

Exploration of Herpetofauna Diversity in Banten Forest Park as a Basis for Biodiversity Information

Yopi Haryandi^{1*}, Latif Sofiana Nugraheni²

¹ Biology Department, Faculty of Science, Institut Teknologi Sumatera, Lampung

²Biology Education Department, Faculty of Teacher Training and Education, Universitas La Tansa Mashiro, Banten

*Email: yopi.haryandi@bi.itera.ac.id

Abstract:

The Banten Forest Park is the only conservation area in Banten managed by the local government and possesses significant potential for high herpetofauna diversity. This study aimed to document the diversity and composition of herpetofauna species within the park. Data were collected using the Visual Encounter Survey (VES) method combined with exploration techniques, conducted from June 22 to 23, 2024. A total of 43 individuals representing nine species, seven genera, six families, and three orders (Squamata, Serpentes, and Anura) were recorded. The Squamata order was the most dominant, comprising the families Agamidae, Gekkonidae, Scincidae, and Varanidae, with *Sphenomorphus sanctus* and *Eutropis multifasciata* identified as the most abundant species. All recorded species are categorized as Least Concern by the IUCN and are not listed as protected under Indonesian wildlife regulations. The Shannon–Wiener diversity index ($H' = 1.75$) indicates a moderate level of species diversity. The findings collectively demonstrate that the habitat within Banten Forest Park maintains adequate ecological integrity to support a diverse community of reptiles and amphibians, underscoring the importance of conserving habitat heterogeneity in tropical lowland ecosystems.

Keywords: Herpetofauna, Biodiversity, Banten Forest Park, Scincidae, environmental indicators

Introduction

Indonesia ranks fourth globally in reptile diversity and sixth in amphibian diversity. Approximately 16% of the world's reptiles (781 species) are found in Indonesia, along with 270 amphibian species (Convention on Biological Diversity, 2025). On the island of Java, 39 species of amphibians have been recorded, predominantly frogs (Iskandar, 1998; Riyanto, 2008), while 62 species of reptiles have also been documented (Wowor, 2010).

Several studies have examined the presence and diversity of herpetofauna across Java. In Mount Halimun National Park (TNGH), 53 species of herpetofauna were recorded, including two endemic tree frogs, *Nyctixalus margaritifer* and *Philautus pallidipes* (Mumpuni, 2001). Similarly, a study in Mount Ciremai National Park, West Java, identified 43 species of herpetofauna, including two endemic frogs, *Microhyla achatina* and *Huia masonii* (Riyanto, 2008). (Gunawan et al., 2024) also reported 37 species of herpetofauna in the Mount Tilu area, Kuningan, West Java. Meanwhile, 18 species were recorded in the Situ Bagendit tourism area, Garut District, West Java (Nurfadhilah et al., 2024). The number of herpetofauna species continues to increase as new records are discovered, emphasizing the importance of further studies on herpetofauna occurrence and diversity in Indonesia.

The presence of herpetofauna serves as an important indicator reflecting ecosystem balance, sustainability, and environmental quality within a given area. As noted by (Syarif & Nugraha, 2021),

herpetofauna act as sensitive bioindicators of environmental change. Similarly, (Yuliany, 2021) emphasized that herpetofauna possess specific habitat preferences, making them effective as bioindicators. These species rely heavily on freshwater sources such as rivers, lakes, ponds, and swamps for breeding and maintaining moisture levels. Amphibians, in particular, require high humidity to prevent water loss through their skin, making moist environments essential for their survival. Consequently, the presence of freshwater sources is a crucial factor influencing both amphibians and reptiles (Thurman et al., 2022; Zylstra et al., 2019).

One of the conservation areas in Banten with high biodiversity potential, both flora and fauna, is the Banten Grand Forest Park (Taman Hutan Raya Banten; Tahura Banten) (Haryandi et al., 2025; Nugraheni & Haryandi, 2025). This area represents a lowland tropical rainforest ecosystem containing several freshwater streams, providing suitable habitats for herpetofauna communities. According to the Law of the Republic of Indonesia Number 32 of 2024 concerning the Amendment to Law Number 5 of 1990 on the Conservation of Living Natural Resources and Their Ecosystems, Grand Forest Park (Tahura) is designated as a Nature Conservation Area intended for the collection of plant and animal species and utilized for research, science, education, cultivation support, culture, tourism, and recreation. The area has also been developed as a tourist destination for both local and international visitors.

To date, data on the presence and diversity of herpetofauna in Tahura Banten have not been

reported. However, such information is essential for assessing environmental quality, which is continuously changing, and can serve as a basis for sustainable environmental management within the park. Furthermore, faunal diversity data can support the development of nature-based tourism in Tahura Banten, such as herpetofauna inventory-based ecotourism. Therefore, the objective of this study was to identify the species composition of herpetofauna in Banten Grand Forest Park.

Material and Methods

The research was conducted in the Banten Forest Park (Tahura) located in Carita District, Pandeglang Regency, Banten (Figure 1). Data collection was carried out on June 22-23, 2024, along with two observation transects. The first transect started from the Tahura office area to Curug Putri, while the second transect started from the Tahura office to the Carita gate. Both transects can be seen in Figure 1. Observations were conducted in the morning from 9:00 a.m. to 12:00 p.m. and in the evening from 7:00 p.m. to 10:00 p.m. This study used the Visual Encounter Survey (VES) method combined with transects (Kusrini, 2019). The Visual Encounter Survey (VES) method was selected because it effectively detects both diurnal and nocturnal species within a short sampling period. Although the two-day survey represents a limitation, repeated day and night searches along two transects maximized species detection. Similar short-term VES applications have been used successfully in other herpetofauna studies in Java (Gunawan et al., 2024; Kusrini, 2019; Nurfadhilah et al., 2024).

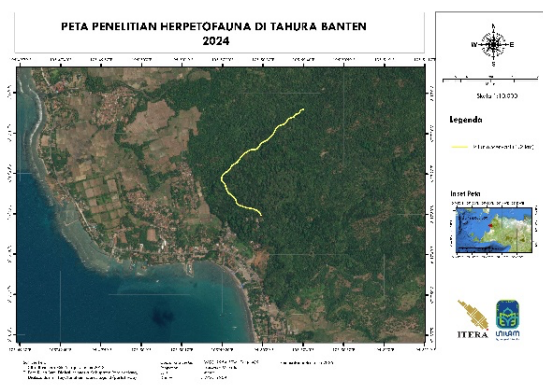


Figure 1. Transect map of herpetofauna survey sites in Banten Forest Park.

Herpetofauna data was collected based on direct encounters along the transect route, recording each encounter with reptiles and amphibians. Observations were made by searching for herpetofauna above vegetation and hiding behind rocks, fallen logs, litter, and aquatic areas. The herpetofauna data was then identified using the book

A Field Guide to The Reptiles of South-East Asia (Das, 2010) and Illustrated Guide and Identification of Amphibians of Java Island (Alhadi et al., 2021). The data obtained were analyzed quantitatively to obtain the Shannon-Wiener species diversity index (H').

Results and Discussion

Composition and Conservation Status of Herpetofauna

Based on the research conducted in Taman Hutan Raya Carita, Pandeglang, Banten, nine herpetofauna species were identified, belonging to three orders: Squamata, Serpentes, and Anura. The Squamata order was the most dominant, consisting of families Agamidae, Gekkonidae, Scincidae, and Varanidae. The recorded species include *Bronchocela jubata*, *Draco volans*, *Gekko gekko*, *Sphenomorphus sanctus*, *Eutropis multifasciata*, and *Varanus salvator*. All of these species are categorized as Least Concern (LC) by the IUCN and are not listed as protected species in Indonesia. The diversity of Squamata species suggests that the habitat conditions in Taman Hutan Raya (Tahura) Banten are still capable of supporting reptile populations that depend on diverse vegetation structures and natural shelter. The complete list of herpetofauna species is presented in Table 1.

In addition, the Serpentes order was represented by a single species, *Dendrelaphis formosus* from the family Colubridae. From the Anura order, two species were recorded: *Limnonectes macrodon* the family Dicroglossidae and *Polypedates leucomystax* the family Rhacophoridae. These amphibians serve as important environmental indicators because they rely heavily on high humidity and the presence of freshwater sources, such as rivers or ponds, for reproduction (Luedtke et al., 2023; Niu et al., 2024; Wells, 2007). The presence of amphibian species in this area indicates that the water and humidity conditions in Tahura Banten are still favorable for supporting fauna sensitive to environmental changes.

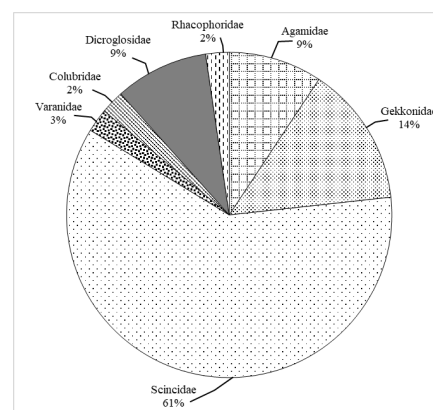


Figure 2. Composition of Herpetofauna Families in Banten Nature Reserve

Table 1. Types of Herpetofauna in Tahura Banten

Order	Family	Species	Local name	Conservation status	protection status
Squamata	Agamidae	<i>Bronchocela jubata</i>	Bunglon surai	LC	Not protected
		<i>Draco volans</i>	Cekibar	LC	Not protected
	Gekkonidae	<i>Gekko gecko</i>	Tokek rumah	LC	Not protected
	Scincidae	<i>Sphenomorphus sanctus</i>	Kadal hutan bergaris	LC	Not protected
		<i>Eutropis multifasciata</i>	Kadal kebun	LC	Not protected
	Varanidae	<i>Varanus salvator</i>	Biawak air	LC	Not protected
Serpentes	Colubridae	<i>Dendrelaphis formosus</i>	Ular paku	LC	Not protected
Anura	Dicroglossidae	<i>Limnonectes macrodon</i>	Bangkong batu	LC	Not protected
	Rhacophoridae	<i>Polypedates leucomystax</i>	Katak-Pohon Bergaris	LC	Not protected

Note: Conservation status Least Concern (LC) according to the IUCN; Protection status based on the Regulation of the Minister of Environment and Forestry of the Republic of Indonesia No. 106/2018.

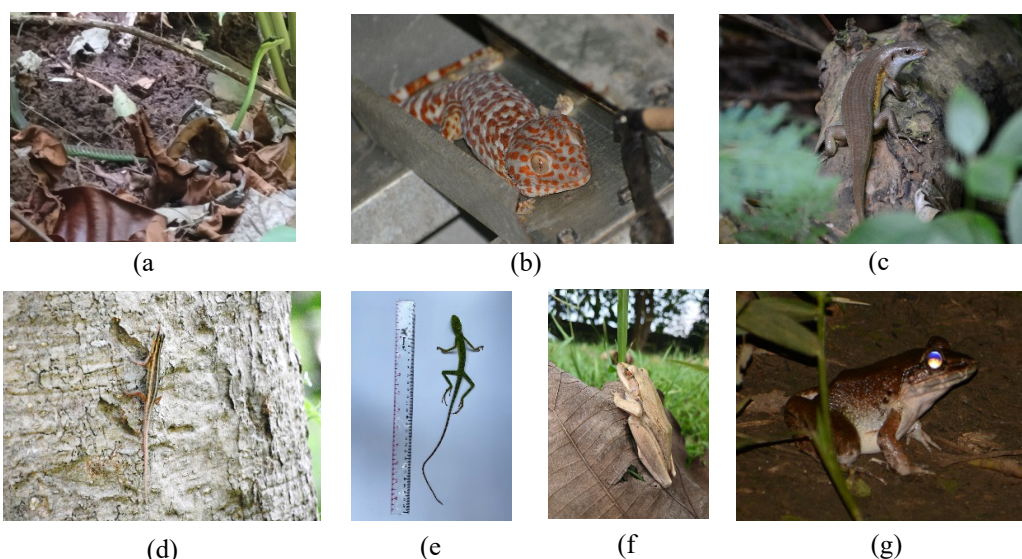


Figure 3. Types of herpetofauna found in Tahura Banten; (a) *Dendrelaphis formosus*; (b) *Gekko gecko*; (c) *Eutropis multifasciata*; (d) *Sphenomorphus sanctus*; (e) *Bronchocela jubata*; (f) *Polypedates leucomystax*; dan (g) *Limnonectes kuhlii*.

Based on Figure 2, the Scincidae family dominates the herpetofauna composition in Tahura Banten, comprising 61% of the total species recorded. The global ecological success of Scincidae is driven by a combination of morphological, behavioral, and physiological flexibility that allows them to occupy a wide range of habitat types, from moist forests to disturbed open areas. Their cylindrical and smooth body shape, as well as the tendency of some species to behave semi-fossorial, provides an advantage in exploiting microhabitats such as leaf litter and soil

crevices in tropical forest areas such as Tahura Banten. In addition, their generalist diet and efficient thermoregulation enable Scincidae to adapt to temperature variations and food availability, even in areas with high anthropogenic pressure. Thus, the dominance of Scincidae in Tahura Banten not only reflects habitat conditions that are still supportive of terrestrial reptiles, but also indicates that this family has highly effective evolutionary and ecological strategies for survival in dynamic tropical ecosystems (Anderson et al., 2023; Chapple et al., 2023).

Table 2. Herpetofauna Species Found on Each Observation transect

Order	Family	Species	Transect		Total
			1	2	
Squamata	Agamidae	<i>Bronchocela jubata</i>	3	-	3
		<i>Draco volans</i>	1	-	1
	Gekkonidae	<i>Gekko gecko</i>	4	2	6
	Scincidae	<i>Sphenomorphus sanctus</i>	13	-	13
		<i>Eutropis multifasciata</i>	12	1	13
	Varanidae	<i>Varanus salvator</i>	1	-	1
Serpentes	Colubridae	<i>Dendrelaphis formosus</i>	1	-	1
Anura	Dicroglossidae	<i>Limnonectes macrodon</i>	-	4	4
	Rhacophoridae	<i>Polypedates leucomystax</i>	-	1	1
Total			34	5	43
Shannon-Wiener Index			1.50	1.21	1.75

Diversity of Herpetofauna Species

The results of the herpetofauna survey recorded a total of 43 individuals, comprising nine species, seven genera, six families, and three orders. The order Squamata exhibited the highest species richness, represented by *Bronchocela jubata*, *Draco volans*, *Gekko gecko*, *Sphenomorphus sanctus*, *Eutropis multifasciata*, and *Varanus salvator*. Among these, *Sphenomorphus sanctus* and *Eutropis multifasciata* were the most dominant species, each contributing 13 individuals. The order Serpentes was represented by *Dendrelaphis formosus*, whereas the order Anura included *Limnonectes macrodon* and *Polypedates leucomystax*. The Shannon–Wiener diversity index (H') values for transects 1 and 2 were 1.50 and 1.21, respectively, with an overall diversity index of 1.75, indicating a moderate level of species diversity.

The Shannon-Wiener diversity index ($H'=1.75$) observed in Banten Forest Park indicates a moderate diversity level. This value is consistent with findings from other forest ecosystems on Java. For instance, Gunawan et al., (2024) reported H' values ranging from 1.6 to 2.0 in Mount Tilu, West Java, while Subeno, (2018) found an H' of 1.8 in the upper Sindoro River area of Central Java. These comparable diversity levels suggest that the moderate diversity recorded in Banten Forest Park is typical of Java's lowland tropical forests, where habitat complexity and microclimatic variations maintain balanced herpetofauna communities.

Although environmental parameters such as humidity, temperature, and canopy cover were not measured, field observations revealed clear habitat contrasts between transects. The study area, ranging from 13 to 214 meters above sea level, includes both lowland and slightly elevated terrain. Transect 1 at

higher elevation with forest vegetation supported more reptiles, while Transect 2 at lower elevation with paddy fields and ponds harbored more amphibians. These elevational and habitat differences likely influenced species composition and diversity, consistent with patterns reported in other Javan lowland forests where microclimatic and vegetation heterogeneity shape herpetofauna assemblages (Nurfadhilah et al., 2024; Subeno, 2018).

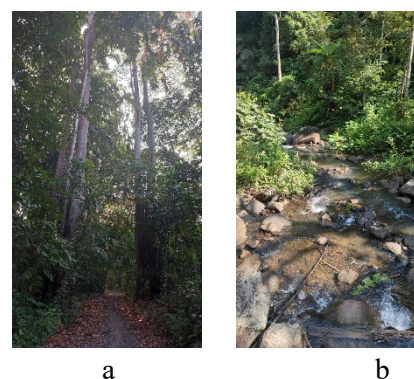


Figure 4. a. Habitat transect 1; b. Habitat transect 2

The variation in diversity between transects is likely influenced by habitat heterogeneity, including differences in humidity, vegetation density, and water availability, which are crucial determinants for both reptile and amphibian distribution. In general, the habitat in Tahura Banten is classified as lowland tropical rainforest with a diverse landscape. This study utilized two transect lines. Transect 1 is located in a forested area with vegetation dominated by medium to large-sized trees, accompanied by surrounding undergrowth (Figure 4a). Despite the relatively dense vegetation, sunlight is still able to penetrate through the canopy gaps, making this transect a suitable habitat for reptiles. This is supported by the high number of reptile sightings recorded along this transect. Reptiles generally require heat sources to increase their body temperature in order to function normally, either by

basking under direct sunlight or by absorbing heat from warm surfaces such as rocks or soil. Conversely, to reduce their body temperature, reptiles typically seek shade or alter their body posture to minimize water loss through evaporation (Ario, 2010; Subeno, 2018). Furthermore, the habitat conditions in Transect 2 consist of rice fields, water ponds, and rivers (Figure 4b). A high number of amphibian individuals were recorded along this transect. The presence of amphibians in this area is closely related to their need for a humid environment to maintain skin moisture and prevent dehydration (Iskandar, 1998).

Conclusion

The herpetofauna survey conducted in Taman Hutan Raya (Tahura) Carita, Pandeglang, Banten, revealed a total of nine species belonging to three orders: Squamata, Serpentes, and Anura. The dominance of Squamata, particularly the Scincidae family, which accounted for 61% of the total individuals recorded, reflects the strong ecological adaptability of this group in tropical environments. The presence of multiple Squamata families (Agamidae, Gekkonidae, Scincidae, and Varanidae) indicates that Tahura Banten still provides a structurally diverse habitat capable of supporting various reptile groups. Meanwhile, the occurrence of amphibians such as *Limnectes macrodon* and *Polypedates leucomystax*, which are highly dependent on humidity and freshwater sources, signifies that the area retains suitable hydrological conditions to sustain moisture-sensitive fauna. The Shannon–Wiener diversity index ($H' = 1.75$) suggests a moderate level of species diversity, highlighting that despite certain environmental pressures, the ecological integrity of Tahura Banten remains relatively stable.

References

- Alhadi, F., Kaprawi, F., Hamidy, A., & Kirschey, T. (2021). *Amfibi Pulau Jawa - Panduan Bergambar dan Identifikasi*. Perkumpulan Amfibi Reptil Sumatera & NABU.
- Anderson, R. O., Tingley, R., Hoskin, C. J., White, C. R., & Chapple, D. G. (2023). Linking physiology and climate to infer species distributions in Australian skinks. *Journal of Animal Ecology*, 92(10), 2094–2108. <https://doi.org/10.1111/1365-2656.14000>
- Ario, A. (2010). *Buku Panduan Lapangan Mengenal Satwa Taman Nasional Gunung Gede Pangrango*. Conservation Indonesia.
- Chapple, D. G., Slavenko, A., Tingley, R., Farquhar, J. E., Camaiti, M., Roll, U., & Meiri, S. (2023). Built for success: Distribution, morphology, ecology and life history of the world's skinks. *Ecology and Evolution*, 13(12). <https://doi.org/10.1002/ece3.10791>
- Convention on Biological Diversity. (2025). *Biodiversity Facts Status and trends of biodiversity, including benefits from biodiversity and ecosystem services*. <https://www.cbd.int/countries/profile?country=id>
- Das, I. (2010). *A Field Guide to the Reptiles of South-East Asia*. New Holland Publishers.
- Gunawan, D. A., Qadriyah Fitri Catur Wijayanti, Irvanda Mustofa Arif, & Febriyan Eka Tama. (2024). Keanekaragaman Jenis Herpetofauna di Kawasan Gunung Tilu, Kuningan, Jawa Barat. *Biosfer: Jurnal Biologi Dan Pendidikan Biologi*, 9(1), 21–25. <https://doi.org/10.23969/biosfer.v9i1.11339>
- Haryandi, Y., Fatriani, Ri., Nugraheni, L. S., Mukhoyyaroh, Q., & Utami, N. (2025). Kepadatan dan Keanekaragaman Burung di Taman Hutan Raya (Tahura) Banten: Analisis dengan Metode Point Count. *Maximus: Journal of Biological and Life Sciences*, 3(1), 22–27.
- Iskandar, Dj. (1998). *Amfibi Jawa dan Bali-Seri Panduan Lapangan*. Puslitbang Biologi LIPI.
- Kusrini, M. D. (2019). *Pedoman Penelitian dan Survey Herpetofauna di Alam*. Fakultas Kehutanan IPB.
- Luedtke, J. A., Chanson, J., Neam, K., Hobin, L., Maciel, A. O., Catenazzi, A., Borzée, A., Hamidy, A., Aowphol, A., Jean, A., Sosa-Bartuano, Á., Fong G, A., de Silva, A., Fouquet, A., Angulo, A., Kidov, A. A., Muñoz Saravia, A., Diesmos, A. C., Tominaga, A., ... Stuart, S. N. (2023). Ongoing declines for the world's amphibians in the face of emerging threats. *Nature*, 622(7982), 308–314. <https://doi.org/10.1038/s41586-023-06578-4>
- Mumpuni. (2001). Keanekaragaman Herpetofauna di Taman Nasional Gunung Halimun, Jawa Barat. *"Biodiversitas Taman Nasional Gunung Halimun" Berita Biologi*, 5(6), 712–720. https://www.fairportlibrary.org/images/files/RenovationProject/Concept_cost_estimate_accepted_031914.pdf
- Niu, Y., Zhang, X., Zhang, H., Men, S., Xu, T., Ding, L., Li, X., Wang, L., Wang, H., Storey, K. B., & Chen, Q. (2024). Ecological adaptations of amphibians to environmental changes along an altitudinal gradient (Case Study: Bufo gargarizans) from phenotypic and genetic perspectives. *BMC Biology*, 22(1). <https://doi.org/10.1186/s12915-024-02033-6>
- Nugraheni, L. S., & Haryandi, Y. (2025). Kepadatan Populasi Monyet Ekor Panjang (*Macaca fascicularis* Raffles. 1821) di Tahura Banten, Jawa Barat, Indonesia. *Maximus: Journal of*

- Biological and Life Sciences*, 3(1), 2834.
<https://doi.org/10.30736/ktb.v6i1.814>
- Nurfadhilah, N. A., Syahrahmani, A., Liani, H. R., Lawana, D. D., Nathaniel, B. R., & Kurnia, I. (2024). Keanekaragaman Amfibi Dan Reptil Di Kawasan Wisata Situ Bagendit Dan Sekitarnya, Kabupaten Garut Provinsi Jawa Barat. *Wanamukti: Jurnal Penelitian Kehutanan*, 27(1), 1–16.
<https://doi.org/10.35138/wanamukti.v27i1.689>
- Riyanto, A. (2008). Komunitas Herpetofauna di Taman Nasional Gunung Ciremai, Jawa Barat. *Jurnal Biologi Indonesia*, 4(5), 349–358.
- Subeno, S. (2018). Distribusi dan Keanekaragaman Herpetofauna di Hulu Sungai Gunung Sindoro, Jawa Tengah. *Jurnal Ilmu Kehutanan*, 12(1), 40.
<https://doi.org/10.22146/jik.34108>
- Syarif, R., & Nugraha, F. A. D. (2021). Keanekaragaman Herpetofauna di Perkebunan Kelapa (*Cocos nucifera* L.) di Desa Simbur Naik Kecamatan Muara Sabak Timur Kabupaten Tanjung Jabung Timur, Provinsi Jambi. *Prosiding SEMNAS BIO 2021*, 1807–1817.
<http://repository.unp.ac.id/33823/>
- Thurman, L. L., Cousins, C. D., Button, S. T. C., Garcia, T. S., Henderson, A. L., Olson, D. H., & Scott, J. P. (2022). Treading water: Conservation of headwater-stream associated amphibians in Northwestern North America. *Imperiled: The Encyclopedia of Conservation*, 499–513.
<https://doi.org/https://doi.org/10.1016/B978-0-12-821139-7.00112-4>
- Wells, K. D. (2007). *The Ecology and Behavior of Amphibians*. University of Chicago Press.
- Wowor, D. (2010). Studi biota perairan dan herpetofauna di Daerah Aliran Sungai Ciliwung dan Cisadane: Kajian hilangnya keanekaragaman hayati. In *Lembaga Ilmu Pengetahuan Indonesia (LIPI). Bogor*.
- 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.
<https://doi.org/10.24002/biota.v6i2.2996>
- Zylstra, E. R., Swann, D. E., & Steidl, R. J. (2019). Surface-water availability governs survival of an amphibian in arid mountain streams. *Freshwater Biology*, 64(1), 164–174.
<https://doi.org/10.1111/fwb.13204>