XXV Congresso AIOL

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Contributi innovativi dell'oceanologia e della limnologia alla conoscenza, al recupero e alla salvaguardia delle risorse acquatiche minacciate dai cambiamenti globali

Strumenti e approcci innovativi nelle scienze acquatiche in un mondo che cambia

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SESSIONE SPECIALE 5 – Ecosistemi acquatici freddi: fortezze di biodiversità sotto il fuoco del cambiamento globale – Monica Tolotti, Andrea Lami, Giampaolo Rossetti

Cold refugia in warming mountains: a glimpse of hope for alpine stream invertebrates?

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Climate change is causing a rapid warming of the alpine river networks, thus threatening the survival in the long-term of cold-adapted taxa, including specialised species from glacier-fed streams. Within this context, research is increasing on the potential role of streams fed by “rock glaciers” (rocky landforms with permafrost ice) as climate refugia in warming mountains. In fact, rock glaciers are less vulnerable to air warming when compared with valley glaciers, and still support cold water conditions in deglaciated landscapes. In a high-mountain area of the European Alps (Sulden valley), we studied the hydroecology of streams emerging from rock glaciers (rock glacial), vegetated slopes (krenal) and glaciers (kryal, glacio-rhithral). Rock glacial streams were very cold (<1.5°C), and composition, abundance and diversity of dwelling invertebrates were similar to those of krenal and glacio-rhithral stream sections. Although cold-adapted EPT species were abundant in rock glacial streams, and preliminary identification of Chironomidae specimens confirmed the presence of species typical of cold environments (*Diamesa* genus), not all species present in the kryal were found in the rock glacial streams. Thus, further research is needed on rock glacial communities, to predict the fate of cold-adapted biodiversity and inform climate adaptation strategies in warming mountains.

Let’s see where they MIGHT go: a connectivity study of Antarctic fish populations by Lagrangian simulation in the Weddell Sea and Antarctic Peninsula

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Under a climate change scenario, the Weddell Sea continental shelf (Antarctica) is likely to be a sink area of biodiversity and a refugium for highly cold-adapted benthic organisms. One of the plans that are currently underway in international waters is to establish a network of marine protected areas (MPAs) at a circum-Antarctic scale. In this perspective, including the Weddell Sea in the spatial planning of MPAs in the Southern Ocean will be essential. To this aim, and considering that patterns of connectivity are increasingly recognized as relevant information to support spatial planning of MPAs, we have generated connectivity data for a range of Antarctic fish species, mainly located in the Weddell Sea and Antarctic Peninsula. We have focused on species of the sub-order Notothenioidei with different ecological habits: three species of the genus *Chionodraco* (icefish, benthic) and *Aethotaxis mitopteryx* (nototheniid, pelagic). Considering the life-history traits of the target species and the distribution of genetic variability, we have generated some hypotheses of large-scale connectivity that we have tested by using the Lagrangian module of COHERENS to simulate particle dispersal.