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Wildlife in Disturbed Forests: Reptile and Amphibian Diversity in South Papua

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Abstract

The unavoidable economic development in Papua will certainly cause habitat changes. The logging activities in the production forest areas provide various habitat types with different typologies based on the clearing of areas for timber production and human access in each habitat. This research aims to analyze the diversity, richness, evenness, and similarity of reptile and amphibian communities in relation to the type of habitat disturbance in the Production Forest Area of Boven Digoel, Papua. Field surveys were conducted in June-July 2023, using active and passive survey methods in highly disturbed, moderately disturbed, and undisturbed habitats. The Shannon diversity index values of herpetological diversity in the three habitat types ranged from 0.75 to 1.94. Highly disturbed habitats have the lowest number of individuals and species of reptiles and amphibians. However, the common reptiles and amphibians are found in undisturbed habitats. Two species of protected reptiles were recorded in this area. This indicates that some species are at risk of extinction if action is not taken to conserve their habitats.

Keywords: diversity, herpetofauna, Papua

1. Introduction

Papua is part of the eastern Indonesian archipelago, with a length of 2800 km and a width of 750 km, stretching from the equator to 12 SL and 129-155 EL [1]. Its geological history has given rise to various ecosystems and biogeographical areas [2], providing ideal habitats for animal life, including endemic species. Gaveau et al. [3] stated that Papua has a forest area of around 343,000 km^2, equivalent to 83% of its land area and 42% of Indonesia's remaining forest area. Many parts of Papua remain unexplored, and research on herpetological diversity (amphibians and reptiles) in Papua is still relatively limited. Hence, the total number of herpetofauna species discovered in Papua is lower (374 species) than that in Papua New Guinea (553 species). Research on reptiles on the island of New Guinea (including the Indonesian part of Papua) also shows that there are more records from areas outside Indonesia, for example, reptile identification books published by de Rooij [4] and O'Shea [5] and an amphibian identification book published on *The Frog of New Guineae and The Solomon Islands*. The total number of reptile species in Papua in 2012 was around 241, consisting of 141 species of lizards, 83 species of snakes, 15 species of turtles and tortoises, and two species of crocodiles, and there are 150 species of amphibians in Papua; most of which are still unknown [1]. Research related to the diversity of herpetofauna in Papua was carried out by several researchers, for example, by Krey and Burwos [6] in Wondama Bay, West Papua Province and around the Asei River, Saokorem Village, Tambrauw Regency [7].

PT. Inocin Abadi in Boven Digoel Regency, South Papua, is a forestry sector company that manages and utilizes natural forest timber products based on the year of felling or RKT (Rencana Karya Tahunan), or part of an area based on the year. Differences in felling years were used to determine the levels of habitat disturbance. Kusrini et al. [8] stated that human activities can lead to a reduction in species richness within a habitat. Thus, research on the diversity of reptiles and amphibians in PT is limited. The Inocin Abadi area is crucial for identifying differences in herpetological diversity at various levels of habitat disturbance and providing updated scientific literature for further research on the presence of reptiles and amphibians in Papua, particularly in the Boven Digoel Regency. In addition, it is hoped that

this research can help conservation efforts to preserve endangered reptile and amphibian species by providing data on endangered species.

This study aimed to identify the diversity of reptile and amphibian species based on the level of habitat disturbance and compare the levels of richness, evenness, and similarity of reptile and amphibian communities across different levels of habitat disturbance in the PT Inocin Abadi area, Boven Digoel Regency, South Papua Province.

2. Materials and Methods

2.1. Time and study sites

This study was conducted from June to July 2023. The total time in the field was 18 days of field observation. This study was conducted in the PT Inocin Abadi area of the Boven Digoel Regency, South Papua Province. A map of the research location is shown in Figure 1.

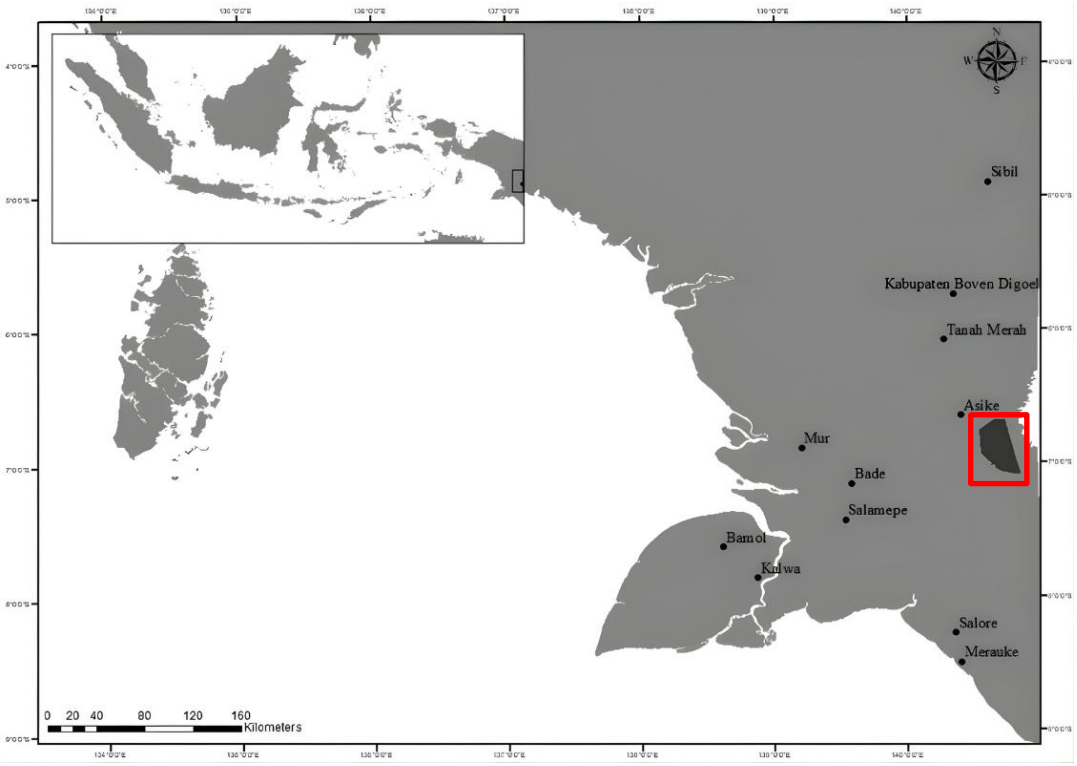

Figure 1. The research location was PT Inocin Abadi, Asike, Boven Digoel Regency, South Papua Province.

2.2. Habitat descriptions

PBPH (*Perizinan Berusaha Pemanfaataan Hutan*) or forest utilization business licensing work area PT Inocin Abadi has several types of land cover, such as primary dry land forest, secondary dry land forest, primary swamp forest, secondary swamp forest, swamp thickets, shrubs, open land, and water bodies [9]. This area is divided into zones based on the year of felling and the human habitation. The data collection routes during this study were the 2013, 2014, 2018, and 2024 RKTs. Apart from the track in the logging RKTs, data were collected in gardens, settlements, and main roads.

The most disturbed habitat, or Highly Disturbed Habitat, is located approximately 10 m from the main road, following the 3 m wide logging trail, located at RKT 2013, RKT 2014, and RKT 2018. The dominant plants on this route included *Casuarina equisetifolia*, *Lycopodium cernuum*, *Syzigium* sp., and *Nephrolepis hirsutula*. Vegetation diversity in highly disturbed habitats usually consists of open vegetation with a vegetation cover of 18.80-19.40% (Figure 2). Four ephemeral pools were found on this path; however, we recorded several water bodies in the 2018 RKT, which were also classified as highly disturbed. These were calm,

permanent streams dominated by rocks and deep, muddy soil. The water depth ranges from 10-40 cm with a width of 0.85 m. The average temperature in highly disturbed habitats is 25.5℃.

Figure 2. Highly disturbed habitat (a) Main road branch route (b) Forest floor cover (c) Forest floor during the rainy season (d) Forest floor during hot weather (e) Waterlogging during the rainy season (f) Water conditions in the aquatic habitat.

Terrestrial habitats in moderately disturbed areas are located along logging block boundaries. This approximately 1-meter path was created for routine survey activities before logging and functions as a block boundary for the logging area. The block boundary route is only used during survey activities by the authorized personnel. The forest floor consists of leaf litter, 3-5 cm thick, with several puddles with an average ambient temperature of 24 °C. Vegetation cover ranges from 68-83.76%, dominated by *Vatica rassak*, *Horsfieldia irya*, *Anisoptera costata, Palaquium* sp., *Myristica fatua*, and *Syzigium* sp. Moderately disturbed aquatic habitats were located in RKT 2024, approximately 500 m from the main road (Figure 3). The main substrate consisted of solid soil with several muddy areas. The water depth ranges from 10-50 cm with an average path width of 2.23 m. Vegetation cover on this route is 61.8%, with a average temperature of 25.5℃. The dominant plants on this route were *Calamus* sp. and *Syzigium* sp.

Figure 3. Moderately Disturbed Habitat (a) Terrestrial path (b) Forest floor during the rainy season (c) Water pools under the roots of fallen trees (d) Aquatic path (e) Water conditions in the aquatic path (f) Water pools.

The undisturbed habitat is located in the 2024 RKT, specifically along the PWH (Forest Area Opening) route. This route was traversed only once when the course was marked in 2019. The distance between the data collection route and the main road was approximately 800 m. The forest floor was dominated by soil and leaf litter approximately 5 cm thick, with many pieces of damp rotting wood and no pools of water. There is a seasonal swamp covering an area of 30 m^2, which only exists during high rainfall and was discovered during data collection on July 6, 2023, when daily rainfall was highest (20-50 mm/day). The water depth was 47 cm and dried up during hot weather. The width of the transect line ranges from 0.5-1 m. The average air temperature in the undisturbed habitat was 23-24.5℃, and vegetation cover ranges from 77-82.83%, dominated by *Horsfieldia irya*, *Calophullym inophyllum*, *Palaquium* sp., and *Syzygium* sp.

The aquatic habitat in the undisturbed area consisted of a tributary with a calm, permanent flow that was also dependent on the season. The primary substrate was muddy soil with some solid soil. The water depth ranges from to 10-30 cm with an average path width of 1.13 m. Water levels recede during hot weather. Vegetation cover on this route was 80% and was dominated by *Syzigium* sp., *Hopea iriana*, *Palaquium* sp., and *Blechnum orientale*. The average air temperature in this habitat was 23.5 ℃ (Figure 4).

Figure 4. Undisturbed habitat (a), terrestrial path (b), forest floor (c), seasonal swamp (d), aquatic habitat (e), water condition (f), and low tide conditions during hot weather.

The area outside the forest is considered a highly disturbed habitat. This is because the habitat consists of residential lanes, gardens, and main roads (Figure 5). The main road is a 10 m wide dirt track that is usually used by heavy equipment for logging. The data collection routes in the park were near residential areas and were dominated by *Musa* sp., *Areca catechu*, *Aquilaria malaccensis*, and *Palaquium* sp. The park has an artificial reservoir with a diameter of approximately 3 m. This park is also close to a swamp and a large river that borders the PT Inocin Abadi area.

Figure 5. Outside forest habitat (a) Main road (b) Residential lanes (c) Domination of Musa sp. (d) Park.

2.3. Data collection

Habitat disturbance was determined based on distance to the main road, availability of road access frequented by humans [10], and proximity to human habitation [8]. Surveys were conducted in the evening (20:00-23:00 (UTC+09:00)) and during the day (08:00 -11:00 (UTC+09:00)). Data collection was conducted using a combination of time search and transect methods, implementing both active and passive techniques. Reptiles and amphibians were actively located using the Visual Encounter Survey/VES technique [11], both during the day and at night. Additionally, glue traps made from wooden boards measuring 30 cm × 30 cm, covered with plastic, and rat glue, were placed during morning surveys. Ten glue traps were placed in each transect at a distance of 25 m in both terrestrial and aquatic habitats and checked every 30 min. Observations were carried out twice on each transect line, measuring 500 and 200 m in terrestrial and aquatic sites, respectively.

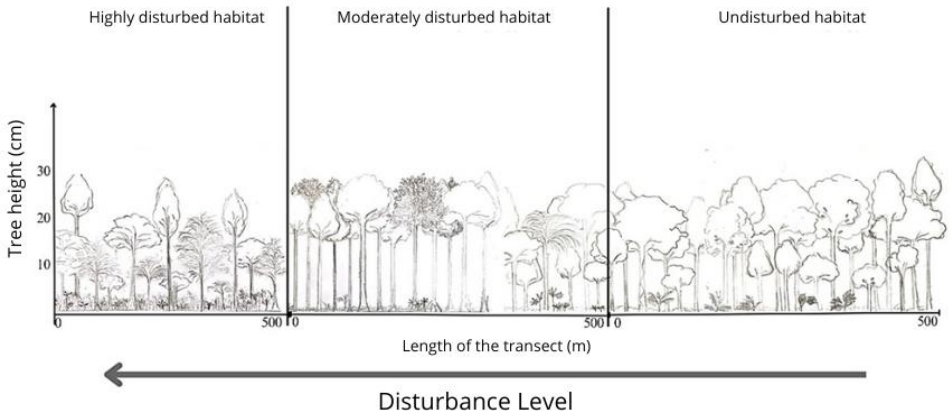

Figure 6. Profile diagram of habitat disturbance levels at the study sites.

Amphibians were captured by hand and placed in plastic bags, while reptiles were caught using a bagger attached to the snake's bag with a hook stick to put distance from the snakes. For each captured individual, the time of encounter, activity, position, substrate, and coordinates were recorded using GPS. Their body length and weight were measured, documented using a camera, and identified using field guides. Reptiles and amphibians that were identified and documented were returned to the capture location. Several specimens that could not be identified to the species level were preserved in 70% alcohol and deposited at the Biosystematics and Evolution Research Center, Herpetology Laboratory, BRIN (National Research and Innovation Agency), Bogor, West Java, for further identification.

The body weights of reptiles and amphibians are measured using scales. The length of amphibians and reptiles with small body sizes was measured using calipers, whereas a measuring tape was used for reptiles with large body sizes. Length measurements for reptiles of the Order Squamata are expressed in snout-vent length (SVL) is the length of the body from the tip of the head to the beginning of the tail, and snout-tail length (STL), the total length of the reptile from the end of the head to the tip of the tail. In contrast, the Testudinata is expressed in CCL (Curve Carapace Length), the maximum curved length of the carapace from the anterior to posterior end of the carapace, CCW (Curve Carapace Width), namely the width of the carapace curve measured from the widest point of the carapace, and TTL (Total Tail Length), which is the length from the midline of the posterior edge of the carapace. Overall, data collection was performed for 225.3 person-hours (**Table 1**).

Table 1. Efforts to search for reptiles and amphibians based on habitat disturbance levels.

Habitat Disturbed Level	Number of paths	Time of Observation (hour-minute)	Number of Observation	Total Effort (person-hours)
Highly Disturbed Habitat	4	14 hour, 20 minute	4	57.3
Moderately Disturbed Habitat	3	11 hour	6	66
Undisturbed Habitat	3	17 hour	6	102
Total				225.3

2.4. Data analysis

Data on reptiles and amphibians are presented in Table 2 and Table 3, including conservation status based on Indonesian Ministry of Environment and Forestry Regulation (*Permen LHK*) No. 106 of 2018, the International Union for Conservation of re and (IUCN) red list, and Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) appendices. The trend of species discovery was estimated using a species accumulation curve. Diversity indices were calculated using the Shannon-Wiener Species Diversity Index (H), Species Evenness Index (E), and Chao-1 estimation to estimate species richness (S), as well as community similarity, analyzed using the Bray-Curtis similarity index. Data were analyzed using PAST software version 4.03.

3. Results and Discussion

3.1. Results

The total number of reptiles found in the research route comprised 189 individuals from eight families and 26 species (Figure 7). Additionally, *Sphenomorphus* sp. 2 and *Varanus salvadorii* were found outside the research route, and *Leiopython albertisii* was found dead outside the PT Inocin Abadi area, on the road to Asiki. We also recorded some pet reptiles owned by local residents, such as *Morelia viridis* and *Elseya papua*. Another species of turtle that could potentially exist around this area is *Carettochelys insculpta*, which can be found in rivers [12]. Ten species of reptiles could only be identified to the genus level, namely *Gehyra* sp., *Dendrelaphis* sp., *Stegonotus* sp., *Hemidactylus* sp., *Carlia* sp., *and Emoia* sp. 1, *Emoia* sp. 2 *Eutropis* sp.. *Sphenomorphus* sp. 1, *Sphenomorphus* sp. 2, *Leiopython* sp. Based on Indonesian Ministry of Environment and Forestry Regulation (Permen LHK) No. 106 of 2018, two species of reptiles documented were protected by law, namely Morelia viridis and *Varanus indicus*. Several reptile species recorded fall under CITES Appendix II, namely *Candoia aspera, Morelia viridis, Varanus doreanus, Varanus indicus*, and *Leiopython albertisii*. A list of the reptile species found, including their IUCN status, is presented in Table 2.

The amphibians comprised 124 individuals of 16 species from five families (Figure 8). Four species could only be identified to the genus level, while waiting for the results of more detailed taxonomic analysis: *Platyplectrum* sp., *Xenobatrachus* sp., *Copiula* sp., and *Hylarana* sp. Two species could not be identified: *Copiula* cf. *fistulans* and *Xenobatrachus* cf. *subcroceus*. None of the amphibians found in this study are protected by Indonesian law or listed in the CITES appendices. A list of the amphibian species recorded during this study, along with their IUCN status, is presented in Table 3.

Table 2. Reptile species found in each category of habitat disturbance in the PT Inocin Abadi Area (June–July 2023).

No	Species	IUCN Red List	Number of Individuals					Total
			HDH	MDH	UH	OF	P	
	Family Agamidae							
1	*Lophosaurus dilophus**	LC			1			1
	Family Boidae							
2	*Candoia aspera*	LC			1			1
	Family Colubridae							
3	*Boiga irregularis*	LC			1		1	1
4	*Dendrelaphis* sp.	-		1				1
5	*Stegonotus modestus*	LC			1			1
6	*Stegonotus parvus*	LC				1		1
7	*Stegonotus* sp.	-		1				1
8	*Tropidonophis mairii*	LC		2				2
9	*Tropidonophis multiscutellatus*	LC			1			1
	Family Elapidae							

No	Species	IUCN Red List	Number of Individuals					Total
			HDH	MDH	UH	OF	P	
10	*Acanthophis laevis*	LC		1				1
	Family Gekkonidae							
11	*Cyrtodactylus novaeguineae*	LC		1				1
12	*Gekko vittatus*	LC				1		1
13	*Hemidactylus* sp.	-				1		1
14	*Gehyra* sp.	-		1				1
	Family Pythonidae							
15	*Leiopython albertisii*	LC					1	1
16	*Leiopython* sp.	-		1				
17	*Morelia viridis*	LC				3	2	3
18	*Simalia amethistina*	LC		1		3		5
	Family Scincidae							
19	*Carlia aenigma**	LC	27[10]	43	62[4]			145
20	*Carlia* sp.	-			2			
21	*Emoia* sp. 1*	-		1				2
22	*Emoia* sp. 2*	-	[1]	1	5[1]			11
23	*Eutropis* sp.*	-			1			2
24	*Sphenomorphus jobiensis**	-			1			2
25	*Sphenomorphus* sp.1*	-	2	3[1]	5			1
26	*Sphenomorphus* sp.2	-					1	
	Family Varanidae							
27	*Varanus doreanus*	LC				1		1
28	*Varanus salvadorii*	LC					1	
29	*Varanus indicus**	LC				1		1
	Family Chelidae							
30	*Elseya papua*	-					1	
	Total		40	58	80	11	7	196

*Species preserved in the BRIN Zoological Museum, (HDH) Highly Disturbed Habitat, (MDH) Moderately Disturbed Habitat, (UH) Undisturbed Habitat, (OF) Outside of Forest area, (P) Pet or outside PT Inocin Abadi area, ( ) Number of reptiles in the terrestrial path, ([.]) Number of reptiles in the aquatic path

Table 3. Amphibian species found in each category of habitat disturbance in the PT Inocin Abadi Area (June to July 2023).

No	Species	IUCN Red List	Number of Individuals				Total
			HDH	MDH	UH	OF	
	Family Hylidae						
1	*Litoria infrafrenata*	LC				3	3
	Family Limnodynastidae						
2	*Platyplectrum melanopyga**	LC	2	1	3		6
3	*Platyplectrum* sp.	-	3				3
	Family Microhylidae						
4	*Austrochaperina gracilipes*	LC	1	1	1		3
5	*Cophixalus parkeri**	LC			2		2
6	*Copiula* cf. *fistulans**	LC		6	2		8
7	*Copiula* sp. *	-	3		3[1]		7
8	*Hylophorbus rufescens**	DD	7[9]	7[4]	13[12]	1	53

9	*Xenobatrachus* cf. *subcroceus**	DD		[2]	[1]		3
10	*Xenobatrachus* sp. *	-		1	5[2]		8
	Family Pelodryadinae						
11	*Ranoidea gracilenta**	LC			[2]		2
	Family Ranidae						
12	*Hylarana daemeli**	LC	2[3]	[3]	[2]		10
13	*Hylarana novaeguineae*	LC		[1]			1
14	*Hylarana papua*	LC		1		[3]	4
15	*Hylarana* sp.	LC			[1]		1
16	*Litoria nasuta*	LC	4			[6]	10
	Total		29	32	50	13	124

*Species preserved in the BRIN Zoological Museum, (HDH) Highly Disturbed Habitat, (MDH) Moderately Disturbed Habitat, (UH) Undisturbed Habitat, (OF) Outside of Forest area, ( ) Number of amphibians in the terrestrial path, ([.]) Number of amphibians in the aquatic path

Figure 7. Reptile species in the PT Inocin Abadi area (June to July 2023).

Figure 8. Amphibian species in the PT Inocin Abadi area (June to July 2023).

Species accumulation curves for reptiles in the PT Inocin Abadi area showed an upward trend, whereas the curve for amphibians showed increasing results and tended to slope (Figure 9). A rising curve shows that the addition of new species is parallel to increasing research time, meaning that there is still the possibility of adding new species of reptiles and producing a flattened curve by increasing research time. A curve that has reached a sloping state means that almost all amphibian species at the research location have been recorded.

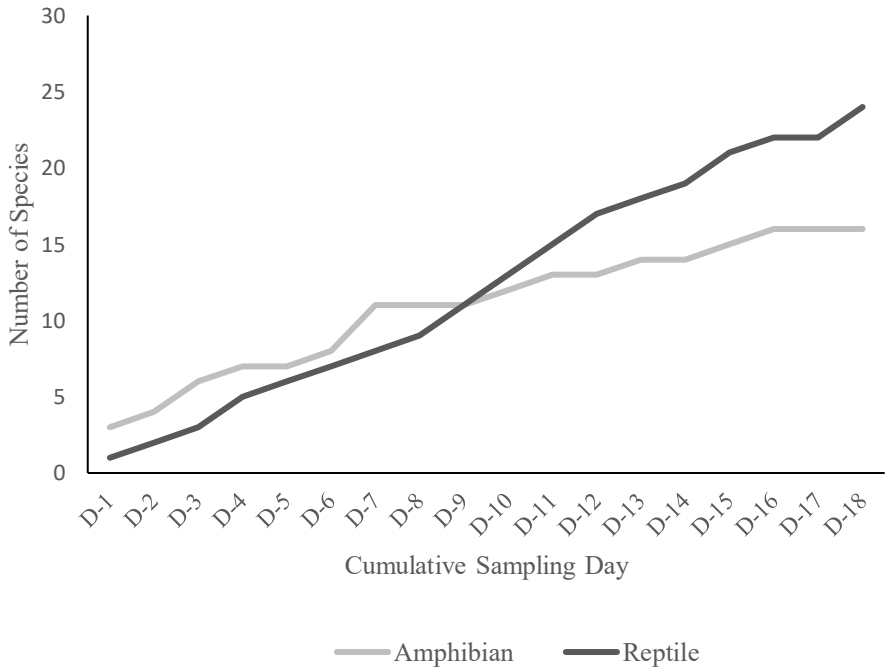

Figure 9. Species accumulation curves for amphibians and reptiles in the PT Inocin Abadi area.

The calculation of the species diversity index showed different results for reptiles and amphibians (Table 4). In general, the Shannon diversity and evenness index values were higher for amphibians than for reptiles. The highest Shannon index values were observed in undisturbed habitats for reptiles (H'= 0.807) and amphibians (H'= 0.742). However, based on this study, there is a tendency for the evenness index value to be higher outside forest areas for reptiles and amphibians. The evenness of reptile species outside forest areas (E= 0.863) was closer to 1 than that of amphibians in the same habitat (E= 0.856).

Table 4. Diversity, evenness, and richness index values of reptile and amphibian species in the PT Inocin Abadi Area (June–July 2023).

Index	Reptile				Amphibian			
	HDH	MDH	UH	OF	HDH	MDH	UH	OF
Shannon (H')	1.799	0.314	1.152	0.807	1.231	1.714	1.597	1.742
Eveness (E)	0.863	0.456	0.263	0.224	0.856	0.793	0.548	0.519
S Observation	7	3	10	12	4	7	9	11
S est (Chao)	17	3	30	20,5	4	7	14	11,6
Number of Individual	11	40	58	80	13	29	32	50
Total				189				124

*(HDH) Highly Disturbed Habitat, (MDH) Moderately Disturbed Habitat, (UH) Undisturbed Habitat, (OF) Outside of Forest area

Reptile communities in highly and moderately disturbed habitats had the highest community similarity, whereas amphibian communities in moderately disturbed and undisturbed habitats had the highest similarity (Figure 10). A high community similarity value indicates that the reptile or amphibian species in the two habitats are almost identical. Reptile and amphibian communities outside the forest area have the most different species of amphibians compared to other species in terms of disturbance.

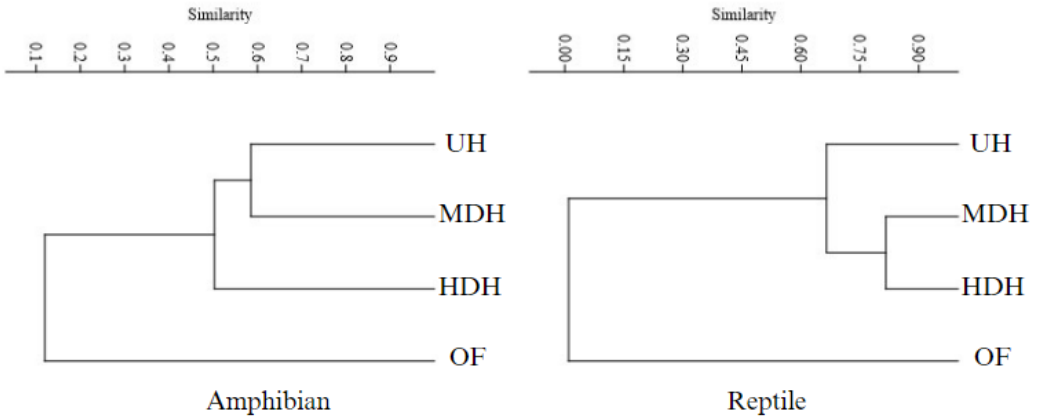

Figure 10. Dendrogram of Bray-Curtis coefficient of similarity across habitats with different disturbances based on amphibian (left) and reptile (right) species composition.

3.1 Discussion

This research also shows the discovery of a more significant number of species compared to the latest study by Krey and Tuwurutubun [13] in Ubadari Fakfak Village, West Papua, which found 45 species of herpetofauna. The differences in the research results may be attributed to differences in time and location. Research by Krey and Tuwurutubun [13] was conducted for 12 days by 3-4 observers in a habitat type of lowland hilly secondary forest and around waterfalls, while this study was conducted in lowland forest with more time and number of observers.

Based on the level of habitat disturbance, the number of species and species composition showed different results. Highly disturbed habitats had the lowest number of individuals and species of reptiles and amphibians compared to other habitats. Because highly disturbed habitats have open vegetation, reptiles and amphibians may face difficulties in sheltering from drought. Species found in highly disturbed habitats can adapt to environments with high levels of disturbance.

The reptile commonly found in highly disturbed habitats was *Carlia aeingma* (n=36). This species is often found in leaf litter and dry wood chunks in terrestrial habitats and basks on riverbanks during the day. Highly disturbed habitats have relatively little vegetation cover, providing many basking opportunities for diurnal lizards such as skinks. Several fossorial skinks were also found at this location. A similar observation was made in East Kalimantan, where skinks tend to be found in open habitats [14]. Apart from that, skinks such as *Sphenomorphus* sp. and *Carlia* sp. is usually found in holes in fallen wood and litter [15]. According to Allison [16], several species of *Carlia* could be found in disturbed habitats such as settlements and open gardens, and tend to be more common in areas that receive direct sunlight [16]. *Morelia viridis* was the most common reptile found outside the forest areas, observed crossing the main road. Generally*, M. viridis* is known to be arboreal; however, all specimens found during this study were not found on trees. Willson [17] states that this species is often seen going underground at night. The habitat of *M. viridis* is densely vegetated forests, but this species can also be found in habitats adjacent to forests, plantations, and succession forests [5].

The most common amphibian species found in highly disturbed habitats was *Hylophorbus rufescens* (n=17). *Hylophorbus rufescens* was found in both terrestrial and aquatic transects of the study. According to Kraus [18], *Hylophorbus* sp. usually inhabits leaf litter on the forest floor. This genus is found in primary lowland forests and lower montane habitats at an altitude of 360-860 meters above sea level [18]. Other species, such as *Litoria infrafrenata*, have been found several times outside the forest area on the main road while crossing. The loud calls of this species were heard around banana trees in the gardens. According to residents, *L. infrafrenata* appears on the walls of houses or roadsides during the monsoon. During this study, it was only found on the main road and in gardens in early July. This is thought to be associated with an increase in rainfall (42 mm in June, increasing to 132 mm in July). This suggests the potential for this species to inhabit residential habitats during the months with higher rainfall. *Litoria infrafrenata* is an arboreal frog that has adapted well to disturbed habitats, such as forests, parks, cities, and residential areas [19].

Common species of reptiles and amphibians are found in undisturbed habitats. This is because undisturbed habitats have more diverse vegetation cover, providing more microhabitats for reptiles and amphibians. In addition, the presence of seasonal swamps in this habitat resulted in the discovery of a specialist species that only exists in undisturbed habitats, *Ranoidea gracilenta*. Factors that influence the community structure of amphibians and reptiles found in a location are canopy, humidity, and tree species richness [20].

A higher number of reptile and amphibian species were found in the terrestrial route (66%) than in the aquatic route (34%). This may be due to the high diversity of microhabitats utilized by herpetofauna, such as leaf litter, pieces of rotting wood, puddles, and vegetation. No tadpoles were found during the surveys. The flow of water at the research location is also highly dependent on the season; when hot weather arrives, the water recedes, and sometimes the water flow is cut off due to drought.

The presence of dominant species in moderately disturbed and undisturbed habitats (*Carlia aenigma* and *Hylophorbus rufescens*) causes low evenness index values. Habitat conditions outside the forest area include a variety of habitats, such as settlements, mixed gardens, creeks, and main roads. The results of this research agree with results from Kusrini et al. [8] and Gillespie et al. [21], that diversity index values were much lower in highly disturbed habitats than undisturbed habitats. A high community similarity value indicates that the reptile or amphibian species in the two habitats are almost the same. Reptile and amphibian communities outside the forest area have the most different species of amphibians compared to other species under habitat disturbance. This condition can be caused by differences in microhabitats that exist in a habitat. Several factors, such as vegetation

composition, distance between adjacent habitats, and other environmental factors, may influence the similarity of amphibian communities.

This study contributes scientific information regarding the diversity and distribution of herpetofauna in the Boven Digoel region. In addition, regenerated forest areas, residential areas, and plantations also supported various species of reptiles and amphibians with tolerance towards habitat disturbance. *Ranoidea gracilenta, Hylarana* sp., *H. novaeguineae, Xenobatrachus* cf. *subcroceus*, and *Xenobatrachus* sp. only found in undisturbed and moderately disturbed habitats. In addition, we recorded two species of protected reptiles in the area. This shows that some of these species are vulnerable to extinction if action is not taken to conserve their habitat. Thus, the existence of potential areas for habitat herpetofauna must receive special attention from managers to ensure that the diversity of amphibians and reptiles does not decrease.

4. Conclusions

The discovery of 25 species of reptiles and 16 species of amphibians in this study indicates that the production forest area can support a diverse range of reptiles and amphibians. Some discoveries have yet to be identified at the species level, indicating the possibility of undescribed species at this location. Although the values of the Shannon diversity index and evenness were relatively higher in highly disturbed areas, the disturbed areas at this research location consisted of various habitat types, thus encouraging the presence of more species of reptiles and amphibians, especially those that are tolerant of disturbance. The research was conducted during the dry season over a relatively short period. The data collection time needs to be increased because there is still potential for other species of reptiles or amphibians that have not yet been discovered in this area. PT Inocin Abadi requires continuous monitoring to assess the potential diversity and population trends of the species within it. Considering that herpetofauna are highly sensitive to environmental changes, areas with potential for their conservation should receive special attention from management to ensure that the biodiversity of herpetofauna within them does not decline. The unpredictable weather conditions in the PT Inocin Abadi area have caused some areas to dry out, making efforts such as establishing artificial wetlands within the forest area necessary to sustain species that depend on water and prevent their extinction.

Author Contributions

RM: Conceptualization, Methodology, Investigation, Formal Analysis, Writing – original draft; **CCK:** Conceptualization, Methodology, Investigation, Formal Analysis; **MDK:** Supervision, Conceptualization, Methodology, Writing – Review and Editing; **AM:** Supervision, Writing – Review and Editing.

Conflicts of interest

There are no conflicts to declare.

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