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Canting Expedition: Herpetofauna Diversity in the Mendolo Village, Lebakbarang, Pekalongan

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Abstract

Central Java is an area that has natural forests with quite high biodiversity potential, one of which is Mendolo Village, Lebakbarang, Pekalongan. The diversity of herpetofauna species is one of its potential biodiversity. Data collection on herpetofauna in Mendolo Village has not yet been carried out even though this village is in direct contact with natural forests with great potential. The aim of this research is to reveal the diversity of herpetofauna types at this location. The method used is VES (*Visual Encounter Survey*). The data obtained was then analyzed using the Shannon-Wiener Diversity Index. There were 23 species of reptiles and 16 species of amphibians with a Diversity Index value of 2.942 for reptile types and 2.28 for amphibian. The conclusion that can be drawn is that the diversity of herpetofauna species in Mendolo Village is in the quite high category.

Keywords: Diversity, Frogs, Lizards, Mendolo, Snakes

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Introduction

Java is one of the large islands in Indonesia. Java Island has quite high diversity. In general, the island of Java is divided into three large parts, western, central and eastern Java. The three regional landscapes have different climates, land and environmental conditions. This is one of the factors in the distribution and variation of existing biodiversity (Subeno, 2018). Natural forests in Java, especially in Central Java, are a source and habitat for biodiversity, including herpetofauna. However, natural forests in the Central Java region continue to decline to an alarming level. Land fragmentation is generally caused by conversion into agricultural land, plantations and settlements or even infrastructure development (Gunawan et al., 2010).

Threats to biodiversity can occur in herpetofauna. Herpetofauna, which consists of amphibians and reptiles, is an ecosystem component and part of biodiversity that inhabits water, land, and even trees (*arboreal*) (Huda, 2017). Apart from that, the herpetofauna group has its own role in nature. It is very important for an area to have data on fauna, including herpetofauna, to understand their role and existence. Herpetofauna has ecological, economic, cultural, aesthetic and religious value. Herpetofauna is also an important agent in the food chain and an environmental indicator for predicting climate change(Ali et al., 2017). The loss or decline of the herpetofauna population in an area can indicate a change in the quality of that place (Yuliany, 2021).

Mendolo Village is one of the villages in Lebakbarang District, Pekalongan, Central Java, which is located on the plateau at an altitude of 600 meters above sea level. This area is included in the western Dieng mountains. The north side of Mendolo Village border is Kutarembet Village, the east side bordered by Bantar Kulon Village, and the west side border is Karanganyar District. This village is a water catchment area which is very important for the

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sustainability of living things around it. Like in Petungkriyono District which is also located in Pekalongan, Central Java, this village consists of hills, wilderness, waterfalls and rivers with clear water (Eprilurahman et al., 2010). However, data regarding biodiversity in Mendolo Village is still very minimal. As a village that directly borders secondary forest, biodiversity is very important to record. Based on research, the herpetofauna diversity in Petungkriyono is classified as medium to high (Eprilurahman et al., 2010). It does not rule out the possibility that Mendolo village also has the potential for high herpetofauna diversity. The aim of this research is to reveal the diversity of herpetofauna in Mendolo Village. The results obtained can become an initial database for further research and as a reference for determining policies in Mendolo Village.

Research Methods

This research was conducted in Mendolo Village, Lebakbarang District, Pekalongan Regency, Central Java Province. The research area is divided according to habitat type, namely rice field habitat (SW), river (SG), production forest (HP), secondary forest (HS), and around residential areas (PM).

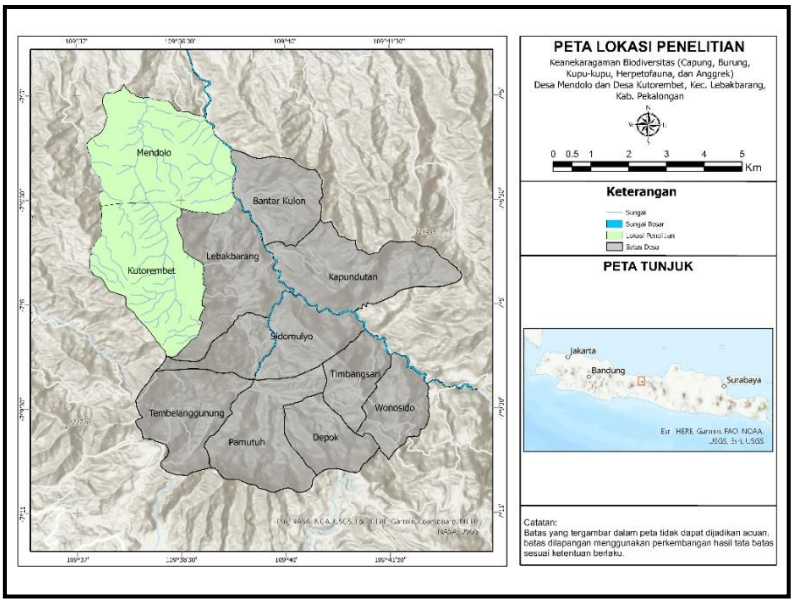

Figure 1. Map of research locations for herpetofauna diversity in Mendolo Village

The research was conducted for 10 days in January 2023. Data collection was divided into 2 sessions, namely during the day (diurnal) at 08.00 – 12.00 WIB and at night (nocturnal) at 20.00 – 01.00 WIB. The method used in this research is the VES (Visual Encounter Survey) method, which is a method carried out by following a predetermined path directly (direct observation) in various microhabitats where it is suspected that herpetofauna species may be found (Jusmaldi et al., 2019). The tools and materials used are cameras, tally sheets, field identification books (*Panduan Lapangan Herpetofauna (amfibi & reptil) di Kawasan Ekowisata Desa Jatimulyo, Buku Panduan Lapangan Herpetofauna Taman Nasional Alas Purwo, A Field Guide to the Reptiles of South-East Asia – Indraneil Das,Panduan Bergambat Identifikasi Amfibi Jawa Barat*) and security equipment.

Herpetofauna diversity data was analyzed using the Shannon-Wiener Diversity Index with the following formula (Ismaini, 2015):

$H' = -\sum Pi \, Ln \, Pi$
H’ = Shannon-Wiener Diversity Index
Pi = Proportion of type-i

Diversity is said to be very low if the value is <1, if the value ranges between 1-1.5 then it is said to be low and said to be medium if the value ranges between 1.5-2.0, while it is said to be high if the value is >2.0 (Brower et al., 1997). Herpetofauna type data is tabulated in the form of tables and graphs and then described (Gunawan et al., 2021).

Result and Discussion

Based on research that has been carried out, data on the diversity of herpetofauna species in Mendolo Village is 37 species, consisting of 23 species from the reptile class and 14 species of amphibians. The reptiles found at the research location consist of 6 families, namely: Agamidae, Gekkonidae, Lacertidae, Scincidae, Colubridae, and Viperidae. Locations where reptiles are found vary. There is only one type of reptile found in all habitats, namely *E. multifasciata*. This is because this type of lizard has the ability to live in various habitats (Noperese et. al, 2019). Garden lizards (*E. multifasciata*) can live in trees, on the ground, and even underground (Nabilla et al., 2023). The presence of *E. multifasciata* is an indicator of the habitat ecosystem in the area. This species plays an important role in the food chain in its environmental ecosystem (Rahma, 2021). The existence of this species indicates the abundance of insects in the area. Because this lizard's main food is insects, including insects that are pests for farmers. However, there are several species of reptiles that are only found in one habitat, including *Draco fimbriatus, Gehyra mutilata, Lycodon subcintus, Dryophiops rubescens, Xenochrophis trianguligerus, Dendrelapis formosus, Xenodermus javanicus,* and *Craspedocephalus puniceus*. Some snakes were found close to residential areas because there were lots of rats (snake prey) in that area, and food supplies can be met. Apart from residential areas, they can also be found in rice fields, plantations and forests. In this habitat they can prey on lizards, rats which are pests in rice fields, and they also become food for several other animals such as eagles. However, negative views towards snakes are still common because they are considered wild and dangerous animals. This results in bad actions such as killing snakes both venomous and non-venomous, thereby reducing the population. Even though the presence of snakes is also needed in the rotation of the food chain in an ecosystem (Asri et al., 2015). One of venomous snake found is *Craspedocephalus puniceus* which has strong venom. It was found in the secondary forest habitat. Usually, this snake perches on a branch or tree that is starting to rot or die. This snake can be differentiated morphologically from other types, namely *T. insularis* and *T. albolabris*. Apart from that, the geographic origin of this snake comes from the central part of Java (Anita et al., 2022).

Gehyra mutilata is found in houses attached to the walls. Apart from eating small insects in the house, he also eats leftover rice and sugar. This was confirmed in observations of the food of *Gehyra mutilata* which also eats bread (Weterings & Weterings, 2018). Apart from being found in housing, this species can be found in trees and in forests. However, in this observation, no species were found in this habitat. This species can help pollinate flowers because it also sucks nectar from some flowers (Notes et al., 2017).

Table 1. Data on reptile species in Mendolo Village and locations of encounters

Class	Family	Scientific Name	Encounter Location				
			PM	SG	SW	HP	HS
Reptil	Agamidae	*Bronchocela jubata*		✓	✓		
		Bronchocela cristatella			✓		
		Draco volans	✓			✓	✓
		Draco fimbriatus		✓			
		Gonocephalus chamaeleontinus		✓	✓		✓
	Gekkonidae	*Cyrtodactylus marmoratus*		✓	✓	✓	
		Gehyra mutilata	✓				
		Gekko gecko	✓			✓	
		Hemidactylus frenatus	✓		✓	✓	
		Gekko kuhli	✓	✓			
		Sphenomorphus sanctus			✓	✓	
	Lacertidae	*Takydromus sexlineatus*			✓	✓	

Lanjutan Tabel 1.

Class	Family	Scientific Name	Encounter Location				
			PM	**SG**	**SW**	**HP**	**HS**
Reptil	Scincidae	*Eutropis multifasciata*	✓	✓	✓	✓	✓
		Eutropis rudis		✓		✓	
		Eutropis rugifera	✓		✓		
		Dasia olivacea		✓		✓	
	Colubridae	*Ahaetulla prasina*			✓	✓	
		Lycodon subcintus	✓				
		Dryophiops rubescens		✓			
		Xenochrophis trianguligerus		✓			
		Dendrelapis formosus			✓		
		Xenodermus javanicus				✓	
	Viperidae	*Craspedocephalus puniceus*					✓

Tabel 2. Data on amphibian types in Mendolo Village and encounter location

Class	Family	Scientific Name	Encounter Location				
			PM	**SG**	**SW**	**HP**	**HS**
Amfibi	Bufonidae	*Duttaphrynus melanostictus*		✓			
		Ingeroprhynus biporcatus	✓			✓	✓
		Ingerophrynus parvus				✓	
		Prynoidis aspera	✓	✓		✓	
	Dicroglossidae	*Limnonectes kuhlii*		✓	✓	✓	✓
	Megophryidae	*Leptobrachium hasseltii*		✓		✓	✓
		Megophrys montana				✓	
	Microhylidae	*Microhyla achatina*	✓				
	Ranidae	*Chalcorana chalconota*		✓	✓	✓	✓
		Fejervarya limnocharis	✓		✓	✓	
		Odorrana hosii		✓	✓	✓	✓
		Wijayarana masonii		✓		✓	
		Polypedates leucomistax	✓			✓	
	Rhacoporidae	*Rachophorus margaritifer*					✓

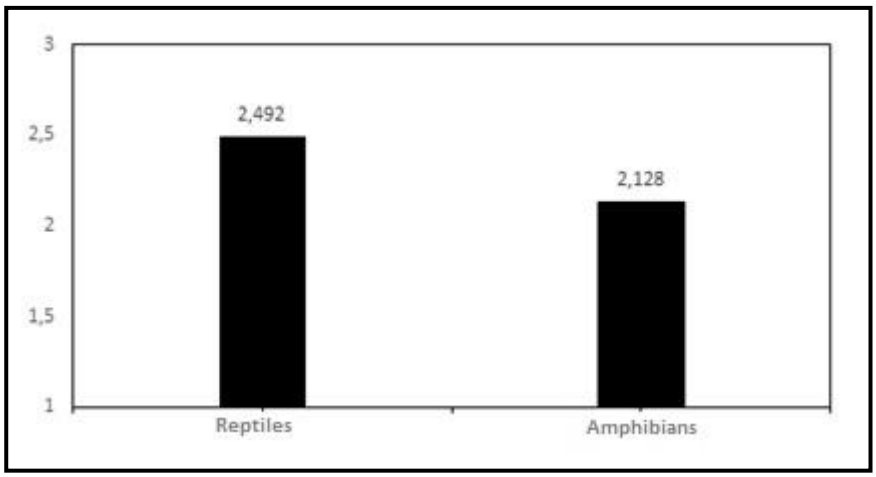

Figure 2. Graph of differences in diversity index values for herpetofauna (reptiles and amphibians) in Mendolo Village

There were 14 species of amphibian registered during the observation. Fewer compared to the number of reptile species. Consists of 6 families. However, some species are endemic to Java. Among them are: *Megophrys montana, Microhyla achatina, Wijayarana masonii,* and *Rachophorus margaritifer* (Eprilurahman et al., 2010). From the composition of frog species, several species were found to have similar habitats, but some species had specific habitats and were not found in all habitats. *Megophrys montana* can be found in primary forests which are quite humid. Lives in wet litter and has color adaptation abilities that are very similar to leaf litter (Mumpuni, 2001). *Megophrys montana* and *Wijayarana masonii* are two species whose existence is significantly threatened due to deforestation in various mountainous areas in Java. Both are also very sensitive indicators of damage to microhabitat changes (Cahyadi & Arifin, 2019). *Rachophorus margaritifer* can be found in Secondary Forest. This frog is one of endemic amphibians of Java whose distribution convers West Java to East Java (Sulistyahadi et al., 2020). However, the number of individuals found was not large during exploration. It is also possible that the exploration location coverage is less extensive. Apart from that, some species are known to have difficulty being found in nature. The physical characteristics of rivers greatly influence the variety of amphibian species found. supported by the effort required can influence the results of the species obtained based on the length of the search, the extent of the survey area and the number of researchers (Jusmaldi et al., 2019).

Amphibians are animals whose lives depend on the presence of water. For example *Chalcorana chalconota* which is semi-aquatic (Hidayah et al., 2018). while *Polypedates leucomistax* is usually found on bush twigs or leaves and even around the house. However, this has threats from various combinations of causes, namely: habitat reduction, pollution, introduction of exotic species, diseases and parasites, and overfishing (Hasibuan et al., 2022). This is also thought to be caused by a decline in the population due to destruction of the habitat and environment.

The diversity of herpetofauna species in Mendolo Village has a high Diversity Index value. In the reptile class, the diversity index value is 2.492 and in the amphibian class 2.128. The diversity index is said to be high if the value is more than 2.0 and medium if the value is between 1.5-2.0, while low if the value is between 1.0-1.5 and very low if it is less than 1.0 (Brower et al., 1997). It can be said that the diversity of herpetofauna species from both the reptile and amphibian classes in Mendolo Village can be said to be quite high with so many species discovered. There is a change in habitat openness will be directly proportional to the level of species diversity (Nurhayat et al., 2020). Species diversity can also be used to measure community stability, namely the ability of a community to remain stable despite disturbances. A community can be said to be diversified because it consists of many species (Findua et al., 2016).

However, the diversity index indicates the number of herpetofauna species in Mendolo Village. In fact, deeper studies are needed to see the population of each herpetofauna species. This is useful in recording the level of evenness and density between species.

Conclusion and Suggestion

Based on the research that has been carried out, it can be concluded that the species of herpetofauna in the form of reptiles and amphibians were found. There were 23 species of reptiles found, while there were 14 spesies of amphibians. The Diversity Index value for each class is 2.492 for reptiles and 2.128 for amphibians. It can be assessed that the diversity of herpetofauna species in Mendolo Village is quite high.

The suggestion that can be given is to make better educational efforts for the community so that they understand the magnitude of the herpetofauna biodiversity in the area. However, there is always a need for more in-depth research and broader exploration. Because this research is limited by time and space. So, the wider the exploration distance, it is possible that there will be many other types of herpetofauna.

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References

Ali, W., Javid, A., Khan, W. A., Hussain, A., Rizwan, M., Ameer, M., & Sajid, A. Q. (2017). Diversity and habitat preferences of herpetofauna at Kalabagh Game Reserve, District Mianwali, Punjab, Pakistan. *Russian Journal of Herpetology* 24(4): 267–274.

Anita, S., Sadjuri, A. R., Rahmah, L., Nugroho, H. A., Mulyadi, Trilaksono, W., Ridhani, W., Safira, N., Bahtiar, H., Maharani, Hamidy, A., & Azhari, A. (2022). Venom composition of Trimeresurus albolabris, T. insularis, T. puniceus and T. purpureomaculatus from Indonesia. *Journal of Venomous Animals and Toxins Including Tropical Diseases* 28: 1–13.

Asri, A., Yanuwiadi, & Bagyo. (2015). Persepsi masyarakat terhadap ular sebagai upaya konservasi satwa liar pada masyarakat Dusun Kopendukuh, Desa Grogol, Kecamatan Giri, Kabupaten Banyuwangi. *Jurnal Pembangunan Dan Alam Lestari* 6(1): 42–47.

Brower, J. E., Zar, J. H., & Von Ende Carl, N. (1997). *Field and Laboratory methods for General Ecology*. Boston: McGraw-Hill

Cahyadi, G., & Arifin, U. (2019). Potential and Challenges on Amphibians and Reptiles Research in West Java. *Jurnal Biodjati* 4(2): 149–162.

Eprilurahman, R., Qurniawan, T. F., Kusuma, K. I., & K, C. H. (2010). Studi Awal Keanekaragaman Herpetofauna Dipetungkriyono, Kabupaten Pekalongan, Provinsi Jawa Tengah. *Zoo Indonesia* 19(1): 19–30.

Findua, A. W., Sugeng, P. H., & Nuning, N. (2016). the Biodiversity of Reptile in Repong Damar Pahmungan Village West Coast (University of Lampung Permanent Plot Case of Study). *Jurnal Sylva Lestari* 4(1): 51–60.

Gunawan, D. A., Ramajati, R. R. D., Arif, I. M., & W, Q. F. C. (2021). Inventory of Herpetofauna Types in Banyak Angkrem Hills and Kedung. *International Converence on Science and Engineering* 4(February): 119–121.

Gunawan, H., Prasetyo, L. B., Mardiastuti, A., & Kartono, A. P. (2010). Fragmentasi Hutan Alam Lahan Kering Di Provinsi Jawa Tengah. *Jurnal Penelitian Hutan Dan Konservasi Alam* 7(1): 75–91.

Hasibuan, M. M., Dwiputro, A., Fajri, S. R., & Tohir, R. K. (2022). Keragaman Jenis Herpetofauna di Kawasan Hutan Kota Ranggawulung Kota Subang. *Bioscientist : Jurnal Ilmiah Biologi* 10(2): 1150.

Hidayah, A., Hanifa, B. F., Devi, S. R., Septiadi, L., Alwi, M. Z., & Afifudin, F. A. (2018). Keanekaragaman Herpetofauna di Kawasan Wisata Alam Coban Putri Desa Tlekung Kecamatan Junrejo Kota Batu Jawa Timur. *Prosiding Seminar Nasional VI Hayati 2018*, *December* 79–91.

Huda, S. A. (2017). Jenis Herpetofauna Di Cagar Alam Dan Taman Wisata Alam Pengandaran Jawa Barat. *Scientiae Educatia* 6(1): 41.

Ismaini, L. (2015). Analisis komposisi dan keanekaragaman tumbuhan di Gunung Dempo, Sumatera Selatan. *Conference: Seminar Nasional Masyarakat Biodiversitas Indonesia* 1(76): 1397–1402.

Jusmaldi, J., Setiawan, A., & Hariani, N. (2019). Keanekaragaman Dan Sebaran Ekologis Amfibi Di Air Terjun Barambaisamarinda, Kalimantan Timur. *Berita Biologi* 18(3): 295-303

Mumpuni, M. (2001). Biodiversitas Taman Nasional Gunung Halimun. *Berita Biologi* 5(6): 711–720.

Nabilla, Anindira Suratman, S., Satriani, N., Az Zahro Zaskya, F., Anjung Fortuna, Z., Bagus Putra Prakarsa, T., Studi Biologi, P., Pendidikan Biologi, J., & Matematika dan Ilmu Pengetahuan Alam, F. (2023). Diversitas Spesies Reptil (Squamata) pada Habitat Akuatik dan Terestrial di Magelang, Surakarta, dan Magetan (Diversity of Reptile Species (Squamata) In Aquatic and Terrestrial Habitats in Magelang, Surakarta, and Magetan). *Jurnal Biologi Universitas Andalas* 11(1): 14–21.

Notes, H., Tanalgo, K. C., Academy, C., Vulnerability, B. C., Mapping, C., View, I., & View, L. M. (2017). First evidence of nectarivory by four-clawed gecko , Gehyra mutilata (Wiegmann , 1834) (Squamata : Gekkonidae) on a bat- pollinated Calabash tree (Crescentia cujete L.) (Bignoniaceae) in Southcentral Mindanao, Philippines. *Herpetology Notes* 10(September): 493–496.

Nurhayat, D., Iyai, D. A., Saragih, D., Runtuboi, Y., Burwos, H., Widayati, I., Pakage, S., & Wambrauw, H. (2020). Herpetofauna Pada Habitat Hutan Batu Gamping Di Manokwari, Papua Barat; Spesies, Keragaman, Kekayaan Dan Populasi. *Jurnal Biosilampari : Jurnal Biologi* 3(1): 20–28.

Rahma, S. (2021). PEMANFAATAN KADAL (Eutropis multifasciata) SEBAGAI OBAT ALERGI GATAL OLEH MASYARAKAT SUMBER, KABUPATEN CIREBON. *Jurnal Pendidikan Biologi* 8(2): 152–157.

Subeno, S. (2018). Distribusi dan Keanekaragaman Herpetofauna di Hulu Sungai Gunung Sindoro, Jawa Tengah. *Jurnal Ilmu Kehutanan* 12(1): 40.

Sulistyahadi, F. N., Puspitasari, I. G. A. A. R., & Nuryanto, A. (2020). Genetic Diversity Analysis of Rhacophorus margaritifer (Schlegel, 1837) in Baturraden, Purwokerto, Central Java, Indonesia Revealed by Based on RAPD Marker. *Journal of Tropical Biodiversity and Biotechnology* 5(1): 44–52.

Tri Rima Setyawati, J. N. A. H. Y. (2019). Inventarisasi Jenis-Jenis Kadal (Sub Ordo Sauria) di Kawasan Hutan Primer, Hutan Sekunder dan Pemukiman di Desa Parek Kacamatan Air Besar Kabupaten Landak. *Jurnal Protobiont* 8(2): 62–68.

Weterings, R., & Weterings, P. (2018). Observations of the Warty house Gecko, Gekko Monarchus (Schlegel, 1836), feeding on bread. *Herpetology Notes* 11(April): 319–320.

Yuliany, E. H. (2021). Keanekaragaman Jenis Herpetofauna (Ordo Squamata) di Kawasan Hutan Rawa Gambut Tropis Mangsang-Kepayang, Sumatera Selatan. *Biota : Jurnal Ilmiah Ilmu-Ilmu Hayati* 6(2): 111–119.