

**FAUNAL REMAINS FROM DIANG MAHANG IN KALIMANTAN:
TAXONOMIC IDENTIFICATION AND THEIR ARCHAEOLOGICAL
CONTEXT**

**Sisa Fauna dari Diang Mahang di Kalimantan: Identifikasi Taksonomis
dan Konteks Arkeologinya**

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Abstrak

Sisa fauna, baik vertebrata maupun invertebrata, merupakan temuan penting dalam penelitian arkeologi. *Proxy* tersebut dapat memberikan informasi identitas spesies binatang yang dapat berhubungan dengan manusia di suatu situs. Penelitian ini ditujukan untuk memahami keberadaan sisa-sisa fauna di ceruk payung Diang Mahang, sehingga dapat dipahami pula interaksi manusia dengan lingkungan di sekitarnya pada masa lampau. Penelitian terdahulu tentang sisa fauna di kawasan ini belum pernah dilakukan. Oleh karena itu, perlu dilakukan identifikasi taksonomis terhadap sisa-sisa fauna yang berkaitan dengan aktivitas manusia pada masa lampau di Diang Mahang. Penelitian ini menerapkan metode kualitatif-analitik dengan penalaran induktif. Analisis dilakukan dengan cara memperhatikan karakter diagnostik tulang untuk menentukan identitas taksonomisnya. Hasil penelitian menunjukkan bahwa sisa vertebrata terdiri atas tiga klas utama, yaitu Mamalia, Reptilia, dan Pisces. Berdasarkan karakteristik diagnostiknya, kelas Mamalia terdiri atas lima ordo, yaitu Rodentia, Chiroptera, Primata, Carnivora, dan Artiodactyla. Sementara itu, ciri-ciri diagnostik Reptilia menunjukkan keberadaan ordo Lacertilia dan Serpentes. Kelas Pisces menunjukkan genus *Himantura signifier* (sg.) dan famili Cyprinidae. Sisa-sisa invertebrata terdiri atas filum Moluska and Arthropoda. Sisa moluska marin *cowry* pun ada, tetapi bukan merupakan jenis yang dapat dikonsumsi. Secara kontekstual, sisa-sisa fauna berasosiasi dengan peralatan litik dan gerabah, yang menunjukkan aktivitas skala mikro di Diang Mahang yang berhubungan dengan kehidupan sehari-hari manusia di ceruk payung.

Kata kunci: sisa fauna, analisis taksonomi, karakteristik diagnostik, vertebrata, dan invertebrata

Abstract

Faunal remains, both vertebrates and invertebrates, are important discoveries in archaeological research. Such proxy may provide information on the identity of animal species which may associate with human at a site. This research aims to understand the existence of faunal remains in the rockshelter of Diang Mahang to further comprehend the interaction of humans and their environment in the past. No research involving animal remains in this region has been conducted before. Therefore, it is necessary to carry out a taxonomic identification of the faunal remains related to human activities in the past in Diang Mahang. This study applies a qualitative-analytic method with

inductive reasoning. The analysis was performed by observing the diagnostic characteristics of a bone to determine its taxonomic identity. Results of diagnostic characteristics showed that vertebrate remains comprise three main classes, i.e., Mammals, Reptiles, and Pisces. The remains of the invertebrate consist of Molluscs and Arthropods. Marine Cypraeid also existed but was not of the edible variety. Contextually, faunal remains are associated with lithics and pottery, indicating a micro-scale activity in Diang Mahang related to humans' daily life in the rockshelter.

Keywords: *faunal remains, taxonomic analysis, diagnostic characteristic, vertebrates, and invertebrates*

INTRODUCTION

The faunal remains, either discovered above ground or in archaeological units, are essential parts of an archaeological assemblage which may support the interpretation of a site (Ansyori and Awe 2015; Chase and Teeter 2004; Marciniak 1999; Meadow 1983). Such proxy or indirect evidence of human activities reflect patterns of ideas and behaviour of past communities (White, Scott, and Ashton 2006; Wedage et al. 2019; Wadley and Colfer 2004). On a macro-scale, the study of faunal remains or zooarchaeology provides information to reconstruct climate change (Yalden 2004; Bement et al. 2007; Lyman 2017). Teresa E. Steele (2015) states that over the past decade zooarchaeologists have shifted their perspectives from how the environment shapes society to how society changes the environment. On a micro-scale, faunal remains are important not only for recognizing the human environment and biodiversity in the past but also for understanding human behaviour towards nature (Storm et al. 2005; van den Bergh et al. 2009; Overton and Taylor 2018). Nevertheless, there is a possibility that unpredictable taphonomy history may not be answered by faunal analysis (Lyman 2002; Cain 2006).

Kalimantan is one of the geographic regions in the tropics that represent high biodiversity in the world (MacKinnon et al. 1996; Purwayantie and Suryadi 2020; Wadley and Colfer 2004), especially its mammalian species (Budiharta and Meijaard 2014). MacKinnon et al. (1996) claim there were several different zoogeographical divisions on the island of Borneo. The differences were mainly determined by geographical boundaries such as rivers and mountains. Hence, the faunas of Kalimantan's mountainous regions and lowland forests consist of different endemic species.

The present-day vertebrates (Kusmartono et al. 2019; Balai Besar Betung Kerihun and Danau Sentarum 2017; Borneo Wildlife Care 2021) show a variety of species typical to the limestone karst mountain regions in the upper basin of Sungai Kapuas (Table 1). This research focuses on faunal remains, both vertebrates and invertebrates, discovered in the rockshelter of Diang Mahang, in Kalimantan (Kusmartono et al. 2019).

The rockshelter of Diang Mahang is located on the southern slope of Bukit (hill) Mahang, in the upper reaches of Sungai Kapuas (Figure 1), about 31 km (geodesic distance) east of Putussibau, the capital city of Kabupaten Kapuas Hulu (Estiningsih

2018). Diang Mahang is situated at E 113.7414639 and N 0.802280556, at an altitude of 246 masl (meters above sea level; Kusmartono et al. 2019), and is surrounded by dense limestone forests (MacKinnon et al. 1996). Three units were excavated on the terrace of Diang Mahang.

Table 1. A variety of species typical to the limestone karst mountain regions in the upper reaches of Sungai Kapuas

<i>Aerodramus salangana</i> (Mossy-nest swiftlet)
<i>Alcedo meninting</i> (Blue-eared kingfisher)
<i>Amyda cartilaginea</i> (Asiatic softshell turtle)
<i>Arctictis binturong</i> (Binturong)
<i>Barbonymus collingwoodii</i> (<u>Ray-finned fish</u>)
<i>Buceros rhinoceros</i> (Hornbill)
<i>Cervus unicolor</i> (Sambar deer)
<i>Chlorocharis emiliae</i> (Pygmy black eye)
<i>Copsychus saavis</i> (White-rumped shama)
<i>Enicurus leschenaultia</i> (White-crowned forktail)
<i>Eonycteris spelaea</i> (Cave nectar bat)
<i>Falco peregrinus</i> (Peregrine falcon)
<i>Haliastur indus</i> (Brahminy kite)
<i>Harpactes diardii</i> (Diard's trogon)
<i>Helarctos malayanus</i> (Sun bear)
<i>Hylobates muelleri</i> (Müller's gibbon)
<i>Lanthanotus borneensis</i> (Earless monitor lizard)
<i>Macaca nemestrina</i> (Pig-tailed macaque)
<i>Machaeramphus alcinus</i> (Bat hawk)
<i>Meiglyptes grammithorax</i> (Buff-rumped woodpecker)
<i>Muntiacus muntjak</i> (Muntjac deer)
<i>Nasalis lavartus</i> (Proboscis monkey)
<i>Neofelis diardi borneensis</i> (Clouded leopard)
<i>Oculocincta squamifrons</i> (Pygmy white eye)
<i>Penthetor lucasii</i> (Dusky fruit bat)
<i>Pongo pygmaeus</i> (Orangutan)
<i>Presbytis</i> spp. (Langur)
<i>Pteropus vampyrus</i> (Borneo flying fox)
<i>Python breitensteini</i> (Borneo short-tailed python)
<i>Silurus</i> spp. (Catfish)
<i>Tor putitora</i> (Putitor mahseer)
<i>Tragulus</i> spp. (Mousedeer)
<i>Varanus salvator</i> (Asian water monitor)
<i>Wallago leerii</i> (Wallago catfish)

(Source: Kusmartono et al. 2019, tnbkds.menlhk.go.id/borneowildlifecare.org)

(Figure 2), i.e., E1N1, W1S1, and W2S1. The E1N1 and W1S1 were excavated, 2x1 m, to a depth of 83 cmbs (centimetre below surface), showing the presence of four layers, A to D (Figure 3). Unit W2S1 was excavated, 1x1 m, to a depth of 147 cmbs, and exposed five layers, A to E layers (Figure 2; Kusmartono et al. 2019).

The limestone forests prevent sun penetration resulting in a very humid environment (80%), making low light intensity around the Bukit Mahang massif. Such condition also affects the pH level of soil in the rockshelter. Thus, resulting in fragmented and highly weathered faunal remains due to burials in acidic soil with a pH of 4.5-6.5.

Since there is no precedent research on faunal remains in the upper reaches of Sungai Kapuas, the question that arises are: what is the taxonomic identity of the faunal remains, and what is their context that associates with human activities in Diang Mahang in the past? The objective of this research is to understand humans' interactions with their surrounding environment.

The present research was carried out using qualitative-analytic methods with inductive reasoning. The reasoning was explained by describing the collected data in detail and recording it verbally and pictorial. Afterwards, the analysis of faunal remains was performed by observing the diagnostic characteristics to determine their taxonomic identities.

The taxonomic identification was conducted by determining the taxon of fauna represented by a bone, tooth, or shell (Driver 2011; Lyman 2002). Basic identification requires familiarities to levels of family, genus, or species based on the Linnaean hierarchical taxonomy (Lyman 2019; Zhang 2011). Hence, specimens of the faunal

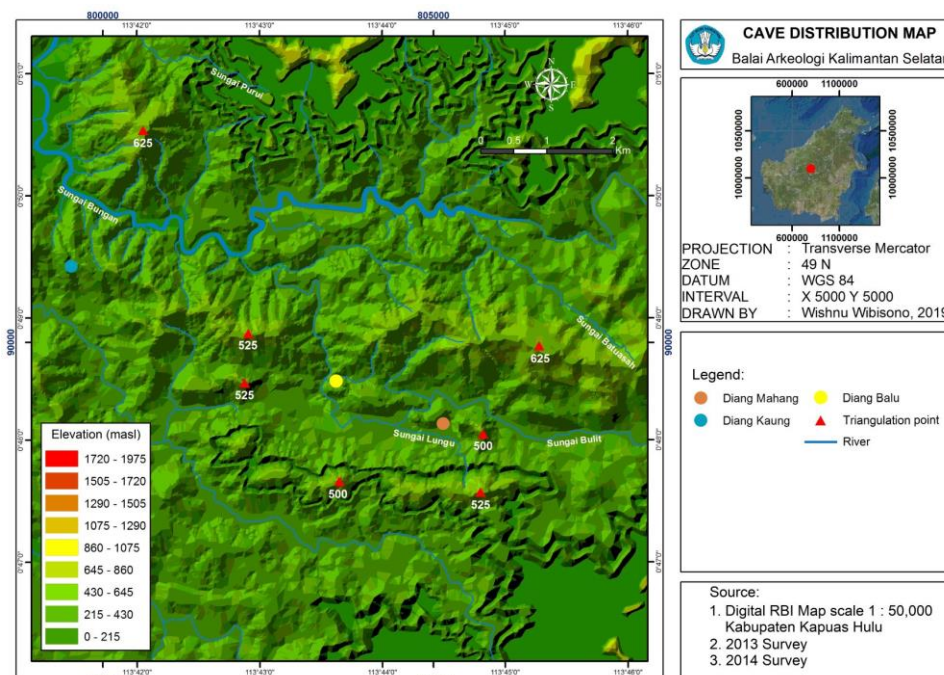


Figure 1. Diang Mahang (orange circle on the map, red circle on inset map), at E 113.7414639 and N 0.802280556, is geographically located in the middle of Kalimantan, approximately 453 km (geodesic distance) to the west coast (Source: Digital RBI Map Kabupaten Kapuas Hulu, redrawn by Muhammad Wishnu Wibisono, 2019; modified by author)

remains were observed by their diagnostic characteristics (Dobney and Rielly 1988; Fauzi 2016; Karr and Outram 2012; Milner 1999; Rachmatika 2001; Walton 1960; Wolverton 2013) such as jaw bone, vertebrae, phalanges, metatarsal, etc.

RESULT AND DISCUSSION

Taxonomic Identification

The faunal remains collected from the rockshelter of Diang Mahang comprise vertebrates and invertebrates. The population of vertebrate remains, including bones and teeth, totaled 5127 and weighing 3166.15 grammes (gm; Table 2). The vertebrate assemblage is weathered that out of the 5127 fragments only 38 (0.0074%) *total number of fragments* (TNF; 20.60 gm; Figure 4) showed identifiable and recorded analytical attributes. The population of recorded invertebrates was 305 and weighing 215.63 gm (Table 3), but the TNF showing diagnostic characteristics were 79 with a weight of 116.71 gm (Figure 5;).

Most faunal remains, either vertebrates or invertebrates, are very fragile and weathered due to the acidity of soil. These vertebrate bone assemblages are categorized into four size groups (in millimeters): <20 (very small), 21-40 (small), 41-60 (medium), 61-80 (large). 54.29% TNF of bones measuring 21-40 mm, whereas that of measuring 61-80 mm represents the smallest percentage (Kusmartono et al. 2019) (2.86%; Table 4). Large variations in bone size occurred in unit W1S1, followed by that in E1N1. The taxonomic identification of genera and species employed modern comparative specimens from two websites that provide databases of mammals (www.animaldiversity.org) and fish (www.sandrine.tercerie.free.fr).



a.



b.



Figure 2. Three excavation units in Diang Mahang, i.e. a. E1N1, b. W1S1, and c. W2S1, showing a number of roof falls (Source: image by author, 2019).

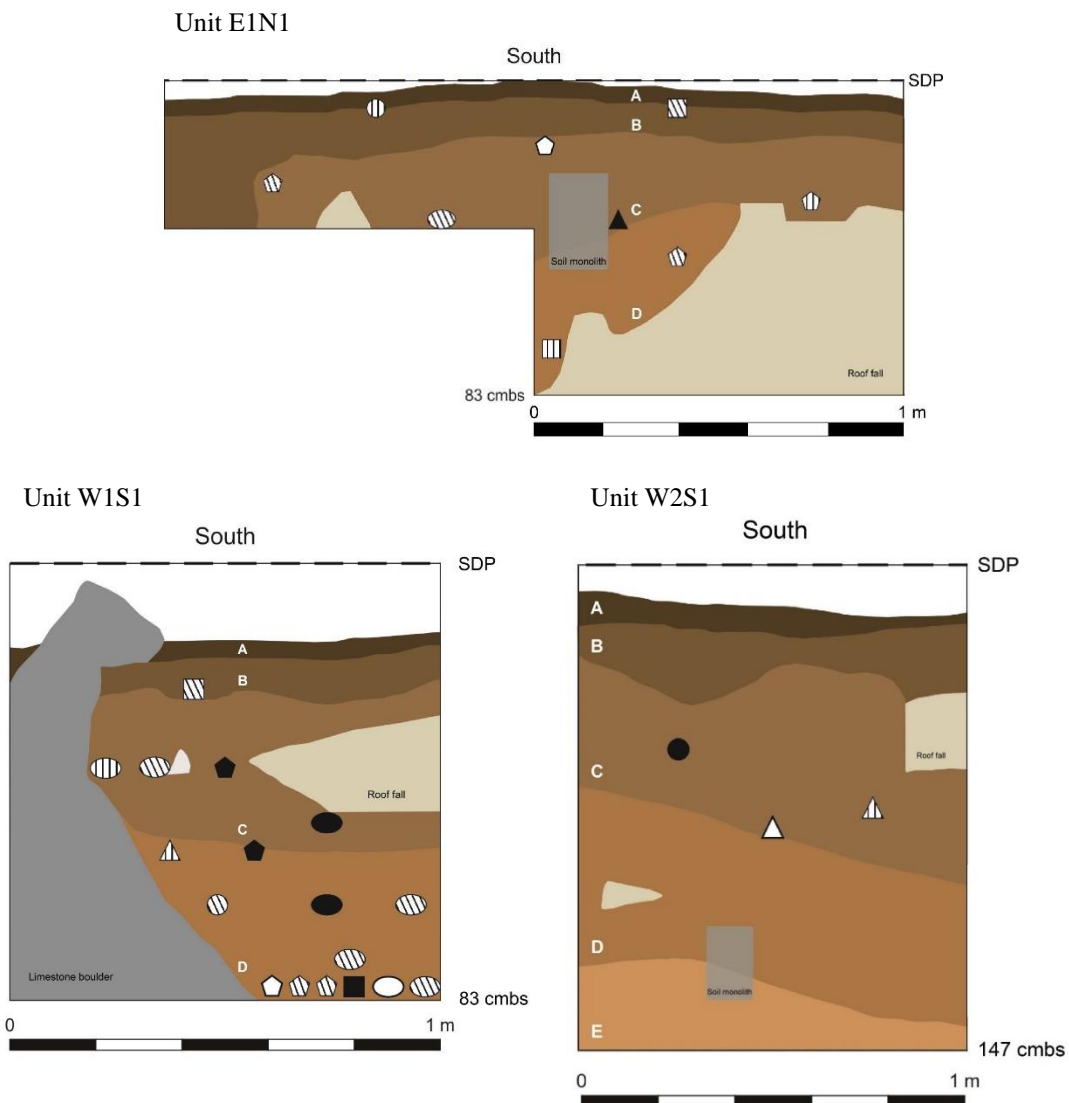
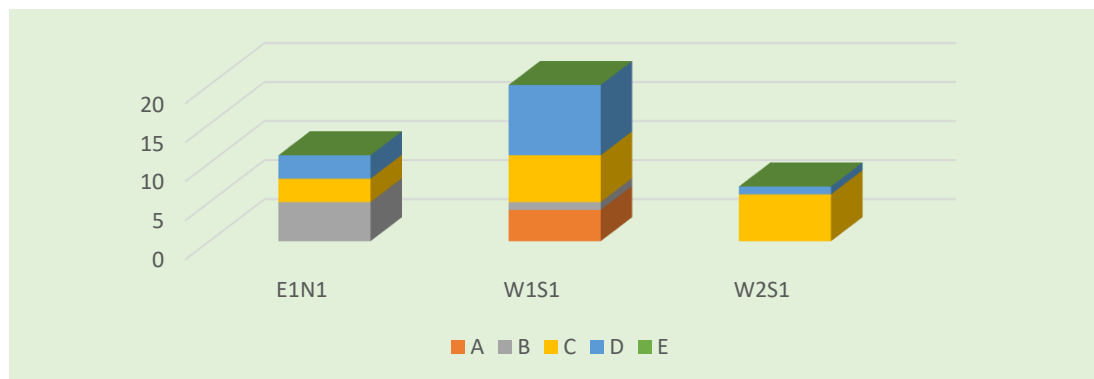
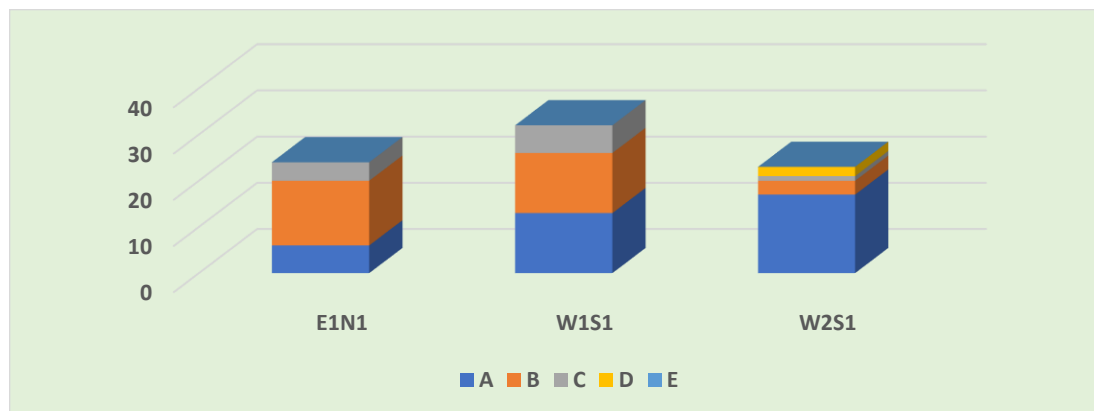


Figure 3. Assemblages of faunal remains in each cultural layer (south wall) of the three excavation units in Diang Mahang (Source: drawn by Muhammad Wishnu Wibisono, 2019; modified by author).

Table 2. The distribution of the total population of vertebrate remains in Diang Mahang by count (c) and weight (gm).

Unit	E1N1		W1S1		W2S1		Total	
Layer	c	gm	c	gm	c	gm	c	gm
A	820	385.5	277	105.8	108	68	1205	559.3
B	291	185.1	748	412.6	62	29	1101	626.7
C	367	269.3	1151	744.05	53	54.7	1571	1068.05
D	371	284.4	338	200.6	541	427.1	1250	912.1
E	0	0	0	0	0	0	0	0
Total	1849	1124.3	2514	1463.05	764	578.8	5127	3166.15

**Figure 4.** The distribution of vertebrate remains in Diang Mahang by TNF (Source: Kusmartono et al., 2020).**Figure 5.** The distribution of invertebrate remains in Diang Mahang by TNF (Source: Kusmartono et al., 2020).**Table 3.** The distribution of the total population of invertebrate remains in Diang Mahang by count (c) and weight (gm)

Unit	E1N1		W1S1		W2S1		Total	
Layer	c	gm	c	gm	c	gm	c	gm
A	18	8.06	62	22.72	17	35.6	97	66.38
B	96	91.45	25	9.31	23	15.3	144	116.06
C	19	12.5	25	9.31	7	5.2	51	27.01
D	0	0	0	0	13	6.18	13	6.18
E	0	0	0	0	0	0	0	0
Total	133	112.01	112	41.34	60	62.28	305	215.63

Table 4. Length of bones from Diang Mahang in mm

Measures	<20	21-40	41-60	61-80
Trenches				
E1N1	0	7	4	0
W1S1	8	8	0	1
W2S1	3	4	0	0
Total	11	19	4	1

Table 5. Identifiable diagnostic characteristic of vertebrates in Diang Mahang by TNF (Source: Kusmartono et al., 2020).

E1N1			W1S1			W2S1		
Layer	Code	DC	Layer	Code	DC	Layer	Code	DC
A	MG4	Thoracic vertebrae	A	MG35	Metatarsal	A	---	---
	MG5	Calcaneus		MG36	Phalange			
	MG38	Radius		MG42	Phalange			
	MG63	Radius		MG44	Mandible			
B	MG43	Tibia	B	MG1	Phalange	B	---	---
	MG25	Mandible						
	MG6	fr Femur						
C	MG2	Epiphysis thoracic vertebra	C	MG23	Humerus	C	MG7	Caudal vertebra
	MG3	Cervical vertebra		MG24	Costae		MG8	fr Metacarpal
	MG26	Mandible		MG57	Vertebrae		MG9	fr Radius
D	MG20	Phalange	D	MG22	Mandible	D	MG10	fr Pelvic
							MG11	Phalange
							MG12	Phalange
							MG13	Ulna
				MG33	Humerus		MG14	Lumbar vertebra
				MG34	Metatarsal		MG16	Metacarpal
				MG39	Humerus			
				MG40	Maxilla			
				MG41	Caudal vertebra			
				MG27	Humerus			
				MG28	Femur			
				MG29	Tibia			
				MG30	Vertebrae			
				MG31	Caudal vertebra			
				MG32	Claw			

Note: DC = diagnostic characteristic

Fr = fragment

The identifiable diagnostic characteristics belong to jawbones, ribs, vertebrae, long bones, finger bones, and teeth. Amongst the bones and teeth, there are also human molars. Detailed diagnostic features distributed in each unit and layer of Diang Mahang consist of (Table 5) the *maxilla* (upper jaw), *mandible* (lower jaw), *cervical vertebrae* (cervical spine, just below the skull), *thoracic vertebrae* (middle part of the spine), *thoracic epiphysis vertebrae* (the tip of the twelve bones of the backbone), *costae* (ribs), *lumbar vertebrae* (the spine between the ribs and pelvis), *caudal vertebrae* (bones that make up the tailbone), *pelvic* (pelvis), *humerus* (upper arm bone), *radius* (forearm

bone), *ulna* (forearm bone that stretches to the smallest finger), *metacarpal* (palm bone), *phalange* (finger bone), *femur* (thigh bone), *tibia* (shin bone), *tarsal* (bone near the heel), *calcaneus* (heel bone), *metatarsals* (sole of the foot), and claws (Kusmartono et al. 2020).

The 38 TNF vertebrates represented their number of specimens (NISP) and were able to be identified to levels of family and genus. The 79 TNF invertebrates were identifiable to levels of phylum and genus. The taxonomic classification of vertebrates resulted in three main classes, i.e Mammalia, Reptile, and Pisces. Based on its diagnostic characteristics, the mammalian bones belong to the order of Rodentia, Chiroptera, Primate, Carnivora, and Artiodactyla.

Further analysis showed that the Rodentia consisted of two taxa, mice (Muridae) and squirrels (Sciuridae). Recognised diagnostic features of cave mice were mandible, humerus, femur, and tibia. A small squirrel was noticed by the pelvic and femur. The Chiroptera or bats (Figure 6) recovered from the excavation were known from their lower jaw and several long bones.



Figure 6. Bat mandibles (MG46) recovered from layer A unit E1N1 (Source: image by author).

The presence of primates is evident from a number of teeth, radius, vertebrae including caudal vertebrae, metatarsals, and phalange. These bones and teeth belonged to langurs (Cercopithecidae) and macaque. The identified carnivores include bears (Ursidae) and wild cats (Felidae). The bears were recognised by their thoracic vertebrae which perhaps belong to a sun bear. The Felidae was noticed from mandible fragments with intact molars as well as the calcaneus, which may be parts of a clouded leopard (*Neofelis* sp.), a native species in Borneo. The Artiodactyla includes the wild pig *Sus barbatus*, and was recognised by their molars, incisors, phalanges, and metatarsals.

The reptile was further identified as the order Squamata which includes the lizard species (Lacertilia) and aglyphous snakes possibly a small python. On the other hand, Pisces or fish was recognised by the backbone which belongs to *Himantura signifier* (sg.), and pharyngeal teeth (Figure 7) from the Cyprinidae family (Kusmartono et al. 2020).



Figure 7. *Pharyngeal teeth* of a carp (MG47) recovered from layer A unit E1N1 (Source: image by author).

The 79 TNF invertebrates were dominated by Molluscs totalling 73 NISP, followed by six Arthropods (Kusmartono et al. 2020). The 73 molluscs were aquatic gastropods (Table 6). 34 gastropods of the Thiariidae were further identified as *Stenomelania* sp. (Figure 8), which are edible and have been a source of protein to humans in the past until today. On the other hand, the gastropods of the Lymnaeidae, Planorbidae, and Cypraeidae families are not edible.

Table 6. The TNF of shells of a variety of gastropod and crustacean recovered in Diang Mahang in count and weight (gm)

Variety	Count	Weight
Thiariidae	34	80.80
Lymnaeidae	21	31.00
Planorbidae	11	6.05
Cypraeidae	7	7.24
Brachyura	6	4.45
Total	79	129.54

Seven mollusc shells of Cypraeidae or cowry belong to marine gastropods. Ethnohistorically, the people of Kalimantan often use mollusc shells as accessories such as necklaces, but there are also those who use them as ornaments for headdresses and clothing. On the other hand, the Arthropods found in the excavation units were six shells of freshwater crustacean claws from the Brachyura of the crab family (Kusmartono et al. 2020).



Figure 8. Thiaridae *Stenomelania* sp., a predominant species of gastropods in Diang Mahang (Source: image by author).

The taxonomic identification of faunal remains indicates a wide range of terrestrial and aquatic animals. Figure 9 shows the distribution of mammals recovered in each excavation unit which consist of small rodents such as squirrels and mice, small bats, medium to small size primates such as langurs and macaques, medium carnivores such as sun bears and wild cats, and medium-size wild pigs. The reptiles comprise small lizards and small pythons, whereas identifiable fishes were of freshwater stingray, carp, and mahseer.

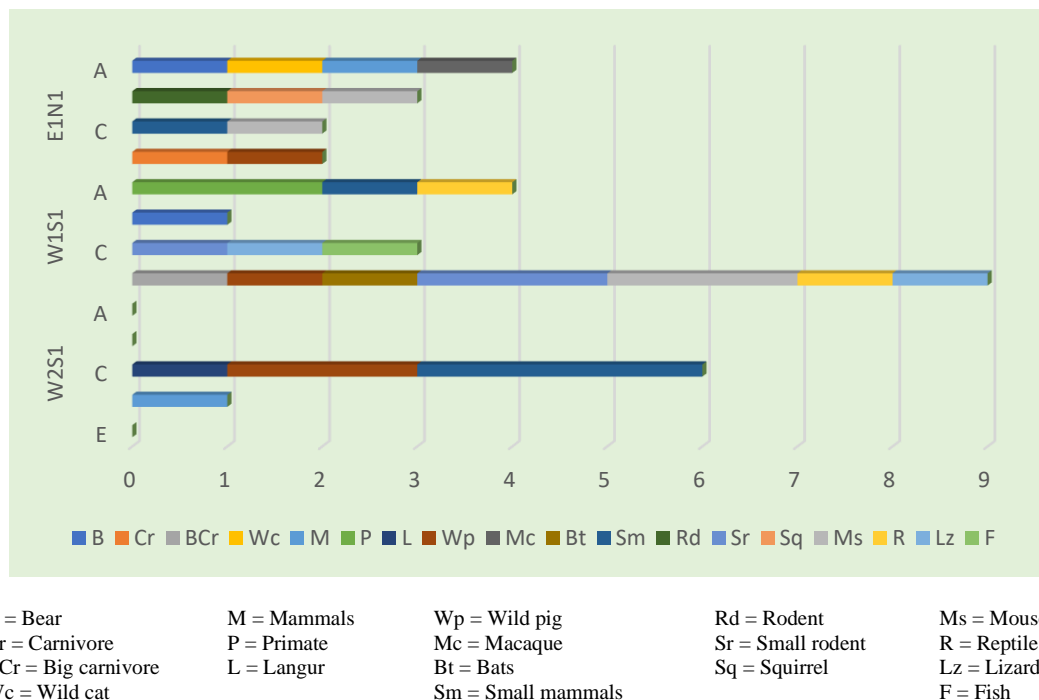


Figure 9. The distribution of vertebrates in layer A-D in units E1N1, W1S1, and W2S1 based on NISP (Source: Kusmartono et al, 2020).

Such a variety of faunal remains indicates the source of a diet of the inhabitant of Diang Mahang, which may also reflect the preference of their alimentation. Animal protein was also obtained by consuming molluscs of *Stenomelania* sp. Such faunas are native to the rainforest environment of Bukit Mahang, and some dwell within the interior of caves such as mice and small pythons. The inhabitant of Diang Mahang might have procured such animals without leaving too far from the rockshelter. Even today, people from the closest village still hunt wild pigs and python as well as catch mahseer or gather *Stenomelania* sp for daily consumption. Thus, it further portrays humans' continuous ability to adapt, survive and inhabit the dense tropical rainforest regions and depend on resources provided by nature.

AMS ¹⁴C Radiocarbon dates and the Archaeological Context of Faunal Remains in Diang Mahang

The distribution of faunal remains varies in each layer (A-D) of units E1N1, W1S1, and W2S1. The diversity in detail in its archaeological context can be seen clearly in Figure 9. The remains of mammals consist of sun bears, clouded leopard (*Neofelis* sp.) and macaque were found in unit E1N1 layer A; a soil, which the deposition is recent and ongoing. Layer A also contains the mollusc shells of *Stenomelania* sp. and Planorbidae (Figure 10). Layer B contains the remains of small rodents such as cave mice, squirrels, and shells of *Stenomelania* sp. Layer C contains the remains of the cave mice as well as shells of *Stenomelania* sp. and crab claws. Layer D unit E1N1 contains the remains of carnivores and wild pigs (*Sus barbatus*; Figure 9).

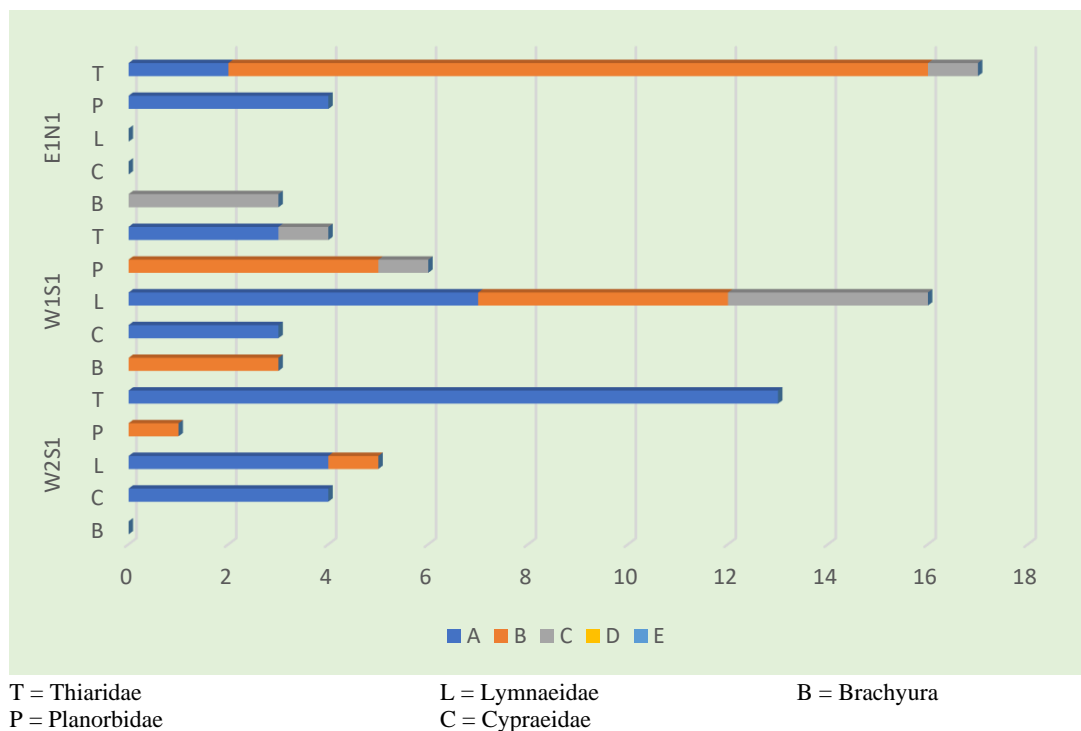


Figure 10. The distribution of Molluscs and Arthropoda in layer A-C in units E1N1, W1S1, and W2S1 based on NISP (Source: Kusmartono et al, 2020).

The AMS ^{14}C radiocarbon on charcoal samples analysed at the Waikato laboratory (University of Waikato, New Zealand) taken directly at a depth of 83 cmbs, yielded a date 680-560 cal.BP (Wk-50262) for layer D unit E1N1 (Kusmartono et al. 2019). This date indicates that layer D was occupied by humans during the historical period. In layer D, the remains of fauna are associated with lithics, which include flakes, scrapers, and hand adzes, as well as pottery. Thus, it suggests the archaeological context of Diang Mahang around CE 1300 connotes daily activities related to food preparation.

The humus layer A unit W1S1 contains faunal remains comprising small mammals, primates such as the macaque, reptiles, and invertebrates including Thiaridae, Lymnaeidae, and Cypraeidae (cowry). A bear phalange was recovered in layer B as well as mollusc shells of Lymnaeidae and Planorbidae, and Brachyura claws. Layer C contains remains of small mammals belonging to rodents, lizards, freshwater stingray *Himantura* sg., and mollusc shells of Thiaridae *Stenomelania* sp., Lymnaeidae, and Planorbidae. The faunal remains from layer D unit W1S1 are more varied consisting of large carnivores perhaps sun bears, wild pig *Sus barbatus*, bats, small rodents, mice, reptiles including lizards (Figure 9).

The AMS ^{14}C radiocarbon dating of the charcoal samples taken directly at a depth of 62 cmbs gave a date 670-550 cal.BP (Wk-50261) for layer D units W1S1. This date is equivalent to the date for layer D in unit E1N1 suggesting both archaeological contexts are comparable. This also suggests that layer D was occupied by humans during the historical period. The faunal remains here associated with lithics such as flakes, scrapers, and cores, as well as pottery; thus, supports the understanding that the archaeological context is related to humans' daily activities. The trend of faunal alimentation between CE 1300 and the younger periods indicates a slight difference of the latter by an additional protein intake from monkeys, either langurs or long-tailed macaques (Figure 9).

The remains of vertebrate fauna in unit W2S1 were found only in layers C-D (Figure 9). Layer C contains the remains of medium-size mammals such as langurs (Cercopithecidae), wild pig *Sus barbatus*, and small mammals. Layer D contains one lumbar bone and one metacarpal of mammals. On the other hand, remains of invertebrates were recovered in layers A-B containing gastropods of Thiaridae, Lymnaeidae, Planorbidae, and Cypraeidae. Layer E is sterile of faunal remains.

Charcoal samples were taken from the E unit W2S1 layer at a depth of 117 cmbs, and the AMS ^{14}C radiocarbon dating gave a date of 32,650-31,500 cal.BP (Wk-50264) for layer E/W2S1. As mentioned above, neither artefacts nor faunal remains were recovered from layer E/W2S1. In archaeology, these items are essential evidence of human occupation. However, the absence of such archaeological items to the unaided eye does not mean that the data are missing. Therefore, collecting other proxies by means of soil monoliths or wet sieving and having them microscopically analysed is a necessity to understand whether Diang Mahang has undergone anthropurbation.

Presently, the AMS ^{14}C radiocarbon date is the only data available for the synthesis of human occupation, possibly anatomically modern humans (AMH), in layer E/W2S1 during the Late Pleistocene, when humans still relied on their natural surroundings and carried out their daily activities by gathering food from the forest.

Thus, based on the geological law of superposition, it is expected that the chronology of layers A-D will be younger than 30,000 years. Since units W2S1 and W1S1 are juxtaposed to each other, hypothetically the deposition of layer D unit W2S1 coincides with the deposition of layer D unit W1S1. Hence, suggesting the age of layer D unit W2S1 is approximately CE 1300, and the archaeological context is likely to be similar to that of layer D units E1N1 and W1S1.

CONCLUSION

The remains of fauna, both vertebrates and invertebrates, provide significant information on the close interaction between humans of Diang Mahang and their natural surroundings. Although the NISP of faunal remains is very small, the variety of fauna, both terrestrial and aquatic, indicates that the original habitat of fauna that was exploited by the inhabitants of Diang Mahang was the rockshelter and the canopy of Bukit Mahang.

At a micro-scale which is on the terrace of Diang Mahang, the spatial context indicates that the identifiable faunal remains and their association with lithic and pottery reflect daily domestic life activities. However, the variety of fauna of the canopy around Bukit Mahang suggests that hunting was still practised by the inhabitant of Diang Mahang then. Regarding the temporal context, the AMS ^{14}C dates signify the chronological presence of the faunal remains in layer D units E1N1 and W1S1, and hypothetically unit W2S1, was around 600 years ago. This relates to humans' day-to-day domestic activities on the terrace of Diang Mahang during the Meghalayan age.

Conclusively, the study of faunal remains here is still in its early stage and must be continued with an interdisciplinary perspective to further understand humans' behavior to survive in the midst of the canopy of Bukit Mahang. For future projection, it is necessary to collect proxies for microscopic analysis to provide comprehensive information on anthropurbation. Hence, on a macro scale, interpretation of the cultural processes that have taken place in the upper reaches of Sungai Kapuas can be comprehensively reconstructed.

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