

Lizards and Snakes (Reptiles: Squamata) in Gunung Palung National Park as Biology Learning Resources

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Abstract: This research aims to analyze the Squamata order in Gunung Palung National Park as a learning resource. The study was conducted through 2 stages. First to identify the diversity of squamata in SRCP TNGP with observation Visual Encounter Survey. Second to analyze the potential of squamata diversity as biology learning resource using questionnaire to analyze the potential data as biology learning resource. The research findings revealed 15 individuals from 10 species and 6 families of the Squamata order. Based on the results and feedback from 8 respondents, squamata order is considered suitable as a learning resource. The requirements for a learning resource include clear potential, clear learning objectives, alignment with learning goals, clarity of information provided, clear exploration guidelines, and clear expected outcomes. The results of the lizard and snake inventory study in TNGP, as a biology learning resource, align with the attainment of basic competencies in the field of biology, encompassing various levels of biodiversity, ecology, and environmental change, specifically in the subtopic of environmental conservation, suitable for class X high school.

Keywords: Biology; Learning resource; Reptiles; Squamata

Introduction

Gunung Palung National Park (TNGP) is a conservation area located in two regencies, namely North Kayong and Ketapang, West Kalimantan (BPS Kab. Kayong Utara, 2018; Kubo et al., 2019). Gunung Palung National Park is a national park in West Kalimantan that falls under in-situ conservation and is one of the largest lowland dipterocarp mixed primary forests in Kalimantan (Fawzi et al., 2018). Gunung Palung National Park has several research stations, one of which is the Cabang Panti Research Station (SRCP) located at 1°13'S, 110°7'E, with an elevation ranging from 0 to 1116 m in the west-central part of TNGP (Knott et al., 2021). The fauna potential of TNGP is highly diverse, and several studies have shown that SRCP TNGP serves as a habitat for 32 species of dung beetles (Malina et al., 2018), 15 species of dragonflies (Julaika et al., 2018), 27 species of frogs (Anura) (Setyawati et al., 2018),

orangutans (Rizal, 2021), long-tailed macaques (Febriyanda et al., 2022), Ants (Sanjaya et al., 2024) and butterflies (Nurliza et al., 2023). However, to date, there is still no scientific information available on the diversity of reptile species, particularly the Squamata order, in SRCP TNGP. Therefore, this research is conducted to supplement the existing data.

Reptiles are a group of animals that inhabit both aquatic and terrestrial habitats (Shaw, 2018). Reptiles belong to the group of ectothermic crawling animals whose body temperature depends on the environmental temperature. They adapt to their environment by basking in the sun to warm their bodies, and if the weather is too hot, reptiles will seek suitable places to lower their body temperature (Fatmawati et al., 2022). The order Squamata is the largest order within the reptile class, consisting of 722 species (Uetz et al., 2020). The Squamata order is further divided into three suborders: Amphisbaenia, Sauria (Lacertilia), and

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Serpentes (Ophidia) (Sutriyono, 2020). Indonesia has the highest reptile diversity in the world, with approximately 511 reptile species distributed throughout the country (Bari et al., 2018). Kalimantan, specifically, is known to have at least 227 reptile species (Widjaja, 2014). The abundance of species data provides valuable insights into the potential biodiversity, enriching students' knowledge about the diversity of life in West Kalimantan. Based on these reasons, conducting this research is highly necessary.

The topic of biodiversity is important because in Biology lessons, each topic is interconnected and related to one another (Septian et al., 2018). The topic of biodiversity can be taught using various learning resources, in line with the opinion of Nurmalasari (2020). Local species of flowers or forests can be utilized as learning resources for teaching about biodiversity. The diversity of reptile species in the Squamata order is relevant to the topic of biodiversity, and to assess its potential, it can be evaluated based on six aspects as requirements for a learning resource: clarity of potential, clarity of learning objectives, alignment with learning goals, clarity of information presented, clarity of exploration guidelines, and clarity of expected outcomes (Suhardi, 2022).

A learning resource is an experience that essentially encompasses everything that can be experienced and leads to learning events. It means there is a change in behavior towards improvement (Musfiqon, 2012). A learning resource can also be defined as anything that facilitates students in obtaining information, knowledge, and skills during the learning process. According to Purnomo et al. (2013), a learning resource refers to materials used and needed in the learning process, which can be in the form of textbooks, printed media, electronic media, speakers, the surrounding environment, and other resources available in the learning environment that help optimize learning outcomes. Utilizing the environment as a learning resources can be an option in learning, so that learning is more interesting and meaningful (Hur et al., 2021). Learning resources can take the form of writing (handwritten or printed), images, photos, guest speakers, natural objects, and cultural products (Susilo, 2018). As we know, learning resources should facilitate students in acquiring information, knowledge, experiences, and skills in the teaching and learning process (Virgiawan, 2016). Choosing the environment as a learning resource can make it easier for students to get factual and more contextual learning resources (Setiawan et al., 2024). Utilizing the environment for the learning process can help students build an understanding of the concepts of science material being studied, proving that learning by utilizing the

environment will be more effective (Hikmawati et al., 2021).

This research chose the Squamata order as the research subject because the data obtained can be an important reference in studying biodiversity in West Kalimantan. This research reveals species-level biodiversity which can be used as a new learning resource and is related to surrounding diversity in Biodiversity material for class X High School.

Method

The research was conducted at the Cabang Panti Research Station in Gunung Palung National Park using two stages of study: The first stage was conducted to identify the diversity of the Squamata order in the Cabang Panti Research Station of Gunung Palung National Park. Data collection was performed through observational methods using the Visual Encounter Survey (VES) technique. This method was combined with the transect sampling method along several transect lines. Data collection was carried out twice a day, during the daytime from 08:00 to 12:00 WIB and continued during the nighttime from 19:30 to 22:00 WIB. The data obtained was analyzed using the relative abundance index, the Shannon-Wiener diversity index (H'), the probability of encounter, and the Simpson dominance index.

Equality 1. Relative Abundance Index. Abundance is calculated using the formula in Odum (1996).

$$KR = ni/N \times 100 \% \tag{1}$$

Equality 2. Shannon-Wiener Species Diversity Index (H'): The value of the species diversity index was determined using the Shannon-Wiener diversity index formula (Odum, 1996).

$$H' = Pi \ln Pi \tag{2}$$

$$Pi = \frac{\text{species } ke-i}{\sum \text{total individual of species}} \tag{3}$$

Equality 3. Encounter probability can be calculated using the formula:

$$P(a) = n(a) / n(s) \tag{4}$$

Equality 4. Simpson Dominance Index: The Simpson Index (D) is a biodiversity index that measures the dominance of species and their common occurrence in a sample (Lemos et al., 2015; Simpson, 1949). The formula for Simpson's diversity index is:

$$D = \frac{1}{\sum_{i=1}^s pi^2} \tag{5}$$

Equality 5. The second stage of the research was conducted to analyze the potential of Squamata biodiversity as a biology learning resource. The analysis was carried out using questionnaire distributed to teachers at SMA Negeri 1 Sengah Temila, MAN Insan Cendikia Sambas, and MAS Pendai Mandor. The aspects measured to determine the indicators of a learning resource included clarity of potential, clarity of learning objectives, alignment with learning goals, clarity of disclosed information, clarity of exploration guidelines, and clarity of expected outcomes, indicating the feasibility of the research results as a learning resource. Equality 6. The feasibility as a learning resource is analyzed using the following formula:

$$P = \frac{f}{N} \times 100 \tag{6}$$

P = Percentage

F = Total score obtained

N = Maximum score

Table 1. Assessment for Suitability as a Learning Source (Riduwan et al., 2013)

Percentage %	Interpretation
81 ≤ score ≤ 100	Very feasible
61 ≤ score ≤ 80	Feasible
41 ≤ score ≤ 60	Fairly feasible
21 ≤ score ≤ 40	Not enough feasible
0 ≤ score ≤ 20	Infeasible

Result and Discussion

Gunung Palung National Park as a Habitat for Squamata Order

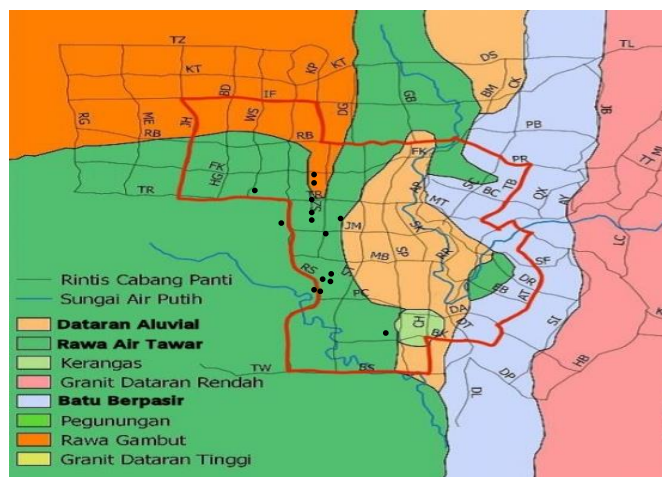


Figure 1. Squamata exploration area at Cabang Panti Research Station, Gunung Palung National Park (Source: <https://yayasanpalung.com>)

Explanation:

- = Squamata encounter locations
- = Exploration area

Gunung Palung National Park (TNGP) is a conservation area located in Kayong Utara Regency and Ketapang Regency, West Kalimantan, covering an area of 90,000 hectares. This study focused on the Cabang Panti Research Station (SRCP) within TNGP, with habitat types including freshwater swamps, alluvial plains, and sandy rocks (Susanto et al., 2012). The survey area and encounters of squamata are shown in Figure 1.

Habitat of Squamata Encounters at SRCP TNGP

The habitat of freshwater swamp is an area with a forest floor that is often flooded, and the region experiences seasonal floods (Rizal, 2021). The water acidity level or pH is less than 6. The daytime light intensity ranges from 0.79 to 675 LUX, with a temperature of 25-28°C and an average temperature of 26.5°C, and air humidity of 94%. During the night, the light intensity ranges from -0.15 to 0.50 LUX, with a temperature of 24-28°C and an average temperature of 26°C, and air humidity of 93%.

Alluvial plains are lands formed by the process of sedimentation by rivers. Alluvial plains are composed of materials carried by river flows and then deposited in a certain place due to a decrease in transporting energy. Alluvial plains have gentle topography and fine-textured materials (Verstappen, 2014). The soil pH ranges from 4 to 5. The daytime light intensity ranges from 304 to 675 LUX with an average intensity of 489.5 LUX, a temperature of 25-28°C with an average temperature of 26.5°C, and air humidity of 94%. During the night, the light intensity ranges from -0.15 to 0.50 LUX, a temperature of 24-28°C, and air humidity of 93%.

Sandstone is an ecosystem with a habitat type primarily consisting of sand-sized or granular rock particles that can originate from other rock fragments and have a soil pH below 6. The daytime light intensity ranges from 0.79 to 675 LUX, a temperature of 25.2-27.2°C with an average temperature of 26.2°C, and air humidity of 94%. During the night, the light intensity ranges from -0.15 to 0.50 LUX, a temperature of 24-28°C with an average temperature of 26°C, and air humidity of 93%.

During the 14-day research period, several species from different families were found. From the Agamidae family, the species *Gonocephalus bornensis*, *Gonocephalus grandis*, and *Draco melanopogon* were observed. The Geckonidae family was represented by *Cyrtodactylus consobrinus*. The Scinidae family included *Eutropis rudis* and *Lipinia vittagera*. The Varanidae family was represented by *Varanus salvator*. Among the snake species, the Colubridae family was represented by *Boiga dendrophila* and *Dendrelaphis caudolineatus*, while the Viperidae family was represented by *Tropidolaemus subannulatus*.

Table 2. Diversity of Squamata in SRCP TNGP

Taxa	Total Individuals		
	Freshwater swamp	Alluvial plains	Sandstone
Agamidae			
Draco melanopogon	-	-	1
Gonocephalus bornensis	1	4	1
Gonocephalus grandis	-	1	-
Gekkonidae			
Cyrtodactylus consobrinus	-	-	1
Scinidae			
Eutropis rudis	-	1	-
Lipinia vittagera	-	1	-
Varanidae			
Varanus salvator	-	1	-
Viperidae			
Tropidolaemus subannulatus	-	1	-
Colubridae			
Boiga dendrophila	-	1	-
Dendrelaphis caudolineatus	-	1	-
Total Species	1	11	3

Based on the obtained results, in the alluvial plain habitat, there were 11 individuals from 5 suborders of Squamata. In the sandy rock habitat, there were 3 individuals from 2 suborders of Squamata. In the freshwater swamp habitat, there was 1 individual from 1 suborder of Squamata.

Squamata Diversity

Based on the research findings, a total of 15 individuals from 10 species and 6 families of the Squamata order were identified. The identification of lizard and snake species found was verified by Dr. Junardi, S.Si, M.Si, an expert herpetologist and lecturer at the Faculty of Mathematics and Natural Sciences, Tanjungpura University. The lizard species found were *Gonocephalus bornensis*, *Gonocephalus grandis*, and *Draco melanopogon* from the Agamidae family. *Cyrtodactylus consobrinus* from the Gekkonidae family. *Eutropis rudis* and *Lipinia vittagera* from the Scinidae family. *Varanus salvator* from the Varanidae family. The snake species found were *Boiga dendrophila* and *Dendrelaphis caudolineatus* from the Colubridae family, and *Tropidolaemus subannulatus* from the Viperidae family. The data was then analyzed using the Relative Abundance Index, Shannon-Wiener Species Diversity Index (H'), Encounter Probability, and Simpson's Dominance Index.

The research data shows that Borneo Forest Dragon (*Gonocephalus bornensis*) has a relative abundance value of 40%, while the species *Eutropis rudis*, *Gonocephalus grandis*, *Draco melanopogon*, *Cyrtodactylus consobrinus*, *Boiga dendrophila*, *Dendrelaphis caudolineatus*, *Lipinia vittagera*, *Varanus salvator*, and *Tropidolaemus*

subannulatus all have the same relative abundance value of 6.67%. According to Susiana (2011), the abundance of a species in nature is influenced by several abiotic and biotic factors, such as environmental conditions, food availability, and predators. The forest at Cabang Panti Research Station has The Encounter Probability Index with reptiles of the Squamata order along the 8 transect lines shows that Borneo Forest Dragon (*Gonocephalus bornensis*) has the highest encounter probability value of 0.75, while the species *Eutropis rudis*, *Gonocephalus grandis*, *Draco melanopogon*, *Cyrtodactylus consobrinus*, *Boiga dendrophila*, *Dendrelaphis caudolineatus*, *Lipinia vittagera*, *Varanus salvator*, and *Tropidolaemus subannulatus* all have the same encounter probability value of 0.125. Based on these results, it can be concluded that there is still a relatively low number of Squamata reptile species encountered in each transect.

Table 3. Index Calculation Analysis

Taxa	number of individuals	KR (%)	P	D
Agamidae				
Draco melanopogon	1	6.67	0.13	0
Gonocephalus bornensis	6	40	0.75	0.16
Gonocephalus grandis	1	6.67	0.13	0
Gekkonidae				
Cyrtodactylus consobrinus	1	6.67	0.13	0
Scinidae				
Eutropis rudis	1	6.67	0.13	0
Lipinia vittagera	1	6.67	0.13	0
Varanidae				
Varanus salvator	1	6.67	0.13	0
Colubridae				
Boiga dendrophila	1	6.67	0.13	0
Dendrelaphis caudolineatus	1	6.67	0.13	0
Viperidae				
Tropidolaemus subannulatus	1	6.67	0.13	0
Total	15			100%

Number of individuals description: KR= relative abundance; H'= species diversity index; P= opportunity meeting; D= simpson's dominance index

The species found include *Eutropis rudis*, *Gonocephalus grandis*, *Draco melanopogon*, *Cyrtodactylus consobrinus*, *Boiga dendrophila*, *Dendrelaphis caudolineatus*, *Lipinia vittagera*, *Varanus salvator*, and *Tropidolaemus subannulatus*, all with the same dominance value of 0.004. The species that were most frequently encountered in the Squamata order is the Borneo Forest Dragon (*Gonocephalus bornensis*) with a total of 6 individuals and a dominance index value of 0.16. Based on the calculation of Dominance Index using the Simpson's formula, the cumulative Dominance Index for all habitat types in SRCP is 0.196. This indicates that the

dominance level in SRCP is relatively low and there is no Squamata order species that dominates. According to Desinawati et al. (2018), a Dominance Index ranging from 0 to 0.5 indicates the absence of a dominating species, while a range of 0.5 to 1 indicates the presence of a specific dominating species.

Table 4. Number of Individuals, Species Richness and Species Diversity Index

	Freshwater swamp	Alluvial plains	Sandstone	Total
Individuals	1	11	3	15
Species	1	8	3	12
Family	1	5	2	8
H'	0	1.89	1.09	2.98
Criteria H'	Low	Medium	Medium	

The diversity index values for the reptiles in the Squamata order found in Stasiun Riset Cabang Panti, TNGP, indicate different levels of diversity in various habitats. The freshwater swamp habitat falls under the low category with a diversity index value of 0, the alluvial plain habitat is classified as moderate with a diversity index value of 1.89, and the sandy rock habitat is also classified as moderate with a diversity index value of 1.09. According to Sulaeman et al. (2018), when the diversity index value is not less than 1 and not greater than 3, the diversity is considered moderate. The results of the data analysis align with the range of diversity index values proposed by Shanon-Wiener (Odum, 1996), which states that $H > 3$ indicates high species diversity in a transect, $1 \leq H \leq 3$ indicates moderate species diversity in a transect, and $H < 1$ indicates low or limited species diversity in a transect.

also at 13.34%. The families Gekkonidae, Varanidae, and Viperidae have the same percentage value of 6.67%.

Compatibility with Biology Materials

Clarity of objectives in the scope of biology, specifically in the subtopic of scientific methods, is for students to acquire information about the scope of biology (issues related to various Biology objects and levels of organization of life), the stages of scientific methods, and the principles of work safety based on observations in daily life.

Clarity of objectives in the topic of biodiversity at various levels is for students to acquire information about the classification of various reptile species in the order Squamata based on genetic and species diversity, focusing on morphological characteristics. One example of species diversity is the Forest Dragon (*Gonocephalus bornensis*) and the *Eutropis rudis*. Biodiversity is indicated by the presence of species variations within the order Squamata. Variations in living organisms occur at the genetic, species, and ecosystem levels, thus broadly dividing biodiversity into three levels: genetic diversity, species diversity, and ecosystem diversity.

Clarity of objectives in the topic of Ecology is for students to acquire information about the components of an ecosystem based on research findings, and to analyze information/data from studies on Squamata order regarding ecosystems and the interactions occurring within them.

Clarity of objectives in the subtopic of Environmental Changes, specifically in the conservation of the environment, is for students to acquire information about environmental changes and their impacts on life, particularly on the flora and fauna present in those environments. It emphasizes the importance of preserving the surrounding environment to ensure the well-being of ecosystems and everything within them.

Potential as a Learning Resource

Based on figure 3, it can be concluded that the research results on the types of Reptiles of the Squamata Order found in Gunung Palung National Park meet the criteria as a learning resource according to 8 verifiers from various schools in West Kalimantan. This indicates that the research results are suitable to be used as a Biology learning resource.

The research can be utilized as a learning resource through observation and the process of identifying the research findings. A biology learning resource encompasses all things, both objects and subjects that can be used to gain experiences in order to achieve understanding in biology learning. Based on the research findings of the Reptile and Lizard Inventory (Reptilia: Squamata) in Gunung Palung National Park, it

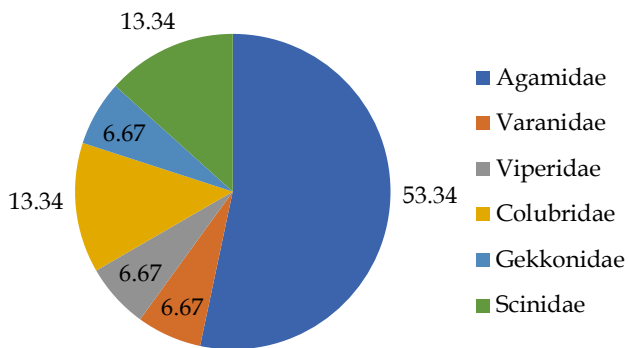


Figure 2. Percentage relative abundance

From the percentage results, the highest abundance is observed in the Agamidae family with a value of 53.34%, followed by Scincidae at 13.34%, and Colubridae

can be utilized as a Biology learning resource for class X high school.

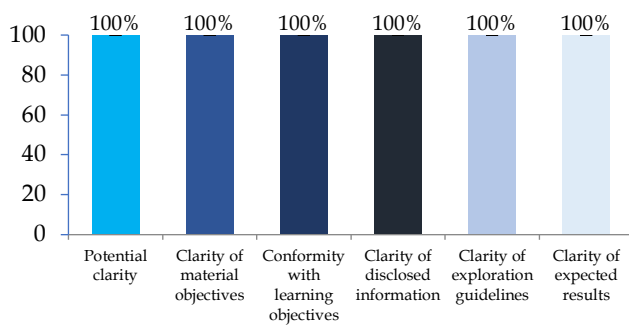


Figure 3. Analysis of research appropriateness of learning resource terms

Potential Clarity

Clarity of potential is an object that has potential as a source of learning if the object contains problems that can be revealed in a teaching and learning activity (Kurniawan et al., 2014). Data resulting from the Snake & Lizard Inventory in Gunung Palung National Park can be used as a new learning resource for students, because the results of the data obtained present various types of reptiles, classification, morphology, and physical conditions of the environment. Potential research data on snakes and lizards in Gunung Palung National Park can be used as a source of learning because students can know directly and can collect data about the diversity of the species of the squamata order found in West Kalimantan, know the morphological characteristics of the various species found, environmental and other physical conditions that can be linked to living things classification system material, ecology, biodiversity, both at the gene, species and ecosystem levels, as well as environmental preservation material. In line with the opinion (Sardiman, 2016), the use of learning resources in learning can help students to acquire the desired knowledge, skills, and attitudes.

Clarity of Material Goals

Inventory of Lizards & Snakes (Reptilia: Squamata) in Gunung Palung National Park describes the types of reptiles found, morphology, classification, and habitat characteristics found in the order of squamata reptiles. Therefore, from the results of this study, it was possible to achieve the objectives of learning Biology, namely students obtained information about the description of the characteristics of various types of Reptiles of the Squamata Order based on the data obtained. Students also get information about the classification of reptile species and the morphological characters of the Reptile Order Squamata.

Based on the results with 3 verifiers, Mrs. Maria Dolorosa Albertha, S.Si from SMA Negeri 1 Sengah

Temila, Mrs. Suriyani, S.Pd from MAN Insan Cendikia Sambas, and Mrs. Ernawati, S.Pd from MAS Pendai Mandor, it was found that the results were in the form of data types of reptiles, description of species, characteristics and morphology, suitability with KD and material according to learning objectives.

Potential related to Reptiles of the Squamata Order in accordance with the standard content of the 2013 Biology high school curriculum Main Material Scope of Biology, especially in KD 3.1 Understanding the scope of biology (problems on various Biology objects and levels of organization of life), scientific methods and work safety principles based on observations in life daily. In the subject matter of Various Levels of Indonesian Biodiversity, namely KD 3.2. Analyzing observational data on various levels of biodiversity (genes, species and ecosystems) in Indonesia. In the subject matter of Ecology, namely KD 3.9. Analyzing information/data from various sources about the ecosystem and all the interactions that take place in it. In the subject matter of Environmental Change: Environmental Preservation, namely 3.10.

Clarity of Disclosed Information

The information disclosed from the results of this research is in the form of research products, these research products are based on scientific facts and concepts. Facts obtained from the results of research conducted for 14 days showed that there were 6 families of Reptilia in Gunung Palung National Park, namely: Agamidae, Gekkonidae, Colubridae, Scinidae, Varanidae and Viperidae and 9 types of Reptilia of the Order Squamata, namely: *Gonocephalus bornensis*, *Gonocephalus grandis*, *Cyrtodactylus consobrinus*, *Boiga dendrophila*, *Dendrelaphis caudolineatus*, *Eutropis rudis*, *Lipinia vittagera*, *Varanus salvator*, *Tropidolaemus subannulatus* according to class X high school biology material.

The information obtained is in the form of various levels of biodiversity, classification of living things, morphological characteristics, and physical conditions of the environment in Gunung Palung National Park. Potential learning resources for reptiles of the order Squamata can be used as new learning resources for students, by looking at data from research on reptiles of the order Squamata in Gunung Palung National Park, students can observe and know the diversity of reptile species, their classification and morphological characteristics. *Clarity of Exploration Guidelines*

The clarity of exploration guidelines can be observed from work procedures during research such as determining research objects, tools and materials, work methods, conducting research, analyzing data, discussing research results, and drawing conclusions. The information in this study regarding the order of

squamata reptiles can be used as a guide or procedure for exploring or observing. The results of the research that has been carried out can be used as an alternative source of learning biology from the surrounding environment and can explain the scope of material for biology, sub-material for scientific methods, Various Levels of Indonesian Biodiversity, Ecology, Environmental Change, sub-material for environmental preservation.

Clarity of Expected Results

Based on the results of the research Inventory of Lizards & Snakes (Reptilia: Squamata) in Gunung Palung National Park can help students achieve learning goals as shown by increasing cognitive, affective and psychomotor values. This is in line with the opinion of Mayasari (2017) because regional culture, local wisdom, and the surrounding environment can have a certain impact on students' learning experiences in the form of mindset (cognitive), attitude patterns (affective), and behavior patterns (psychomotor). From the results of this study, students are expected to gain knowledge, attitudes, and skills about a problem that can be related to the potential of the area they have.

The acquisition of the cognitive aspect is that students can classify various types of reptiles of the Squamata order into species level biodiversity based on their morphological characteristics, describe physical and environmental characteristics, can find out the components of the ecosystem contained from research results. In line opinion Eurika et al. (2017) good learning resources can ideally provide useful learning experiences for students, so as to improve students' thinking skills. Utilizing the environment as a learning resource in the learning process is very necessary, not only to encourage students to get to know nature but also to influence students to understand material concepts related to nature (Santoso et al., 2022).

Conclusion

Based on the results of the research and discussion, it can be concluded that the research "Inventory of Snakes & Lizards (Reptilia: Squamata) in Gunung Palung National Park as a Source for Learning Biology" is as follows: The types of reptiles of the order Squamata found at the Research Station Branch Panti Gunung Palung National Park are from the Agamidae family, namely *Gonocephalus bornensis*, *Gonocephalus grandis*, and *Draco melanopogon*. Geckonidae family *Cyrtodactylus consobrinus*. Scinidae family *Eutropis rudis*, and *Lipinia vittagera*. Family varanidae *Varanus salvator*. The types of snakes found were from the colubridae family *Boiga dendrophila*, and *Dendrelaphis caudolineatus*, Viperidae family *Tropidolaemus subannulatus*. The potential of

reptiles of the order Squamata corresponds to the material for biology class X, especially in the material for the scope of biology, sub-material for scientific methods, Various Levels of Indonesian Biodiversity, Ecology, Environmental Change, sub-material for environmental preservation.

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Author Contributions

Preparation of research concepts and designs, module development, data collection, data analysis, manuscript writing and editing R.A. Guidance during research and manuscript writing, A.E.S. Guidance during research and manuscript writing M.Q. All author have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare that there are no relevant conflicts of interest related to this research.

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