

Preliminary study on differences characterizes the populations of olm (*Proteus anguinus*) in cave and those found in epigeal environment

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Abstract

The olm (*Proteus anguinus*) is considered the most representative example of all the stygobiont fauna. Nevertheless, it is also reported in some spring habitats of Friuli Venezia Giulia (North-eastern Italy). Springs are intriguing habitats that border two strongly distinct environments: surface and underground. They may provide distinct environmental pressures to stygobiont animals promoting new adaptations.

The aim of this study is to verify if there are differences in the structural morphology of the head and in the presence of melanin in the skin between the olms that are found in caves compared to the individuals found in the external environment.

During 2021, 28 olms, 18 from underground habitats and 10 from external sites, were photographed in standard conditions with a metric reference. For each individual, only the cephalic region has been considered. The pictures were processed using *TPSdig* software. For each picture we placed 2 landmark homologues, matching the emergence of the gills branches, and 48 semi-landmark to define the contour of the head. With regard to melanin 2 mm of skin were removed from the tail of the olm and analyzed through a spectrophotometer. The results indicate a significant effect of the environment on the shape of the olm's head, in fact the shape of the head appears more elongated in the front and narrower in the parietal region in the olms coming from the hypogean environment. In addition, the olms that use the epigeal environment show higher melanin levels in their skin.

These findings provide a first evidence of differences occurring between olm populations/sub-populations living in caves and those exploiting surface habitats.

Keywords

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Conflicts of interest