

## **Diversity and distribution of Hymenoptera from two different elevations of Denai Hutan Cadamba, UiTM Puncak Alam**

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### **Structured Abstract**

**Background:** Hymenoptera is essential to ecosystems, that includes bees, ants, wasps, and sawflies. The problem to be addressed is that no researchers have yet researched Hymenoptera diversity in Denai Hutan Cadamba, which is open for hiking activities.

**Methods:** A study on the diversity and abundance of Hymenoptera was conducted at Denai Hutan Cadamba, where one Malaise trap was installed at low (70m) and high (100m) elevations. They were labeled Trap 1 and 2, respectively, and left unattended for two weeks before being collected, sorted, and identified according to their family.

**Results:** A total of 215 individuals of Hymenoptera were collected, belonging to 23 families and 78 morphospecies. The identified families were Formicidae, Vespidae, Braconidae, Ichneumonidae, Eupelmidae, Roproniidae, Evaniidae, Mymaridae, Tiphidae, Sphecidae, Anthophoridae, Mutilidae, Aulacidae, Apidae, Perilampidae, Trigonidae, Stephanidae, Figitidae, Eucharitidae, Eulophidae, Megaspilidae, Chrysididae, and Scoliidae. The individuals of Hymenoptera were found more abundant in Trap 2 (176 individuals, 20 families, 62 morphospecies) than in Trap 1 (36 individuals, 12 families, 21 morphospecies). Vespidae was the most abundant family recorded, with 56 individuals, followed by Formicidae (46 individuals) and Braconidae (20 individuals). According to the Shannon-Weiner Diversity Index ( $H'$ ), Trap 2 ( $H' = 2.273$ ) has a higher diversity value than Trap 1 ( $H' = 2.136$ ). In contrast, the Evenness Diversity Index ( $E'$ ) showed that Trap 1 ( $E' = 0.705$ ) has a higher diversity value than Trap 2 ( $E' = 0.485$ ). The Margalef Richness Diversity Index ( $R'$ ) showed that Trap 2 ( $R' = 3.675$ ) has a higher diversity value than Trap 1 ( $R' = 3.003$ ). A non-parametric Mann-Whitney test showed no significant difference in the distribution of Hymenoptera between the high and the low elevations, with (Mann-Whitney = 0.625,  $df = 1$ ,  $P > 0.05$ ).

**Conclusion:** The differences in distribution between elevations are due to the homogenous environment between the low and high elevations, the difference in vegetation density, the trap placement, accessibility to food resources, the sampling activities duration, and the rainfall. This study's findings can be used as a reference for future hymenopteran studies.

**Keywords:** Diversity, Abundance, Hymenoptera, Elevations

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