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Fishermen's Perspective on Herpetofauna: A Case Study from Kuala Tungkal, Tanjung Jabung Barat, Jambi

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ABSTRACT

The population of herpetofauna (Class: Reptilia, Amphibia) is continuously declining throughout the world. Moreover, habitat changes such deforestation drive rapidly to declining process. Human communities play an important role in conserving the herpetofauna by maintaining and improving the harmonious relationship between human and environment. Therefore, these association will strongly support the conservation of herpetofauna and their habitats. This study is aimed to survey the herpetofauna communities, explore the local people perspective on herpetofauna, and the relationship between human and herpetofauna. We found 12 species observed in this survey that included to 3 order of herpetofauna: anura, squamata and testudines. Local people recognized herpetofauna species around them well and do not harm them because of their roles, such as part of nature (39%), bioindicator (33%), myth (17%), and economic value (11%). We also revealed the local knowledge on herpetofauna, as 14 local names and their roles. Despite Kuala Tungkal is a strategic area for the national port development that probably impacts herpetofauna microhabitat, it needs serious attention on herpetofaunal issues.

Keywords: *Herpetofauna, habitat change, local people, Kuala Tungkal*

INTRODUCTION

There is a good evidence of the herpetofauna (Class: Reptilia, Amphibia) declines throughout the world, especially amphibians, although both amphibians and reptiles can be found in almost every spatial scales and habitat types [1]. Loss of habitat is considered to be the biggest factor of herpetofauna declines [2, 3]. Other threats such as UV-B radiation, diseases, species introduction, over-exploitation, and climate change also play an important role in the declining of herpetofauna population [4, 5].

Overall, only a few studies on herpetofauna in Sumatera island is published, on the other hand, deforestation is steadily increasing over time and resulting in some fragmented areas [6, 7]. The coastal and lowland areas are vulnerable to the process of intensification of agriculture, residential, and industrial [8].

Local people play an important role as the policy maker that build upon their indigenous culture, customs, and norms as well as the specific and identical rules among some districts. Meanwhile, the people beliefs on the fauna near them are often correlated with dogma, folklore, symbols, ceremony materials, and educational background. Therefore, these relationship will strongly support the conservation effort of herpetofauna and their habitats [9].

Our previous observation in Kuala Tungkal showed a well-conserve mangrove and *Nypa fruticans* population that is predicted to be the habitat of amphibians and reptiles in the lowland areas [10]. The present study is aimed to survey the herpetofauna and explore the people perspective on herpetofauna and the relationship between human and herpetofauna. We focused on Kampong Nelayan village, which most of the local communities are fishermen who collected shrimps by using the traditional net.

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MATERIALS AND METHODS

The study was conducted on 22nd – 29th August 2016 in Kuala Tungkal, Tungkal Ilir subdistrict, Tanjung Jabung Barat regency, Jambi Province, Sumatera.

Visual Encounter Survey (VES) was applied to reveal the herpetofauna composition in two typical areas. First, the terrestrial of Kampong village, mangrove, marsh vegetation and second, the coastal and river. We also performed a snow-ball deep interview with the local people. We also followed the daily activities of the society to seek their basic knowledge of herpetofauna. Then, we classified their basic knowledge about the roles of herpetofauna in local people lifes and the relation among them.

RESULTS AND DISCUSSION

We recorded two common snakes, Dog-faced Water Snake *Cerberus rynchops* and Crab-eating Mangrove Snake *Fordonia leucobalia*. Both of these species were found below the houses or at tidal rivers and mangrove forests, and live in a small pit at the muddy coast. The snakes preyed on crabs and small fish, mainly found during the high tide when crabs and small fish come out from the holes of the mud [10]. The local people called this snake as Ular Air. They know that these snakes are non-venomous species, although they have very painful bites due to their scar-shaped teeth. Only fishermen who have a good experience in sailing will be able to differentiate the hole of *C. rynchops* or *F. leucobalia* with the hole of crab *Scylla* sp. [10,11]. Local people have an interesting way to prevent snake's hole while they are collecting crab. The holes with a crab inside will have an appearing bubble. More interestingly, they used bare hand to grab the crabs. This traditional technique was commonly used during the low tide at noon.

We also observed two individuals of sea snakes, *Hydrophis* sp. named as Ular Kipas (refers to the flat-shaped tail that looks like a propeller – see Table 2). Local people believed that sea snake brings a fortune due to its usual appearance with a group of fish. They were not offensive and attack when only disturbed [11]. Local people know that sea snakes are included as deathly venomous snakes [10,11].

The venom of sea snake caused deaths with symptoms of ATN (Acute Tubular Necrosis) and renal ischemia [14]. Local people performed traditional medicine to treat the snake bite victim with consuming traditional Chinese medicine consists of some pills and mineral water. It was quite unreasonable, but scientifically, sea snake often left a dry bite or only injected a small amount of venom [15].

Table 1. List of species found in two typical areas: Terrestrial area full of mangrove and marsh vegetation; and coastal and river area. n=number of individuals

Species	*n*	*Habitat*
Cerberus rynchops	23	under the houses, appeared when high tide
Fordonia leucobalia	6	under the houses, appeared when high tide
Hydrophis sp.	2	sea mostly found during fishing
Bungarus fasciatus	2	muddy-marsh
Xenopeltis unicolor	1	Bush, near fish-pond
Dendrelaphis pictus	2	Mangrove
Siebenrockiella crassicollis	1	Walking on the road
Fajervarya limnocharis	2	Muddy road
Duttaphrynus sp.	1	Road
Emoia atrocostata	2	Nipa, near houses (kampong)
Hemidactylus sp.	7	Building and houses
Varanus salvator	2	Sunbathing at dead tree

Amphibians showed a lower diversity than reptiles in Kuala Tungkal (see Table 1). It was probably related to the location that often submerged by the tidal wave of brackish water or salt water. Only Asian grass frog can be found in the lowland or even in the sea level area [34], while a toad found on the dry-soil road. Black marsh turtle also reported being commonly found near the river during the floods in Kuala Tungkal. It has been predicted that the water stream took them from the upstream to the estuary. Nevertheless, black marsh turtle quite commonly found even in the cosmopolitan region like Singapore [17]. However, this tortoise listed as vulnerable by IUCN Red List and registered as CITES II. On the other hand, based on our earlier observation of the trading activities (especially the Black Marsh Turtle) showed that Kuala Tungkal, and possibly the surrounding regions, has become one of the important suppliers for the pet market in Jambi. In contrary with the informants, the government through the Director General of Nature Conservation (Badan Konservasi Sumber Daya Alam) has limited the harvest quota only on 5 of the 10 provinces in Sumatera, with a harvest quota of 5.000 individual, 4.500 for the export purposes and 500 for domestic use [16].

Herpetofauna communities have an important role

Table 2. List of herpetofauna based on people's perspectives

Local Name	*The expected name based on the information of morphological characters*
Ular Tanah	*Enhydris* sp.
Ular Keke	*Xenopeltis* sp.
Ular Talimas	*Boiga dendrophilia*
Ular Karet	*Cryptelytrops purpureomaculatus*
Ular Bakau	*Dendrelaphis pictus*
Ular Sendok	*Naja* sp.
Ular Kipas	*Hydrophis* sp.
Ular Weling/Welang	*Bungarus* sp.
Ular Air	*Cerberus rynchops* and *Fordonia leucobalia*
Ular Kramei	Predicted as *Dendrelaphis pictus*
Ular Sajadah	Sea snake (*Hydrophis* sp and *Laticauda* sp.)
Ular Hitam	Predicted as *Ophiophagus hannah*
Ular Sawe/ Piton	*Python reticulatus*
Bajuku	Trionychidae
Kodok/katak muara	*Fejervarya* sp.
Penyu	*Lepidochelys olivacea*
Miawak / Menyawak	*Varanus salvator*
Kadal bakau	*Emoia atrocostata*

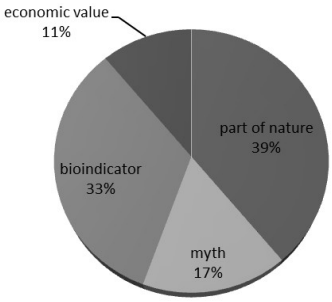

Figure 1. Percentage of people's perspective on herpetofauna

or affect the society life. Some of them have a cultural value and traditional beliefs (see Table 2). On the other hand, local people also recognized herpetofauna as a threat that appears at a certain time.

Ular Karet or mangrove pit viper *Cryptelytrops purpureomaculatus* was avoided by local people due to its deathly venom. Its presence in Kuala Tungkal still remain a mystery, because our observation did not find it although the area is estimated as a suitable habitat for mangrove pit viper. Das (2015) confirmed that the distribution of *C. purpureomaculatus* in Sumatra is mostly in the west region, Indragiri, Riau. Nonetheless, Vogel *et al.* (2012) predicted that this snake is widespread in Sumatra. Local people explained that the presence of these snakes is affected by the floods. Flood carried some materials and snakes into the house.

However, only a few cases of snakebite were recorded. Local people avoided snake attacks by moving the snake to other places slowly and carefully. People tended to have a high vigilance against snakes, even when it compared to other animals that causing trauma, such as a spider or a creature with a unique shape, such as mushrooms [18]. The snakebite cases were never treated medically, it is still not fully trusted by the people in developing countries [19, 20]. Recent snakebite case was treated by using traditional Chinese medicines we explained before.

Suku Laut – one of the indigenous tribe in Kuala Tungkal – using the leaves of mangrove Api Api plant, *Avicennia* sp. (see Figure 1), to treat certain types of venomous snake bites, including Mangrove Pit Viper snakes. The tip of *Avicennia* sp. was chewed and crushed together with the soil, then smeared on the bite wound. The wound will soon dry up and recover. Although there was no scientific evidence about the efficacy of this treatment, the plant was known to has several active compounds, such as alkaloids, saponins, tannins, flavonoids, triterpenoids, and glucoside. These substances suspected to be an antiseptic [21].

However, the traditional treatment for snakebites may worsen the patient condition, particularly when medical treatment is too late to be applied. The fearness unsterile materials increase the risk of bleeding in the coagulopathic type of venom. Therefore, every snakebite case is suggested to be immediately assisted by the medical treatment at a nearby hospital [19].

Ular Hitam predicted as *Ophiphagus hannah,* was believed as a sign of bad weather that will come onto Kuala Tungkal for some days. Based on the local people's perspective, this snake usually appears during the dry season to rainy season.

Some certain animals showing an interesting behavior during the transition period between dry to rainy season. For example, snakes and turtles that go down from the mountain toward the lowland indicated the region will get a good rain. Generally, natural indicators tend to be specific for each region based on the local culture, moreover, it is momentous and can not predict long term events. Scientifically, these indicators were not easily applied, interpreted, not reliable [22], and confined to specific places [23].

Ular Talimas or mangrove snake *Boiga dendrophilia* was believed as the supernatural beings that should not be killed and must be immediately expelled to protect the family from bad luck. Most people claimed that this snake was a warning from their ancestors to be vigilant in life. These beliefs arose due to its gorgeous color and non-aggressive motion unless provoked by a human.

Penyu or Olive Ridley sea turtle *Lepidochelys olivacea* usually appear during the clams season, clams were named as *Kerang Tempel*. This turtle is listed as vulnerable and the population is known to be threatened by human activities [24,25]. *Lepidochelys olivacea* is usually found around the fishing port and dock. They preyed on several barnacles and clams that attached to the Bulian or Ulin timber, or Ironwood *Eusideroxylon zwageri*. However, *Eusideroxylon zwageri* was replaced by *Pinang* or Areca nut *Areca catechu* in the port construction. It decreases the number of the barnacles and also *Lepidochelys olivacea* since it prey on bernacles. Ironwood was used by local people for furniture, roofs, heavy construction materials such as ships, marine stakes, bridges, and railroads. This wood can hold a variety of wood-eating insects and fungi [26]. Unfortunately, this type of wood is listed as endangered tree species [27]. Based on people's perspective, Ironwood is preferable for clams, oysters, and various types of barnacles, while Areca nut has a bitter taste and difficult to attached. On the other hand, several barnacles such as *Kerang Darah* or *Anadara granosa* is the main diet for Olive Ridley sea turtles, and being hunted in a big scale [28], then caused the decreasing on sea turtle populations [24].

Kuala Tungkal is a strategic area for the national development. A government plan to implemented two big projects in this area: port and gas power station [30,31,32]. Furthermore, the massive construction significantly impacts to the pristine environment and the biodiversity [33]. In fact, local people have manage their environment very wisely. Therefore, the government should pay a serious attention to the local culture and biodiversity that exist in the area, particularly in Kuala Tungkal. Hopefully, the analysis on the impact of national development can minimize the declining of herpetofauna diversity.

CONCLUSION

There are 3 order of herpetofauna (anura, squamata, testudines) which comprise of 12 species observed in this survey, most of them were snakes. Local people recognized herpetofauna around well and do not harm them as well as they conserve the environment. Most of the local people realized that herpetofauna is part of nature, loss of some species will impact the ecosystem stability. Some local people know that herpetofauna has economical value and can be a used as a bioindicator, involved as local myth

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