Bio Palembanica 2(2): 134-141 (2025)
This journal is available online at: https://ejournal.uigm.ac.id/

Persistence of Herpetofauna Assemblages in Anthropogenic Landscapes: Insights from Rural Bangka Island, Indonesia

RANDI SYAFUTRA[1]*, NURZAIDAH PUTRI DALIMUNTHE[1], SUJADI PRIYANSAH[1], HENDI HENDRA BAYU[1], HELVINA HANDAYANI[1], ABDUL KAMAL[1], NUR AZIZAH NAWANG WULAN[1], REANI FEBRIYANI[1] & RYDHOLLAH ARRAHMAAN[1]

[1]*Department of Natural Resources Conservation, Faculty of Engineering and Science, Universitas Muhammadiyah Bangka Belitung, Indonesia*
**Corresponding Author. Email: randi.syafutra@unmuhbabel.ac.id; https://orcid.org/0000-0001-8156-0613*
Email: nurzaidah.putridalimunthe@unmuhbabel.ac.id; https://orcid.org/0000-0003-0340-5153
Email: sujadi.priyansah@unmuhbabel.ac.id
Email: hendi.hendrabayu@unmuhbabel.ac.id; https://orcid.org/0009-0009-6663-6574
Email: helvinahandayani071001@gmail.com
Email: abdul.kamal@gmail.com
Email: nurazizahnawangwulan@gmail.com
Email: rianipayung699@gmail.com
Email: rydhollaharohmaan@gmail.com

Received 23 November 2025 | Accepted by *G. A. Widayanti*: 18 December 2025 | Published online 27 December 2025.

Abstract
Rural landscapes in Bangka Island, Indonesia, continue to sustain important ecological functions despite ongoing land-use change. Our study investigates herpetofauna assemblages in rural areas of Bangka Island, with a particular focus on how habitat complexity shapes species distribution. Research was conducted in two human-modified sites (Air Duren and Cengkong Abang) within Bangka Regency, Sumatra, Indonesia. Fieldwork took place over three consecutive weeks in July 2022 and employed a time-constrained Visual Encounter Survey (VES) conducted between 07:00 and 09:00 PM. A total of 13 individuals were recorded, representing 7 species across 6 families. Cengkong Abang exhibited greater species diversity (H′ = 1.75 vs. 1.33) and supported forest-associated taxa, likely due to its more structurally complex vegetation. These findings indicate that retained vegetation in rural environments can function as secondary habitat for herpetofauna. Conservation efforts should therefore emphasize the protection and enhancement of vegetation complexity within village landscapes.

Keywords: anthropogenic matrix, Bangka Island, herpetofauna, reconciliation ecology, secondary forest.

Introduction

The rapid conversion of tropical forests into agricultural and residential landscapes is a leading cause of biodiversity decline globally (Kusuma *et al.* 2018; Galindo *et al.* 2022; Jaureguiberry *et al.* 2022; Rosero-Añazco *et al.* 2025). However, recent ecological theory emphasizes the importance of the "matrix", the modified landscape surrounding habitat fragments, in mediating species persistence (Ruffell *et al.* 2017; Fletcher *et al.* 2024; Iqbal *et al.* 2025; Smith *et al.* 2025). Herpetofauna (amphibians and reptiles) are particularly sensitive to such matrix quality due to their poikilothermic physiology, limited dispersal capabilities, and dependence on specific microclimates (Cordier *et al.* 2021; Inman *et al.* 2023; Yustian *et al.* 2023). Consequently, they serve as critical bioindicators of ecosystem health in human-modified environments (Amarasinghe *et al.* 2021; Paudel *et al.* 2022; Rosales *et al.* 2023; Mouane *et al.* 2024)**.**

Bangka Island, situated within the Sundaland biodiversity hotspot, has experienced extensive land-use transformation driven by mining, agriculture, and urbanization (Wulandari *et al.* 2022; Oktavia *et al.* 2024). While protected areas remain the focus of conservation, the vast majority of the island's land cover consists of anthropogenic mosaics, mixtures of settlements, smallholder plantations, and secondary growth (Sari *et al.* 2023; Winata *et al.* 2025). The ecological value of these heterogeneous landscapes remains understudied, despite their potential role in supporting generalist and moderately sensitive taxa (dos Reis-Silva *et al.* 2025).

Herpetofaunal research on Bangka Island remains limited, leaving a critical knowledge gap concerning the ability of species to persist within rural landscapes (Irwanto *et al.* 2019; Hasibuan *et al.* 2021). In response to land-use change affecting herpetofauna on Bangka Island, we aim to characterize the herpetofaunal assemblage, quantify species diversity, and evaluate the role of microhabitats in supporting ecological guilds. In this paper, we emphasize that understanding these dynamics in Bangka Island is crucial for aligning biodiversity conservation with ongoing human development in the region.

Methods

Study Area

The study was conducted in Mendo Barat District, Bangka Regency, Bangka Belitung Islands Province, focusing on two distinct anthropogenic sites: Air Duren and Cengkong Abang Villages (Fig. 1). The landscape is characterized as a semi-rural mosaic comprising residential areas, small-scale agroforestry plots, drainage systems, and fragments of secondary tropical lowland forest. Cengkong Abang Village is distinguished by higher vegetation density and a more stratified canopy compared to Air Duren Village.

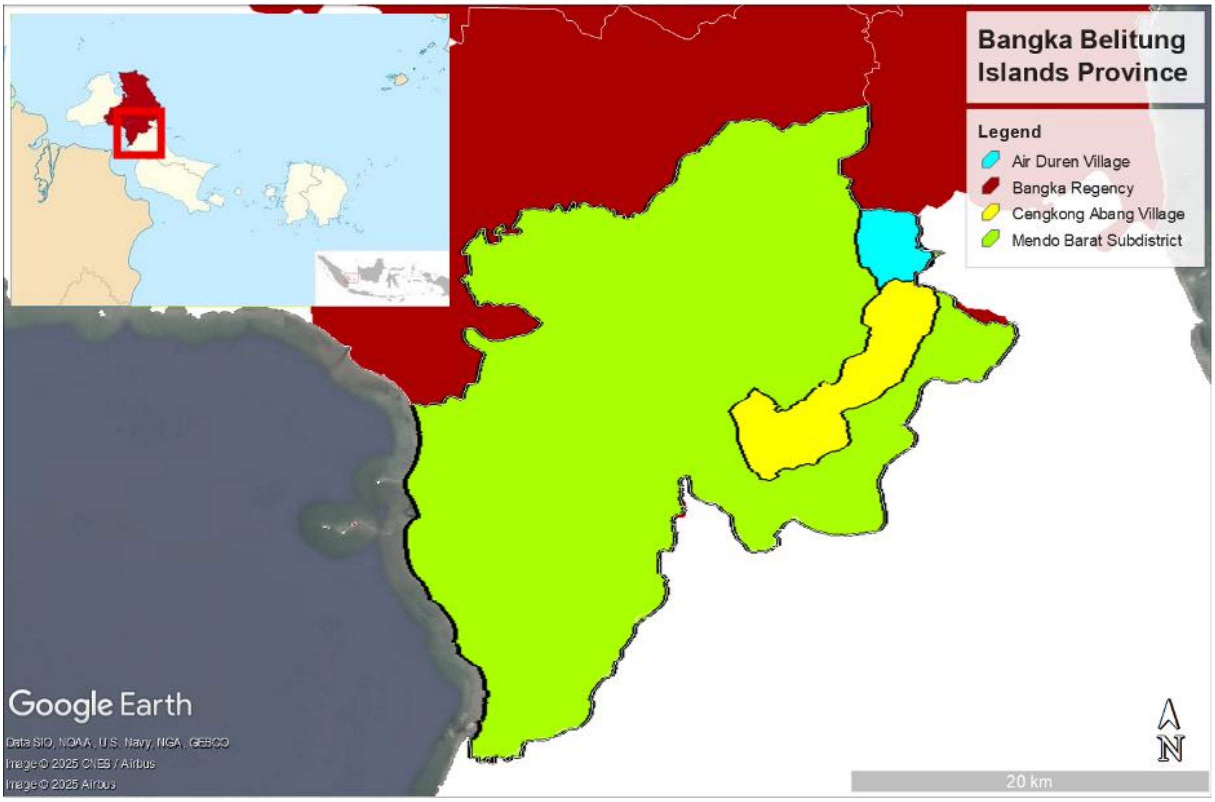

Figure 1. Map of the research location showing Air Duren and Cengkong Abang Villages in Mendo Barat Subdistrict, Bangka Regency, Bangka Belitung Islands Province, Sumatra, Indonesia.

Sampling Design

Field surveys were executed over a three-week period in July 2022. To maximize detection probabilities for nocturnal ectotherms, sampling was restricted to peak activity hours (19:00–21:00) (Maulidi *et al.* 2020; Tan *et al.* 2025). We employed a time-constrained Visual Encounter Survey (VES) method supplemented by purposive microhabitat searching (Tiberti *et al.* 2022). Surveyors traversed standardized transects intersecting key microhabitats, including riparian zones, leaf litter beds, understory vegetation, and anthropogenic structures. Hand-searching was utilized to inspect refugia such as rotting logs, rock crevices, and dense shrubbery.

Data Analysis

Species identification was performed *in situ* using standard field guides, supported by photographic documentation for verification. Data analysis focused on characterizing the assemblage structure using three standard ecological metrics. Species richness (*S*) was defined as the total number of species recorded at each site, while relative abundance was calculated as the proportion of individuals of a species relative to the total number of individuals observed. Community diversity was quantified using the Shannon–Wiener Diversity Index (*H'*), calculated as:

$$H' = -\sum(p_i \ln p_i)$$

where *pi* represents the proportion of individuals belonging to the *i*-th species. The Shannon–Wiener index originates from the formula for information entropy introduced by Claude Shannon in his 1948 paper *A Mathematical Theory of Communication*. It is often referred to as the Shannon–Wiener index to acknowledge the concurrent development of similar cybernetic concepts found in Norbert Wiener's 1948 book *Cybernetics*, and has since been widely applied in ecological studies to describe community heterogeneity (Syafutra *et al.* 2019; Syafutra *et al.* 2025).

Results and Discussion

Assemblage Composition and Abundance

A total of 13 individuals representing 7 species and 6 families were recorded during the study. The distribution of individuals across the two study sites was uneven, with Cengkong Abang Village supporting a higher abundance (*N* = 8) compared to Air Duren Village (*N* = 5). The complete field enumeration is presented in Table 1.

Table 1. Composition and relative abundance of herpetofauna in Air Duren and Cengkong Abang Villages.

Family	Scientific Name	Individual			Relative Abundance (%)
		Air Duren Village	Cengkong Abang Village	Total	
Amphibia					
Dicroglossidae	*Fejervarya cancrivora*	2	2	4	30.79%
Bufonidae	*Duttaphrynus melanostictus*	1	1	2	15.38%
Reptilia					
Scincidae	*Eutropis multifasciata*	1	1	2	15.38%
Gekkonidae	*Gekko smithii*	1	1	2	15.38%
Viperidae	*Tropidolaemus wagleri*	0	1	1	7.69%
Colubridae	*Boiga dendrophila*	0	1	1	7.69%
Colubridae	*Ahaetulla prasina*	0	1	1	7.69%
	Total	**5**	**8**	**13**	**100%**

In terms of relative abundance, the assemblage was numerically dominated by the amphibian *Fejervarya cancrivora* (crab-eating frog), which accounted for 30.79% of the total captures. This dominance is attributed to the species' high adaptability to the drainage systems and moist microhabitats within small-scale agroforestry plots that characterize the semi-rural mosaic (Yodthong *et al.* 2019; Susanti & Sumarmin 2020; Pratomo *et al.* 2024). Synanthropic species, including *Duttaphrynus melanostictus*, *Eutropis multifasciata*, and *Gekko smithii*, each contributed 15.38% to the total abundance, thriving in the interface between residential areas and garden vegetation. In contrast, the arboreal snake specialists Wagler's Pit Viper *Tropidolaemus wagleri*, Gold-ringed Cat Snake *Boiga dendrophila* (Fig. 2), and *Ahaetulla prasina* were rare, each representing only 7.69% (singletons). The persistence of these forest-associated species is strictly linked to the remaining fragments of secondary tropical lowland forest and the stratified canopy retained within older agroforestry stands (Angelstam *et al.* 2023; Tanjung *et al.* 2025; Yahya *et al.* 2025).

Figure 2. The Gold-ringed Cat Snake *Boiga dendrophila* encountered in the complex vegetation structure of Cengkong Abang Village (Photograph: Abdul Kamal).

Ecological Guilds and Filtering

The assemblage structure reflects a strong ecological filtering effect typical of disturbed habitats (Santoandré *et al.* 2019; Hua *et al.* 2024; Chien 2025; Palomino-Cuéllar & Urbina-Cardona 2025). The community is dominated by terrestrial and synanthropic species capable of tolerating human modification. However, distinct arboreal guilds were restricted to the more complex habitat of Cengkong Abang.

The amphibian community was uniform across both sites. The Crab-eating Frog *Fejervarya cancrivora* and Asian Common Toad *Duttaphrynus melanostictus* are disturbance-tolerant commensals (Yap 2015; Pratomo *et al.* 2024), facilitated by anthropogenic water bodies and invertebrate prey availability in both villages.

Reptile Diversity and Habitat Complexity

Reptile distribution revealed pronounced spatial heterogeneity between the two study sites. While *Eutropis multifasciata* and *Gekko smithii* occurred in both villages, 60% of reptile species *Boiga dendrophila*, *Ahaetulla prasina*, and *Tropidolaemus wagleri* were exclusively recorded in Cengkong Abang Village. This pattern strongly supports the habitat heterogeneity hypothesis, whereby increased structural complexity enhances niche availability and supports a broader range of ecological guilds. The presence of a stratified canopy, mature trees, and dense understory vegetation in Cengkong Abang provides essential microhabitats for arboreal and semi-arboreal reptiles.

Comparable patterns have been documented in other anthropogenic landscapes across tropical regions. Studies in agroforestry and rural mosaic systems in Southeast Asia and West Africa have shown that arboreal reptiles are largely absent from simplified monoculture or open habitats but persist in areas retaining secondary forest elements and vertical vegetation structure. For example, Frishkoff *et al.* (2015) and Nowakowski *et al.* (2018) reported that forest-associated reptiles were restricted to landscapes with higher canopy cover and microclimatic stability. Similar findings were also reported by Jayakumar & Nameer (2018) in rural South Asia, where reptile diversity increased with vegetation stratification. These comparisons indicate that the reptile assemblage pattern observed in Cengkong Abang aligns with broader ecological trends in human-modified tropical landscapes.

Diversity Indices

The diversity analysis revealed clear ecological differences between the two study sites. As summarized in Table 2, Cengkong Abang Village exhibited higher species richness and diversity (H' = 1.75) than Air Duren Village (H' = 1.33). This higher Shannon–Wiener index reflects not only greater species richness but also a more balanced distribution of individuals among ecological guilds. The coexistence of terrestrial generalists and arboreal specialists in Cengkong Abang suggests that the availability of diverse microhabitats (such as tree trunks, canopy foliage, shaded understory, and forest edges) enhances community heterogeneity.

In contrast, Air Duren Village is characterized by open areas and simplified vegetation dominated by monoculture and residential land use. These habitat conditions favor disturbance-tolerant terrestrial species but limit niche availability for arboreal and habitat-specialist reptiles, resulting in lower diversity and community complexity. The dominance of generalist taxa in Air Duren highlights the role of habitat simplification as a limiting factor for herpetofaunal diversity. Overall, these findings emphasize that vegetation structure and habitat complexity, rather than land-use classification alone, are key determinants of herpetofaunal diversity in rural anthropogenic landscapes.

Table 2. Comparison of ecological metrics and habitat characteristics.

Ecological Parameter	Air Duren Village	Cengkong Abang Village
Species Richness (S)	4	7
Total Abundance (N)	5	8
Shannon-Wiener Index (H')	1.33	1.75
Dominant Guild	Terrestrial Generalists	Mixed (Arboreal & Terrestrial)
Habitat Characteristics	Monoculture/Open Areas	Stratified Canopy/Secondary Growth

Conservation Implications and Reconciliation Ecology

From a conservation planning perspective, these findings advocate for "reconciliation ecology"—the promotion of biodiversity in human-dominated landscapes. Management strategies in Bangka's rural areas need not strictly separate human use from conservation. Instead, maintaining vegetation complexity, specifically by preserving understory shrubs and canopy trees within village boundaries, can significantly enhance the matrix permeability for herpetofauna. This approach ensures that even small patches of vegetation function as functional corridors and micro-refugia, allowing species persistence amidst ongoing land-use change.

Conclusion

This study demonstrates that rural landscapes in Bangka, while anthropogenically modified, are not devoid of biodiversity value. Instead, they function as functional matrices supporting a mix of synanthropic generalists and forest-associated specialists. The occurrence of species such as *Tropidolaemus wagleri* suggests that even small patches of secondary vegetation can serve as vital refugia for sensitive taxa. The preservation of these structural elements within the rural matrix is therefore crucial for maintaining regional herpetofaunal diversity.

References

Amarasinghe, A.A.T., Putra, C.A., Henkanaththegedara, S.M., Dwiyahreni, A.A., Winarni, N.L., Sunaryo, Margules, C. & Supriatna, J. 2021. Herpetofaunal diversity of West Bali National Park, Indonesia with identification of indicator species for long-term monitoring. *Global Ecology and Conservation* 28: e01638. DOI: https://doi.org/10.1016/j.gecco.2021.e01638

Angelstam, P., Bush, T. & Manton, M. 2023. Challenges and solutions for forest biodiversity conservation in Sweden: assessment of policy, implementation outputs, and consequences. *Land* 12(5): 1098. DOI: https://doi.org/10.3390/land12051098

Baderan, D.W.K., Sukirman Rahim, S. & Iqbal, M. 2023. "Life finds a way": A reflection on the smuggling of a living fossil, the Borneo Earless Monitor, *Lanthanotus borneensis* (Squamata: Lanthanotidae), in Indonesia. *Herpetology Notes* 16: 155–159.

Chien, S.-C. 2025. Ecological homogenization and convergence in urban ecosystems: A global synthesis of biotic, abiotic, and ecosystem dimensions. *Environmental and Sustainability Indicators* 28: 100954. DOI: https://doi.org/10.1016/j.indic.2025.100954

Cooper, W.J., McShea, W.J., Forrester, T. & Luther, D.A. 2020. The value of local habitat heterogeneity and productivity when estimating avian species richness and species of concern. *Ecosphere* 11(5): e03107. DOI: https://doi.org/10.1002/ecs2.3107

Cordier, J.M., Aguilar, R., Lescano, J.N., Leynaud, G.C., Bonino, A., Miloch, D., Loyola, R., & Nori, J. 2021. A global assessment of amphibian and reptile responses to land-use changes. *Biological Conservation* 253: 108863. DOI: https://doi.org/10.1016/j.biocon.2020.108863

Fletcher, R.J., Smith, T.A.H., Troy, S., Kortessis, N., Turner, E.C., Bruna, E.M. & Holt, R.D. 2024. The prominent role of the matrix in ecology, evolution, & conservation. *Annual Review of Ecology, Evolution and Systematics* 55(1): 423–447. DOI: https://doi.org/10.1146/annurev-ecolsys-102722-025653

Frishkoff, L.O., Hadly, E.A. & Daily, G.C. 2015. Thermal niche predicts tolerance to habitat conversion in tropical amphibians and reptiles. *Global Change Biology* 21(11): 3901–3916. DOI: https://doi.org/10.1111/gcb.13016

Galindo, V., Giraldo, C., Lavelle, P., Armbrecht, I. & Fonte, S.J. 2022. Land use conversion to agriculture impacts biodiversity, erosion control, and key soil properties in an Andean watershed. *Ecosphere* 13: e3979. DOI: https://doi.org/10.1002/ecs2.3979

Hasibuan, R. S., Cita, K. D., Raharjo, S., Pracahyo, A. S., Indarto, F., & Zurmie, T. 2021. Diversity of herpetofauna and mammals on reclamation land PT. Refined Bangka Tin Bangka. *Sains Natural* 11(2): 39–47. DOI: https://doi.org/10.31938/jsn.v11i2.296

Hua, F., Wang, W., Nakagawa, S., Liu, S., Miao, X., Yu, L., Du, Z., Abrahamczyk, S., Arias-Sosa, L.A., Buda, K., Budka, M., Carrière, S.M., Chandler, R.B., Chiatante, G., Chiawo, D.O., Cresswell, W., Echeverri, A., Goodale, E., Huang, G., Hulme, M.F., Hutto, R.L., Imboma, T.S., Jarrett, C., Jiang, Z., Kati, V.I., King, D.I., Kmecl, P., Li, N., Lövei, G.L., Macchi, L., MacGregor-Fors, I., Martin, E.A., Mira, A., Morelli, F., Ortega-Álvarez, R., Quan, R., Salgueiro, P.A., Santos, S.M., Shahabuddin, G., Socolar, J.B., Soh, M.C.K., Sreekar, R., Srinivasan, U., Wilcove, D.S., Yamaura, Y., Zhou, L. & Elsen, P.R. 2024. Ecological filtering shapes the impacts of agricultural deforestation on biodiversity. *Nature Ecology & Evolution* 8(2): 251–266. DOI: https://doi.org/10.1038/s41559-023-02280-w

Iqbal, M., Sari, D. K., Arifah, N., Widayanti, G. A., & Aprillia, I. 2025. Notes on Humans as Prey of Reticulated Pythons *Malayopython reticulatus* (Serpentes: Pythonidae) in Indonesia. *Bio Palembanica* 2(1): 43–49. DOI: https://doi.org/10.36982/bio.v2i1.5385

Inman, R.D., Esque, T.C. & Nussear, K.E. 2023. Dispersal limitations increase vulnerability under climate change for reptiles and amphibians in the southwestern United States. *The Journal of Wildlife Management* 87(1): e22317. DOI: https://doi.org/10.1002/jwmg.22317

Irwanto, R., Lingga, R., Pratama, R., & Ifafah, S. A. 2019. Identifikasi Jenis-jenis Herpetofauna di Taman Wisata Alam Gunung Permisan, Bangka Selatan, Provinsi Kepulauan Bangka Belitung. *Pendipa 3*(2): 106–113. DOI: https://doi.org/10.33369/pendipa.3.2.106-113

Jaureguiberry, P., Titeux, N., Wiemers, M., Bowler, D.E., Coscieme, L., Golden, A.S., Guerra, C.A., Jacob, U., Takahashi, Y., Settele, J., Díaz, S., Molnár, Z. & Purvis, A. 2022. The direct drivers of recent global anthropogenic biodiversity loss. *Science Advances* 8(45): eabm9982. DOI: https://doi.org/10.1126/sciadv.abm9982

Jayakumar, A.M. & Nameer, P.O. 2018. Species composition and abundance estimates of reptiles in selected agroecosystems in southern Western Ghats, India. *Journal of Threatened Taxa* 10(10): 12328–12336. DOI: https://doi.org/10.11609/jott.3652.10.10.12328-12336

Kusuma, Y.W.C., Rembold, K., Tjitrosoedirdjo, S.S. & Kreft, H. 2018. Tropical rainforest conversion and land use intensification reduce understorey plant phylogenetic diversity. *Journal of Applied Ecology* 55(5): 2216–2226. DOI: https://doi.org/10.1111/1365-2664.13201

Maulidi, A., Purnaningsih, T., Maulina, A., Gunawan, Y.E. & Rizki, M. 2020. Herpetofauna diversity at the University of Palangka Raya, Indonesia. *Biodiversitas* 21(10): 4509-4514. DOI: https://doi.org/10.13057/biodiv/d211006

Mouane, A., Harrouchi, A., Ghennoum, I., Sekour, M. & Chenchouni, H. 2024. Amphibian and reptile diversity in natural landscapes and human-modified habitats of the Sahara Desert of Algeria: A better understanding of biodiversity to improve conservation. *Elementa* 12(1): 00106. DOI: https://doi.org/10.1525/elementa.2022.00106

Nowakowski, A.J., Watling, J.I., Thompson, M.E., Brusch IV, G.A., Catenazzi, A., Whitfield, S.M., Kurz, D.J., Suárez-Mayorga, A., Aponte-Gutiérrez, A., Donnelly, M.A. & Todd, B.D. 2018. Thermal biology mediates responses of amphibians and reptiles to habitat modification. *Ecology Letters* 21(3): 345–355. DOI: https://doi.org/10.1111/ele.12901

Nurdin, M. & Setyawatiningsih, S.C. 2023. The diversity and conservation status of snakes in the eastern part of PT GAN, Riau Province. *Jurnal Pengelolaan Sumberdaya Alam dan Lingkungan* 13(2): 305–312. DOI: https://doi.org/10.29244/jpsl.13.2.305-312

Oktavia, D., Pratiwi, S.D., Kamaludin, N.N., Widiawaty, M.A. & Dede, Moh. 2024. Dynamics of land use and land cover in the Belitung Island, Indonesia. *Heliyon* 10(12): e33291. DOI: https://doi.org/10.1016/j.heliyon.2024.e33291

Palomino-Cuéllar, J.V. & Urbina-Cardona, J.N. 2025. Environmental filtering and limiting similarity shape the taxonomic and functional diversity of amazonian floodplain frogs across pasture–edge–interior gradients. *Global Ecology and Conservation* 62: e03817. DOI: https://doi.org/10.1016/j.gecco.2025.e03817

Paudel, J., Khanal, L., Pandey, N., Upadhyaya, L.P., Sunar, C.B., Thapa, B., Bhatta, C.R., Pant, R.R. & Kyes, R.C. 2022. Determinants of herpetofaunal diversity in a threatened wetland ecosystem: a case study of the Ramaroshan Wetland Complex, Western Nepal. *Animals* 13(1): 135. DOI: https://doi.org/10.3390/ani13010135

Pratomo, H., Susilo, A. & Rosadi, B. 2024. Invertebrate diversity in gastrointestinal Fejervarya cancrivora rice fields in Ciomas, Bogor Regency. *E3S Web of Conferences* 483: 01007. DOI: https://doi.org/10.1051/e3sconf/202448301007

dos Reis-Silva, F., Pizzigalli, C., Seck, S., Cabeza, M., Rainho, A., Rocha, R. & Palmeirim, A.F. 2025. Unveiling how herpetofauna cope with land-use changes—Insights from forest-cashew-rice landscapes in West Africa. *Biotropica* 57(1). DOI: https://doi.org/10.1111/btp.13416

Rosales, A., Suhian, J.P., Gamalinda, E., Paz, S. & Solania-Naling, C. 2023. Herpetofauna of forest fragments within the Agata Mining Ventures Incorporated (AMVI), Agusan del Norte, Caraga Region, Philippines. *Journal of Ecosystem Science and Eco-Governance* 5(2): 54–65. DOI: https://doi.org/10.54610/jeseg.v5i2.79

Rosero-Añazco, P., Zhu, A., Cuesta, F., Speelman, E. & Hofstede, G.J. 2025. What is behind land use change in tropical forests? From local relations to global mining concessions. *Ecology and Society* 30(1): 29. DOI: https://doi.org/10.5751/ES-15646-300129

Ruffell, J., Clout, M.N. & Didham, R.K. 2017. The matrix matters, but how should we manage it? Estimating the amount of high-quality matrix required to maintain biodiversity in fragmented landscapes. *Ecography* 40(1): 171–178. DOI: https://doi.org/10.1111/ecog.02097

Tanjung, R.D., Kusrini, M.D., Mardiastuti, A., Yustian, I. & Setiawan, A. & Iqbal, M. 2023. Amphibian community structure in Isau-Isau Wildlife Reserve, South Sumatra, Indonesia. *Biodiversitas* 24: 6836-6843. DOI: https://doi.org/10.13057/biodiv/d241244

Santoandré, S., Filloy, J., Zurita, G.A. & Bellocq, M.I. 2019. Ant taxonomic and functional diversity show differential response to plantation age in two contrasting biomes. *Forest Ecology and Management* 437: 304–313. DOI: https://doi.org/10.1016/j.foreco.2019.01.021

Sari, S.P., Koedam, N., Pamungkas, A., Muftiadi, M.R. & Van Coillie, F. 2023. Unveiling the diversity of Bangka Island's mangroves: a baseline for effective conservation and restoration. *Forests* 14(8): 1666. DOI: https://doi.org/10.3390/f14081666

Smith, T.A.H., Holt, R.D., Bruna, E.M. & Fletcher, R.J. 2025. Isolating the role of the matrix at patch and landscape scales. *Journal of Animal Ecology* 94(9): 1800–1810. DOI: https://doi.org/10.1111/1365-2656.70089

Staudacher, K., Rennstam Rubbmark, O., Birkhofer, K., Malsher, G., Sint, D., Jonsson, M. & Traugott, M. 2018. Habitat heterogeneity induces rapid changes in the feeding behaviour of generalist arthropod predators. *Functional Ecology* 32(3): 809–819. DOI: https://doi.org/10.1111/1365-2435.13028

Susanti, R. & Sumarmin, R. 2020. Natural feed preference *Fejervarya cancrivora* L. and *Fejervarya limnocharis* L. on the west coast of Sumatra Island. *Eksakta* 21(2): 148–154. DOI: https://doi.org/10.24036/eksakta/vol21-iss2/228

Syafutra, R., Alikodra, H.S. & Iskandar, E. 2019. Mentilin *Cephalopachus bancanus bancanus* (Horsfield, 1821) habitat in Bangka Regency, Indonesia. *Asian Primates Journal* 8(1): 13–24.

Syafutra, R., Alikodra, H.S., Iskandar, E., Hasanah, R., Iqbal, M. & Yustian, I. 2025. Insect diversity as potential feed for Horsfield's tarsier (*Cephalopachus bancanus*) in Bangka Island, Indonesia. *Bio Web of Conferences* 180: 02009. DOI: https://doi.org/10.1051/bioconf/202518002009

Tan, Y., Lin, Z., Xiao, F. & Yu, H. 2025. Divergence in elevation diversity patterns of geckos on two mountains in the Hainan Tropical Rainforest National Park. *Animals* 15(16): 2410. DOI: https://doi.org/10.3390/ani15162410

Tiberti, R., Buchaca, T., Cruset, E., Iacobelli, L., Maini, M., Osorio, V., Puig, M., Pou-Rovira, Q., Sabás, I., & Ventura, M. 2022. Evaluation of visual encounter surveys as a method for the rapid assessment of fish presence and relative density in high mountain lakes. *Aquatic Conservation: Marine and Freshwater Ecosystems* 32(9): 1520–1528. DOI: https://doi.org/10.1002/aqc.3868

Winata, D.G., Mulyanto, B. & Suryaningtyas, D.T. 2025. Exploring land cover dynamics: open mining activities footprint in Central Bangka District, Indonesia. *Journal of Degraded and Mining Lands Management* 12(4): 8051–8063. DOI: https://doi.org/10.15243/jdmlm.2025.124.8051

Wulandari, D., Agus, C., Rosita, R., Mansur, I. & Fikri Maulana, A. 2022. Impact of tin mining on soil physio-chemical properties in Bangka, Indonesia. *Jurnal Sains dan Teknologi Lingkungan* 14(2): 114–121. DOI: https://doi.org/10.20885/jstl.vol14.iss2.art2

Yahya, M.S., Atikah, S.N., Sanusi, R., Norhisham, A.R. & Azhar, B. 2025. Forest-associated understorey birds persist in agroforestry orchards within tropical rubber and oil palm landscapes. *Biotropica* 57(5). DOI: https://doi.org/10.1111/btp.70099

Yap, C.H. 2015. *Diet of five common anurans found in disturbed areas in Northern Peninsular Malaysia*. Master's Thesis. Universiti Sains Malaysia, George Town, 118 pp. DOI: https://doi.org/10.13140/RG.2.1.4481.9443

Yodthong, S., Stuart, B.L. & Aowphol, A. 2019. Species delimitation of crab-eating frogs (*Fejervarya cancrivora* complex) clarifies taxonomy and geographic distributions in mainland Southeast Asia. *ZooKeys* 883: 119–153. DOI: https://doi.org/10.3897/zookeys.883.37544

Yustian, I., Iqbal, M., Tanjung, R.D., Pormansyah., Guntur Pragustiandi, G., Firman Saputra, R.F., Setiawan, A. & Puspito, M. 2023. Fourth report of the White-backed Bug-eyed Frog, *Theloderma licin* (Anura: Rhacophoridae), from Sumatra, Indonesia. *Herpetology Notes* 16: 497-500.