
Spatio-temporal evolution of life history traits: Brown trout colonization of the sub-Antarctic Kerguelen Islands.

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Abstract

During a colonization process qualifying the invasiveness of a species and its adaptive potential to new environmental conditions remains of major interest. The brown trout (*Salmo trutta* L.) display a considerable variation in life history strategies. It is a facultative anadromous species with only a fraction of fish migrating at sea (i.e. partial migration). Introduced in the late 1950s in the Kerguelen Islands, the ongoing colonization of the archipelago presents a unique opportunity to understand underlying causes and mechanisms of biological invasions. This study aims at quantifying variation in freshwater growth and age at first marine migration at various spatio-temporal scales with respect to the colonization process. The analysis of age and growth information contained in the scales of fish has become a standard technique in fish population dynamics model. However, inferring growth for fish is dependent upon an accurate description of the age-length relationship, which may be undermined by ageing errors that arise either from disagreements between scale readers or inability of scales to reflect true age (i.e. erosion, false growth ring). Von Bertalanffy growth function (VBGF) that explicitly accommodate ageing errors from scales was used to compare freshwater growth of population colonized at different times and located at different distances from the colonization front. Associated fish life history (i.e. growth curve and age at first marine migration) is discussed with respect for the role of initial stage, evolution and local adaptation.

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