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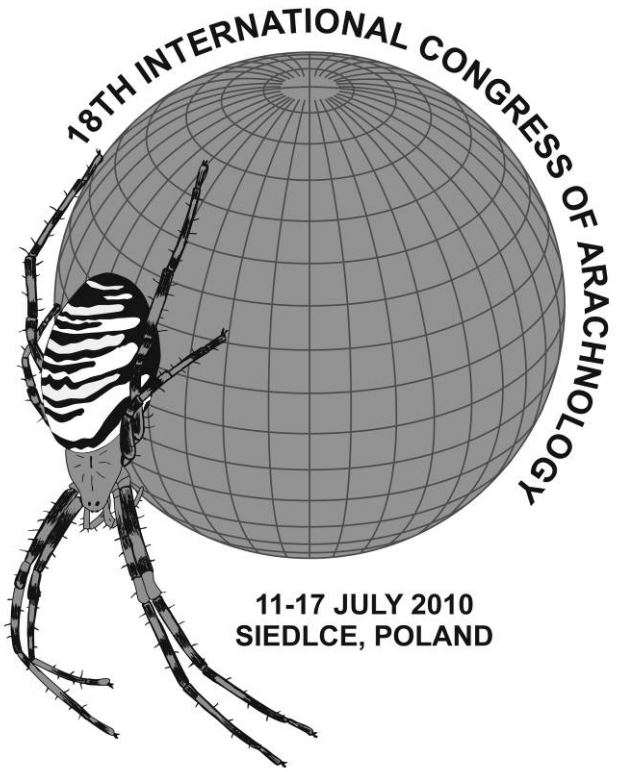

Book of Abstracts

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Soil spiders?

Vlastimil Růžička[1], Vratislav Laška[2], Jan Mikula[2] & Ivan H. Tuf[2]

[1] Institute of Entomology, Biology Centre, České Budějovice, Czech Republic, vruz@entu.cas.cz

[2] Department of Ecology and Environmental Sciences, Faculty of Science, Palacký University, Olomouc, Czech Republic, vratislav.laska@email.cz, jmikula@email.cz; ivan.tuf@upol.cz

Introduction

Spiders are among the most common and ubiquitous of animals; they are indeed found everywhere over the life-supporting land masses of the world. Where any form of terrestrial life exists, it is safe to assume there will also be spiders living close by. Spiders have conquered all of the possible ecological niches upon the land.

A wide spectrum of spider underground habitats also exists. Numerous studies have been devoted to the study of cave spiders. We have a quantity of knowledge on the vertical distribution of spiders in scree fields. Very little still seems to be known about those invertebrates inhabiting the shallow void systems within the bedrock, under the soil cover. Thus, the question arises: what about "soil spiders"?

The objective of our study was to search for permanent soil spiders, i.e. spiders inhabiting the deeper soil profiles for their entire life cycle. We extended our previous study, bring new data, and prepared a mini-review.

Material and methods

Spiders were collected using subterranean traps. The collected animals enter the tube through holes situated at 10 cm interval, and at different depths of from 5 to 135 cm. The material was collected in the soil layers at two localities in the Czech Republic: a beech forest growing on arenaceous marl bedrock, and a floodplain forest growing on a gravel bank.

Results and discussion

Altogether, 61 individuals from 11 spider species were trapped. In beech woods, *Cicurina cicur* and *Porrhomma microps* were the most numerous. *C. cicur* was found at a depth of 5–115 cm. *P. microps* exclusively inhabits the deeper soil layers; it was found at depths of 65–135 cm. In the floodplain forest, *Porrhomma microps* and *Porrhomma myops* were the most numerous. *P. microps* was found at depths of 5–45 cm; whereas *P. myops* exclusively inhabits the deeper soil layers, where it was found at depths of 35–95 cm. *Porrhomma microps* is known as an inhabitant of the leaf-litter in deciduous forests and also of caves. *Porrhomma myops* is known as an inhabitant of screes and caves. In this study, both species were found to inhabit the deeper soil layers.

Modes of speciation

We have evaluated our findings from the perspective of the development of the adaptations of arthropods to subterranean life. We distinguished between those adaptations to life in the soil environment (edaphomorphisms), and those adaptations to life within the cave environment (troglomorphisms). Depigmentation, desclerotization, as well as the atrophy or even loss of eyes are common adaptations. The shortening of the appendages is a typical edaphomorphism; while the elongation of the appendages is a typical troglomorphism. The size ranges of soil inhabitants are generally smaller than those of related epigeous species; however, among cave inhabitants both gigantism and dwarfism are known.

The specimens of *P. microps* from the soil profile exhibit similar body dimensions and proportions as those specimens from the leaf litter in South Moravia, Czech Republic. The specimens of *P. myops* from the soil profile exhibit relatively shorter legs than do the specimens from caves. We assume that the ancient epigean ancestor of the contemporary *P. myops* exhibited similar body proportions as did the epigean *P. pygmaeum* (similar to the other epigeic species, e.g. *P. microphthalmum*). Compared with their close relative *P. pygmeum*, the scree and cave populations of *P. myops* exhibit leg elongations (a troglomorphism); whereas the soil population exhibits cephalothorax diminutions (an edaphomorphism).

We recorded similar morphological adaptations to subterranean life in several spider species. In the case of *P. myops*, we registered two principal different routes of incursion into the undergroud realm. We registered two different originator populations, which colonized two different shallow underground habitats, and could have evolved into separate species when colonizing the deep underground habitats.

The 'hotspots' of subterranean biodiversity in Dinaric Karst harbour highly specialized forms at the end of a long-term underground evolution. Any such previous specialized cave fauna at higher temperate latitudes must have been eliminated by the rigorous periglacial climate; therefore the territory today lying in the Pleistocene periglacial zones harbour invertebrates at the beginning of their underground evolution.

Soil spiders?

Searching for the true edaphobionts, we evaluated the set of obvious microphthalmous Central European spiders, by the exclusion of specialized myrmecophilous species; supplemented by *Wiehlea calcarifera* (not microphthalmous, but generally known as a soil inhabitant). The large species of the genus *Porrhomma* are prevalent; they usually inhabit caves. *P. microps* also inhabits the leaf litter, and the habitat of *P. microcavense* remains unknown. The four smallest species i.e. *Wiehlea calcarifera*, *Hahnia microphthalma*, *Porrhomma cambridgei*, and *Pseudomaro aenigmaticus* could be candidates for soil spiders.