

## **Struktur Komunitas Arthropoda Terrestrial Penyusun Ekosistem Gua Alami dan Gua Wisata di Kawasan Karst Gunungsewu**

Isma Dwi Kurniawan  
15/386952/PBI/01351

### **Abstrak**

Gua memiliki lingkungan khas dengan ekosistem rentan. Banyak gua di Karst Gunungsewu telah dikembangkan menjadi objek wisata dan dikelola secara kurang bijaksana. Pengelolaan gua yang demikian berpotensi mengubah lingkungan dan mengganggu komunitas Arthropoda. Arthropoda merupakan fauna yang berperan menjaga keseimbangan ekosistem gua. Terganggunya komunitas Arthropoda dapat berakibat pada kerusakan ekosistem gua. Penelitian ini bertujuan untuk mengkaji perbedaan struktur komunitas Arthropoda dan klimatik-edafik antara gua alami dan gua wisata di kawasan Karst Gunungsewu. Sampling Arthropoda dilakukan dengan *hand collecting*, *pitfall* dan *bait trap*, serta *berlese extractor*. Klimatik yang diukur yaitu intensitas cahaya, suhu, kelembapan, dan CO<sub>2</sub> udara, sedangkan edafik yaitu suhu, C-organik, N, P, kelembapan, dan pH tanah. Analisis data dilakukan dengan indeks kekayaan spesies, diversitas, pemerataan, dan disimilaritas serta analisis korelasi Pearson. Arthropoda yang ditemukan terdiri dari 6 kelas, 31 ordo dan 209 morfospesies. Kemelimpahan relatif Arthropoda di gua alami dengan intensitas gangguan rendah didominasi oleh kelompok perombak (Spirostreptida, Acari, Entomobryomorpha, Orthoptera, larva), sedangkan di gua wisata terdapat kenaikan kemelimpahan pemangsa (Hymenoptera, Coleoptera, Aranea). Zona gelap gua alami dengan gangguan rendah memiliki indeks kekayaan spesies dan diversitas lebih rendah dari gua wisata dan terdapat dominasi oleh *Rhaphidophora* sp., *Trachyjulus tjampeanus*, *Charon* sp., *Mimocerus* sp., Acari sp.4 dan sp.10, dan larva, sedangkan di gua wisata populasi cenderung merata. Komunitas Arthropoda gua alami dengan gangguan rendah memiliki disimilaritas tinggi dengan komunitas gua wisata. Gua wisata dengan gangguan tinggi memiliki zona gelap dengan suhu udara, intensitas cahaya, CO<sub>2</sub>, suhu dan pH tanah lebih tinggi dibandingkan dengan gua alami, sedangkan kelembapan tanah, C-organik, N dan P lebih rendah. Intensitas cahaya, suhu tanah dan C-organik memiliki nilai korelasi paling besar dengan struktur komunitas Arthropoda. Hasil penelitian ini menunjukkan bahwa terdapat perbedaan struktur komunitas Arthropoda dan klimatik-edafik antara gua alami dan gua wisata. Intensitas cahaya, suhu tanah dan C-organik memiliki pengaruh paling kuat terhadap komunitas Arthropoda.

**Kata Kunci:** *Klimatik, Edafik, Pengelolaan Gua, Konservasi.*

## The Community Structure of Terrestrial Arthropods within Wild Caves and Show Caves in Gunungsewu Karst Area

Isma Dwi Kurniawan  
15/386952/PBI/01351

### Abstract

Cave has specific environmental characters with a fragile ecosystem. Many of caves in Gunungsewu karst area have been developed as show caves and managed unwisely. The such management has big potential to change the environment and disrupt cave Arthropods community. Arthropod is fauna that protect a balance of cave ecosystem. The disturbance on cave Arthropods community can damage the whole cave ecosystem. This study aims to examine the differences on Arthropod communities' structure and climatic-edaphic factors within wild caves and show caves in Gunungsewu karst area. Arthropod sampling was done by hand collecting, pitfall and bait trap, and berlese-tullgreen extractor. The components of climatic factor that were measured comprise light intensity, air temperature, humidity, and CO<sub>2</sub> level, while the edaphic comprise soil temperature, SOC, N, P, moisture, and pH. Data was analyzed by richness, diversity, evenness, and dissimilarity indices and Pearson correlation analysis. All arthropod samples were classified into 6 classes, 31 orders and 209 morphospecies. The relative abundance of Arthropods in wild caves with low disturbance are dominated by decomposer groups (Spirostreptida, Acari, Entomobryomorpha, Orthoptera, larvae), while in the show caves there are some increments on predators abundance (Hymenoptera, Coleoptera, Aranea). The dark zone of wild caves with low disturbance have lower richness and diversity than show caves and dominated by *Rhaphidophora* sp., *Trachyjulus tjampeanus*, *Charon* sp., *Mimocerus* sp., Acari sp.4 and sp.10, and insects larvae, while in the show caves the populations tend to be more evenly distributed. The Arthropod communities of wild caves with low disturbance have high dissimilarity with the show cave communities. Highly disturbed show caves have higher air temperature, light intensity, CO<sub>2</sub>, soil temperature and pH compared to wild caves particularly in the dark zone, while soil moisture, SOC, N and P are lower. Light intensity, soil temperature and SOC have highest correlation values with the indicators of Arthropods community. In conclusion, the recent study indicates that there are differences on the community structure of Arthropods and climatic-edaphic conditions within wild caves and show caves. Light intensity, soil temperature and SOC give the strongest influence on the Arthropod communities.

**Key Words:** *Climatic, Edaphic, Cave Management, Conservation.*