

Chapter 18

Proximate and Ultimate Control of Eel Continental Dispersal

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18.1 Introduction

Eels *Anguilla* spp. are fishes belonging to the Superorder Elopomorph, a group of phylogenetically ancient teleosts (Nelson 1994). Eels have ancestrally evolved a continental growth phase and thus migrate between marine breeding and continental feeding areas. In continental waters, eels colonize an extremely wide variety of salt (SW), brackish and freshwater (FW) habitats. Such ubiquity is almost unique among teleost fishes. However, the mechanisms controlling eel continental dispersal, i.e., distribution in different growth habitats, remain largely unknown. Dispersal is here understood in ecological terms and is thus referred to as movements leading to habitat colonization in general. Dispersal is a pivotal process for both species persistence and evolution, and involves a great diversity of ecological phenomena (Clobert et al. 2001). In the eel, dispersal in different habitats may influence survival, growth, sex differentiation, age and size at silvering [female size affects fecundity, egg-size and larval viability (Einum et al. 2004)], swimming ability during the spawning migration, and finally capacity to reproduce. In turn, decision-makings by individual dispersers for migration to, immigration in and emigration from different habitats depend on genetic, physiological, morphological and social attributes and are affected by a number of environmental parameters (Clobert et al. 2001).

In this chapter, we provide material to understand how (proximate control) and why (ultimate control) dispersal patterns by eels in continental habitats are what they

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