Morphological variations in a novel geographically-separated *Papilio* species from Maluku Utara province, Indonesia

# Abstract

You could put the abstract here, if you wanted to.

# Introduction

We studied some butterflies in Indonesia.

# Methods

We caught the butterflies and measured them. We used telepathy to figure out the other things that we couldn’t measure with a ruler. Three collectors independently collected samples at each of three locations on daily hikes.

We used regression to do the statistics analysis (1).

# Results

Demographic statistics are shown in [Table 1](#tbl-table1). We found that the butterflies were different at each of the sites.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 1: Descriptive statistics for the longwing study.   | **Characteristic** | **Tidore**, N = 321 | **Ternate**, N = 571 | **Kayoa**, N = 111 | **p-value**2 | | --- | --- | --- | --- | --- | | Wing length (cm) | 29 (25, 31) | 15 (13, 15) | 24 (22, 26) | <0.001\*\*\*3 | | Wing width (cm) | 12.02 (10.19, 12.55) | 7.16 (6.50, 7.64) | 9.88 (9.42, 10.50) | <0.001\*\*\*3 | | Antenna length (cm) | 6.10 (5.51, 6.42) | 3.22 (2.82, 3.51) | 5.36 (4.93, 5.71) | <0.001\*\*\*3 | | Body length (cm) | 8.88 (8.07, 10.21) | 5.31 (4.24, 6.15) | 8.22 (6.92, 8.97) | <0.001\*\*\*3 | | Number of spots | 4 (3, 4) | 6 (6, 7) | 5 (4, 5) | <0.001\*\*\*3 | | Age | 17 (13, 26) | 15 (12, 26) | 23 (14, 32) | 0.33 | | Number of offspring | 28.5 (25.0, 30.0) | 26.0 (23.0, 30.0) | 30.0 (24.5, 32.0) | 0.143 | | Collector |  |  |  | 0.54 | | EM | 11 (34%) | 21 (37%) | 4 (36%) |  | | ZB | 10 (31%) | 18 (32%) | 6 (55%) |  | | ZW | 11 (34%) | 18 (32%) | 1 (9.1%) |  | | 1 Median (IQR); n (%) | | | | | | 2 \*p<0.05; \*\*p<0.01; \*\*\*p<0.001 | | | | | | 3 Kruskal-Wallis rank sum test | | | | | | 4 Fisher’s exact test | | | | | |

We also did some regressions, and those are in [Table 2](#tbl-table2).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 2: Crude and adjusted regression estimates where wing length (cm) is the outcome variable.   | **Characteristic** | Crude | | | Adjusted | | | | --- | --- | --- | --- | --- | --- | --- | | **Beta** | **95% CI**1 | **p-value** | **Beta** | **95% CI**1 | **p-value** | | Wing width (cm) | 2.7 | 2.5, 2.9 | <0.001 | 0.26 | 0.07, 0.44 | 0.006 | | Age | 0.12 | -0.01, 0.24 | 0.073 | -0.01 | -0.03, 0.01 | 0.2 | | Antenna length (cm) | 4.8 | 4.7, 5.0 | <0.001 | 3.9 | 3.5, 4.4 | <0.001 | | Body length (cm) | 2.9 | 2.6, 3.2 | <0.001 | 0.18 | 0.00, 0.36 | 0.049 | | Population |  |  |  |  |  |  | | Tidore | — | — |  | — | — |  | | Ternate | -14 | -15, -13 | <0.001 | -1.1 | -2.1, -0.07 | 0.036 | | Kayoa | -5.2 | -7.2, -3.3 | <0.001 | -1.3 | -2.0, -0.58 | <0.001 | | 1 CI = Confidence Interval | | | | | | | |

# Discussion

This paper is so good, it should be in Nature (Billings, personal communication, 2024).

# References

1. Gelman A, Hill J. Data analysis using regression and multilevel/hierarchical models. Cambridge University Press; 2007.