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Vertical stratification of the ant assemblage in a Panamanian rainforest

M. Leponce¹, J.H.C. Delabie², I. Cardoso do Nascimento², B. Corbara³, J. Orivel⁴, Y. Roisin⁵, S.P. Ribeiro⁶, R. Campos⁶, J. Schmidl⁷, A. Floren⁸ & A. Dejean⁹

¹Section of Biological Evaluation, Royal Belgian Institute of Natural Sciences, Rue Vautier 29, B-1000 Brussels, Belgium

²U.P.A. Laboratório de Mirmecologia, Convention CEPLAC-UESC, C.P. 7, 45600-000 Itabuna, BA, Brazil

³LAPSCO, UMR-CNRS 6024, Université Blaise Pascal, 34 avenue Carnot, F-63037 Clermont-Ferrand cedex, France

⁴Laboratoire d'Évolution et Diversité Biologique, UMR-CNRS 5174, Université Toulouse III, 118 route de Narbonne, F-31062 Toulouse cedex 4, France

⁵Behavioural and Evolutionary Ecology CP 160/12, Université Libre de Bruxelles, Avenue F.D. Roosevelt 50, 1050 Brussels, Belgium

⁶Departamento de Ciências Biológicas/ICEB, Universidade Federal de Ouro Preto, 35400-000 Ouro Preto, MG, Brazil

⁷Ecology & Nature Conservation, Institute for Zoology I, Staudtstr. 5, D-91058 Erlangen, Germany

⁸Lehrstuhl für Tierökologie und Tropenbiologie, Universität Würzburg, Biozentrum, Am Hubland, D-97074 Würzburg, Germany,

⁹CNRS-Guyane (UPS 2561 and UMR-CNRS 5174), 16 avenue André Aron, F-97300 Cayenne, France

Maurice.Leponce@naturalsciences.be, delabie@cepec.gov.br, corbara@univ-bpclermont.fr, orivel@cict.fr, yroisin@ulb.ac.be, spribeiro@iceb.ufop.br, jschmidl@biologie.uni-erlangen.de, floren@biozentrum.uni-wuerzburg.de & alain.dejean@wanadoo.fr

The study of the distribution of ant diversity in complex environments such as tropical rainforests is generally hindered by the difficulty of access to the treetop (canopy). Our aims were to evaluate the spatial distribution of ant diversity in a Panamanian rainforest. Ants were collected in 8 sites and at different heights with 5 complementary methods (Winkler extraction of leaf-litter fauna, pitfall traps, Berlese extraction of soils, insecticide fogging, visual inspection of canopy branches, dead wood and palm trees). Overall 372 species were found, half of which were collected at the ground level and the other half on trees. Only 12% of the species were common to both strata. Myrmicines and ponerines dominated the ground level whereas dolichoderines, formicines and pseudomyrmicines were more abundant in the canopy. The understory sheltered 61 species which were an equal mixture of ground- and canopy-dwelling ants. Only 5 species were only found at the understory level. No clear pattern of species co-occurrence was detected at the understory or canopy level, suggesting the absence of an arboreal ant-mosaic. The horizontal species turnover was partly correlated to the geographical distance between sites and to habitat characteristics. These results show a clear vertical stratification in the ant assemblage which is composed of a ground-dwelling and of an arboreal-dwelling subset of species. An intermediate fauna lives at the understory level. In conclusion, a classical ant survey performed at the ground level documents only half of the species present in the habitat.

Vertical distribution of termites in a Panamanian rainforest

Y. Roisin¹, T. Bourguignon¹, B. Corbara², A. Dejean³, J. Orivel⁴ & M. Leponce⁵

¹Behavioural and Evolutionary Ecology CP 160/12, Université Libre de Bruxelles, Avenue F.D. Roosevelt 50, 1050 Brussels, Belgium

²LAPSCO, UMR-CNRS 6024, Université Blaise Pascal, 34 avenue Carnot, F-63037 Clermont-Ferrand cedex, France

³CNRS-Guyane (UPS 2561 and UMR-CNRS 5174), 16 avenue André Aron, F-97300 Cayenne, France

⁴Laboratoire d'Évolution et Diversité Biologique, UMR-CNRS 5174, Bât. 4R3, Université Toulouse III, 118 route de Narbonne, F-31062 Toulouse cedex 4, France

⁵Section of Biological Evaluation, Royal Belgian Institute of Natural Sciences, Rue Vautier 29, B-1000 Brussels, Belgium

yroisin@ulb.ac.be, thomas.bourguignon@ulb.ac.be, corbara@univ-bpclermont.fr, alain.dejean@wanadoo.fr, orivel@cict.fr & Maurice.Leponce@naturalsciences.be

Termites are among the most important decomposers in tropical rainforests. Up to now, studies of their assemblages have been mostly limited to a thin strata from a few centimetres below the forest floor to a man's height above it. In this work, we investigated the diversity of termites in the higher strata, in comparison with the ground-level fauna. Sampling methods included four standard 200-m² ground-based transects, manual collecting in 122 canopy-reaching trees by professional climbers, and trapping of alates by flight interception (FI) and light (L) traps. A total of 1639 FI trap samples were collected over a 9-month period, on 5 plots and at 6 heights (from 0 to 28m), each trap running for 10 days. L trap samples were operated at 4 times of the year, on 8 plots and at 2 heights (1.3 and 35m), and resulted in 90 single-night samples. Ground transects yielded 243 occurrences representing 29 species. Canopy samples provided 63 occurrences representing 10 species, of which 5 had not been collected by ground transects. FI traps collected 478 occurrences and at least 34 species, whereas L traps collected 73 occurrences and at least 16 species. Manual collecting of foragers revealed that soil feeders, absent from the canopy, represent about two-thirds of the ground-level species. Among wood feeders, some species (especially Kalotermitidae) are almost exclusively found in the canopy, while others remain on the ground. Vertical stratification was also apparent in FI and L traps: alates from ground-living species were caught at all heights, whereas canopy species less commonly occurred at lower levels. Although the efficiency of individual FI traps was low, their operation over long periods provided a balanced picture of the whole assemblage.