

A comparison of ecological and life-historical characteristics of the two relict populations of the Critically Endangered Dades trout *Salmo multipunctatus* (Teleostei: Salmonidae) in Southeast High Atlas range, Morocco

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Abstract

Freshwater species with limited distribution ranges are sensitive to the risk of extinction, especially those that occur at low effective population sizes. The Dades trout *Salmo multipunctatus* is a relict salmonid endemic to Morocco. This is a critically endangered species from the headwaters of the arid river Draa basin, with only two surviving genetically distinct populations; Dades and M'Goun, on the southern slope of the High Atlas range. The Dades trout is among the river salmonids with the smallest distribution globally. It is distributed across less than 22 km of stream channels in two isolated locations. The species is threatened because of its limited and isolated distribution, and a future decline in its distribution is projected due to climate change. The purpose of this study was to initiate a recovery plan for the Dades trout based on body condition and growth data. We assessed the somatic condition of this species using the scaled mass index (SMi) in Dades and M'Goun. As the spawning season is clearly seasonal, the analysis of the population size structure, revealed distinct modal size classes corresponding to successive age classes. Population growth parameters were estimated using Beverton and Holt's method based on Von Bertalanffy's model. Mean SMi did not vary significantly according to elevation within the altitudinal range occupied by the species in both areas. The SMi declined sharply with body size from 50 to 75 mm, during the first year after hatching, and then became slower in older individuals. The mean SMi was significantly higher in Dades than in M'Goun (16.27 vs. 12.14; $p < 0.001$). The growth constant rate k (year⁻¹) was slightly lower in the Dades population (0.185 vs. 0.206). The asymptotic body size L_{∞} (mm) was rather higher in M'Goun (245 vs. 220) and the values of growth performance (Φ) were close between the two populations (3.38 vs. 3.24). Estimated longevity (years) were respectively of 14.7 and 13.2, while the estimated natural mortality rates (M) were respectively of 20.4 and 22.8%. The variation in SMi and growth parameters could be attributed to the differences in habitat quality between the two sites. Our findings can be helpful in developing a recovery plan for the last surviving populations of this relict and critically endangered Africa's oldest salmonid species.

Keywords: Dades trout, relict, critically endangered, body condition, growth parameters, conservation.