

Diversity of Collembola and Araneae along an environmental gradient

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FBIS170515230959

Spiders (Araneae) and springtails (Collembola) are two significant arthropod orders in all terrestrial ecosystems, functioning as detritivores and predators, respectively. In South Africa, spiders are relatively well studied, with approximately 2200 spp. recorded (5% of global diversity), while springtails are rather poorly studied, with only 124 spp. known from the country (1.5% of global diversity). For both groups there is some taxonomic expertise available in the country, but little remains known of their biodiversity patterns, particularly in the more arid biomes in the western half of the country.

This study aims to investigate for the first time the effects of east-west aridity gradients on the biodiversity patterns of these two orders, and try to explain the results in relation to temperature, rainfall and vegetation factors, providing baseline data for monitoring future climate change effects. The study will be carried out along a longitudinal gradient at similar latitudes from the western Northern Cape to the eastern Free State, covering sites in the Nama Karoo, arid Savanna and Grassland biomes. Many of the proposed collected sites fall within very poorly sampled areas of South Africa for both spiders (Foord et al. 2011) and springtails (Janion-Scheepers et al. 2016), so the biodiversity data and specimens generated will be invaluable for taxonomists working on both groups.

The material collected will contribute to two national biodiversity projects. Spider data will be included in the South African National Survey of Arachnida, providing critical data on spiders for the Northern Cape particularly, while springtail data will contribute to the Collembola of South Africa database.

Further, we aim to collect fresh material of springtails to do DNA barcoding for all species at all sites, to enable the recognition of species limits and cryptic species, establish distribution ranges and determine environmental preferences of each species.