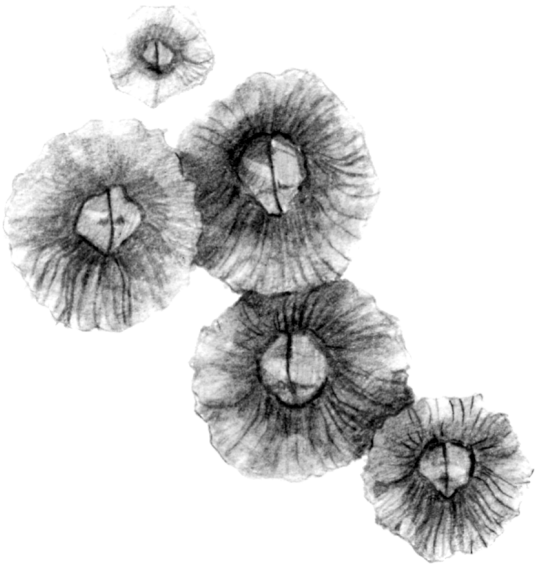
OF BARNACLES AND BASSINIAN LAND BRIDGES

...Dale Appleton **(Parks Victoria)**
...Drawings Kaye Traynor

Hidden under the waves of the Surf Coast lies a tale of population diversity, and hitherto unknown relationships within a species of Surf Barnacle. Modern population genetics has given us insight into ocean current dynamics in times of much lower sea surface levels than those of today.

The Surf Barnacle *Catomerus polymerus* was first described by Charles Darwin in 1854. It is found only on exposed shores, usually on reefs with breaking surf. Commonly found in large numbers, the barnacle lives in the mid-tidal zone. The species occurs from southern Queensland, south along the New South Wales coast, to the southern tip of Tasmania. Its distribution also extends westward along the Victorian and South Australian coasts towards the Great Australian Bight.



The shell is flat, and composed of many plates, which get smaller toward the outer extremities. Specimens can reach a diameter of 30 mm. The shell is perfectly adapted to surviving in wild surf on very exposed sites.

Finding the species is easy, although not without hazard. The preference for high energy, intertidal sites, presents the searcher with options of searching on flat calm days, while still being at risk from waves. The very tip of Point Addis, and the outer section of Eagle Rock, are two locations within the Otway Marine Protected Areas that have healthy populations.

So how do barnacles disperse, and just how do they manage to jump seemingly large gaps in habitat, for instance, the Ninety Mile beach and the Coorong? Both are places without any high-energy reefs to speak of, yet *C. polymerus* has managed to overcome those obstacles.

Barnacles undergo a two-phase life cycle of planktonic larval form and sessile adult form. The planktonic larvae can thus disperse in oceanic currents. The knowledge that laval gene flow should follow ocean currents, past and present, represents an opportunity to study the population genetics of *C. polymerus,* and perhaps infer dynamics of the southern ocean in time past.

We know that 10,000 years ago, sea levels were perhaps 100 m, or more, lower than today. A land bridge, the Bassinian Plain, connected Tasmania to mainland Australia. Our coast was nothing more than a series of hills, giving way to coastal plains, no doubt covered in thousands of hectares more of heath. What happened when the sea rose to flood, and then cut off Tasmania? Where did our *C. polymerus* come from? How did they colonise newly carved, rocky shores?

Kate York, as part of a PhD project at the Department of Genetics, University of Melbourne, decided to find out. Sampling the SE coast of Australia from Cape Carnot in South Australia, via Tasmania though to Charlotte Head in southern QLD, she built a population library of *C. polymerus.* Analysis of that library revealed a fascinating story.

As the waters warmed and rose some 10,000–12,000 years ago, the western extents of Bass Strait flooded first, before the eastern side breached. The Zeehan current carried *C. polymerus* larvae from South Australia across Bass Strait to the western coast of Tasmania. On the way, some of the larvae found our shores, and established the species there.

Rather remarkably, the currents then continued to sweep larvae around the southern shores of Tasmania, and then northward up the east coast of Tasmania, and onto the coast of the Mornington Peninsula and central Bass Strait.

Our Surf Coast *C. polymerus* are thus most closely related to individuals from Portland than they are to individuals from Sorrento. Sorrento *C. polymerus*, having made a journey of some thousands of sea miles, ended up as near geographic neighbours, but distant cousins genetically.

The effect on population diversity, caused by current flow around SE Australia, is of significance when considering marine pest response, and marine pollution events. The humble Surf Barnacle, and the story of its journey from around Tasmania and back to the Victorian coast, may yet prove to be knowledge vital in minimising impact from some future event.

Reference: Katherine L York, Mark J Blacket, Belinda R Appleton 2008, 'The Bassian Isthmus and the major ocean currents of southeast Australia influence the phylogeography and population structure of a southern Australian intertidal barnacle *Catomerus polymerus* (Darwin)' in *Molecular Ecology* vol. 17, Issue No 8, Pages: 1948–1961