biology and life sciences forum

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Abstract

Resident Brown Trout (*Salmo trutta*) Populations in Portugal: Status, Threats, and Fishery Management Requirements †

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† Presented at the IX Iberian Congress of Ichthyology, Porto, Portugal, 20–23 June 2022.
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Abstract: Brown trout (*Salmo trutta*) has high ecological and socio-economic importance in many cold-water rivers of northern and central Portugal. However, no studies have addressed the ecology of this species on a large scale. To understand factors driving Brown trout populations in diverse Portuguese streams, we sampled 33 sites, during the summer season of 2020, in cold-water rivers of Minho, Lima, Neiva, Cávado, Ave, Douro, and Vouga basins. Brown trout populations were characterised by several populations and growth parameters, including abundance, density, biomass, age, and body condition. The relationships of these parameters with environmental variables, biotic factors, and fishery management regulations were analysed, and the reference parameters of the populations were defined. There was a good/excellent ecological integrity in most sites, assessed by several water-quality-related, hydromorphological, and biological metrics. Nevertheless, several threats were identified—namely, the riparian degradation (e.g., mortality of alder trees), the presence of exotic species, habitat fragmentation, overfishing, stocking, and more recently, extended dry periods. Portuguese populations showed higher growth rates but lower density, biomass, and physical condition. Intra- and interspecific competition did not seem to play relevant roles in the regulation of brown trout populations, and the common fishery management appears to have no clear positive impact on the natural sustainability of these wild populations. In this context, under the POSEUR 03-2215-FC-000096 project, several studies were developed for in situ conservation and ex situ reproduction of wild brown trout populations. Global genetic characterisation of brown trout populations was made, and eight wild stocks were selected and acclimated to the captivity for implementation of stocking programs. Furthermore, the rehabilitation of riparian corridors and the implementation of specific exploitation and management plans were also developed for the conservation of sympatric populations of brown trout and the critically endangered freshwater pearl mussel *Margaritifera margaritifera* in Portuguese mountain rivers.

Keywords: population parameters; salmonid streams; ecological integrity; conservation; management

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Citation: Teixeira, A.; Oliveira, J.M.; Sá, F.; Pereira, N.; Faro, A.; Segurado, P.; Miranda, F.; Teixeira, F.; Martinho, A.; Magalhães, M.F. Resident Brown Trout (*Salmo trutta*) Populations in Portugal: Status, Threats, and Fishery Management Requirements. *Biol. Life Sci. Forum* **2022**, *13*, 128. https://doi.org/10.3390/blsf2022013128

Academic Editor: Alberto Teodorico Correia

Published: 20 June 2022

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Author Contributions: Conceptualization, A.T., J.M.O. and M.F.M.; methodology, F.S., N.P., A.F., F.M. and F.T.; formal analysis, P.S.; resources, A.M.; writing—original draft preparation, A.T., F.S. and J.M.O.; writing—review and editing, M.F.M.; All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by POSEUR (03-2215-FC-000096) and Portuguese Environmental Fund.

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by Instituto de Conservação da Natureza e das Florestas (Licença 172/2022/CAPT; Credencial Pesca nº 35/2022).

Informed Consent Statement: Not applicable.

Data Availability Statement: Data availability can be found in project website https://margaritiferamargaritifera.pt/ (accessed on 8 April 2022).

Conflicts of Interest: The authors declare no conflict of interest.