Epikarstic copepod communities of some Italian caves: endemisms and spatial scales.

Bruno M.C.[1,*], Cottarelli V.[2], Grasso R.[3], Latella L.[4], Spena M.T.[3], Zaupa S.[5]

[1]Edmund Mach Foundation, Research and Innovation Centre, S. Michele all'Adige (TN), Italy; [2]Department for Innovation in Biological, Agro-food and Forest systems, Tuscia University, Viterbo, Italy; [3]Department of Biological, Geological and Environmental Sciences, Catania University, Catania, Italy; [4]Natural History Museum of Verona, Verona, Italy; [5]Department of Earth and Environmental Sciences, Bicocca University, Milan, Italy.
* cristina.bruno@fmach.it

The epikarstic habitat is the topmost part of the vadose zone in karstic bedrocks; it is made of an extended network of tiny cracks and fissures, which are partly or completely filled with water percolating from the surface and originating by precipitations. The epikarst is not directly accessible to man, and its fauna is collected with indirect methods such as funnel-shaped traps, which collect the drops of percolation water dripping from the roof of the cave and the organisms contained in them. The epikarstic crustacean fauna from three Sicilian caves (Conza, Entella, and Molara caves) and four caves in the Lessini Mountain in the Venetian Prealps (Covolo della Croce, Grotta A del Ponte di Veja, Grotta di Roverè Mille, Buso della Rana) was recently investigated. The two groups of caves differ in their environmental conditions: the Sicilian caves are all fossil, fed by strongly intermittent and scarce rainfall peaking in the fall; the Lessinian caves are fed by more abundant rainfall, with two yearly peaks (May-June and October-November); two of them are active, one has a temporary stream, one is fossil. The crustacean fauna found in the epikarstic drip of each of the studied caves is characterized by interesting endemic harpacticoid copepods and cyclopoids, and bathynellacean syncarids, often collected in only one cave. Higher diversity was recorded for the Lessinian caves (11 species of copepods in the Lessinian, and 6 species of copepods and one bathynellacean in Sicily); most of the taxa collected in Sicily are endemic of one cave (0.36 endemisms rate for copepods in the Lessinian, and 0.5 for Sicily). Spatial analysis showed very different distributions over short spatial scales (tens of kilometers) and, within each cave, the distribution also varied over distances of a few meters. Our data correspond with other studies where many epikarstic crustaceans showed a distribution with a linear extent of only a few hundred meters: the epikarstic fauna is not uniformly distributed but rather divided in "blocks" probably characterized by different environmental condition and, as a consequence, by different taxocoenoses. The data highlight the epikarst as a source of "hidden" biodiversity, and the importance of management protection plans which include not only the caves, but also the epikarstic overlying layer and the water sources that feed it.