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Initial Survey of Tadpole Species Richness on the Upstream of Pelus River, Limpakuwus, Sumbang, Banyumas

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ABSTRACT

The southern slopes of Mount Slamet are the upstream areas of many rivers, which become the breeding habitat of Anuran. Anuran tadpole species richness can indicate the diversity of Anuran in the area and should be considered as important as the adult Anuran species richness. Moreover, the sampling of tadpoles is more convenient since the tadpoles are usually localized in the water bodies. There is no data of tadpole diversity in the upstream area of Pelus River, Limpakuwus, Sumbang, Banyumas. Therefore, this study was done to complete the data of tadpole species richness on the upstream of Pelus River and support the Anuran diversity data on the southern slope of Mount Slamet. The research was done by a breeding sites survey method along the upstream area of Pelus River, Limpakuwus, Sumbang, Banyumas from February to August 2021. The sample of tadpoles was taken by opportunistic encounter search on the potential habitat of tadpoles, such as pool, creek, and river. Tadpole sampling was done for four hours (08.00 – 12.00), and all the tadpoles were identified at the laboratory. The tadpole (ordo Anura) species richness on the Pelus River upstream consisted of ten species from five families. Namely *Limnonectes kuhlii* (family Dicroglossidae), *Leptobrachium hasseltii* (family Megophryidae), *Megophrys montana* (family Megophryidae), *Microhyla achatina* (family Microhylidae), *Odorrana hosi* (family Ranidae), *Chalcorana chalconota* (family Ranidae), and *Feihyla vittiger* (family Rhacophoridae), *Polypedates pseudotilophus* (family Rhacophoridae), *Rhacophorus margaritifer* (family Rhacophoridae), *Rhacophorus reinwardtii* (family Rhacophoridae). The tadpoles of *F. vittiger* and *P. pseudotilophus* were new records of tadpole species on the southern slope of Mount Slamet.

Keywords: *Anura, Pelus River, Species richness, Tadpole.*

1. INTRODUCTION

Indonesia is one of the countries with high Anuran diversity. There was plenty of data on the Anuran diversity from various areas in Java, Bali, and Sumatera [1, 2, 3, 4]. Nevertheless, the data have not comprised all the areas in Java. The data of Anuran diversity on the southern slope of Mount Slamet was limited in Ketenger, Pancuran Pitu, and Baturraden Botanical Garden [5,6]. Several Anuran species found in this area showed that the southern slope of Mount Slamet has potential as an Anuran habitat.

Mount Slamet is one of the Central Java mountains with high altitudes and high precipitation. The southern slope of Mount Slamet became the upstream area of several rivers, such as the Banjaran and Pelus rivers. There were plenty of water bodies (creek, pool, and pond) along the river that were potential as the habitat of Anuran tadpoles. Tadpole is one of the life stages of an Anura that is usually found localized in the water bodies. Data on tadpole diversity and species richness were still limited, although plenty of data on adult Anuran diversity [7,8]. Previous data of Anuran tadpole species richness were obtained from the upstream area of Banjaran River on the western side of the southern slope of Mount

Slamet. Tadpoles of six families of Anura were found in this area, namely Microhylidae, Megophryidae, Bufonidae, Ranidae, Dicroglossidae, and Rhacophoridae. There was no data on the tadpole species richness in the Pelus River. The upstream area of Pelus River is located on the eastern side of the southern slope of Mount Slamet. The river flows toward Purwokerto city and becomes several tourist atrractions at several sites, such as Limpakuwus Pine Forest, Telaga Sunyi, Curug Beta and Curug Telu [9].

This study became the initial survey of the tadpole species richness in the upstream area of Pelus River. Limpakuwus, Sumbang, Banyumas. Anuran tadpole species richness can also indicate the diversity of Anuran in the area and should be considered as important as the adult Anuran species richness. This study was done to complete the data of tadpole species richness upstream of Pelus River and support the Anuran diversity data on the southern slope of Mount Slamet.

2. MATERIALS AND METHODS

2.1. Materials

The material used in this study were tadpole species found in the upstream area of Pelus River; dipnet and plastic for tadpoles sampling; terrarium for keeping the tadpoles temporarily; smartphone camera of Samsung A30, Apexel APL-HB100mm macro lens, Apexel APL-HD5m 10x macro lens 25mm and acrylic aquarium for photographing the tadpoles; formalin 4% and sample bottles for fixating the tadpoles; and identification guide [1,3,10] for tadpole identification.

2.2. Methods

This research used the survey breeding sites method [11] on one of the upstream areas of the Pelus River. Samples of tadpoles were taken by opportunistic encounter search from several potential breeding sites, such as pool, pond, puddle, creek, and river [12]. Tadpoles sampling was done for four hours (08.00 – 12.00) and were taken with dip nets, then stored inside the plastic bags. The tadpoles were then taken to the laboratory for the identification process. Tadpoles were photographed inside the acrylic aquarium, and other tadpoles were kept inside the terrarium. Identification of tadpoles was made with identification guides [1,3,10]. Then, the tadpoles were fixated with 4% formalin and stored inside bottles [13].

2.3. Research Location Description

This research was conducted on Limpakuwus Forest, one of the upstream areas of Pelus River, Limpakuwus, Sumbang, Banyumas, from February to August 2021. Tadpoles were found from eight Breeding Sites (BS). BS1 was a puddle on the side of the road, BS2 – BS5 were some water inlets/pools along the main water body of Pelus River, and BS6 – BS8 were some creeks at the side of the road.

3. RESULTS AND DISCUSSION

In the survey of Anuran tadpoles on the upstream area of Pelus River, Limpakuwus found tadpoles from eight breeding sites (BS). A total of ten species from five families were found: Ranidae, Megophryidae, Rhacophoridae, Dicroglossidae, and Microhylidae. The

Table 1. The Anuran Tadpole (ordo Anura) Species Richness on the Upstream Area of Pelus river, Limpakuwus, Sumbang, Banyumas.

No	Family	Species	BS1	BS2	BS3	BS4	BS5	BS6	BS7	BS8
1	Dicroglossidae	*Limnonectes kuhlii*	√	-	-	-	√	-	-	-
2	Megophryidae	*Leptobrachium hasseltii*	-	-	-	-	√	√	-	-
3		*Megophrys montana*	-	-	-	-	-	-	√	-
4	Microhylidae	*Microhyla achatina*	-	-	-	-	-	-	-	√
5	Ranidae	*Chalcorana chalconota*	-	-	-	-	-	-	√	-
6		*Odorrana hosii*	-	√	-	-	-	-	-	-
7	Rhacophoridae	*Feihyla vittiger*	√	-	√	-	-	-	-	-
8		*Polypedates pseudotilophus*	-	-	-	-	-	√	-	√
9		*Rhacophorus margaritifer*	-	√	-	√	√	-	√	√
10		*Rhacophorus reinwardtii*	-	-	-	-	-	-	-	√

Note: BS = (Breeding Sites); √ = present; - = absent

Anuran tadpole species richness of Pelus River can be seen in Table 1.

Limpakuwus Forest is one of the upstream areas of Pelus River, Limpakuwus, Sumbang, Banyumas. This area is mostly covered with a secondary forest of pine and amber. It is located around the altitude of 900dr43-1000 masl, and there were plenty of water bodies in this area. Creeks and rivers, some water bodies do not have a clear path nor form creeks or rivers, and just flow across the road. Therefore, there are plenty of puddles and water inlets along the road.

The families of tadpoles found in the upstream area of Pelus River were consistent with the families found in Java. In Java, six families were usually found: Ranidae, Megophryidae, Rhacophoridae, Bufonidae, Dicroglossidae, and Microhylidae [1, 3]. The tadpoles of Bufonidae were not found in the upstream area of Pelus River since it is usually found at a lower altitude, in pools, or slow pace rivers. However, the study of adult Anuran species richness in this area found the species of *Leptophryne borbonica,* and there was no record of *L. barbonica* tadpole on Mount Slamet.

Most of the tadpole species were found in the southern slope of Mount Slamet, namely *Odorrana hosii, Chalcorana chalconota, Leptobrachium hasseltii, Megophrys montana, Rhacophorus margaritifer, Rhacophorus reinwardtii, Limnonectes kuhlii,* and *Microhyla achatina*. However, some species were not found in the upstream area of Pelus River, such as *Huia masonii* (Ranidae) and *Phrynoidis asper* (Bufonidae), not even the adult form. The tadpoles of Dicroglossisae found upstream of Pelus River were members of genus *Limnonectes*. Member of genus *Limnonectes* commonly found in Java were *Limnonectes kuhlii*, *Limnonectes microdiscus,* and *Limnonectes macrodon*. The tadpole of those species was found in the Banjaran river. However, only the tadpole of *L. kuhlii* was found upstream of the Pelus River. The Adult form of *L. kuhlii* was also found in this area. *L. kuhlii* was commonly distributed throughout the southern slope of Mount Slamet and was found on Kalipagu, Baturraden Botanical Garden, and Pancuran Pitu [5, 6].

The tadpole of Microhylidae found in Pelus River was a member of the genus *Microhyla*, namely *Microhyla achatina*. The adult *M. achatina* was found during further sampling in the same area. The tadpole of *M. achatina* was usually found on non-shallow, still, or slow-moving water. The tadpoles of Rhacophoridae found in the upstream area of Pelus River were a member of the genus *Rhacophorus*, *Feihyla*, and *Polypedates*. The tadpoles of *Rhacophorus margaritifer* were the most widespread species and found in most breeding sites in the Pelus River. This data was also supported by the distribution of adult *R. margaritifer* on the southern slope of Mount Slamet, including several areas, Kalipagu, Baturraden Botanical Garden, and Pancuran Pitu [5,6]. The discovery of the tadpoles of *Feihyla vittiger* and *Polypedates pseudotilophus* was a new record since there was no prior data of adult and tadpoles of *F. vittiger* and *P. pseudotilophus* on the southern slope of Mount Slamet. The previous record of *F. vittiger* (formerly *Chiromantis vittiger*) was found in Mount Halimun National Park, West Java [14]. There was no prior data of the tadpole of *P. pseudotilophus* on Java.

AUTHORS' CONTRIBUTIONS

IGAARP designed the research, supervised all the processes, analyzed the data, and wrote the manuscript; HAKR, NDS, MP, and ESW collected and analyzed the data.

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REFERENCES

[1] D.T. Iskandar, LIPI – Seri Panduan Lapangan: Amfibi Jawa dan Bali. Puslitbang Biologi – LIPI, Bogor, 1998.

[2] H. Kurniati, An Illustrated Guide Book: Amphibians and Reptiles of Gunung Halimun National Park, West Java, Indonesia, Biologi Research Centre – LIPI, Cibinong, 2003.

[3] M.D. Kusrini, Panduan Bergambar Identifikasi Amfibi Jawa Barat, Fakultas Kehutanan, Institut Pertanian Bogor, Bogor, 2013.

[4] M. Kamsi, S. Handayani, A.J. Siregar, G. Fredriksson, Buku Panduan Lapangan: Amfibi dan Reptil Kawasan Hutan Batang Toru, Herpetologer Mania Publishing, Medan, 2017.

[5] A. Riyanto, Komunitas Herpetofauna dan Potensinya Bagi Sektor Ekowisata pada Kawasan Ketenger-Baturraden di Selatan Kaki Gunung Slamet, Jawa Tengah, Biosfera vol. 27, 2010, pp. 60-67.

[6] I.G.A.A.R. Puspitasari, E.A.P.W. Wijaya, Survei Awal Keanekaragaman Ordo Anura di Desa Ketenger, Baturraden, Jawa Tengah, Indonesian Journal of Conservation vol 2, pp.84-90. DOI:10.15294/ijc.v2i1.5151

[7] T.M. Leong, L.M. Chou, Tadpole of The Celebes Toad Bufo Celebensis Gunther (Amphibia: Anura: Bufonidae) from Northeast Sulawesi, The Raffles Bulletin of Zoology vol. 48, 2000 pp. 297-300.

[8] M.D. Kusrini, M.I. Lubis, B. Darmawan, The Tree Frog of Chevron Geothermal Concession, Mount Halimun-Salak National Park-Indonesia.Technical report submitted to the Wildlife Trust – Peka Foundation, 2008.

[9] Badan Koordinasi Survey dan Pemetaan Nasional (Bakosurtanal), Peta Rupa Bumi Digital Indonesia 1 : 25.000, Rempoah Edisi 1, pp. 1308-614, 2000.

[10] R.W. McDiarmid, R. Altig, Tadpoles: The Biology of Anuran Larvae, The University of Chicago Press, Ltd., Chicago, 1999.

[11] W.R. Heyer, M.A. Donnelly, R.W. McDiarmid, L.C. Hayek, M.S. Foster, Measuring and Monitoring Biological Diversity: Standard Methods for Amphibians, Smithsonian Institution Press, London, 1994.

[12] A. Schulze, M. Jansen, G. Kohler, Tadpole Diversity of Bolivia's Lowland Anuran Communities: Molecular Identification, Morphological Characterisation, and Ecological Assignment, Zootaxa vol. 4016, 2015, pp. 001-111. DOI: 10.11646/zootaxa.4016.1.1

[13] M.D. Kusrini, Pedoman Penelitian dan Survei Amfibi di Alam. Fakultas Kehutanan, Institut Pertanian Bogor, Bogor, 2009.

[14] M.D. Kusrini, M. I. Lubis, B. Darmawan, L.N. Rahman, Morphological and Ecological Observations on Chiromantis Vittiger (Anura : Rhacophoridae) in Mount Halimun-Salak National Park, Indonesia, Treubia, 2017, pp. 47–66. DOI:10.14203/treubia.v44i0.3246

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