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Inventory of Types of Anura Order in Kedung Klewer Waterfall

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Abstract

Kedung Klewer Waterfall located in Kediri, East Java, is a famous natural tourist attraction. However, research on the inventory of the Anura order there is still very limited. This study aims to identify and describe the species of the Anura order in the Kedung Klewer Waterfall Tourism Area and contribute to the preservation of the Anura order in the region. This research was conducted on January 6-8, 2022 using the *Visual Encounter Survey* (VES) method combined with *transect lines*. Based on the results of research and discussion, it can be concluded that the Anura order found 17 individuals in the Kedung Klewer Kediri waterfall area consisting of 4 families, for the Ranidae Family 2 species were found, namely *Wijayarana masonii* and *Odorana hosii*, the Dicroglossidae family found 1 species, namely *Limnonectes microdiscus*, the Megophrylidae family found 1 species, namely *Leptobrachium hasseltii*, and Family Bufonidae found 1 species, *Phrynoidis asper*.

Keywords: amphibian, anura, inventory, kedung klewer waterfall

INTRODUCTION

Indonesia is one of the countries that has a very high level of biodiversity. This is reflected through the various kinds of flora and fauna that exist in the region. Differences in the diversity of flora and fauna can be caused by various factors, among which are geographical factors. Its territory is located around the equator and is spread over various islands. As a result, each region in Indonesia has a unique variety of flora and fauna (Sutoyo, 2010). In terms of amphibian and reptile diversity, Indonesia is ranked third highest in the world. The diversity of herpetofauna in Indonesia is known to be quite wide. For example, Java and Bali have about 41 species of amphibians, which is lower in number compared to other islands such as Sumatra (90 species), Borneo (148 species), and Peninsular Malaysia (101 species) (Iskandar, 1998).

Amphibians are one of the important elements in ecosystems, and their role has a significant impact, both ecologically and economically. In terms of ecology, amphibians serve as first-order consumer predators, which consume insects and other invertebrate creatures (Iskandar, 1998), as well as acting as a biological indicator in monitoring environmental conditions (Stebbins & Cohen, 2021). From an economic perspective, amphibians have value as a food source, as subjects of research in laboratories, as pets, and as ingredients in the manufacture of medicines (Stebbins & Cohen, 2021).

The natural habitat of amphibians includes primary forests, secondary forests, swampy areas, large rivers, creeks, creeks, ponds, and lakes. In general, amphibians are more often active at night or during the rainy season. This is by the concept described by (Iskandar, 1998) that amphibians live associatively with water, since they live in two different ecosystems, both

in water and on land. The explanation also notes that most amphibians inhabit forests because they need water and high humidity levels (about 75-85%) to protect themselves from drought.

One of the famous natural attractions in Kediri is Kedung Klewer Waterfall, located in Badut Village, Jugo, Mojo District, Kediri Regency, East Java (7°50'59.7"S 111°51'57.8" E). Its natural beauty makes Kedung Klewer Waterfall an attraction for tourists who want to visit it. Even so, until now, research on biodiversity in Clown Village is still limited, so there is no definite data on the types of species that inhabit the area, especially the amphibian group whose role is used as an indicator of environmental pollution and proves the authenticity of the environment around Kedung Klewer Waterfall.

The main purpose of this study is to identify the types of species of the Anura order in the Kedung Klewer Waterfall Tourism Area, describe the characteristics of the Anura Order that exist in various habitat types, and identify them. This research also aims to contribute to knowledge about herpetofauna in Indonesia, especially in Kediri and surrounding areas. The results of this research are expected to make an initial contribution in efforts to preserve the Anura Order in the Kedung Klewer Waterfall area, Kediri.

METHOD

This research was carried out in the Kedung Klewer Waterfall Area, Mojo District, Kediri Regency, East Java, starting from January 6, 2023, to January 8, 2023. The tools used are stationery, flashlights, cameras, and *tally sheet*s. In this study, the survey method used was a combination of *Visual Encounter Survey* (VES) is used to assess the biodiversity of an area, compile a list of existing species, and estimate the relative abundance of each species (Bismark, 2011). Combined with line transects (*line transect*), that is, it involves the use of transects of paths placed along the flow of the river. The watershed in the study area is divided into transect sections, with each transect having a length of 50 meters. The width of each transect is set at a distance of 1 meter from the river bank, both on the right and left sides. The entire transect area is carefully and thoroughly explored (Rafi & Nugraha, 2022). The research work steps are divided into several stages, including determining the location of the transect, conducting sampling, and carrying out the identification process. The observation was conducted at 19.00-22.00 WIB. The objects obtained are then documented and identified. Identification of amphibian types was carried out using the Alas Purwo National Park Herpetofauna Field Guide (Utami et al., 2012), Herpetofauna Field Guide Book in Jatimulyo Village Ecotourism Area (Musthofa et al., 2021) and related journal articles. The data obtained from the exploration will be analyzed in a qualitative descriptive manner by describing each species.

RESULTS AND DISCUSSION

The results of research conducted on January 6 to 8, 2023 in the Kedung Klewer Waterfall Area found 5 families from the amphibian class of the Anura Order with a total of 17 individual encounters. Species found include *Wijayarana masoni, Limnonectes microdiscus, Leptobrachium hasselti, Odorrana hosii, Phrynoidis asper.*

Table 1. The number of individuals of the order anura found

No.	Species	Family	Local Name	Sum Individual
1.	*Wijayarana masonii*	Ranidae	The rapids shell	8
2.	*Limnonectes microdiscus*	Dicroglycoxidae	Bangkong Kerdil	1
3.	*Leptobrachium hasseltii*	Megophrylidae	Bangkong Serasah	3
4.	*Odorrana hosii*	Ranidae	Kongkang Racun	4
5.	*Phrynoidis asper*	Bufonidae	Bangkong Sungai	1

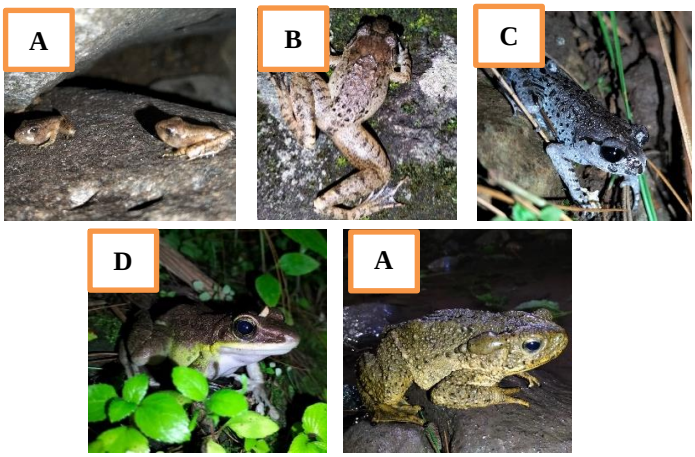

Figure 1. Species found: A) *Wijayarana masony*; B) *Limnonectes microdiscus;* C) *Leptobrachium hasseltii;* D) *Odorrana hosii;* and E) *Phrynoidis asper.*

Anura in the Kedung Klewer Waterfall Area has a variety of habitat types, from several species found some have aquatic habitats, namely from the families Ranidae and Dicroglossidae which can be found in the area of water bodies, waterfall canals, and waterfall tubs. Species from the families Megophrylidae and Bufonidae have terrestrial habitat types that can be found under shrubs, and tree litter, along the path to the waterfall. Table 1 shows that at the time of observation, 5 different species were found and among them were found with the largest number of 8 individuals.

The most commonly found species are *Wijayarana masonii.* which is found on the banks of riverbanks. Based on the IUCN Red List *Wijayarana masonii* is a species classified as LC (*Least Concern*/ Low risk) (IUCN, 2017). Factors in the discovery of many *Wijayarana masonii*

show the quality of the Kedung Klewer Waterfall Area is good because the species only live in clear water habitats, rivers that have fast currents, and rocky rocks (Iskandar, 1998).

The least number of species found were in the families Dicroglossidae and Bufonidae, each of which was seen only once during the survey. In the family Dicroglossidae, we found a species of *Limnonectes microdiscus* sitting on a rock in a stationary position. This behavior may indicate that this species is resting and waiting for potential prey passing through its territory.

The species **rapids shell** (*Wijayarana masonii* has a medium body size, with a small eardrum (tympanum), very thin legs, and much longer compared to other frog species. Their fingers and toes are equipped with large discs and striking rings of circumference. Their skin is smooth with several small bumps. The body color pattern is a mixture of brown and black, with black prominent around the eardrum (tympanum). They are usually found in areas along streams that have heavy currents (Hidayah et al., 2018).

The species **Bangkong kerdil** (*Limnonectes microdiscus*) is easily recognized by the inverted "V" pattern that appears on their backs, and the pattern is brown. Its physical features include a small, slender body, as well as a well-defined eardrum (tympanum), and visible supratympanic folds. This species is usually found in secondary forests. Body size for males of this species usually reaches about 35 mm, while adult females are approximately twice as large as males (Subeno, 2018).

The species **Bangkong serasah** (*Leptobrachium hasseltii*) has a body skin color that is black and has nodules scattered all over the surface of its body. In particular, the legs, mouth, and some other parts of the body have a black color interrupted with white stripes. This frog has a small body size with a slightly rounded body shape. The muzzle is slightly pointed, and the eyes are bulging. The legs are short and slender, with more blunt fingertips. As a rule, this species is limited to forest habitats (Hidayah et al., 2018).

The species **Kongkang racun** (*Odorrana hosii*) has very distinctive morphological characteristics. They can vary in body size, from medium to very large, and have a slim body. The dominant color on the body is dark brown to greenish-brown, with a color that tends to be darker on the sides of the body. Their hands and feet are fitted with widened discs and webbed toes at the base, while their long hind legs make it easy for them to jump significant distances. Their skin has venom glands that produce a characteristic odor, and their skin texture has smooth nodules with no noticeable protrusions. Habitatally, they tend to inhabit ditch or river areas, especially in primary and secondary forests, and often rest on river banks or in vegetation along streams (Hidayah et al., 2018).

The Species **Bangkong River** (*Phrynoidis asper*) has morphological characteristics that include webbed toes to the tip, a large and strong body, and rough skin with spiked or bumpy nodules. Body color is generally dull, grayish, or even blackish-dark brown, with the presence of black dots on the underside, and in males, black skin can be found on the chin. The habitat often occupied by this species is terrestrial, and sometimes they can be found in environments that have been affected by human activities, but still maintain the presence of water flow with the surrounding vegetation (Hidayah et al., 2018).

The order Anura has a very significant function in the ecosystem, both as a predator and population controller, as well as prey for other animals in food webs. Anura, which is used as a biological clues in nature, shows a very high response to changes in its environment. These changes in the environment can be observed through the decline of frog populations in nature. The role of frogs in the ecosystem is an ecological regulator, especially related to pest and disease control because frogs generally eat insects, especially small insects. This confirms how important frog populations are in maintaining ecosystem balance (Rohadian et al., 2022).

CONCLUSION

Based on the results of research and discussion, it can be concluded that the Anura order found 17 individuals in the Kedung Klewer Kediri waterfall area consisting of 4 families, for the Ranidae Family 2 species were found, namely *Wijayarana masonii* and *Odorana hosii*, the Dicroglossidae family found 1 species, namely *Limnonectes microdiscus*, the Megophrylidae family found 1 species, namely *Leptobrachium hasseltii*, and Family Bufonidae found 1 species, *Phrynoidis asper*.

SUGGESTIONS

Further research can be focused on population ecology, genetics, behavior, water quality, and conservation aspects of amphibian species in Kedung Klewer Waterfall. In addition, environmental education programs involving local communities can also be explored. These efforts will improve the understanding and conservation of biodiversity in the region.

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