

MATING FREQUENCIES VARY WITH RAINY DAYS IN RED MILLIPEDES *CENTROBOLUS* COOK, 1897

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Abstract-In this paper, I check for correlations between the mating frequencies for males and females and average temperature, minimum temperature, maximum temperature, precipitation, humidity, rainy days, and average Sun hours in red millipedes *Centrobolus* Cook, 1897. I found a correlation between mating frequency and rainy days (Kendall's $\tau=-0.30$, Z score=-70000, n=8, p=0) ($y = -0.36x + 6.11$). A difference of -1 rainy day contributed to differences in the mating frequencies. With the subtraction of a rainy day, the mating frequency increased, while the increase in the magnitude of any of the other six factors had no direct result on mating frequencies.

I. INTRODUCTION

A forest genus of diplopods belonging to the Order Spirobolida found along the eastern coast of southern Africa was the subject of this study. The millipede genus *Centrobolus* is found in the temperate South African subregion, its northern limits on the east coast of southern Africa being about -17° latitude S. It occurs in all the forests of the coastal belt from the Cape Peninsula to Beira in Mocambique. While the coastal forests of the South-West and Eastern Cape are mist belt temperate forests, those of the Transkei, Natal, Zululand, and Mocambique are somewhat different, being better described as East Coast Bush, they are developed almost entirely in a narrow strip of the litoral on a dune sand substratum, and are more tropical in aspect and composition than those to the west of them. There is a summer rainfall of 762-1016 mm, a uniform environmental temperature, and an absence of frost; the component trees of the coastal bush with their abundant creepers and lianes, while not usually reaching a height of more than 11 meters, provide a dense covering with ample shade and humidity at ground level. As essentially shade-loving Diplopoda, the members of the genus are especially well represented in these litoral forests of the eastern half of the subcontinent [1-81].

In this paper, I check for correlations between the mating frequencies for males and females and average temperature, minimum temperature, maximum temperature, precipitation, humidity,

rainy days, and average Sun hours in red millipedes *Centrobolus* Cook, 1897.

II. MATERIALS AND METHODS

The data were collected during the rainy season because in southern Africa millipede surface activity is strongly seasonal and related to feeding and reproduction and this is also when population densities peak. The two species of millipedes were sampled in their indigenous tropical coastal forest habitat at Twin Streams Farm, Mtunzini, South Africa ($28^\circ 55'S$; $31^\circ 45'E$). It is within this part of the typical coastal forest belt that *C. anulatus* and *C. inscriptus* are in geographical sympatry. An area of forest with continuous tree canopy cover was delimited and all sampling occurred within those bounds. In the first season, two temporally separate sampling efforts were made and the OSR was measured early in the season (DECEMBER) and late in the season (FEBRUARY). Seven weather patterns for December and February were obtained from <https://en.climate-data.org/africa/south-africa/kwazulu-natal/mtunzini-772733/>.

Correlations between mating frequencies and weather factors (one at a time versus mating frequencies) were produced at <https://www.gigacalculator.com/calculators/correlation-coefficient-calculator.php>.

III. RESULTS

I found a correlation between mating frequency and rainy days (Figure 1: Kendall's $\tau=-0.30348849$, Z score=-70000, n=8, p=0) ($y = -0.35714286 \cdot x + 6.10714286$).

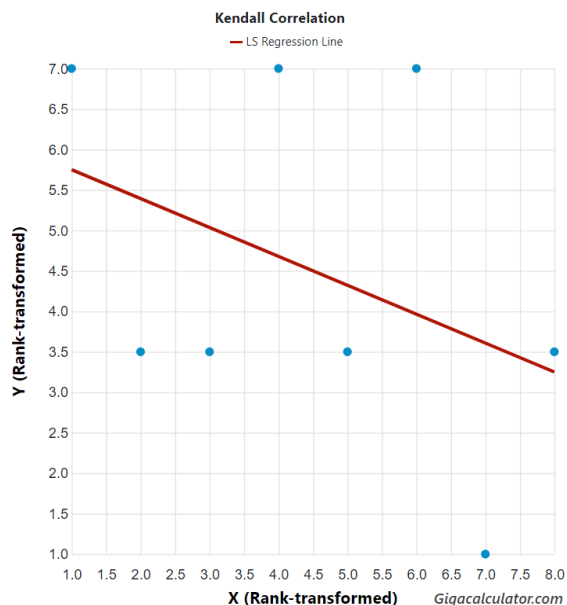


Figure 1. Correlation between mating frequencies and the rainy days in two species of *Centrobolus*.

IV. DISCUSSION

Differences of -1 rainy day contributed to differences in the mating frequencies of *C. anulatus* and *C. inscriptus*. With the addition of a rainy day, the mating frequencies dropped, while the increase in the magnitude of any of the other six factors resulted in no significant relationships (Pearson's r correlation).

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