CHAIRPERSON'S INTRODUCTION

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The importance of measuring physical variables in conjunction with biological sampling of the ocean has been emphasized by many, and reviewed by Legendre and Demers (1984). For example Frank and Leggett (1985) showed that reciprocal oscillations in gelatinous predators and larval fish prey were the result of water mass replacement, driven by onshore/offshore winds, and were not the result of classic Lotka-Volterra dynamics. Similarly, the pursuit of a simplistic grid of stations to determine the distribution and abundance of ichthyoplankton may be misguided and prone to high variance, due to aggregation processes that occur around flotsam, fronts, eddies, shear zones and other linear oceanographic features (Wolanski and Hamner 1988; Kingsford 1990). The aim of this session is to examine some of the interactions between physical features and larval ecology.

One of the first Australian studies to consider the interaction of biota with oceanographic features was the transport of larval phyllosoma of the western rock lobster (reviewed in Phillips 1981). Another early study was on the effects of a mesoscale eddy of the East Australian Current (EAC), by Brandt and Wadley (1981). Today, with satellite imagery we are now far more aware of the nature of large scale features such as the EAC and its eddies, the Flinders Current, the Leeuwin Current and the impacts of El Niño-Southern Oscillation (ENSO) events (Jeffrey *et al.* 1990). There have been other notable Australasian studies on the effects of oceanographic processes on larval distributions, which include larval prawn transport in the Gulf of Carpentaria (e.g. Vance *et al.* 1985), the seasonal distribution of larval fish off the northwest shelf (Young *et al.* 1986), and the distribution of larval blue grenadier off the west coast of Tasmania (Thresher *et al.* 1989), and the west coast of New Zealand (e.g. Murdoch *et al.* 1990). We should give greater recognition to the fundamental contribution of these and other recent larval studies (see summary of literature on fish larvae by Miskiewicz this meeting) to the management of our coastal fisheries. The recent shift in some quarters from larval research to strictly adult fish biology is as shortsighted as ignoring environmental considerations in order to create jobs. A major new frontier in larval biology and fisheries management is the spatial and temporal distribution of spawning effort in Australia's temperate fisheries, and the influence of sporadic upwelling (Jeffrey *et al.* 1990) or run-off.

On the Great Barrier Reef, physical and biological oceanographers are investigating the effects of circulation and riverine inputs on the larvae of the Crown-of-Thorns starfish. Are outbreaks of the starfish due to nutrient inputs or altered circulation features? In a similar vein, Simon Thorrold and David McKinnon report in this Session on the coastal boundary layer off Townsville, where consistently high abundances of larval fish are observed. They also discuss the effects of massive riverine inputs from Cyclone

Joy in January 1991 on the larval distributions in this boundary layer, and on primary and secondary production.

On the east coast of the north island of New Zealand, John Booth and Robert Stewart show the influence of the East Cape Current, and the role of hydrographic features assisting larval retention and settlement of lobster puerulus.

Off eastern Tasmania, Alan Jordan discusses the role of the East Australian Current and the influence of the 1988/89 ENSO event, which may have altered not only the distribution of spawning effort by jack mackerel, but also reduced the trophic links in this area, and resulted in the low production of a variety of fish larvae.

The Spencer Gulf of South Australia supports a valuable fishery for King George whiting; however we know little about the distribution and transport of the larvae. The circulation features are complicated during the summer by a strong front across the mouth of the Gulf, generated by the net evaporative loss at the head of the Gulf (an "inverse estuary"). Barry Bruce in his presentation discusses the age and growth of whiting larvae in the Spencer Gulf, and summarises how the front acts as a barrier to the exchange of larvae with the ocean. He shows a remarkable diversity of larvae in the area, and how the distribution of larvae around the front appears sometimes to be taxon-specific - showing yet again that there are no generalised larval models of dispersal.

At a much finer scale, Aldo Steffe and Mark Westoby examine the effects of an estuarine eddy on the horizontal and vertical distribution of larval fish in Botany Bay, and focus our attention on the ontogenetic development and subsequent behaviour of larvae, and the critical role of the swim bladder. How do fish larvae maintain their distribution in a tidally mixed estuary with a net outflow?

The Workshop's keynote addresses by Rob Murdoch and John Zeldis, and the summaries by the five panellists of this session, as well as other on-going larval research by the Australian oceanographic community (such as on reef fishes, abalone, prawns, scallops, spanner crabs, estuarine plumes and sewage plumes), all highlight the importance of hydrographic features in influencing the distribution of larvae and ultimate recruitment success. During this session, and the discussion, we shall be reminded of the inadequacy of most physical, numerical models in describing larval transport. This is due to unrealistic assumptions of larvae as passive particles, and to our preference for 2-dimensional, depth-averaged models. Mike Sinclair has speculated privately that Australia's relatively small fish-landings may be due not only to general nutrient impoverishment, or to the narrow continental shelf, but perhaps to the lack of topographic and hydrographic features that provide larval retention areas. Hopefully, with new ideas (and new technologies), this workshop should stimulate many of us to address the importance of hydrographic features in larval ecology.

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