

Beach shell assemblage at Rosebud, Victoria, Australia

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Abstract

A death assemblage of molluscs that had washed up on Rosebud Beach in Victoria, Australia was sampled by beachcombing the strandline in August 1982. A total of ten species belonging to bivalves were identified. Faunal analysis revealed that 60% of the specimens were sandy species, and the remaining 40% were rocky species. From the viewpoint of habitat preference, sheltered shore species were dominant, suggesting that the observed species composition represented fauna typical of an embayment environment. Long-term surveys of species diversity and species composition in marine environments is very important to evaluate environmental changes such as global warming and marine pollution.

Key words: Australia, beach shell, death assemblages, Rosebud, Victoria

Introduction

Mollusc shells are a common and important component of modern beach deposits (Davis 1985). Studies on beach shell assemblages of washed up shells are very common because the results can be used by paleontologists for paleoenvironmental reconstruction. While most such studies focus on taphonomic processes, such as transportation, breakage, sorting, erosion, and dissolution (Lutaenko 1994), more integrative approaches involve preserving the observed structure of these beach shell assemblages (Martin 1999).

In 1982, the late Dr. Noboru Suzuki, a botanist and biochemist, collected shells that had washed up on a sandy beach in Rosebud, Victoria, south Australia. Rosebud Beach, which is located to the south of Port Phillip, was considered to be a typical sandy beach with numerous stranded shells. This study was undertaken to examine the stranding of shells on the beach and to perform a faunal analysis of the beach shell assemblage.

In addition, the relationship between the species composition of the beach shell assemblage and the characteristics of the coastal environment were also considered.

Materials and Methods

The study site, Rosebud Beach, was located on the southern Port Phillip coast in Victoria, Australia (Fig. 1). The beach, which is popular with tourists, is composed mainly of fine- to medium-grained sand. The site consists of a sandy beach with a small rocky shore. Mollusc shells were collected along the beach on 23

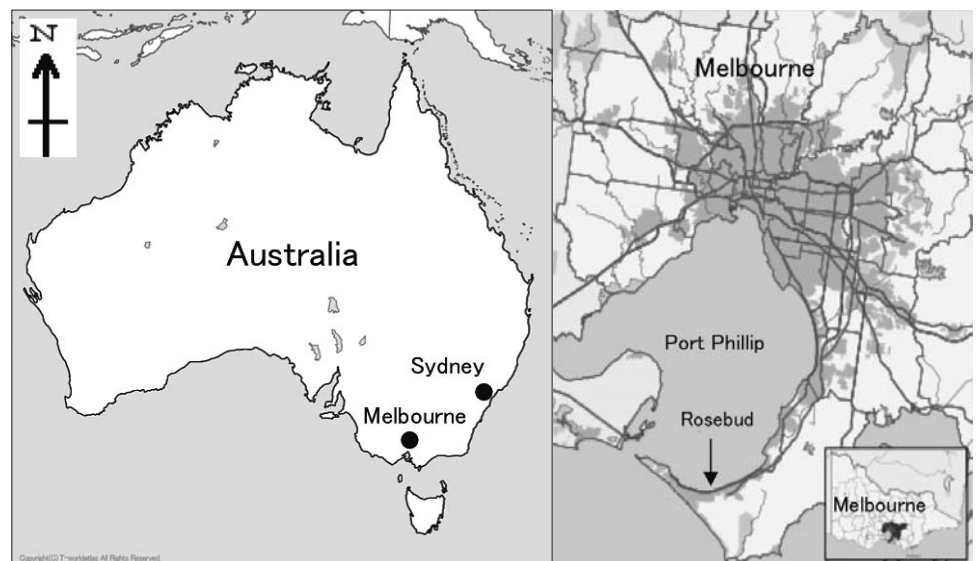


Fig.1 Map showing the study site along the Port Phillip coast in Victoria, Australia.

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August 1982.

The collected shells were identified to species based on published taxonomic literature (Macpherson and Gabriel 1962; Macpherson 1966; Lamprell and Healy 1992, 1998), and their ecological characteristics, such as substrate and habitat preference, were inferred based on previous studies (Wells 1984; O'Hara and Barmby 2000).

Results

The shell assemblage was comprised of a total of 10 species belonging to 7 genera in 7 families; all of the species were bivalves (Table 1). The dominant species were the scallop, *Pecten fumatus*, and the oyster, *Ostrea angasi* (Fig. 2).

The bivalve assemblage was dominated by species such as *Pecten fumatus*, *Ostrea angasi*, *Paphies elongata* and *Katelysia scalarina*, all of which were species that inhabit sandy and rocky substrate types (Fig. 3). Detailed faunal analysis revealed that 60% of the species in the assemblage were sandy species, and the remaining 40% were rocky species.

The habitat preference of the species in the shell assemblage could be characterized as belonging to one of two categories: sheltered shore environments and unspecified exposed or sheltered environments (Table 1). Within the context of habitat preference, sheltered shore species were generally abundant. Of the sheltered shore species, *Pecten fumatus* was the most abundant species.

Discussion

Figure 3 shows the different substrates associated with the mollusc death assemblage at the study site. Sandy bottom species were well represented in the shell assemblage as the study site was a typical sandy beach. The presence of rocky species in the shell assemblage could be attributed to the small rocky shore at the study site.

Table 1 shows the relative proportion of the habitat types associated with the beach shell assemblage collected at the study site. Sheltered shore species were generally more abundant in the shell assemblage. The dominance of sheltered shore species could be attributed to the sandy beaches of the estuaries surrounding the



Fig.2 Drifted shells of Rosebud Beach. A. *Pecten fumatus*, B. *Ostrea angasi*.

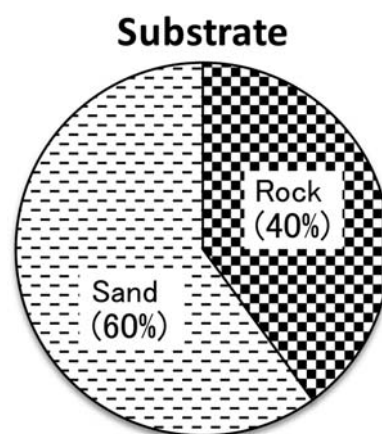


Fig.3 Proportion of substrate types associated with the molluscan death assemblage.

Table 1 Faunal list of beach shell assemblage in the study site

Specific name	Substrate	Habitat	Abundance
(Bivalvia)			
<i>Mytilus galloprovincialis</i>	R	S	R
<i>Mytilus sp.</i>	R	N	R
<i>Pecten fumatus</i>	S	S	A
<i>Pecten sp.</i>	S	N	R
<i>Ostrea angasi</i>	R	S	C
<i>Ostrea sp.</i>	R	N	R
<i>Fulvia tenuicostata</i>	S	S	R
<i>Paphies elongata</i>	S	S	C
<i>Soletellina biradiata</i>	S	S	R
<i>Katelysia scalarina</i>	S	S	C

Substrate; R: Rock, S: Sand.

Habitat; S: Sheltered shore, N: Not specified

Abundance; A: Abundant, C: Common, R: Rare.

embayment.

Based on the presence of both cold- and warm-water species at the site, the beach shell assemblage at Rosebud in Victoria can be considered typical of a temperate region (Macpherson and Gabriel 1962; Macpherson 1966). Recently, however, the incidence of endemic species in the Port Phillip Bay area has been decreasing (O'Hara and Barmby 2000; Boyd 2012). It is possible that an increase in the populations of *Mytilus galloprovincialis* and other exotic species along Port Phillip Bay could be due to an increase in sea surface temperatures and marine pollution along the Victoria coast (O'Hara and Barmby 2000).

From the viewpoint of habitat, sheltered shore species were generally more abundant in the shell assemblage. Long-term records of the faunal components of beach shell assemblages are considered important for monitoring increases in sea surface temperatures and marine pollution.

As the coastal marine environment is subjected to extensive anthropogenic changes, such as global warming and marine pollution, conducting long-term surveys of species diversity and species composition in marine environments is also considered very important.

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オーストラリア、ビクトリア州ローズバッドの打ち上げ貝群集

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要 旨

1982年、オーストラリア、ビクトリア州ローズバッドの打ち上げ貝を、ビーチコーミングにより採集した。打ち上げ貝群集は二枚貝10種から構成され、砂底種が60%で卓越し、残り40%が岩礁種であった。また、生息域に注目すると、大半が波浪の弱い海岸の種で占められていた。これは打ち上げ貝群集の構成が、内湾の砂浜群集に由来することを示唆する。海洋環境における種多様性や種構成の長期的な調査は、温暖化や海洋汚染のような環境変化を評価するのに重要である。

