

An Annotated Checklist of the Herpetofauna of Cikananga Wildlife Centre, Sukabumi, West Java, Indonesia

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ABSTRACT

The herpetofauna diversity of Cikananga Wildlife Center, West Java, Indonesia, was studied using a rapid assessment survey conducted on 10–19 May 2018, as well as incidental observation from staff and volunteers. All amphibians and reptiles observed were identified and recorded during the nine-day survey in the rescue facility, office complex, surrounding forest, and paddy fields. The results showed that 11 species of amphibians from 5 families inhabit the area, 9 species of lizards and 21 species of snakes were also present in the area. This report constitutes a preliminary checklist and first record of amphibians and reptiles in Cikananga Wildlife Center, West Java, Indonesia. The number of specimens was fewer than expected because of the very short survey period, but we hope to record more species in future studies.

Keywords: Cikananga, Sukabumi, West Java, Indonesia, Amphibians, Reptiles

INTRODUCTION

Despite being one of the most biodiverse regions in terms of amphibian and reptile species, herpetological research in Indonesia has not significantly progressed compared to neighboring countries (Iskandar and Erdelen, 2006). Since 2004 to 2010, numerous numbers of new amphibians were recorded but restricted in Papua region. Since 2011, new amphibian records were expanded to Java, Borneo, Sulawesi, and Sumatra region. Over the last ten

years, 53 species of amphibians were newly described, and within 2001–2010, several new species of reptiles were discovered, the majority of them in the Eastern region of Indonesia. In last ten years, seven new species of reptiles were discovered in the Moluccas, Sumatra, and Java. On Java, new species of amphibians and reptiles have been recently discovered, such as the description of *Leptophryne javanica* (Hamidy *et. al.*, 2018), and *Cyrtodactylus klakahensis* (Hartmann *et. al.*, 2016).

The varied habitat of West Java are home to a wide range of amphibian and reptile species. Based on the data from Amphibiaweb (2018) and Reptile Database (2018), 108 species of amphibians and 208 species of reptiles inhabit the island of Java. Herpetofauna inhabit various habitats, from primary and disturbed lowland forest, montane and submontane forest, streams, rivers, caves, to disturbed habitats such as plantations, villages and cities.

West Java is the second largest province in Java with the highest human population (Badan Pusat Statistik, 2010), hence putting its biodiversity at high risk. However, some amphibians and reptiles are still present in naturally vegetated areas and human-dominated areas. Current herpetological studies, particularly in West Java are limited to natural protected and non-protected areas (Riyanto, 2008; Kusriani, 2013; Huda, 2017), while the human-dominated landscapes yet remain unstudied.

We recorded the diversity of amphibians and reptiles that occur in human-dominat-

ed landscape at the Cikananga Wildlife Center and its surrounding area in West Java. This study will provide an overview of herpetological diversity in the southern part of Sukabumi, where no similar studies have been published. Our study is a preliminary list, and we hope to record more species in future studies.

MATERIALS AND METHODS

The diversity of amphibians and reptiles of Cikananga Wildlife Center, West Java, Indonesia (07° 03.390 S 106° 54.695 E, ca. 812m asl.) (Fig. 1), was investigated during an expedition for a period of 9 days from 10–19 May 2018. The Cikananga Wildlife Center is located in the district of Sukabumi in the province of West Java, and it is one of the largest animal rescue centers dedicated to the conservation of wildlife in Indonesia. The area is located in Kampung Cikananga, Desa Cisitu, Kecamatan Nyalindung, Kabupaten Sukabumi, West Java, Indonesia. Covering an area of 14 hectares, Cikananga Wildlife Center is divided into rescue center/ park area and office area (Fig 2). Both areas consist of re-growing forest which is dominated by umbrella trees and *Calliandra* sp. Cikananga Wildlife Center is surrounded by cultivated land that dominated by paddy fields, mixed plantation woodland (teak, *Tectona grandis*; umbrella tree, *Maesopsis eminii*; and white *Albizia*, *Albizia* sp.), and agriculture plantation (tea and vegetables). Patches of mixed pine forest and some unmanaged land formed by open understory grassland and bushes are also still present.

The frogs, lizards and snakes were collected around the office complex, rescue center, along the roadside ditches, forest, rice paddies and a lake in the Cikananga Wildlife Center area and also in the surrounding forest, plantations and rice paddy fields in the area. Most surveys were conducted at night using visual encounter survey with a head torch, as it is the standard method for surveying herpetofauna in tropical regions (Crump and Scott, 1994; Doan, 2009). All non-venomous species were captured by

hand, while snake tongs and hooks were used for venomous species. The observation and/or collection of diurnal lizards, and carcasses were performed during the daytime. All deceased specimens found were fixed in 10% formalin, preserved in 70% ethanol and later deposited at the CWC Office for future reference. To photograph the specimens, we used a digital camera and macro lens. The main references used to identify the specimens were Kus-rini (2013), de Lang (2017), Rusli (2016), Das (2010), and Somaweera (2017). All the amphibians and reptiles from incidental observation by staff and volunteers were also confirmed and recorded



Figure 1a. Location of Cikananga Wildlife Center, Sukabumi, West Java, Indonesia. ©PPSC



Figure 1b. Aerial view of Cikananga Wildlife Center and surrounding areas in Sukabumi, West Java, Indonesia. ©Google Earth

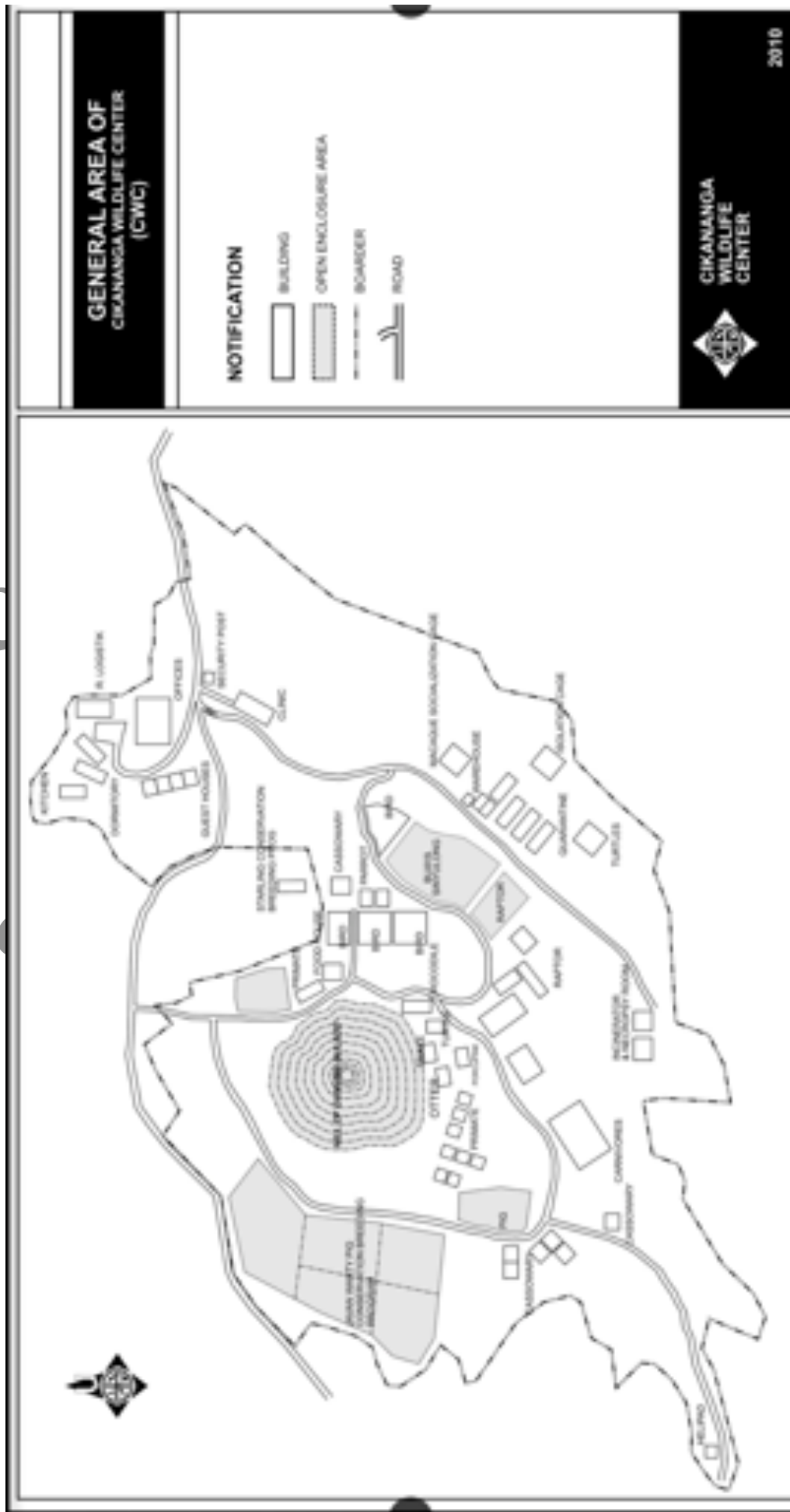


Figure 2: Floor plan of Cikananga Wildlife Center, Sukabumi, West Java, Indonesia. ©PPSC

No	Species	Location					
		Roadside	Office Building	Forested area	Paddy Field	Lake	Park
A. Amphibians							
I. Bufonidae							
1	<i>Duttaphrynus melanostictus</i>	X	X				
2	<i>Phrynooidis asper</i>		X	X			
II. Dicroglossidae							
1	<i>Fejevaryia limnocharis</i>				X		
2	<i>Limnonectes macrodon</i>				X	X	X
3	<i>Limnonectes microdiscus</i>				X		X
4	<i>Occidozyga sumatrana</i>				X		X
III. Ranidae							
1	<i>Amnirana nicobariensis</i>		X				X
2	<i>Chalcorana chalconata</i>						X
IV. Microhylidae							
1	<i>Microhyala achatina</i>	X	X	X	X	X	
V. Rhacophoridae							
1	<i>Polypedates leucomystax</i>	X	X	X	X		X
2	<i>Rhacophorus reinwardtii</i>						X
B. Reptilia							
I. Gekkonidae							
1	<i>Hemidactylus frenatus</i>		X				
2	<i>Gehyra mutilata</i>		X				
3	<i>Gekko gecko</i>		X				
II. Agamidae							
1	<i>Bronchocela jubata</i>	X	X	X	X	X	X
2	<i>Gonocephalus chamaeleontinus</i>		X				X
3	<i>Draco volans</i>		X				X
III. Scincidae							

1	<i>Dasia olivacea</i>		X				
2	<i>Eutropis multifasciata</i>	X	X	X	X	X	X
IV. Varanidae							
1	<i>Varanus salvator</i>				X		
V. Colubridae							
1	<i>Ahaetulla prasina</i>			X	X	X	X
2	<i>Dendrelaphis formosus</i>						X
3	<i>Dendrelaphis pictus</i>				X		X
4	<i>Dendrelaphis subocularis</i>		X				
5	<i>Calamaria linnaei</i>		X				
6	<i>Calamaria schlegeli cuvieri</i>	X					X
7	<i>Coelognathus flavolineatus</i>					X	X
8	<i>Coelognathus radiata</i>					X	X
9	<i>Gongylsoma balioderus</i>						X
10	<i>Lycodon subcinctus</i>						X
11	<i>Oligodon purpurascens</i>	X					
12	<i>Oligodon bitorquatus</i>						X
13	<i>Ramphotyphlops lineatus</i>		X				
14	<i>Sibynophis geminatus</i>						X
VI. Natricidae							
1	<i>Rhabdophis subminiatus</i>			X			X
2	<i>Xenochrophis trianguligerus</i>				X	X	
VII. Pareidae							
1	<i>Parea scarinatus</i>			X			X
VIII. Elapidae							
1	<i>Bungarus scandius</i>						X
2	<i>Bungarus fasciatus</i>		X				X

3	<i>Naja sputatrix</i>		X		X		X
IX. Viperidae							
1	<i>Trimeresurus albolabris</i>				X		
Total species per habitat		7	19	7	16	6	27

RESULTS

A total of 11 species of anurans from 3 families, 7 species of lizards from 3 families and 16 species of snakes from 5 families were recorded to inhabit the Cikananga Wildlife Center area (Table 1).

Species Accounts

Amphibians

Bufo

Two bufonid species, *Duttaphrynus melanostictus*, and *Phrynoidis asper*, represent this family.

Duttaphrynus melanostictus

This is a widespread and common species; it is adaptable and often occurs in disturbed habitats (Kusrini, 2013; AmphibiaWeb, 2016). Several individuals were observed each night crossing the road or on roadsides, and one individual was found in the office building. This species is one of the most commonly observed amphibians by staff and volunteers.

Phrynoidis asper

Several adult specimens were found under the dormitory, and also in the forest near the pig enclosure. This species is usually associated with flowing water such as rivers and streams (Kusrini, 2013). There is a small ditch/irrigation canal in the paddy fields (about 70 cm in width) with flowing water, however no individuals of this species were recorded there. All individuals were found quite far away from any source of water.

Dicroglossidae

We observed four species of frogs from this family: *Fejervarya limnocharis*, *Limnonectes macrodon*, *Limnonectes microdiscus* and *Occidozyga sumatrana*.

Fejervarya limnocharis

A very common species, highly concentrated in rice paddies. An estimation of roughly over 100 specimens were observed each night in the rice paddies. On several occasions there were pairs in amplexus. We identified these amphibians by looking at the morphological characters of 5 individuals randomly captured each night, as well as from clear photographs of incidental observation by staff and volunteers. This species is very similar to *Fejervarya cancrivora*, and inhabits the same habitat type. However, they can be distinguished based on the webbing of the hind feet. *F. limnocharis* is not fully webbed; its web only touches the second sub-articular tubercle on the fourth toe, while in *F. cancrivora*, the web touches the outermost subarticular tubercle on the fourth toe. An outer metatarsal present in *F. limnocharis* is absent in *F. cancrivora*. This species occurs in lowland habitats, rarely above 700 m asl. (Kusrini, 2013).

Limnonectes macrodon

A rough estimation of over 30 specimens were observed each night on the banks of the lake. This species was also abundant in the rice pad-



Figure 3. *Limnonectes macrodon* predating a smaller frog on 4th December 2018. ©Arfah Nasution

dies, an average of 15 specimens were observed each night in the rice paddy fields. This species also occurs in both small and large turtle and crocodile enclosures. One single specimen was observed predated (presumably *C. chalconata*) on 4th December 2018 (Fig. 3).

Limnonectes microdiscus

Three specimens were captured on different occasions. One was found in a puddle on a path near a lake, the other two were found in rice paddies. They are found in lowland forest up to an elevation of 1400 masl. (Kusrini, 2013).

Occidozyga sumatrana

An average of roughly 10 specimens were observed each night. The majority of specimens were found in rice paddies. One was found on a rainy night with a missing hind leg, in a puddle located on a path near a lake. They were distinguished from the similar species *Occidozyga lima* based on morphological characters of the ventral. *O. sumatrana* has a smooth ventral, while *O. lima* will have tubercles dotted around its belly.

Ranidae

In Cikananga Wildlife Center, we found two species of ranids: *Amnirana nicobariensis* and *Chalcorana chalconota*.

Amnirana nicobariensis

Several individuals were observed each night, most often on soil slopes covered with various plant species. One individual was observed inside the office building. Some individuals were observed in or around the turtles and small crocodile enclosures.

Chalcorana chalconota

Several individuals were observed each night, most often on soil slopes covered with various plant species. This species is also commonly

observed perching on branches or foliage, below 2 metres from ground level. Some individuals were observed in or around the turtles and small crocodile enclosures. A pair in amplexus was observed by the pig-nosed turtle tank in the evening.

Microhylidae

One species of microhylid, *Microhyla achatina*, was found on Cikananga Wildlife Center grounds.

Microhyla achatina

Calls from this species were heard in most areas of Cikananga Wildlife Center grounds, except in the rice paddies. Several individuals were found in leaf litter in various places of CWC grounds. 2-3 individuals were observed every night in the office building, as well as the leaf litter and forested area surrounding the building. This small frog is endemic to Java, and can be distinguished from a similar species, *Microhylapalmipes* based on morphological characters. Webs are absent on the hind feet of *M. achatina*, while on *M. palmipes*, 2/3 of the foot is webbed (Kusrini, 2013).

Rhacophoridae

The rhacophorid family is represented here by two species, *Polypedates leucomystax* and *Rhacophorus reinwardtii*.

Polypedates leucomystax

This arboreal frog is perhaps the most common species of Rhacophoridae on Java. It is adaptable and often found in disturbed habitats and in human habitations. One individual was found in the toilet of the office building, and another in the toilet near the crocodiles; both perched on the wall. Several other individuals were seen on the fence of the crocodile and turtle enclosures, and in foliage all around the area.

Rhacophorus reinwardtii

One pair in amplexus was observed on a fence of the small crocodile enclosure on 24th April 2018 (Fig. 4). The frogs were observed at around 20:00 at night, with a light shower of rain.



Figure 4. A pair of *Rhacophorus reinwardtii* in amplexus.
©Nathan Rusli

Reptilia (Lizards)

Gekkonidae

Hemidactylus frenatus

Several individuals were observed on trees and on walls of buildings. This species is associated with human habitations (Das, 2010).

Gehyra mutilata

Several individuals were observed on walls of buildings. This species is found both in primary forest and human habitations (Das, 2010)

Gekko gecko

We did not find any specimens during the survey, however occasionally the distinctive sound of these lizards were heard in the evenings. Staff and volunteers have reported frequent sightings of this species and provided photographs. There is one individual that is seen almost every night in the male dormitory, one living in the office building tower, and several individuals on the walls behind the garage (Ferns, Pers. Comm., 20th December 2018).

Agamidae

Bronchocela jubata

Abundant species found sleeping in trees at night and basking during the day. Both adult and juveniles were observed during every survey, roughly 10 specimens were recorded each night. It is common around disturbed and urban habitats, however in most urban areas of West Java such as Jakarta, they have been outcompeted and replaced by *Calotes versicolor*, which is an introduced species (Risidiana, Pers. Comm., 20th December 2018). *C. versicolor* was not present during this survey, which is a positive sign for this species.

Gonocephalus chamaeleontinus

Two colour variations were observed; a green form and a reddish-brown form. Most often seen basking on vertical trees during the day, and occasionally observed sleeping in the foliage at night. According to reports from staff, they have been observed laying eggs under the dormitory. This is a highland species, found in montane forest above 600m asl (Yuwono, Pers. Comm., 19th December 2018; Risidiana, Pers. Comm., 20th December 2018). The specimens were distinguished from *Gonocephalus kuhlii*, a similar species, based on their large nuchal crest and smooth ventral scales (Das, 2010).

Draco volans



Figure 5. A gravid female specimen of *Draco volans* killed by a domestic cat. We performed an incision to reveal the four eggs contained inside it. ©Nathan Rusli

One male was observed roughly 3-4 metres above the ground, in a tree near the turtle

ponds during the day, on 28th April 2018. A female found dead after being attacked by a domestic cat was collected during the day on 16 May 2018. It was gravid with four eggs (Fig. 5).

Scincidae

Dasia olivacea

A single specimen was recorded in a tree in front of the office building based on a photograph taken in May 2018. The animal was seen basking during the day, roughly 2 metres above the ground.

Eutropis multifasciata

Most often observed basking on the ground or on a tree trunk during the day. One individual was observed at night under a pile of leaves near the garage on 12 May 2018, and another two individuals were observed in leaf litter by the path near the bear enclosures at night on 15th May 2018. A juvenile was observed under a rock by the office building during the day on 22nd April 2018.

Varanidae

Varanus salvator

One individual was observed during the rainy season in 2012, basking next to the lake. Another specimen was observed in 2018 running towards a bird cage, around 16:00 during the afternoon (Tielen Pers. Comm., 21th December 2018). *V. salvator* was observed swimming in a small stream passing through the paddy fields twice, on 16th and 18th November 2018.

Reptilia (Snakes)

Colubridae

Ahaetulla prasina

Ahaetulla prasina is a diurnal arboreal snake. A common species, often found resting in trees at night. An average of 2-3 individuals were

found each night. They prefer lowland habitats and are commonly found around human habitations as well as agricultural areas (de Lang, 2017)

Dendrelaphis formosus

Two individuals were observed. A juvenile was found resting on foliage, roughly one meter above the ground near the cage shed on the evening of 13th May 2018. An adult was found on 18th May resting in a bamboo tree roughly 4 meters above the ground across the clinic, near the gate of the rescue center. They can be distinguished from other *Dendrelaphis* species based on the very large eyes and the presence of three black stripes on the posterior (de Lang, 2017).

Dendrelaphis pictus

This is the most commonly encountered *Dendrelaphis* species, identified by the presence of a light ventro lateral stripe (de Lang, 2017). Several individuals were found resting in trees in the rescue center and rice paddies. Both males and females were observed; a high concentration of this species was found in trees in or near the small crocodile enclosures. One single juvenile specimen was observed eating on frog at paddy field (15th August 2017) and at the park (15th February 2018). A juvenile was observed in the rice paddies, sleeping in a tree on 18th May 2018.

Dendrelaphis subocularis

A single specimen collected in 2007 by drh. Munawar Kholis was preserved in the office building (Fig 6). It was then identified as *Dendrelaphis subocularis* on 14th May 2018 based on morphological characters. *D. subocularis* can be distinguished from other *Dendrelaphis* species based on the supralabial scales; the 5th supralabial scale is enlarged and located under the eye. It is also the only one touching the eye, therefore at the same time it is the subocular scale, hence the species epithet “*subocularis*”. Another morphological feature which distin-

guishes this species from other members of its genus is the presence of black sutures on its lips. Morphological characters used to identify this species were based on information provided in de Lang, 2017.



Figure 6. A specimen of *Dendrelaphis subocularis* collected in 2007. Lateral view of the head which clearly shows the 5th supralabial scale and black sutures. ©Nathan Rusli

Calamaria linnaei

A single specimen was found during the day on 28th April 2018 in a ditch next to the office building being attacked by ants (Fig 7). The specimen was identified by pholidosis; it had six scales surrounding the paraparietal, one preocular scale, and mental touching anterior chin shields. Other morphological features which can add to certainty of identification are the abruptly ending tail and ventral with dark markings. Morphological characters used to identify this species were based on information provided in de Lang, 2017.



Figure 7. *Calamaria linnaei* found in a ditch on 28th April 2018. ©Nathan Rusli

Calamaria schlegeli cuvieri

Two individuals were observed and collected (Fig. 8). One individual was found at night on 11th May 2018, slithering on a soil slope by the road outside the fence of the complex area. Another individual was found dead in front of the food house on 16th May 2018. They were both identified by pholidosis; five scales surrounding the paraparietal, preocular scale absent, and mental not touching anterior chin shields. Other morphological features which can add to certainty of identification are the gradually tapering tail and immaculate yellow ventral. Morphological characters used to identify this species were based on information provided in de Lang, 2017.



Figure 8. *Calamaria schlegeli cuvieri* found slithering on a soil slope on 11th May 2018. ©Nathan Rusli

Coelognathus flavolineatus

One dead juvenile specimen was found on the



Figure 9. A carcass of *Coelognathus flavolineatus* found on 10th August 2018. ©Arfah Nasution

road in front of the crocodile enclosures on 19th May 2017. One adult specimen was observed on 10th August 2018. It was dead and had been half eaten by a predatory animal, possibly a mongoose, which often feed on snakes (Figure 9)

Coelognathus radiata

An adult specimen was observed on 6th May 2018, presumably foraging for prey animals on a vegetable orchard that was covered by thick grasses. A juvenile specimen was found dead and flattened on the road near the security post on 30th July 2018. We assume it was run over by a vehicle (Figure 10).



Figure 10. A juvenile specimen of *Coelognathus radiata* found dead on road. ©Nathan Rusli

Gongylosoma balioderus

One specimen was observed and photographed on the road in front of clinic on a drizzly morning in 2016 (Tielen Pers. Comm., 21st December 2018). It was identified as *Gongylosoma balioderus* based on the following morphological features from de Lang, 2017; large eyes with round pupil, lips yellowish with black sutures. It is presumably female, as females tend to be more vivid in colour than males, and the white ocelli are more contrasting. It bears no longitudinal lines on the body, which distinguishes it from *Gongylosoma longicauda*, in which longitudinal lines are present.

Lycodon subcinctus

A single adult specimen was recorded in the park area based on a photograph that was taken on 14th December 2012. It was distinguished from the venomous *Bungarus candidus* based on the supralabial scales (Das, 2010; de Lang, 2017). This specimen had 8 supralabials; the third, fourth and fifth touching the eye.

Oligodon bitorquatus

A dead specimen was found at the park gate on 25th May 2018. A juvenile was observed on the stairs near the crocodile enclosure on 08th September 2018, and another during the day crossing the road near the clinic on 11th May 2018. Specimens were identified based on the dorsal pattern. Dorsal colour varies from black to brown, with many oblique rows of small reddish spots.

Ptyas korros

Several individuals were found each night, usually resting in the trees surrounding the paddy fields. They have also been observed resting in trees in the park area near the lake. The animals were found resting at a range of roughly 1-2 metres above the ground, in trees which grew on a steep slope. During the day, they have been observed several times in unmanaged grassland with large bushes, as well

as in agricultural areas.

Ramphotyphlops lineatus

One specimen was observed during the midday on the stair to the office building on 10th January 2018. This is the largest of blind snakes on Java, and could be easily identified based on the yellowish head and lower parts, and 12-15 fine zigzag lines on dorsum (de Lang, 2017).

Sibynophis geminatus

A single specimen was recorded in the park area based on a photograph that was taken on 15th April 2018 (Fig. 11). The animal was found slithering near the path to the CCBC entrance on a pile of rocks at 14:00 during the day (Beilby, Pers. Comm., 19th December 2018). It was identified based on its distinctive orange coloration on the nape, as well as two dorsolateral stripes running along the body from behind the neck.



Figure 11. *Sibynophis geminatus* observed on 15th April 2018. ©Jonathan Beilby

Natricidae

Rhabdophis subminiatus

This species was commonly found both during the day and at night (Pers. Obs.). Staff and volunteers often observe them near the clinic, in various locations around the rescue center and complex, basking or slithering on the ground. One was seen hiding inside a pipe during the day. At night, they are observed sleeping in foliage.

Xenochrophis trianguligerus

A range of 1-3 individuals were observed every night resting on protruding branches in the lake. One individual was found slithering in the rice paddies on 18th May 2018 in the evening.

Pareidae

Pareas carinatus



Figure 12. A juvenile specimen of *Pareas carinatus* with lighter markings on dorsolateral. ©Nathan Rusli

Both adults and juveniles were observed. Commonly seen at night in various locations around the rescue center (Pers. Obs.). One adult was found in a tree at night next to the garage on 15th May 2018. A juvenile specimen with an unusual pattern was found resting in a bush, roughly 1 metre above the ground on 23rd April 2018 (Fig 12).

Elapidae

Bungarus candidus

Two individuals were observed. One individual was observed slithering in the otter cage area at night on 24th April 2018. Another was observed on the same night near the warty pig enclosures. Staff and volunteers have also observed this species in the past.

Bungarus fasciatus

An adult individual was observed on 25th April 2018 on the side of the road. One juvenile was found crossing the path near the dormitory in the morning on 26th April 2018, and another

slithering on the wall of the slow loris enclosure in the evening of 11th May 2018. One dead specimen was found on the roadside near to the CWC park gate on 12th September 2018.

Calliophis intestinalis

A single specimen was found during the day in 2016 in a ditch next to the office building. Another specimen was found at the pig enclosure in August 2018. (Tielen Pers. Comm., 21st December 2018).

Naja sputatrix

Adult individuals were often observed basking in the afternoon in front of Mess 1 in the complex area. One single specimen was observed exhibiting arboreal behaviour, climbing on bushes near a vegetable orchard on 10th November 2018 (Fig. 13). One individual was found at night in the rice paddies on 26th April 2018, and another on 10th May 2018. In the past, staff and volunteers have observed this species near the office area, in rice paddies and various places in the rescue center.



Figure 13. *Naja sputatrix* exhibiting arboreal behaviour, climbing on the bushes near vegetable orchard. ©Arfah Nasution

Viperidae

Trimeresurus albolabris

Two individuals were observed, both at night in trees on steep ledges surrounding the rice paddies. One was found on 26th April 2018, and the other on 13th May 2018. This is gener-

ally a lowland species, often found in primary and secondary forest.

DISCUSSION

For the nine-day survey at the Cikananga Wildlife Center area, Sukabumi, West Java, we covered 10.2% of amphibians and 13.5% of reptiles across Java. These are new records of the herpetofauna of Cikananga Wildlife Center, as it is the first time this area has been surveyed. The number of species is less than expected because of the short observation period and climatic factors. Due to the limited survey period, we could not explore and record all the amphibians and reptiles present in the area.

We assumed that combination of urbanization and elevation are also significantly influenced our result. Cikananga Wildlife Center is characterized as a disturbed area, and we could easily find several species of herpetofauna commonly found in disturbed habitat, such as *D. melanostictus*, *F. limnocharis*, *H. erythraea*, *P. leucomystax*, *H. frenatus*, *G. mutilata*, and *B. jubata*. It is believed that urbanization, which converts the natural habitats into agriculture, human settlements, and roads are major contributors to the decline of amphibian and reptile diversity at some locations (Lajmanovich *et al.*, 2003; Storfer, 2003; Gardner *et al.*, 2007; Rais *et al.*, 2015).

Urbanization leads to habitat fragmentation which restrict the dispersal of herpetofauna (Cushman, 2006; Parris, 2006) as well as road kill impacted of vehicular traffic which results in herpetofauna mortality, jeopardizing the survival of endemic, globally, and locally, threatened species (Amarakoon *et al.*, 2010; Baskaran and Boominathan, 2010; Selvan, 2011; Arijit *et al.*, 2012; Karunarathna *et al.*, 2013). We noted several road kills on *C. radiata*, *D. melanostictus*, *A. prasina*, *C. flavolineatus*, and *B. jubata* (fig x). The disturbance of habitat fragmentation also contributed to the habitat alteration which push the amphibians and reptiles inhabit the building area, such as frogs and snakes that commonly found in the

building as well as in the ditch.

Cikananga is on high elevation (>800m a.s.l.) where less species commonly occurred. The trend of species richness showed a decrease in richness with increasing elevation (Watkins *et al.*, 2006). More species of herpetofauna occur at low and middle elevations, while few exist at high elevations which consistent with expected optimum water and energy variables (Malonza, 2015). We highlighted a unique occurrence of herpetofauna in Cikananga where both highland and lowland species are occupied this area. Some highland species found is: *R. reinwardtii* and *C.schlegeli*, while the majority of species found were lowland species.

For the baseline data, we only focused on herpetofauna checklist, yet we found some interesting findings relate to the herpetofauna ecology, such as: the population of house gecko that not really common inhabit the area *P. aspera* that contradict from its common habit (we found this species is more common in area which far from flowing water, whilst the species usually associated with flowing water such as rivers and streams (Kusrini, 2013)).

There are several species of herpetofauna which have been introduced to Java, such as *Trachemys scripta* and *Calotes versicolor* (Das, 2010). During this survey, we did not encounter any non-native species of amphibians and reptiles, which is a positive sign as there is no competition for native species. In some areas, the non-native *Calotes versicolor* has outcompeted and replaced the native *Bronchocela jubata* (Yuwono, Pers. Comm., 19th December 2018; Risdiana, Pers. Comm., 20th December 2018). However, we did observe a domestic cat kill a flying lizard, *Draco volans*, which was gravid with four eggs. This is an invasive species which is common in the area and poses the threat of predation towards herpetofauna and other wildlife such as small birds and invertebrates.

More species were found in the park area (26 species), which provide a re-growth secondary forest with man-made lake, animal pools, and puddles. These bodies of water function as breeding grounds for amphibians. In and around the wildlife center there are rice paddy fields, small streams, and ditches, which are also important for amphibians and reptiles as they provide varied microhabitats to live and breed in. The office complex also accommodates a significant number of amphibians and reptiles (19 species), perhaps because the office building area still has some forested area and is adjacent to the paddy field area.

This study aims to create a checklist of herpetofauna in the area, however there have been observations that raise some interesting questions related to their ecology, such as very low density of *Hemidactylus frenatus*, and the behaviour of *P. aspera* that contradicts from its common habits. We also recorded interaction between herpetofauna and other animals, such as the predation of *C. flavolineatus* by a mongoose, *B. jubata* and an unidentified colubrid snake predated by Crested-serpent Eagle, frogs and lizards predated by snakes, such as *Ahaetulla prasina* and *Dendrelaphis* species, and *Limnonectes macrodon* predated on smaller frogs. Further studies on their ecology would be interesting to conduct in the future.

Surveying herpetofauna in tropical regions is difficult because of their cold-blooded nature. Many species are cryptic, secretive, and somewhat unpredictable, which making it difficult to obtain specimens (Jehle Pers. Comm., 23rd October 2017). A long-term study is needed to increase the list number of herpetofauna, thus we will involve all Cikananga staff and volunteers to help us collect the data from incidental observations.

This checklist is not final, and we expect to find more species during future observations. We will use a longer and wider survey period and area so that we can cover a wider range of habitat types.

ACKNOWLEDGEMENTS

We wish to thank the Cikananga Wildlife Center (PPSC) for providing the facilities and permission to survey on the location, as well as the Indonesia Herpetofauna Foundation (IHF) and Ciliwung Herpetarium who have provided the survey equipment necessary. We would also like to express gratitude to everyone involved in this project, especially the staff and volunteers of PPSC. Last but not least, we would like to thank several individuals who have assisted in the field, provided important advice, submitted photographs, and contributed to this paper in any other way; Inge Tielen, Angga Risdiana, Tom Kirschey, Robert Jehle, Frank Yuwono, drh. Inna Rakhmawati, Bertie Ferns, Jonathan Beilby, Milan de Haan.

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