

Notes on the Rediscovery and Range Extension of the Palawan Wolf Gecko (*Luperosaurus palawanensis*, Brown and Alcalá, 1978) in Palawan, Philippines

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Abstract:- Palawan hosts two endemic species of *Luperosaurus*, a poorly understood genus that is regarded as one of the rarest group of geckos in Southeast Asia. *Luperosaurus palawanensis* was discovered in 1961 in the central portion of the island and *Luperosaurus gulat* was described in 2010 in Mt. Mantalingajan, in the south of the island. Both species have not been recorded again since their discovery. This research notes described the rediscovery of *L. palawanensis* in November 2019, in El Nido, northern Palawan during a rapid assessment in the Biodiversity Assessment Monitoring Site of the Department of Environment and Natural Resources – Protected Area Office. The new observation involves an individual which resembles the first specimen reported by Brown and Alcalá (1978), and is identified as *L. palawanensis* by its possession of extended skin flaps bordering the limbs and body, and extensive webbing among its finger toes. Additionally, it has spines laterally on its tail, small scales encircling the tail, small granular snout scales, and reduced chin plates—all of which allies it with *Luperosaurus* to the exclusion of *Gekko* as traditionally defined. This record suggests a range extension of the species from central to northern Palawan and a new species record for El Nido. This further demonstrates the importance of El Nido's remaining forest areas for biodiversity research, wildlife monitoring, and conservation of Palawan's unique and highly endemic land vertebrates.

Keywords:- *Luperosaurus*; Rediscovery; Range Extension; Palawan; Philippines.

I. INTRODUCTION

Palawan is a large island province in the southwest of the Philippines. The island has been traditionally considered as a biogeographic extension of Borneo, to which it was once connected, or nearly so (Esselstyn et al. 2004). The island has been spared much of the deforestation tragedy that has plagued the rest of the Philippines and still holds a forest cover of around 50% (PCSDS 2015). Although the local biodiversity is relatively poorly studied, the island is known for its relatively high levels of vertebrate endemism (Brown et al. 2007, Diesmos et al. 2015, Leviton et al. 2018).

Palawan hosts two endemic species of *Luperosaurus*, a poorly understood genus that is regarded as one of the rarest group of geckos in Southeast Asia (Gaulke et al. 2007). *Luperosaurus palawanensis* was discovered in 1961 and was formally described based on 2 specimens from Malatgaw river, Southeast of Thumb Peak at coordinates

9° 45' 42.98" N and an approximate elevation of 330 meter above sea level, about 3.5 km Northwest of Iwahig in the central portion of the island, after which the species has not been recorded again (Brown et al. 2010). *Luperosaurus gulat* was described a decade ago, based on a single specimen found in Mt. Mantalingajan, in the south of the island (Brown et al. 2010). This species has also not been recorded again since its discovery, underlining the need for more taxonomic and conservation-oriented research programs targeting Palawan's understudied vertebrate fauna.

Regular, reoccurring, and periodic biodiversity monitoring is important as it gives us updates and trends on the status of target species that serves as basis of management options and conservation measures. The Biodiversity Assessment and Monitoring (BAMS) program in the municipality of El Nido in the north of Palawan was first assessed in April, 2018 and recorded a resident herpetofauna 18 species. A second rapid BAMS assessment was conducted in November, 2019. Several new records

were obtained during this survey, including the first record of *Luperosaurus palawanensis* since its first discovery 59 years ago and its formal description 42 years ago (Brown and Alcala, 1978).

II. METHODS

The sampled site is part of the Biodiversity Monitoring System (BAMS) of the El Nido –Taytay Managed Resource Protected area in Barangay Maligaya, El Nido, Palawan, Philippines (Fig. 1). Extended opportunistic surveys during the BAMS general assessment sampling on November 1 and 2 2019, were initiated outside the monitoring plots and transects, in the hopes of documenting additional species that may be undetected by these standardized sampling procedures.

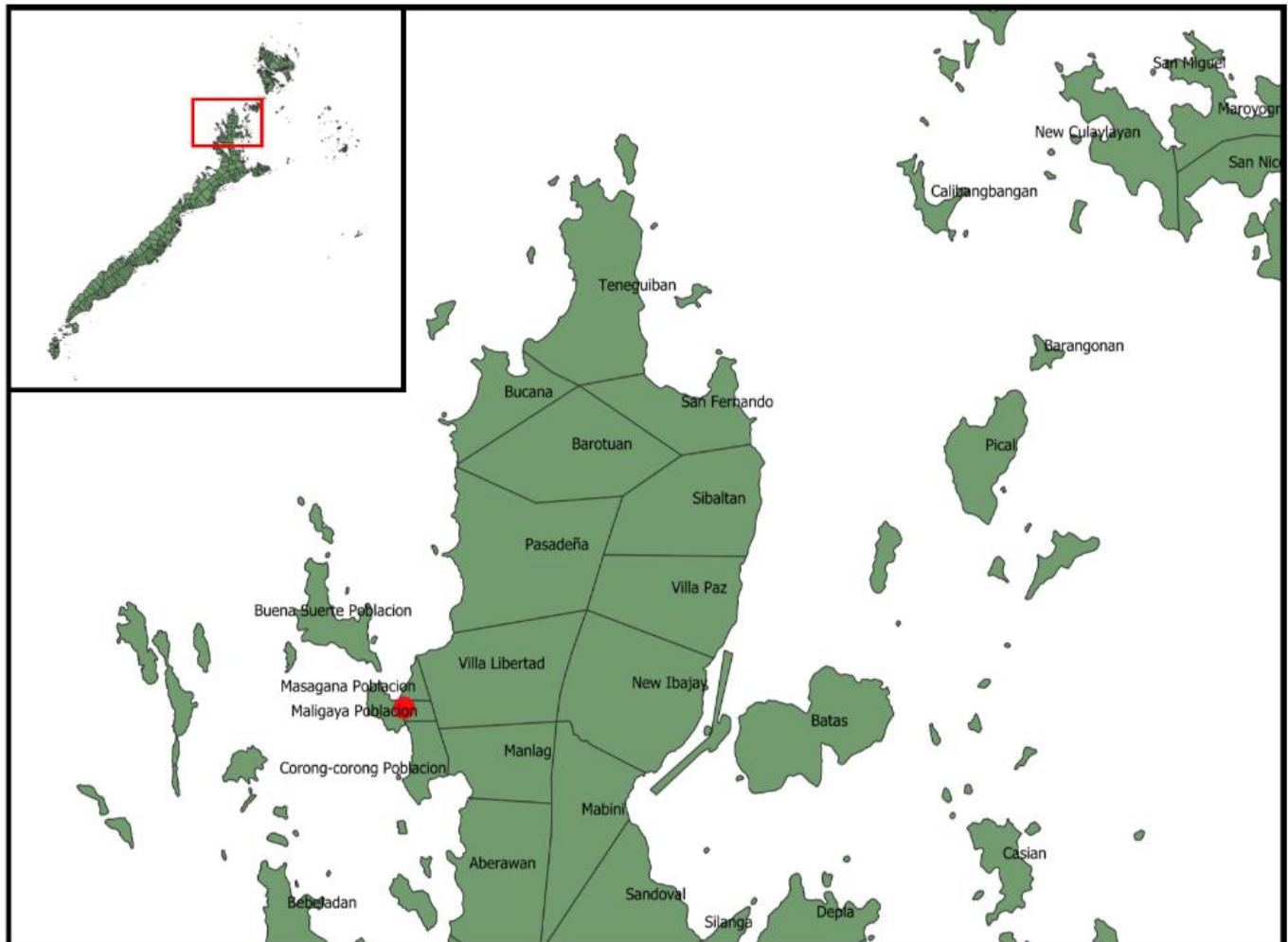


Fig 1:- Map of Palawan, Philippines (inset) and the location of the Biodiversity Monitoring System (BAMS) and the site of the new sighting of *L. palawanensis* in El Nido, Northern Palawan (red dot).

Our team surveyed a trail stretching for about 1 kilometer from Barangay Maligaya proper to the BAMS and about 300 meters of the forested area after the end of the monitoring site. The first author and two field assistants searched leaf litter, dead logs, log and rock crevices, epiphytes, and buttresses of large trees along the trails.

III. RESULTS AND DISCUSSION

At approximately 13:00 PM on November 1, 2020, the first author noticed a small gecko falling from a large tree in the survey area. The individual was captured and confined to a 2 cubic feet transparent polyethylene container for identification purposes, and to allow for semi-natural live photography of the subject; several physical measurements were taken, where after the specimen was released back in the place where it was first captured (Fig. 2).



Fig 2:- *Luperosaurus palawanensis* resting on a branch in El Nido, Northern Palawan.

Our captured individual has a total length of 65 millimeter (37mm snout-vent length; 28mm tail length). We initially identified it as belonging to the *Lepidodaactylus* group of geckoes due to the characteristics of having extended skin flaps along lateral surfaces of the abdomen and legs and interdigital webbing among the digits of hands and feet. We then examined the two *Luperosaurus* species that have been recorded for Palawan as comparison. Our specimen matched the description of *L. palawanensis* (Brown and Alcala 1978) by having spines in its tail, which are not present in *L. gulat* from southern Palawan (Brown et al. 2010). Based on photographs and by comparison to

the original description (Brown and Alcala 1978), our identification of *L. palawanensis* was further confirmed by Dr. Rafe Brown who had examined the holotype and paratype specimens, deposited at the California Academy of Sciences, San Francisco USA. This species was first recorded and identified based on two specimens from Malatgao River in Puerto Princesa in central Palawan. There have been no follow-up sightings of the species since its initial discovery, despite multiple attempts. Our record suggests a significant range extension of the species from central to northern Palawan as shown in Figure 3.

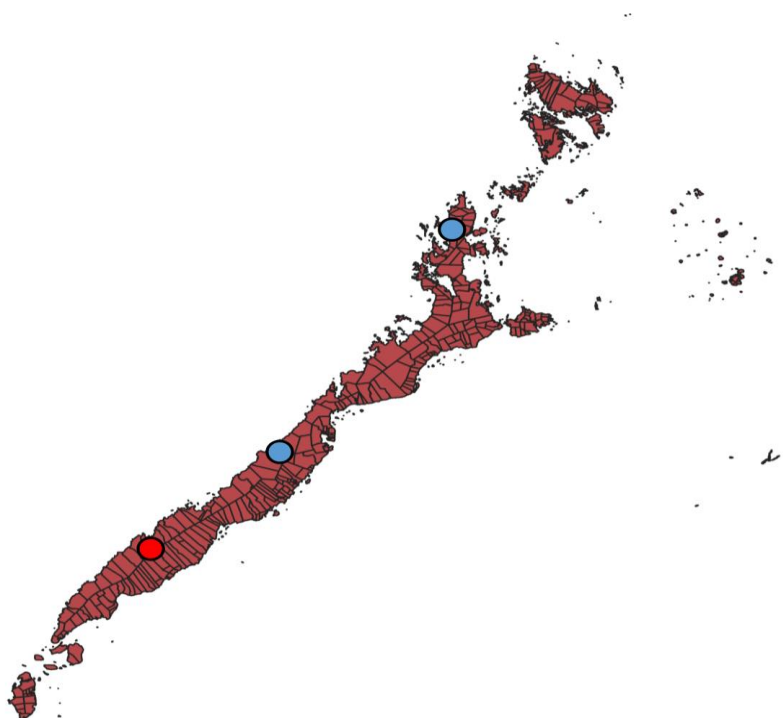


Fig 3:- The only known localities for *Luperosaurus palawanensis* (blue circles) and *L. gulat* (red circle) in Palawan, Philippines.

The specimen was recorded in a secondary lowland forest at an altitude of approximately 70 meter above sea level. The forest was characterized by second growth dipterocarp forest, about 30% slope with vines, lianas, rattan, bamboo, shrubs and epiphytes dominating the

understory (Fig. 4). Several small creeks are found in the vicinity of the area where the specimen was sighted. The soil in the area is composed of sandy clay, and some small rocks and boulders along creeks.



Fig 4:- Habitat of *Luperosaurus palawanensis* in El Nido.

It is highly recommended to re-sample the area over a longer period of time, with re-surveys necessary in both the rainy and dry months of the year, in order to accurately understand its population size, behavior and ecology. Finally, we strongly suggest collection of voucher specimens of this population for national biodiversity referencing and documentation, and for much needed future phylogenetic studies. The desirability of these types of surveys and re-surveys and the need for genetic specimen collection is illustrated by documented increases in estimation of biodiversity of Philippine sites, when sites have been revisited in different seasons (Brown et al. 2000; Siler et al. 2010) and by the case of "*Luperosaurus gulat*", a species which was classified as a *Luperosaurus* (Brown et al. 2010), but was recently transferred to the genus *Gekko*, based on phylogenetic studies from DNA sequences (Wood et al., in press).

DNA sequencing is furthermore important as recent studies involving *Gecko* and *Cyrtodactylus* in the Philippines suggest all Philippine *Gecko* find their ancestral origin in a faunal exchange with Palawan (Siler et al. 2012) whereby it has been hypothesized that Palawan is not a faunal extension of northern Borneo but has a much older origin and should be seen as a separate microcontinent. By including additional species like *L. palawanensis* in such phylogenetic studies, we will be in better position to unravel the mystery of Palawan's origin.

The finding further demonstrates the importance of El Nido for biodiversity research, monitoring and conservation. With tourism developing rapidly in the

region, El Nido's forests have declined rapidly. As this short research note indicated, the last patch of forest remaining in El Nido holds significant value in terms of biodiversity; thus, policy makers would be well advised to take these, and other recent findings into consideration, when developing management plans for the municipality.

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