OR005

What is the relationship between altitude and ant colony size?

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Bergmann's rule describes an increase of body size from tropical to polar latitude; the rule also applies from low to high altitude. In terms of physiology and genetics, the colony is the unit of selection for ants; colony size (worker number in a colony) can be considered the body size of a colony. Combining these two ideas, this project uses two wood ant species, *Formica lugubris* and F. *paralugubris*, to investigate changes in colony size with altitude. We firstly developed an accurate and non-destructive method to estimate wood ant nest size (worker number) and also found that mound volume was feasible in representing nest size. We tested the hypothesis that nest size increases with increasing altitude in Swiss Jura Mountains during the summer 2012. Mound volume was used to estimate nest size and colony size. We found that canopy cover was probably a more important factor than altitude related to nest size variation. For a more comprehensive study with a wider altitudinal range, we investigated the relationship between altitude, canopy cover and polydomy of these two wood ant species along an altitudinal gradient (1200-2000 m) in the Swiss Alps in 2013. Overall, our results showed that colony size was larger both with rising altitude and with rising canopy cover. Temperature is the most likely underlying cause of these effects, due to the generally colder thermal environments both in shady areas and in higher altitude. Taken together, our findings demonstrate a positive trend between colony size and altitudinal gradients and follow Bergmann's rule. This study has implications for understanding the effects of climate change on social insects.