MASS IS RELATED TO NINE FACTORS IN FOREST RED MILLIPEDES *CENTROBOLUS* COOK, 1897

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***Abstract*- Mass was tested for a correlation with nine factors (altitude, lowest number of daily hours of sunshine in a day, precipitation, minimum temperature, lowest relative humidity, month with the highest number of rainy days, curved surface area, maximum precipitation, minimum precipitation) in red millipedes *Centrobolus*. The mass was correlated with altitude (r=-0.61748194, Z score=-1.90738826, n=4 species, p=0.02823510), lowest number of daily hours of sunshine in a day (r=- 0.7424, r^2=0.5512, n=4 species, p=0.013036), precipitation (r= 0.7653, r^2=0.5857, n=3 species, p=0.026995), minimum temperature (r= -0.764, r^2=0.5837, n=3 species, p=0.027319), lowest relative humidity (r= -0.7514, r^2=0.5646, n=3 species, p=0.031747), month with the highest number of rainy days (r= -0.754, r^2=0.5685, n=3 species, p=0.030689), curved surface area (r= 0.8946, r^2=0.8003, n=4 species, p=0.000468), maximum precipitation (r=- 0.8627, r^2=0.7443, n=4 species, p=0.001313), and minimum precipitation (r=0.7006, r^2=0.4908, n=4 species, p=0.023917).**

Keywords: **correlation, mass, Red Millipedes.**

I. INTRODUCTION

Red millipedes are found in the southern African subregion with northern limits on the east coast being about -17° latitude S and southern limits being -35° latitude S. They are well represented in the littoral forests of the eastern half of the subcontinent [1-287]. It consists of taxonomically important species with 12 species considered threatened and includes nine vulnerable and three endangered species [226]. It occurs in all the forests of the coastal belt from the Cape Peninsula to Beira in Mocambique [225]. These worm-like millipedes have female-biased sexual size dimorphism [57].

Here, the mass was tested for a correlation with nine factors (altitude, lowest number of daily hours of sunshine in a day, precipitation, minimum temperature, lowest relative humidity, month with the highest number of rainy days, curved surface area, maximum precipitation, minimum precipitation) in *Centrobolus* Cook, 1897.

II. MATERIALS AND METHODS

Mass (g) measurements for 3-4 species of southern African *Centrobolus* were obtained from published material [123]. Eight climatic factors were obtained for each collected locality from https://en.climate-data.org/. A correlation between mass with nine factors (altitude, lowest number of daily hours of sunshine in a day, precipitation, minimum temperature, lowest relative humidity, month with the highest number of rainy days, curved surface area, maximum precipitation, minimum precipitation) was generated at https://www.socscistatistics.com/tests/pearson/default2.aspx HYPERLINK "https://www.socscistatistics.com/tests/pearson/default2.aspx%20HYPERLINK%20%22https://www.socscistatistics.com/tests/pearson/default2.aspx%22" (Appendix 1-10).

III. RESULTS

The mass was correlated with lowest number of daily hours of sunshine in a day (Fig. 1: r=-0.7424, r^2=0.5512, n=10, p=0.013036).

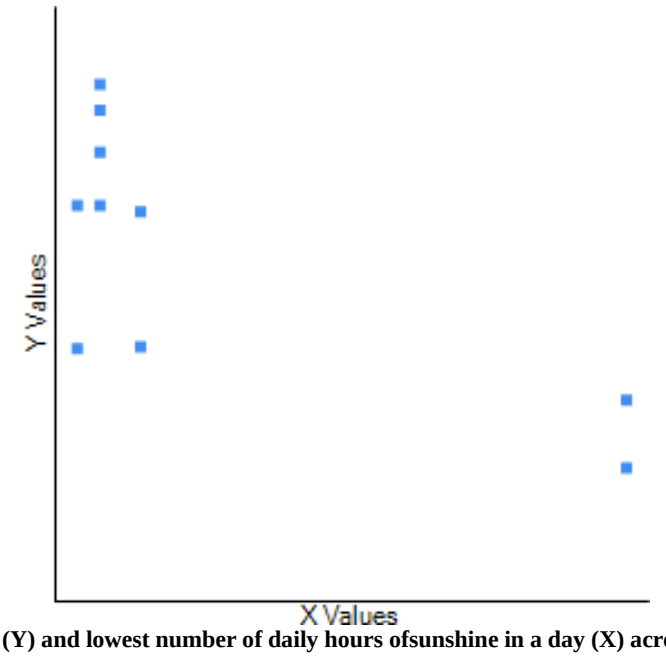

Fig. 1. Correlation between mass (Y) and lowest number of daily hours ofsunshine in a day (X) across therange of *Centrobolus* Cook, 1897.

The mass was correlated with precipitation (Fig. 2: r=0.7653, r^2=0.5857,n=8, p=0.026995).

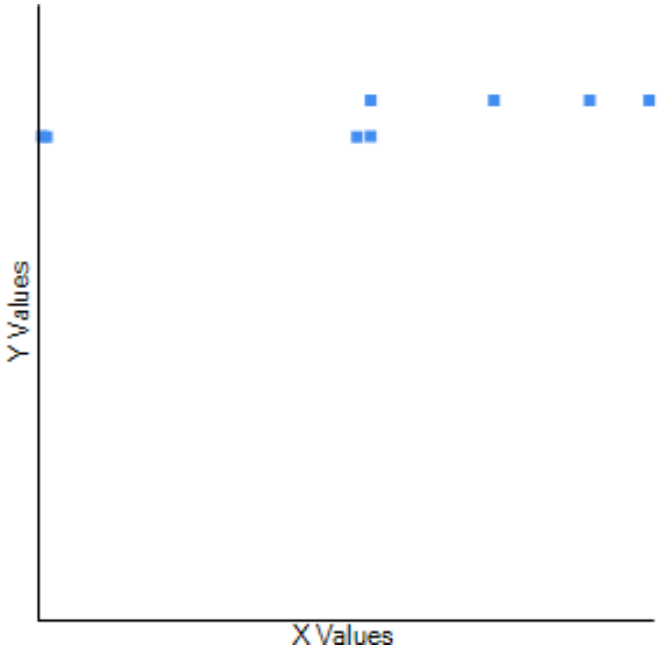

Fig. 2. Correlation between the mass (X) and precipitation (Y) across therange of *Centrobolus* Cook, 1897.

The mass was correlated with minimum temperature (Fig. 3: r=-0.764,r^2=0.5837, n=8, p=0.027319).

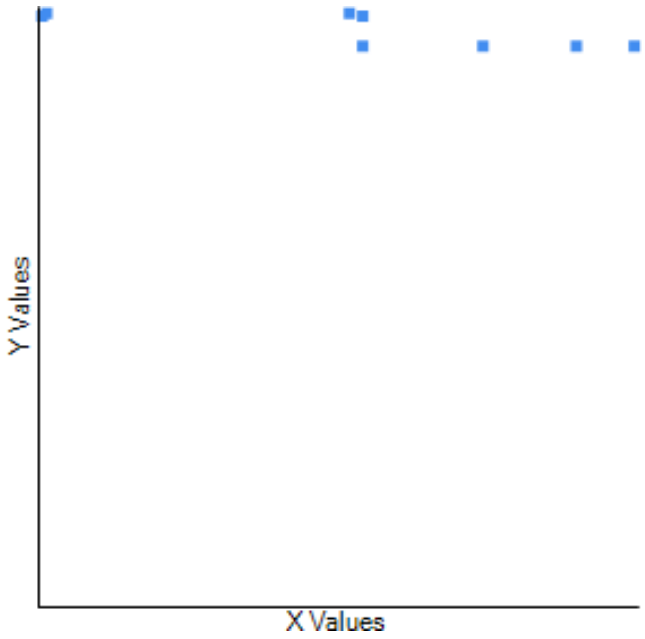

Fig. 3. Correlation between the mass (X) and minimum temperature (Y)across therange of *Centrobolus* Cook, 1897.

The mass was correlated with lowest relative humidity (Fig. 4: r=-0.7514,r^2=0.5646, n=8, p=0.031747).

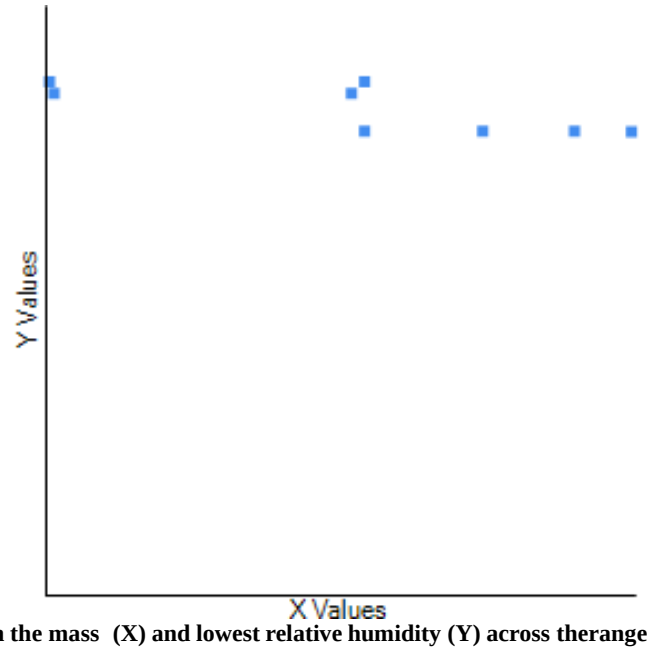

Fig. 4. Correlation between the mass (X) and lowest relative humidity (Y) across therange of *Centrobolus* Cook, 1897.

The mass was correlated with the month with the highest number of rainy days (Fig. 5: r=-0.754, r^2=0.5685, n=8, p=0.030689).

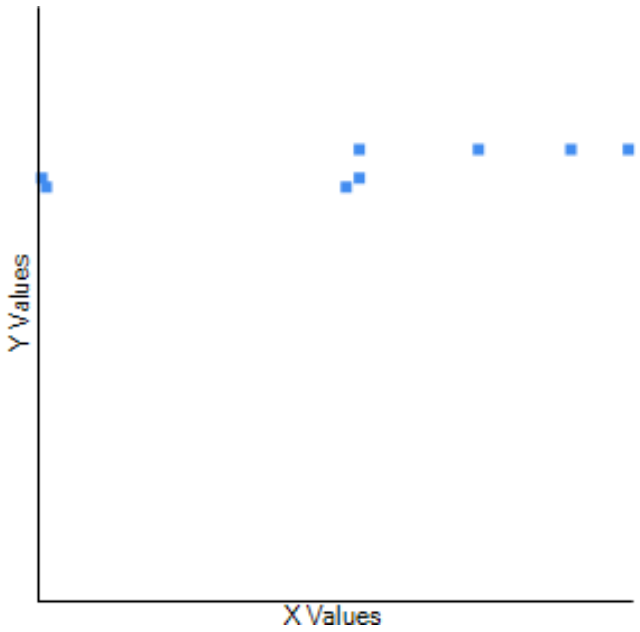

Fig. 5. Correlation between the mass (X) and the month with the highestnumber of rainy days (Y) across therange of *Centrobolus* Cook, 1897.

The mass was correlated with curved surface area (Fig. 6: r=0.8946, r^2=0.8003,n=10, p=0.000468).

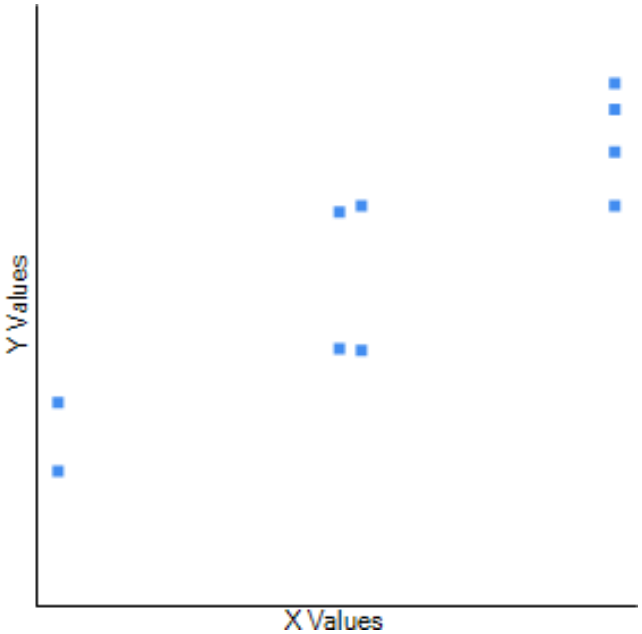

Fig. 6. Correlation between mass (Y) and curved surface area (X) acrosstherange of *Centrobolus* Cook, 1897.

The mass was correlated maximum precipitation (Fig. 7: r=-0.8627,r^2=0.7443, n=10, p=0.001313).

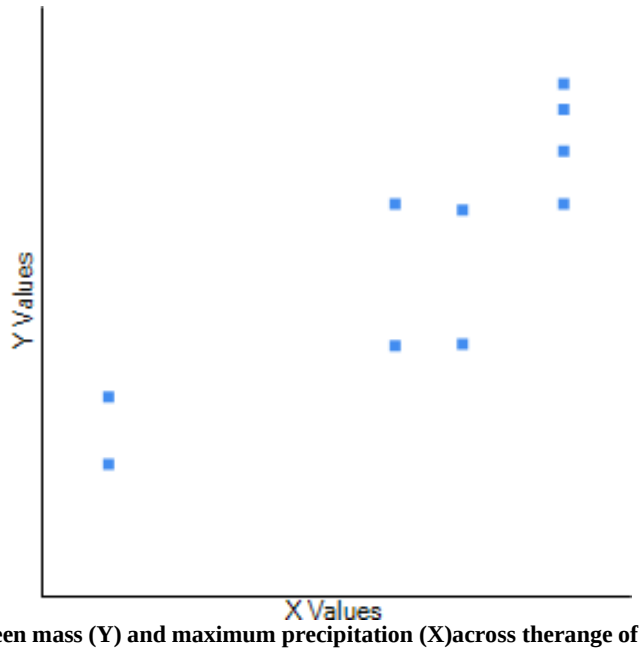

Fig. 7. Correlation between mass (Y) and maximum precipitation (X)across therange of *Centrobolus* Cook, 1897.

The mass was correlated minimum precipitation (Fig. 8: r=0.7006,r^2=0.4908, n=10, p=0.023917).

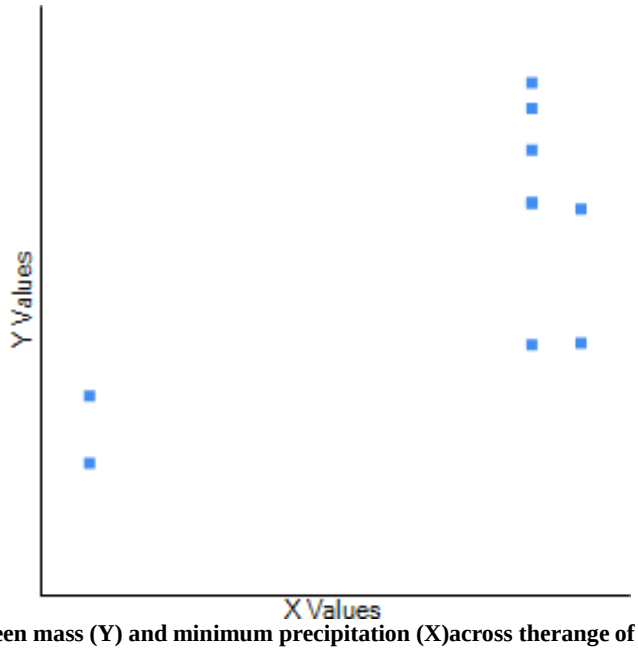

Fig. 8. Correlation between mass (Y) and minimum precipitation (X)across therange of *Centrobolus* Cook, 1897.

The mass was correlated with altitude (Fig. 9: r=-0.61748194, Z score=-1.90738826, n=10, p=0.02823510).

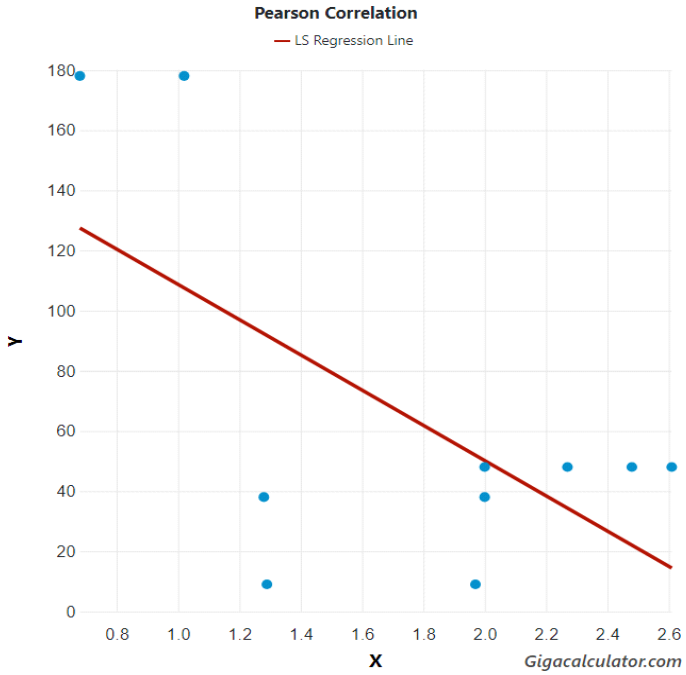

Fig. 9. Correlation between mass (Y) and altitude (X) across the range of *Centrobolus* Cook, 1897.

IV. DISCUSSION

There is a correlation between mass with nine factors (altitude, lowest number of daily hours of sunshine in a day, precipitation, minimum temperature, lowest relative humidity, month with the highest number of rainy days, curved surface area, maximum precipitation, minimum precipitation) in *Centrobolus*.

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APPENDIX 1. The mass (g) across *Centrobolus* Cook, 1897.
1.29
1.97
2.48
2.00
2.27
2.61
1.28
2.00
0.68
1.02
APPENDIX 2. Lowest hours of sunshine in a day (h) across the range of *Centrobolus* Cook, 1897 for which mass were recorded.
6.97
6.63
6.44
11.04
APPENDIX 3. Precipitation (mm) for three species of *Centrobolus* Cook,1897.
944
1015
945
APPENDIX 4. Minimum temperature (degrees Celsius) for three speciesof *Centrobolus* Cook, 1897.
19.8
18.7
19.7
APPENDIX 5. Lowest relative humidity (%) for three species of *Centrobolus* Cook, 1897.
68.18
63.06
69.75
APPENDIX 6. Month with the highest number of rainy days for threespecies of *Centrobolus* Cook, 1897.
13.97
15.23

14.26

APPENDIX 7. Curved surface area (mm^2) across four species of *Centrobolus* Cook, 1897 for which mass were recorded.

1764.318
2483.743
1822.124
1030.442

APPENDIX 8. Maximum precipitation (mm) in four species of *Centrobolus* Cook, 1897 for which mass were recorded.

113
119
109
92

APPENDIX 9. Minmum precipitation (mm) in four species of *Centrobolus* Cook, 1897 for which mass were recorded.

42

39
39
12

APPENDIX 10. Altitude (h) across the four species of *Centrobolus* Cook, 1897 for which mass were recorded.

9
48
38
178