

MACROFAUNAL BENTHIC ASSEMBLAGES OF A CLAM-DREDGED SANDY BEACH IN THE GULF OF VALENCIA (WESTERN MEDITERRANEAN)

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Abstract

The macrofaunal benthic community of a sandy beach exposed to the effects of commercial clam dredging was studied to characterise the species distributions and assemblages. Two well-differentiated macrofaunal communities were found: a shallower one characterised by the bivalve *Donax trunculus* and the crab *Portumnus latipes*, occurring between 0.5 and 2.5 m depth, typical of fine and medium sandy sediments subjected to strong hydrodynamism, and a deeper, more diverse one, characterised by the bivalves *Chamelea gallina*, *Donax semistriatus*, *Mactra stultorum*, the gastropod *Nassarius mutabilis* and the crab *Liocarcinus vernalis*, typical of well sorted fine sand sediments.

Key words: beach, communities, Mediterranean, *Donax*, *Chamelea*

Sandy shores are dynamic environments which faunistic structure is determined by factors related with both the sediment and hydrographic characteristics. Infralittoral sandy beach ecosystems are often exploited by dredging for bivalves along the Mediterranean (1). One of such fisheries takes place along the Gulf of Valencia, the target species being the bivalves *Donax trunculus* and *Chamelea gallina* (2,3). The present study set out to characterise the distribution patterns of the two species and their associated communities in relation with depth and sediment characteristics.

Material and methods

Monthly samples were collected subtidally between June 1989 and May 1990 at two stations located in a sandy beach off Cullera (eastern coast of Spain; 39° 10' N, 0° 13' W). Sampling was performed between 0.5 and 6 m depth using an experimental dredge of 4.5x4.5 mm steel mesh-size. The abundance of all species was quantified. Percentage occurrence and mean density (number/m²) of each species was estimated per depth intervals. Bottom and surface temperature, salinity, oxygen content, granulometry and organic matter content of the sediment were taken at every station. Cluster and correspondence analysis methods were applied to the matrix of species density in each sample to analyse community composition and structure.

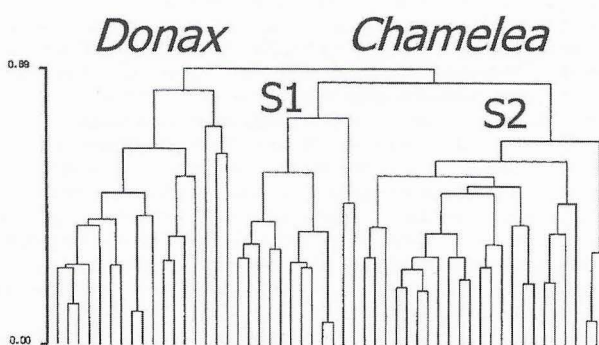
Table 1. Species collected in over 40% of the samples taken within each depth interval, listed in order of decreasing percentage occurrence. n = number of samples taken at each depth interval.

1.6-2.5 m		2.6-3.5 m	
n=15		n=13	
<i>Donax trunculus</i>	100.0	<i>Diogenes pugilator</i>	100.0
<i>Diogenes pugilator</i>	93.3	<i>Chamelea gallina</i>	92.3
<i>Chamelea gallina</i>	73.3	<i>Donax semistriatus</i>	92.3
<i>Portumnus latipes</i>	40.0	<i>Mactra stultorum</i>	69.2
		<i>Donax trunculus</i>	61.5
		<i>Siphonocetes sabatieri</i>	53.8

3.6-4.5 m		4.6-5.5 m	
n=11		n=14	
<i>Chamelea gallina</i>	100.0	<i>Chamelea gallina</i>	100.0
<i>Diogenes pugilator</i>	100.0	<i>Diogenes pugilator</i>	100.0
<i>Donax semistriatus</i>	90.9	<i>Donax semistriatus</i>	100.0
<i>Mactra stultorum</i>	90.9	<i>Nassarius mutabilis</i>	85.7
<i>Nassarius mutabilis</i>	90.9	<i>Spisula subtruncata</i>	78.6
<i>Spisula subtruncata</i>	81.8	<i>Mactra stultorum</i>	78.6
<i>Liocarcinus vernalis</i>	72.7	<i>Pandora inaequalis</i>	71.4
<i>Acanthocardia tuberculata</i>	63.6	<i>Liocarcinus vernalis</i>	57.1
<i>Macoma cumana</i>	45.5	<i>Acanthocardia tuberculata</i>	50.0
<i>Tellina nitida</i>	45.5	<i>Macoma cumana</i>	42.9

Results and discussion

A total of 18 bivalves, 7 crustaceans, 5 gastropods, 1 scaphopod, and 2 echinoderms was collected. The seven crustacean species included one amphipod, one penaeid and two caridean prawns, two brachyuran and one anomuran crabs. The commonest species within each depth stratum differed widely (Table 1), with a marked boundary found at around 3 m, which is confirmed by cluster (Fig. 1) and ordination analysis.



The specific diversity was much lower in the community of *D. trunculus*, in which two species, *D. trunculus* and *Portumnus latipes* accounted for most of the species abundance. The community of *C. gallina* showed a higher diversity, and was typically characterised by high densities of the bivalves *C. gallina* and *Spisula subtruncata*. Other characteristic species of this community were the bivalves *Donax semistriatus*, *Acanthocardia tuberculata*, and *Mactra stultorum*, the gastropod *Nassarius mutabilis*, and the swimming crab *Liocarcinus vernalis*. Densities of the hermit crab *Diogenes pugilator* were higher in this community than in the *D. trunculus* community, where this species occurred frequently, but with low densities.

The community of *D. trunculus* in the western Mediterranean can be established as characteristic of beaches of medium and fine sand subjected to a strong hydrodynamism (4). The community of *C. gallina* is found deeper, with a sediment characterised by a higher proportion of fine sand and lower hydrodynamism.

References

- 1 - Froglià C., and Bolognini S., 1987. Clam fishery with hydraulic dredges in the Adriatic Sea. *G.F.C.M. Stud. Rev.*, 62: 37-40.
- 2 - Ramón M., and Richardson C.A., 1992. Age determination and shell growth of *Chamelea gallina* (Bivalvia: Veneridae) in the western Mediterranean. *Mar. Ecol. Prog. Ser.*, 89: 15-23.
- 3 - Ramón M., Abelló P., and Richardson C.A., 1995. Population structure and growth of *Donax trunculus* (Bivalvia: Donacidae) in the western Mediterranean. *Mar. Biol.*, 121: 665-671.
- 4 - Zeichen M., Agnesi S., Mariani A., Maccaroni A., and Ardizzone, G.D., 2002. Biology and population dynamics of *Donax trunculus* L. (Bivalvia: Donacidae) in the South Adriatic coast (Italy). *Estuar. Coast. Shelf Sci.*, 54: 971-982.