



Conference Abstract

# Exploring the morphospace in subterranean spiders

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## Abstract

In light of the reduced diversity and abundance of species, subterranean habitats represent ideal models systems in which to investigate characters displacement in species sharing the same habitat. In order to minimize direct competition, it is expected that sibling species occupying the same subterranean habitat should differentiate their morphological niche. Conversely, geographically vicariant species occupying similar microhabitats should display a convergent morphology. We tested these hypotheses by studying character displacement in different species of *Troglohyphantes* Joseph, 1881 spiders (Araneae: Linyphiidae) in the Western Italian Alps. These spiders underwent a remarkable radiations in subterranean habitats, with numerous stenoendemic elements showing different degrees of subterranean adaptation. For each considered species, we examined 10 to 15 females specimens for a number of morphological characters related to body size, degree of subterranean adaptation (eyes development, flattening of the cephalotorax and leg elongation) and trophic specialization (chelicera and fang length). These traits were combined in a multidimensional space in order to describe the geometry of the n-dimensional Hutchinsonian hypervolume representing the morphological niche of each species. Once the hypervolumes were constructed, pairwise similarity among each species niche was calculated using different overlap indexes. We found that the niche hypervolume of all *Troglohyphantes* species had a comparable size. However, the distance among niche centroids was lower for species with similar subterranean adaptation and significantly higher in coexisting species. Furthermore, when found in the same cave, species with similar degree of adaptation showed a limited niche overlap. Overall, our results highlight the key role of competition in shaping morphology when competing species are present.

## **Keywords**

Niche differentiation, functional traits, Araneae, Huntchisonian hypervolume

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