

SERGESTES ARCTICUS KRÖYER 1855: SIZE GRADIENTS IN THE LIGURO-PROVENÇAL BASIN

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The study of samples of pelagic Eucarid crustaceans obtained from a large area in the Liguro-Provençal basin gives evidence to density and size gradients which are probably influenced by the surface circulation. A relationship between life cycles and drift in the water masses is suggested. Over a period of two weeks (August 17-29, 1991) using the R/V Minerva (CNR), an area of 8600 sq. naut. mi. was covered, and 20 sampling stations were located along four transects: A, Genoa-Calvi; B, Monaco-Calvi; C, Marseilles-Gulf of Porto; and D, perpendicular to B, from 43.13.89N 07.35.66E to 43.32.63N 08.15.49E (Fig. 1). The standard haul for macroplankton consisted in an oblique tow of a 15 feet open I.K.M.T. (2x2 mm mesh in the cod end) from 750 m to the surface in steps. The haul lasted two hours at a ship speed of about 3 knots. The net opening was 17.55 m²; the amount of filtered water per hour was 97571 m³. After the sorting, crustacean decapods were identified as to species and measured as to carapace length in mm under the dissecting microscope. This paper concerns *Sergestes arcticus*, the second most abundant species among crustacean decapods, for which the vertical space covered by the sampling includes the largest part of the population (FRANQUEVILLE 1971, SARDOU and ETIENNE 1988). In this species ontogenetic migrations have been described. At night young specimens crowds surface waters (HARGREAVES 1984). Maturity in males is at about 28 mm tl (HANSEN 1922) which corresponds to 8 mm carapace l. Females reach larger sizes. A total of 1156 specimens was collected with numbers ranging from 8 to 189 per haul. The carapace length-frequency distributions can be assigned to three groups:

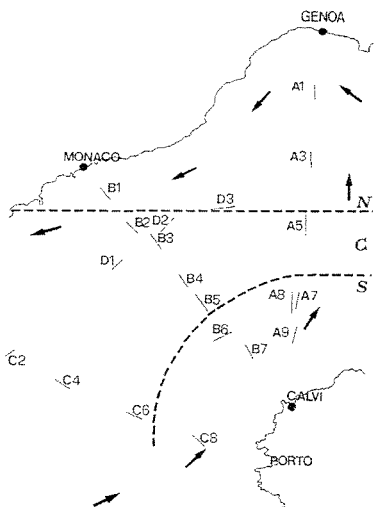


Fig. 1. Sampling stations (capital letters and numbers) and surface currents (arrows) are indicated. On the basis of sizes of *Sergestes arcticus*, three sectors (N. northern, C. central, S. southern) have been distinguished.

- a) Northern sector of the Basin, i.e. Stations A1, A3, B1, D3; *S. arcticus* is present with low densities (average 41.76 per haul) and large sizes (Fig. 2a).
 - b) Southern sector, on the Corsican side (St. A7, A8, A9, B6, B7, C8): the average number of shrimps is 54.34; a significant part of the length-frequency distribution is formed by small individuals (Fig. 2c).
 - c) Central sector encircled by the Liguro-Provençal front (St. A5, B2, B3, B4, B5, D1, D2, C2, C4, C6): samples are generally richer in number (N=66.3) and composed of both young (in lesser quantity) and adults (Fig. 2b).

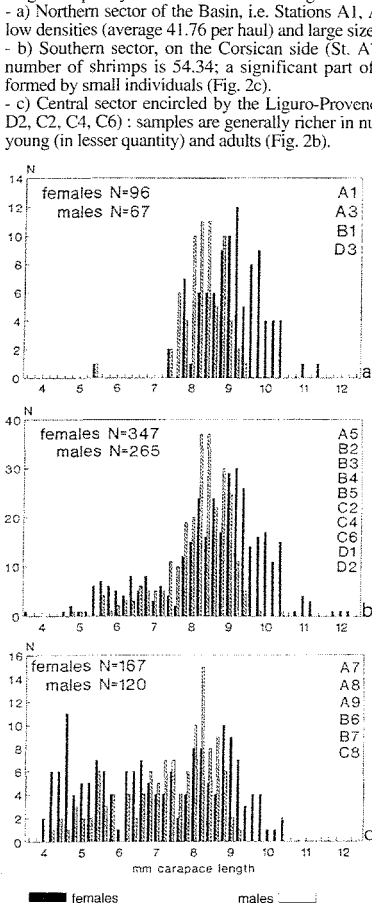


Fig. 2 a, b, c. Length/frequency distributions of *S. arcticus* recorded in the northern, central and southern sectors of the sampled area.

In our opinion the concentration of young individuals in the Corsican sector is of particular interest, indicating a nursery area which is probably fed from the South-West. In fact, it could be related to a drift along the Atlantic surface waters, a branch of which enters the Gulf of Genoa from the South along the West coast of Corsica. On the other hand, large individuals can move by means of the Liguro-Provençal coastal current towards the West, gaining a position from which eggs and larvae can return to the Corsican area. The overall drift of the shrimps is probably slower than the current gyre, given that *S. arcticus* moves daily up and down in the water column, touching water layers which have different speeds (the deepest layers are also the slowest). Young individuals could be transported more quickly because they inhabit higher waters than adults. We have recorded this general pattern of distribution of young and adults in other eurybathic crustacean decapods and euphausiids of the same area. Horizontal migrations necessary to complete the life cycle have been described in several species of Acetes (XIAO and GREENWOOD, 1993).

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