



Geographical distribution of pelagic decapod shrimp in the Atlantic Ocean

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Abstract

Ninety-one species of pelagic decapod shrimp were identified in 938 midwater-trawl collections taken between 1963 and 1974 from the North and South Atlantic. Distributional maps are provided for the most frequently occurring species. Nighttime abundance of most species was greatest within the upper 200 m. Degree of geographical overlap was estimated using the geometric mean of the proportion of joint occurrences with a value ≥ 0.5 deemed significant. Geographical distributions tended to be unique, and only 31 species had values ≥ 0.5 with one or more other species. Species within genera and within phylogenetic subgroups of *Sergia* were generally parapatric or partially overlapping in distribution. Five geographical groupings of co-occurring species across genera were identified: Subpolar-Temperate, Southern Hemisphere, Central, Tropical, Eastern Tropical and Western Tropical. The two species of the Southern Hemisphere group are circumpolar at temperate latitudes. The 12 species of the Central group occurred throughout the subtropical and tropical North and South Atlantic. The eight species of the Tropical group occurred broadly across the equatorial Atlantic and Caribbean with ranges usually extending into the Gulf of Mexico and northward in the Gulf Stream. The two species of the Western Tropical group occurred most often in the western tropics, but there were scattered occurrences at subtropical latitudes. The four species of the Eastern Tropical group were endemic to the Mauritanian Upwelling and the Angola-Benguela Frontal zones off western Africa. Two of the three species in the Subpolar-Temperate group had bipolar distributions, and all three occurred in the Mediterranean and in the Mauritanian Upwelling zone. Most Central, Tropical and Western Tropical species were present in the in the Gulf of Mexico. The 10 species from the Mediterranean were a mixture of Subpolar-Temperate, Central and benthopelagic species. Patterns of distribution in Atlantic pelagic decapods closely parallel those of other pelagic taxa, but myctophid fishes from the same collections appear to partition subtropical regions more finely.

Key words: decapod shrimp, pelagic, geographical distribution, Atlantic Ocean, ocean circulation and water masses

Introduction

Decapod shrimp are a major component of the micronekton (2–10 cm) in subpolar to tropical regions of the world ocean, exceeded in number and biomass among the crustaceans only by the generally much smaller euphausiids (Brodeur *et al.* 2004). Although the shrimp fauna is phylogenetically diverse, with representatives of many genera and families within both decapod suborders, species are similar in general morphology, behavior and diet. Decapod shrimp collectively play an important role in the transfer of biomass within the marine food web. They scavenge organic debris but also actively prey on a wide spectrum of zooplankton, especially copepods, and appear to be the main competitors of midwater fish, the other major predatory group in the micronekton (Hopkins & Sutton 1998). In turn, they are eaten by a range of predators including other shrimp, siphonophores, cephalopods, dimersal and pelagic fish, and in the case of at least one species, *Eusergestes similis*, baleen whales (Pereyra *et al.* 1969, Pinkas *et al.* 1971, Omori *et al.* 1972, Biggs 1977, Brock 1985, Bulman & Koslow 1992, Cartes 1993, Bjelland & Monstad 1997, Yamamura & Inada 2001, Bergstad *et al.* 2003).

Decapod shrimp have been the subject of several vertical distribution and regional faunal studies in the Atlantic and confluent seas (Foxton 1970a, 1970b, 1972a, Kensley 1971a, 1971b, Crosnier & Forest 1973, Foxton & Roe 1974, Donaldson 1975, Heffernan & Hopkins 1981, Roe 1984, Pohle 1988, Hopkins *et al.* 1989, Andersen & Sardou 1992, Cartes *et al.* 1994, Flock & Hopkins 1992, Hopkins *et al.* 1994, Hargreaves 1999, Koukourous *et al.* 2000, Politou *et al.* 2005, Pequegnat & Wicksten 2006, MacIsaac 2013, Cardoso *et al.* 2014), but there has not been an accounting to date of the entire shrimp fauna over the entire ocean. This study is based on examination of 938

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