# Optimization of cave habit in *Arrhopalites* (Collembola: Arrhopalitidae)

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The traditional methods of optimization based on strict parsimony poses some problems when dealing with ecological traits. The cave habit was optimized on the phylogeny of the genus Arrhopalites (Collembola: Arrhopalitidae) and two different approaches were used. The recurrent homoplasy with rather an ecological meaning like this would lead to an ambiguous understanding of the evolution of the cave habit.

The normal method brought a 21 steps long optimization for the ecological trait "cave habit". It resulted in a hypothesis where the cave habit is taken as plesiomorphy at the species level. In other words, an ancestral cave isolated species would disperse through the surface from one cave system to another. It would require that reversions from cave to surface dwelling condition have to occur.

The alternative method of optimization implies in a less parsimonious hypothesis, 36 steps long. This approach assumes no reversive evolution of the cave habit, successive events of cave invasions are admitted by considering the ecological trait, cave dwelling, an ordinate character.