

Arachnida in the Cave: Rapid Assessment Inventory from Tourism Caves and Karst Area in West Sumatra

Fithria Diniyati¹⁾, Sepriyoga Virdana¹⁾, Genta Permana¹⁾

Biology Department, Faculty of Mathematics and Natural Sciences, Andalas University. Jl. Universitas Andalas, Limau Manis, Padang 25163, West Sumatra, Indonesia.

Email: araneaefidi@gmail.com



Abstract-- Caves is as dark environment can act as a trap for the the cave fauna in the outside. So that the cave can trigger a process of evolution from the outside of the cave fauna to be able to adapt and survive in the caves. Thus, this reserach aimed to study the diversity of spiders that live in the caves and karst area in West Sumatra and to explore the wealth of diversity biodiversity that has not been revealed by science. Survey method was used in this reserach and spiders was collection by direct sampling in hand collection in the caves. Spiders was identified by using Identification Guide (Gerald, 2011). Four families and five species were found in this research.

Keywords – Cave Fauna, Karst, Arachnida,

I. INTRODUCTION

The cave as a dark environment can act as a trap for fauna from outside the cave, so that the cave can trigger the process of fauna evolution from outside the cave to adapt and survive in the cave. There are various forms of adaptation in the cave, both morphologically, behaviorally and physiologically, so that the cave fauna has a different shape and even behavior from its relatives outside the cave. The most important adaptation is the reduction of the organ of vision due to the total darkness of the cave environment. Due to the non-functioning of the sense of sight, it causes the development of other senses to replace the sense of sight (Rahmadi, 2007).

West Sumatra is an area rich in tourism potential. The beauty that spreads evenly throughout the region of West Sumatra, we can see with many tourist objects, ranging from cultural tourism, arts and crafts tourism, and nature tourism. For nature tourism, especially adventure tourism, there are many famous locations in West Sumatra such as Lake Maninjau with paragliding adventure tours, white water rafting tours in Batang Antokan Kab. Agam and Batang Tarusan in Kab. South Coast, rock climbing tourism and sports in the Harau Valley and no less interesting the beauty of the land of a thousand Sisawah caves as a tourist location for cave exploration adventures.

Cave tourism in West Sumatra has begun to be in demand, this can be seen from the many tourists who visit these caves, and the types of fauna, especially spiders (Arachnidae) are interesting to do research both on species and characteristics, so far research on spiders research is still very rare, in West Sumatra in particular, previous research only on bat, fish and amphibian species. As in Nielsen & Cohen (2004) from Tioman Island, North Sulawesi, *Bostrychus microphthalmus* Hoese & Kottelat (2005) from Tanete Cave South Sulawesi and *Diancistrus typhlops* Nielsen, Schwarzhans & Hadiaty (2009) from Muna Island, Southeast Sulawesi. Therefore, it is very necessary to explore cave spiders to develop the fauna resources found in tourist attractions in West Sumatra and to identify dangerous spider species (arachnidae) so that conservative efforts can be made for tourist attraction managers.

Research on the diversity of karst arachnids and caves in West Sumatra is still very minimal (Deharveng and Bedos, 2000), compared to the number of cave that have been recorded and mapped. its biodiversity has not been revealed, on the other hand the rate of pressure on this ecosystem is increasing so it is feared that if research is not carried out immediately many species that cannot survive will become extinct before their existence is known.

Based on the substantial basis that has been stated previously, it is a very important and interesting thing to do research on the exploration of spiders in several tourist caves in West Sumatra.

The purpose of this study was to reveal the diversity of spiders and Finding and describing new types of spiders (Arachnida) in several tourist caves and karst areas in West Sumatra.

II. METHODS

This research was conducted from February to May 2016. Sample collection was carried out in several cave locations in West Sumatra, including: Sisawah Cave (Sijunjung), Loguang Cave (Sijunjung), Silokek Cave (Sijunjung Regency), Kamang Cave (Agam), Cave Ngalau Aia hilang (District of Padang Pariaman), Caves of Kalilawa (City of Padang) and Caves of Ngalau Pangian, (Lintau). Sample identification was carried out at the Animal Taxonomy Laboratory, Department of Biology, Faculty of Mathematics and Natural Sciences, Andalas University, Padang.



Figure 1. Map of West Sumatra

Method

The method used in this research is a *survey method* and direct field collection (*Direct sampling*) with the *Hand collection technique*

Tools and materials

Spiders collected from caves, tourist attractions and karst areas of West Sumatra. Materials to preserve using 70% alcohol. The tools used in this research are light microscope and GPS.

Field Sample Collection and Preservation

The collection of spider samples was carried out using the *hand collection method* in accordance with the conditions of the collection location. All samples obtained were then recorded for specific characteristics such as body color, eye color, and other characters that are thought to be lost or changed if preserved and then some samples were photographed with a digital camera. Each sample is labeled with a sample code. All samples of spiders were then put into collection bottles which had been filled with 70% alcohol solution by adjusting the position of their bodies and limbs.

Species Identification

Identification of samples from the collection location was carried out in the laboratory using the *spiders identification guide* (Gerald, 2011). Color characters were identified based on sample photos, while observations of morphometric and meristic characters were carried out using a binocular microscope and digital calipers.

Sample preservation

Preservation of spider samples was carried out by wet preservation, the collected samples were put into collection bottles containing 70% alcohol and stored in the specimen cabinet.

Data analysis

Data were analyzed descriptively. The profits obtained are described and entered into the table.

III. RESULTS AND DISCUSSION

From the research that has been done on the exploration of Arachnida species in caves, tourist attractions and karst areas, it was found that five types of arachnids belong to four families. The number of species and their location can be seen in table 1.

Table 1. Types of Arachnia found in tourist caves and karst areas in West Sumatra

No.	Family	Species	Region
1.	Sparassidae	<i>Heteropod</i> sp	Padang
	Pholcidae	<i>Spermophora</i> sp	
2.	Sparassidae	<i>Heteropoda</i> sp	Sijunjung
	Pholcidae	<i>spermophora</i> sp	
3.	Sparassidae	<i>Heteropoda</i> sp	Tanah datar
	Pholcidae	<i>spermophora</i> sp	
	Tetranagtidae	<i>tetragnatide</i> sp	
4.	sparsasidae	<i>Heteropoda</i> sp	Agam
5.	sparassidae	<i>Heteropods venatoria</i>	Pariaman
	Charinidae	<i>Sarax</i> sp	

From the table above, it can be seen that from the caves that have been sampled, the *Heteropod* sp. from the Sparassidae family which is most commonly found in tourist caves and karst areas in West Sumatra, then the *Tetragnatida* sp. from the family Tetragnatidae Only found in Ngalau Pangian, Lintau, Tanah Datar Regency, while Charanidae, is a species of a different order from spiders but is still classified as Arachnida. This species is known as Kalacemeti which is found in Ngalau Aia Hilang, Lubung Alung, Pariaman.

Araneae is a member of a large family and has a wide distribution area. All members make a nest, with a rounded nest type and wait for its prey in the middle of the web. Has a very strong net, so it can last up to several days (Barrion and Litsinger, 1995).

Habitat and active time of spiders also cause spiders to not be found at the sampling location. The Clubionidae type, for example, is a spider that is active at night during the day this spider enters the cocoon it makes. Kniridae is the most active type of spider and Thomisidae can manipulate itself by resembling the color of flowers (Robert, 1995).

Sparassidae family . This family of spiders has a brown body characteristic and is quite large in size with very little body structure and dorsal pattern. Adult spiders have a body length ranging from 2.2 to 2.8 cm and have a leg span from 7 to 12 cm. Adult females have a larger body size than males, especially in the abdomen, however, adult males have longer legs than females. This family of spiders has a yellow *clypeus* and a wide marginal band encircling the entire carapace (Breene, 2003). One of the genera found was *Heteropod* . This genus has strong mandibles and teeth. The surface of the *cephalothorax* is flat, the abdomen is mostly elongated and broad. *Epiginium* has a pair of lobes (Robert, 1995).

Family Tetragnathidae Spiders of this family have diaxial chelicerae, without *cribellum* and *calamistrum* . Tibia and metarsus I and II without spines, tarsals with two toothed claws, eight eyes and arranged vertically and large, the second row is small and the third row is medium (Nababan, 2010). One of the genera found is *Tetragnatida* has a character that has a long jaw. Makes a nest in damp and bushy areas. It has elongated legs and body. Pedipalps in males are prominent and have hairs at the base of the tarsus.

Pholcidae family . Spiders belonging to this family have very long legs like harvestman spiders. Therefore, this type of spider is also known as *Daddy-Long-legs* . The difference between the *Daddy long-legs* spider and the *Harvestman* is that the *Harvestman* has an almost fused *cephalothorax* and *abdomen* so that it has the same structure, whereas the *Daddy long-leg* spider has the same structure. The *cephalothorax* and *abdomen* are two distinct parts that are connected by a narrow visible tube and another difference is that harvestman spiders do not make webs (Goethals, 1997). The genus found in this family is *Spermophora* which has long legs and a reddish body found in colonies in caves, these spiders have large pedipals and irregularly shaped webs.

Family Charinidae . This family belongs to the order Amblypygi. This order is one of the member orders of the Arachnida Class. Amblypygi has two body parts, namely the *cephalothorax* (prosoma) and *abdomen* (opisthosoma). Amblypygi are flattened with spiked claws and forelegs modified into taste buds (antennae). Amblypygi have 3 pairs of legs that are used for walking (Ramadi, 2007).

IV. CONCLUSION

The spiders found in tourist caves and karst areas in West Sumatra are four families and five species. The most common spiders of the genus *Heteropod* from the family Sparassidae and the genus *Tetragnatida* from the family Tetragnathidae were only found in the Ngalau Pangian cave, Lintau.

V. ACKNOWLEDGEMENTS

Thanks to Prof. Dahelmi, all Team for Sample Collecting and Student Creativity Program from Higher Education of Indonesia 2016

REFERENCE

- [1] Breene, RG (2003). *Common Names of Arachnids* . The American Arachnological Society Information on Arachnids. http://www.americanachnology.org/archnid_common_names2003.pdf (March 15, 2015).
- [2] Deharveng, L. and A. Bedos. 2000. The Cave Fauna of Southeast Asia: Origin, evolution and Ecology in. Wilkens, H., Culver, DC, and Humphreys, WF (eds), *Ecosystem of The World*. Vol . 30
- [3] Hoese, DF and M. Kottelat. 2005. *Bostrychus microphthalmus*, a new microphthalmic cavefish from Sulawesi (Teleostei: Gobiidae). *Ichthyol* . 183-191.

- [4] Nababan , E. P. 2009. Diversity of Spiders (Ordo Araneae) in Mangrove Areas. *Thesis* . Department of Biology, Faculty of Mathematics and Natural Sciences. IPB. Bogor
- [5] *Nielsen , Jorgen G. and Cohen , Daniel M. _ 2004. Grammonus thielei* (Ophidiiformes: Bythitidae)- a new bhythid cavefish from off Sulawesi, Indonesia. *Ichthyol.* 20:83-86
- [6] Nielsen, Jorgen G, Schwarzhans, W, and Hadiaty, RK 2009. A blind, new species of *Diancistrus* (Teleostei : Bythitidae) from three caves on Muna Island, Southeast of Sulawesi, Indonesia. *Ichthyol* . 241-245
- [7] Rahmadi, Cahyo. 2007. Karst, the repository of cave fauna. *Braga* 1(3): 60-61
- [8] Robert, J. M. 1995. Spiders of Britain and Nothern Europe. Harper Collins Publisher. London.
- [9] Wegner, G. S.2011. *Spider Identificatoin Guide*. The Chemical Company, The Ohio University Press : USA