

# Reduction of the metabolic level by phenotypic plasticity involved in cave colonization by the Pyrenean newt *Calotriton asper*

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## Abstract

To test the hypothesis whether a lower metabolic rate is expected in cave organisms compared to surface ones due to an adaptation to food scarcity in subterranean environments, we measured the oxygen consumption rates of individuals from hypogean (i.e. subterranean) and epigean (i.e. surface) populations of the troglomorphic newt *Calotriton asper*. We found that epigean individuals exhibit higher rates than hypogean ones and showed that when we acclimated epigean *C. asper* to cave conditions, these individuals reduced their oxygen consumption. We compared the metabolic levels of hypogean and epigean *C. asper* acclimated and non-acclimated to the cave, with the obligate cave salamander *Proteus anguinus* as well as two epigean species: an urodel (*Ambystoma mexicanum*) and a fish (*Gobio occitaniae*). As predicted, we find differences between hypogean and epigean species, and that the troglomorphic *C. asper* exhibited in-between performances. We argue then that this shift of the metabolic level observed between epigean *C. asper* non-acclimated and acclimated to the cave is not directly due to the food availability in our experiments but to a stasis of the temperature. However we then discuss that this adjustment of the metabolic level under a temperature close to the thermal optimum may secondarily allow individuals to cope with the food limitations of the subterranean environment.

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