Snake Diversity at Universitas Indonesia’s Urban Forest

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Abstract. Universitas Indonesia’s urban forest is part of Universitas Indonesia’s campus located at Depok, West Java. It is modified into an educational forest, green open space, and water absorption area. The condition of urban forest created its own built environment, which is transformed into an unavoidable interaction between human and wildlife, including snake. Some species that are found at the academic area consisted of local species and introduced species from urban area around campus. It is interesting to know about the diversity of the species at Universitas Indonesia’s urban forest. We used visual encounter survey (VES) as a method to collect all data from 2017 to 2018, including obtained report that has been reported to us. The result showed that the diversity index of snake at Universitas Indonesia’s urban forest in 2018 is higher than in 2017. Its composition consists of Naja sputatrix, Ahaetula prasina, Dendrelaphis pictus, Phyton reticulatus, Xenopeltis unicolor, Pareas carinatus, and Ptyas korros. Those snakes are easily found at Universitas Indonesia’s urban forest during wet season.

1. Introduction

The Universitas Indonesia (UI) area has a variety of landscapes, consisting educational areas and educational facilities, artificial lakes, urban forests, and green parks. Buildings interspersed with plants and parks dominate the campus area and other facilities. The artificial lake consists of 6 lakes, abbreviated as KAMPUS, consisting of Kenanga Lake, Agathis Lake, Mahoni Lake, Puspa Lake, and Salam Lake which can store up to 52,500 m³ of water [1]. Kenanga Lake is surrounded by buildings, namely the Ukhwah Islamiyah Mosque, the Art Center Building, the Rector’s Building and the Balairung Building. Mahoni Lake is directly adjacent to the Pusgiwa building, park or open area of the Faculty of Economics building, and the green open area of Faculty of Humanities. Agathis Lake is directly adjacent to green open space, Puspa Lake and Salam Lake directly adjacent to the Universitas Indonesia’s urban forest.

The diversity of landscape is one of the supporting factors for wildlife in the vicinity of UI Depok Campus. Wildlife that can be found around UI Depok campus consists of groups of animal wildlife mammals, such as dogs, cats, squirrels, bats, rats, and deer. Some fish group that can also be found are for example tilapia fish, goldfish, broom fish, eel fish, siam fish, betta fish, guppy fish, and catfish. From group of birds, the types of animals that can be found are for example chilies, nectar birds,
pheasants, finches, cucak birds, passer birds, turtles, benthic birds, swallows, Hirundo birds, crooked beaks, starlings, black eagles, cipoh, gerygone birds, uncuing birds, chicks, chickens and many others. From the Amphibians group, there are Bufo crows, tree frogs, rice field frogs. From reptile groups they consist of snakes, monitor lizards, chameleons lizards as well as a huge variety of insects that can be found at UI Depok Campus.

Various animals interact directly and indirectly with humans, for UI academic community or non-UI citizens who visit or stop at UI Campus. The interaction can be in the form of feeding directly to the animals such as with fruits, leftovers, or specific animal foods. Indirect interaction such as certain tree planting activity can affect symbiosis which certain animal use such place to stop, shelter, nest and seeking source of food. The interaction has been running long before the establishment of UI Campus because the landscape condition before UI Campus existed was in the form of rice fields, rubber plantations, and secondary forests. The construction of UI Depok Campus still has similar habitation to the original ones so the presence of animals in it still remains the same so far.

UI Depok campus which has education area directly adjacent to animal habitat is in our particular concern because the animals will not be familiar with buildings but they are more comfortable with open areas. Still, we often find wild animals that enter the building or around the building area; such as bats, swallows, honeybees, frogs and snakes. Among wildlife that enters the building, they were found to make nests and breed. One of the animals that are often found in educational areas especially snakes, generally set free until they enter the building. Snake is classified in reptile class and Squamata order [2]. It has remarkable morphological feature such as reduced eyes, modified jaws, cycloid body scales with feeding behavior as carnivores, eating such as insects to bigger animals like rats or frogs [3]. Snakes are even found attacking humans when they feel threatened.

The existence of snake in UI campus is a common thing, because many places can become habitats for snake and snake preys on rats, squirrel, frog, fish, insect, most types of molluscs and others. Snake habitat close to human activity is essential to create encounter spot between snake with human in, especially UI residents. Some records show that snakes are found in buildings and some facilities such as ATM rooms, bathrooms and office space.

2. Methods
Data recording of the presence of snakes is carried out using VES method (modified visual encounter survey). VES method is commonly used to determine species richness and to estimate the number of species in a specific area [4]. This method is carried out in the observer area. Every encountering with a snake is included in the record by counting type of snake encountered, time, snake activity, location, number, and description. This information is stored and snake is kept for examination, only the remaining scales left behind, eggs, etc. The recording was done throughout 2017 and 2018 at campus area of Universitas Indonesia. The duration of observation is from 08.00 to 20:00. To capture the snake for identification we use snake hook and snake grab.

3. Results
The results of direct observation in the field and from incoming can be seen in figure 1 and table 1. Based on findings and reports of snake presence in 2017 (figure 1), cobra snakes (Naja sputatrix) are most commonly found in the academic community area of 11, four snakes (Ahaetulla prasina) and one snake stick (Dendrelaphis pictus).

In 2018 findings and reports of the existence of snakes were more diverse, mostly for cobra species (Naja sputatrix) there were about ten tails counted. Top snakes, stick snakes, rainbow snakes (Xenopeltis unicolor), Pyton reticulatus snakes, snail snakes (Pareas crenatus), and koros snakes (Ptyas korros) were found in 2018.
Figure 1. Reported Data of Snakes Species Field Observation by VES Method year 2017 – 2018

Table 1. Snakes Species based on venom.

| No. | Latin Names                | Local Names | Venomous/Non   |
|-----|---------------------------|-------------|----------------|
| 1   | *Coeglonathus flevalineatus* | Ular Kopi   | Non Venomous   |
| 2   | *Ptyas korros*            | Ular Koros  | Non Venomous   |
| 3   | *Pareas carinatus*        | Ular Siput  | Non Venomous   |
| 4   | *Xenopeltis unicolor*     | Ular Pelangi| Non Venomous   |
| 5   | *Phyton reticulatus*      | Ular Sanca  | Non Venomous   |
| 6   | *Dendrelaphis pictus*     | Ular Lidi   | Non Venomous   |
| 7   | *Ahaetulla prassina*      | Ular Pucuk  | Middle Venomous|
| 8   | *Naja sputatrix*          | Ular Kobra  | High Venomous  |

Figure 2. Snakes found in Universitas Indonesia Depok Campus Area

4. Discussion
Cobra snakes are found mostly in areas adjacent to human activities. The proximity location of cobra to human existence is because it has high adaptability. Nearby untidy human environment and the presence of garbage allows the existence of rats around educational building; rats as prey invite cobras as predators. The ability to flatten its body makes this snake capable of hiding in debris and can enter small gaps and holes. Cobra snakes are a high-venomous type of snake, active at night, preying on frogs, mice, and other small mammals. This species is dangerous due to its ability to spit venom to its aggressor [5].

After Cobra the quantity of shoot snake is found most, followed by green snake that resembles leaf in many observations they are found in trees. The park areas at almost every location of the building on UI campus are well maintained, the place becomes attraction or haven for snakes and areas to cross
especially for snake shoots. Top snakes prefer to be on trees and prey on amphibians, insects and small reptiles. Top snakes do not have deadly effect on humans. The colour of green body makes it disguised against leaf on the tree, so its place is near the leaves.

There are not many other species found apart from sticks snake, rainbow snakes, coffee snakes, snail snails, and koros snakes. Stick snakes (*Dendrelaphis pictus*) have the habit of staying on trees. They generally eat frogs, mice, grasshoppers, lizards, and crickets. Their prey can be found around buildings and the park around educational buildings. This causes the presence of sticks snake easily found around UI activities.

The rainbow snake is found in one of the buildings on UI Campus which is directly adjacent to Kenanga Lake. This is possible because one of the prey of rainbow snakes is amphibians found at the edge of Kenanga Lake. The way in of rainbow snakes into the building is possible because there are cracks and crack holes around the building that becomes their entrance. One of the habits of rainbow caterpillar is to consume the rat wholly.

Another type of snake which we found in this area is the coffee snake. Coffee snakes are found in buildings adjacent to Kenanga Lake, they are close to the lake to prey on frogs and lizards, as well as the rat populations. This coffee snake is also commonly found as food for larger snakes, monitor lizard and birds of prey.

Koros snake is also included in the record of snakes found in education area of UI Depok Campus. The type of mice that become their food is related to the presence of garbage and food scraps that are laying around the education area. Koros snake mainly helps to control rat population in Indonesia, as well as frogs, lizards and birds.

Snakes which are found around human activities because their habitat is adjacent to the area of human motion, is also sustained by the presence of prey and shelter or hiding places. In the location of education area and around education building there is a small pool as part of the garden arrangement. The small pool is a breeding ground for frogs as they must always close to water. The existence of frogs being one of the inhabitants of pond becomes attraction for snake. Snakes become frog predator. The snake passes through trees and grasses, then approaches the pond to preys on frogs and lizards.

Along with growing plants in the garden area of the building, these plants become site of capturing insect and inviting reptile. Reptiles and birds are insect predators. This environment allows snakes to find their food near plants with reptiles and birds that they can consume. Garden parks and grasses are suitable locations for snakes to cross and to move from one place to another.

5. Conclusion
In conclusion, diversity index of snake at Universitas Indonesia’s urban forest in 2018 is higher than in 2017. Snake variation records a list consisting of *Naja sputatrix*, *Ahaetula prassina*, *Dendrelaphis pictus*, *Phytot reticulatus*, *Xenopeltis unicolor*, *Pareas carinatus*, and *Ptyas korros*, as one part of Universitas Indonesia’s wildlife species composition.

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