High population differentiation in the rock dwelling land snail (Trochulus caelatus) endemic to the Swiss Jura Mountains

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Author(s) Ursenbacher, Sylvain; Alvarez, Caren; Armbruster, Georg F. J.; Baur, Bruno
Author(s) at UniBasel Ursenbacher, Sylvain ; Baur, Bruno ; Armbruster, Georg ;
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Understanding patterns of genetic structure is fundamental for developing successful management programmes for isolated populations of threatened species. Trochulus caelatus is a small terrestrial snail endemic to calcareous rock cliffs in the Northwestern Swiss Jura Mountains. Eight microsatellite loci were used to assess the effect of habitat isolation on genetic population structure and gene flow among nine populations occurring on distinct cliffs. We found a high genetic differentiation among populations (mean F (ST) = 0.254) indicating that the populations are strongly isolated. Both allelic richness and effective population size were positively correlated with the size of the cliffs. Our findings support the hypothesis that T. caelatus survived on ice-free cliffs during the Pleistocene glacier advancements from the Alps. Due to the establishment of beech and pine forest under recent, temperate climate conditions, dispersal between cliffs is no longer possible for rock-dwelling snails such as T. caelatus. Our results provide basic data for developing a conservation action plan for this endangered gastropod species.
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