CURVED SURFACE AREA IS RELATED TO SECOND POLAR MOMENTS OF INERTIA IN FOREST RED MILLIPEDES *CENTROBOLUS* COOK, 1897

M. Cooper

University of Johannesburg, South Africa.

Abstract- Curved surface area was tested for a correlation with second polar moments of inertia in red millipedes *Centrobolus*. Male curved surface area was correlated with second polar moments of inertia (Pearson's r=0.69904571, Z score=3.77232986, n=22, p=0.00008089). Female curved surface area was correlated with second polar moments of inertia (Pearson's r=0.80438147, Z score=4.84231537, n=22, p=0.00000064).

Keywords: curved surface area, red Millipedes, second.

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 [1-297]. It taxonomically consists of 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 Beira in to Mocambique [225]. These wormlike millipedes have femalebiased sexual size dimorphism [57].

Here, curved surface area is correlated with second polar moments of inertia in *Centrobolus* Cook, 1897.

II. MATERIALS AND METHODS

Horizontal tergite width measurements for 22 species of Centrobolus southern African were obtained from published material [57]. These were halved to get radii (r). The surface areas (mm²) were calculated based on the equation $2 \cdot \pi \cdot \mathbf{r} \cdot (\mathbf{r} + \mathbf{h})$ for males and females. A correlation between curved surface area and second polar moments of inertia was generated at https://www.socscistatistics.com/t ests/pearson/default2.aspx (Appendix 1 & 2).

III. RESULTS

Male curved surface area was correlated with second polar moments of inertia (Fig. 1: r=0.69904571. Ζ Pearson's score=3.77232986. n=22p=0.00008089). Female curved surface area was correlated with second polar moments of inertia (Fig. 2: Pearson's r=0.80438147, Z score=4.84231537, n=22, p=0.0000064).

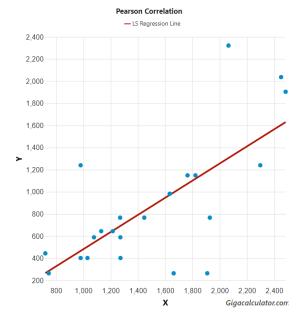


Fig. 1. Correlation between male curved surface area and second polar moments of inertia across therange of *Centrobolus* Cook, 1897.

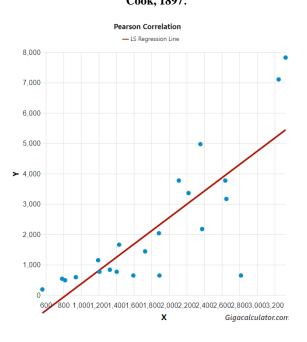
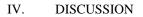


Fig. 2. Correlation between female curved surface area and second polar moments of inertia across therange of *Centrobolus* Cook, 1897.



There is a correlation between curved surface area and second polar moments of inertia.

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APPENDIX 1. Curved

surface areas in males followed by second polar moments of inertia across the range of *Centrobolus* Cook, 1897. 980.177, 402.124 2297.861, 1239.434 1215.796, 644.125 1030.442, 402.124 1633.628, 981.748 1764.318, 1148.506 1447.018, 766.499 2483.743, 1903.390 1130.973, 644.125 1269.832, 766.499 2064.655, 2321.061 746.442, 263.834 980.177, 1239.434 1927.681, 766.499 1822.124, 1148.506 1662.531, 263.833 1908.832, 263.833 1271.717, 588.750 721.31, 443.870 1078.195, 588.750 1272.345, 402.124 2450.442, 2035.752

APPENDIX 2. Curved surface areas in females followed by second polar moments of inertia across the range of *Centrobolus* Cook, 1897. 1884.956, 2035.75204 2817.38, 644.12467 818.071, 488.784066 939.965, 588.749544

1890.61.644.12467 2221.734, 3358.5787 2638.938, 3771.48199, 2652.133, 3165.33069, 1404.92, 766.498501 1594.044, 644.12467 3325.062, 7820.54505, 559.832, 186.284035 1432.566, 1658.13276, 1727.876, 1437.37682 2376.301, 2174.89962 2356.194, 4970.09776 2111.15, 3771.48199 1327.009, 833.844037 783.513, 537.024006 1193.805, 1148.50596, 1208.885, 766.498501 3245.894, 7101.91201