



Title: M04D03-A: The effect of altitude on dung beetle community structure in a Honduran cloud forest.

Keywords: Biological indicators; biodiversity; climate change; data handling; deforestation; ecosystems; environmental monitoring; field techniques; human impact; rainforest; sampling; transects; species richness, species evenness, abundance

Skills: Calculations, graphs, discussions and summary.

In tropical rainforests dung beetles are a conservation priority. As they move dung for feeding, nest building and the provision of nutrients to their larvae, the forest collaterally benefits as a result of soil fertilisation and aeration, nutrient recycling, seed dispersal, pollination, reduction in seed predation and the biological control of the eggs and larvae of mammalian parasites. As forest degradation continues apace, the survival of dung beetles, along with the important ecosystem services they fulfil, is threatened. The effects of global climate change are often first perceived when researchers notice alterations in the distributions of organisms. These distributional changes are most commonly associated with shifting latitudes as opposed to elevations. However, studies in dung beetle communities suggest that altitude affects species richness and diversity and therefore dung beetles can be useful Biological Indicators of disturbance and loss of biodiversity.

This study involved an assessment of the species richness of dung beetles in Cusuco National Park (CNP), Honduras. Seven areas were sampled across a range of altitudes (600-2200m) throughout the park. Species richness is calculated by adding up the number of different species of dung beetle found at each site.



Phanaeus endymion



The table below shows the results of a survey conducted in an area of CNP known as Cortecito. The transect was 3km long with 14 different sample points located at different altitudes.

Sample point	Altitude (m)	Species richness	Abundance
1	700 - 799	7	373
1	900 - 999	10	275
1	1400 - 1499	6	103
1	1500 - 1599	7	94
2	1600 - 1699	6	134
2	1700 - 1799	6	74
3	2000 - 2199	5	99
3	2100 - 2199	6	50

Tasks and questions:

1. Calculate the mean species richness for this transect and place your answers into the table. Express your answer to an appropriate number of decimal places.
2. Calculate the mean abundance of dung beetles for this transect.
3. Plot a suitable graph or graphs to show the relationship between altitude, species richness and abundance.
4. Why do you think the altitude ranges displayed were chosen?
5. State clearly what is suggested by your graphs.

