. Therefore, systematic, multi-seasonal monitoring across consecutive years is essential to fully evaluate seasonal fluctuations. From a practical standpoint, the documented presence of destructive wood-feeding, subterranean pests, specifically *Coptotermes curvignathus* and *Coptotermes formosanus* near campus infrastructure like Kolej Tok Gajah underscores the need for proactive pest management. Campus administrators should implement targeted baiting systems and protective soil barriers at the interfaces where structural zones meet high-diversity natural habitats like the Seri Gading Forest. Understanding these dynamic ecological elements will ultimately support the development of more robust, proactive termite management strategies in both urbanized campus spaces and natural forest ecosystems.

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