**S1 Table. Details and references of ant elevational gradients used in analyses.** List of robust and informative elevational gradients in ant species richness. Each denoted by study site (reference), diversity pattern (D: decreasing; LP: low-plateau; MP: mid-peak), data scale (L: local; R: regional), survey methods (B: baited traps, F: canopy or bark fogging; H: hand collection; L: litter sifting; M: malaise traps; P: pitfall traps; R: museum records), latitude, mountain base climate, % of gradient sampled, meters unsampled at mountain base, mountain height (m), temperature $r^2$ values, MDE diversity and range $r^2$ values, species-area $r^2$ values, best fit EGCM environmental model, EGCM environmental model $r^2$ values, EGCM simulation $r^2$ values, and total number of species and genera on gradient.

| Study Site (Reference) | Div. Pattern | Scale | Survey Methods | Lat. | Climate | % Grad. | Unsamp. base (m) | Mtn Hgt (m) | Temp *r2* | MDE Div. *r2* | MDE Rng *r2* | Area *r2* | EGCM best mod | EGCM Env. *r2* | EGCM Sim. *r2* | Species (Genera) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soutpansberg, South Africa (Munyai & Foord 2012) | D | L | P | -23.0 | Arid | 72.3 | 106 | 938 | 0.745 | --- | --- | 0.887 | --- | --- | --- | 78 (28) |
| Utah, USA (Allred 1982) | MP | R | H | 39.5 | Arid | 78.9 | 52 | 3459 | 0.149 | 0.111 | 0.080 | 0.509 | ATP | 0.698 | 0.969 | 121 (23) |
| Colorado, USA (Gregg 1963) | MP | R | H | 39.0 | Arid | 95.1 | 49 | 3367 | 0.492 | 0.162 | 0.027 | 0.809 | AT | 0.326 | 0.978 | 149 (40) |
| Nevada, USA (Wheeler & Wheeler 1986) | MP | R | H, R | 38.5 | Arid | 92.8 | 9 | 3835 | 0.000 | 0.896 | 0.174 | 0.900 | AT | 0.981 | 0.975 | 157 (28) |
| W. Texas, USA** | MP | R | B, H, L, R | 32.8 | Arid | 92.1 | 0 | 2498 | 0.148 | 0.379 | 0.353 | 0.907 | AP | 0.981 | 0.975 | 149 (35) |
| Chisos Mtns, TX, USA (Van Pelt 1983) | MP | R | B, H, L, R | 29.3 | Arid | 76.2 | 348 | 1706 | 0.007 | 0.406 | 0.417 | 0.002 | TP | 0.855 | 0.968 | 81 (29) |
| Soutpansberg, South Africa (Munyai & Foord 2012) | MP | L | P | -23.0 | Arid | 83.4 | 142 | 1067 | 0.141 | --- | --- | 0.563 | --- | --- | --- | 78 (28) |
| Cederburg Wilderness, South Africa (Botes et al. 2006) | MP | L | P | -32.4 | Arid | 97.8 | 5 | 1964 | 0.000 | --- | --- | 0.004 | --- | --- | --- | 85 (24) |
| Montenegro (Karaman 2011) | D | R | H | 42.3 | Wet | 77.5 | 100 | 2194 | 0.928 | 0.070 | 0.455 | 0.767 | T | 0.794 | 0.283 | 87 (28) |
| McPherson Range, Australia (Burwell & Nakamura 2011) | D | L | F, H, L | -28.2 | Wet | 66.9* | 300 | 1196 | 0.749 | 0.651 | 0.556 | 0.806 | A | 0.777 | 0.970 | 169 (57) |
| Voralberg, Austria (Glaser 2006) | LP | R | R | 47.3 | Wet | 59.6* | 12 | 2853 | 0.851 | 0.405 | 0.618 | 0.110 | T | 0.909 | 0.197 | 65 (17) |
| Volcan Barva, Costa Rica (Longino & Colwell 2011) | LP | L | L | 10.3 | Wet | 67.3* | 50 | 2897 | 0.826 | 0.711 | 0.880 | 0.487 | P | 0.719 | 0.682 | 401 (70) |
| Espinhaco, Brazil (Araujo & Fernandes 2003) | LP | L | B, H | -19.4 | Wet | 56.4* | 322 | 1241 | 0.775 | 0.950 | 0.406 | 0.773 | T | 0.982 | 0.961 | 39 (15) |
| South Tirol, Italy (Hellrigl 2003) | MP | R | H, R | 46.8 | Wet | 62.6* | 9 | 3674 | 0.029 | 0.068 | 0.203 | 0.194 | T | 0.189 | 0.922 | 70 (24) |
| Smoky Mtns, TN, USA (Lessard et al. 2007) | MP | L | L, M, P | 35.6 | Wet | 75.4 | 161 | 1807 | 0.701 | 0.102 | 0.625 | 0.845 | ATP | 0.727 | 0.953 | 38 (20) |
| Mt Isarog, Philippines (Samson et al 1997) | MP | L | P, H | 13.7 | Wet | 75.6 | 250 | 1983 | 0.593 | 0.190 | 0.368 | 0.373 | A | 0.575 | 0.971 | 52 (20) |
| Western Ghats, India (Sabu et al. 2008) | MP | L | L | 11.7 | Wet | 58.1* | 300 | 2322 | 0.205 | 0.026 | 0.811 | 0.543 | A | 0.200 | 0.845 | 29 (18) |
| Bocas del Toro, Panama (Olson 1994) | MP | L | L, P | 8.8 | Wet | 58.1* | 300 | 2375 | 0.799 | --- | --- | 0.686 | --- | --- | --- | 196 (-) |
| Ambohitsitondroina, Madagascar (Fisher 1998) | MP | L | L, P | -15.1 | Wet | 95.5 | 25 | 2053 | 0.506 | 0.177 | 0.067 | 0.684 | A | 0.349 | 0.988 | 272 (28) |
| Fiji (Sarnat & Economo 2012) | MP | R | ALL | -17.7 | Wet | 98.1 | 0 | 1324 | 0.654 | 0.359 | 0.096 | 0.850 | A | 0.579 | 0.914 | 174 (42) |

* < 70% of gradient sampled, but primarily upper elevations where diversity had already decreased monotonically
** Moody & Francke 1982; Cockendolpher & Francke 1990

## S1: References


1. Allred DM. Ants of Utah. Gt Basin Nat. 1982;42: 415–511.

2. Araújo LLM, Fernandes GWG. Altitudinal patterns in a tropical ant assemblage and variation in species richness between habitats. Lundiana. 2003;4: 103–109.

3. Botes A, McGeoch MA, Robertson HG, van Niekerk A, Davids HP, Chown SL. Ants, altitude and change in the northern Cape Floristic Region. J Biogeogr. 2006;33: 71–90. doi:10.1111/j.1365-2699.2005.01336.x

4. Burwell CJ, Nakamura A. Distribution of ant species along an altitudinal transect in continuous rainforest in subtropical Queensland, Australia. Mem Queensl Museum. 2011;55: 391–412.

5. Cokendolpher JC, Francke OF. The ants (Hymenoptera, Formicidae) of western Texas. Part II. Subfamilies Ecitoninae, Ponerinae, Pseudomyrmecinae, Dolichoderinae, and Formicinae. Spec Publ Mus Tex Tech Univ. Lubbock, TX: Texas Tech Press; 1990.

6. Fisher BL. Ant diversity patterns along an elevational gradient in the Réserve Spéciale d'Anjanaharibe-Sud and on the western Masoala Peninsula, Madagascar. Fieldiana Zool. 1998;90: 39–67.

7. Glaser F. Biogeography, diversity, and vertical distribution of ants (Hymenoptera: Formicidae) in Vorarlberg, Austria. Myrmecological News. 2006;8: 263–270.

8. Gregg RE. The Ants of Colorado. Univ. of Colorado Press. Boulder, Colorado, xvi. Denver, CO: University of Colorado Press; 1963.

9. Hellrigl K. Faunistik der Ameisen und Wildbienen Südtirols (Hymenoptera: Formicidae et Apoidea). Gredleriana. 2003;3: 143–208.

10. Karaman MG. Zoogeography, diversity and altitudinal distribution of ants (Hymenoptera: Formicidae) in the Mediterranean and the oro-Mediterranean parts of Montenegro. North West J Zool. 2011;7: 26–34.

11. Lessard JJP, Dunn RRR, Parker CCR, Sanders NNJ. Rarity and diversity in forest ant assemblages of Great Smoky Mountains National Park. Southeast Nat. 2007;0: 215–228.

12. Longino JT, Colwell RK. Density compensation, species composition, and richness of ants on a neotropical elevational gradient. Ecosphere. 2011;2: art29. doi:10.1890/ES10-00200.1

13. Moody JV, Francke OF. The ants (Hymenoptera, Formicidae) of western Texas Part I. Subfamily Myrmicinae. Lubbock, TX: Texas Tech Press; 1982.

14. Munyai TC, Foord SH. Ants on a mountain: spatial, environmental and habitat associations along an altitudinal transect in a centre of endemism. J Insect Conserv. 2012;16: 677–695. doi:10.1007/s10841-011-9449-9

15. Olson DM. The distribution of leaf litter invertebrates along a neotropical altitudinal gradient. J Trop Ecol. 1994;10: 129–150.

16. Sabu TK, Vineesh P, Vinod K. Diversity of forest litter-inhabiting ants along elevations in the Wayanad region of the Western Ghats. J Insect Sci. 2008;8: 1–14.

17. Samson DA, Rickart EA, Gonzales PC. Ant diversity and abundance along an elevational gradient in the Phillippines. Biotropica. 1997;29: 349–363.

18. Sarnat E, Economo E. The ants of Fiji. Berkeley and Los Angeles, CA: UC Publications in Entomology, University of California Press; 2012.

19. Van Pelt A. Southwestern Association of Naturalists Ants of the Chisos Mountains, Texas (Hymenoptera: Formicidae). Southwest Nat. 1983;28: 137–142.

20. Wheeler G, Wheeler J. The ants of Nevada. Los Angeles, CA: Natural History Museum of Los Angeles County; 1986.