FOREWORD

MINI-SYMPOSIUM: BEHAVIORAL ECOLOGY OF CRUSTACEANS

Crustaceans are common and conspicuous in a wide range of environments, particularly in the marine realm. Despite their high diversity and abundance, many aspects of their natural history and general biology remain little known. The diversity and often contrasting life history strategies of crustaceans make it difficult and in some cases impossible to generalize broadly. Among the many topics treated in comparative studies of crustaceans, their behavioral ecology has received increasing interest.

In Chile, crustacean research has a long tradition starting with the Abbot Juan Ignacio Molina in 1782, and including Nicolet in 1849 using material collected by Claudio Gay, Philippi in the mid-eighteen hundreds, and Carlos Porter, the founder of the Revista Chilena de Historia Natural, with over 50 publications at the beginning of the 20th century. While in the 1800's and 1900's research was primarily oriented towards taxonomy, the emphasis during the last two decades of the 20th century shifted towards ecological studies. The rise of important crustacean fisheries (shrimps and crabs) along the Chilean coast has been accompanied by an increasing number of studies of their population biology leading to the current interest in their behavioral ecology. The topics of these studies include reproductive behavior, larval biology, parental care, recruitment processes, species interactions, feeding ecology, predator-prey interactions and parasite-induced changes in their behavior.

The lectures presented at the Mini-Symposium "Comportamiento de Crustaceos" held in Valdivia (Chile) in May of 2002 covered each of these wide-ranging topics and most of the contributions from the mini-symposium are published here. Fernández & Brante used novel techniques to measure the effects of the brooding behavior of brachyuran crabs on embryonic development and oxygen consumption. Provisioning of developing embryos with oxygen causes energetic costs to brooding females. These costs can be considerable, and the authors suggest that they may have important effects on life history evolution. Upon completion of embryo incubation, females release larvae at very specific moments. The temporal cueing of larval release to environmental conditions (e.g., spring tides) has been demonstrated for a variety of estuarine species, in many of which the larvae are transported by tidal currents to the mouth of estuaries and offshore. Christy in his contribution provides evidence that synchronization of larval release is a mechanism to avoid predation on larvae by water column predators. Following completion of the larval cycle, competent larvae need to find adequate habitats to settle.

When these habitats are not available, larvae can delay settlement, but Gebauer et al. show that this capacity is limited in decapod larvae and even spontaneous metamorphosis may occur. Further, delaying metamorphosis may have consequences later in life by negatively affecting juvenile size and growth.

The first juvenile stages of many decapod crustaceans are very susceptible to predation, but one mechanism to reduce predation risk is to be cryptic. Recent studies by Palma et al. have revealed that the juvenile stages of many benthic decapods are cryptically colored. Upon growing to larger sizes these decapods become less susceptible to predation and lose their cryptic coloration. Caridean shrimp are vulnerable to predators throughout life and this may have important consequences for their reproductive behavior. Mating is comparatively brief in caridean shrimp, and most species lack precopulatory mate guarding as revealed in the review by Correa & Thiel. Following fertilization almost all crustaceans incubate their embryos and, while most species release pelagic larvae, several continue to care for their offspring up to late juvenile or even adult stages. Extended parental care may have important consequences for their population dynamics. Direct development may also be advantageous for species that travel on floating substrata as suggested in the review by Thiel.

In summary, crustacean behavior is diverse and determined by a variety of extrinsic and intrinsic factors. Most contributors noted that many topics in crustacean biology can be profitably studied with local species from Chile. We encourage students of marine biology to use crustaceans as model organisms in order to address topical questions in ecology and evolution.

Our thanks go to the editors of Revista Chilena de Historia Natural to unite these contributions in this issue, and to the Sociedad de Ciencias del Mar for providing the space during its XXII Congress in Valdivia in 2002. In particular, we

thank Iván Gómez for his enthusiastic support of the Mini-Symposium. Finally, we hope that the stimulating atmosphere at the Mini-Symposium may be a first step to future meetings and collaborative studies on the behavioral ecology of Crustaceans.

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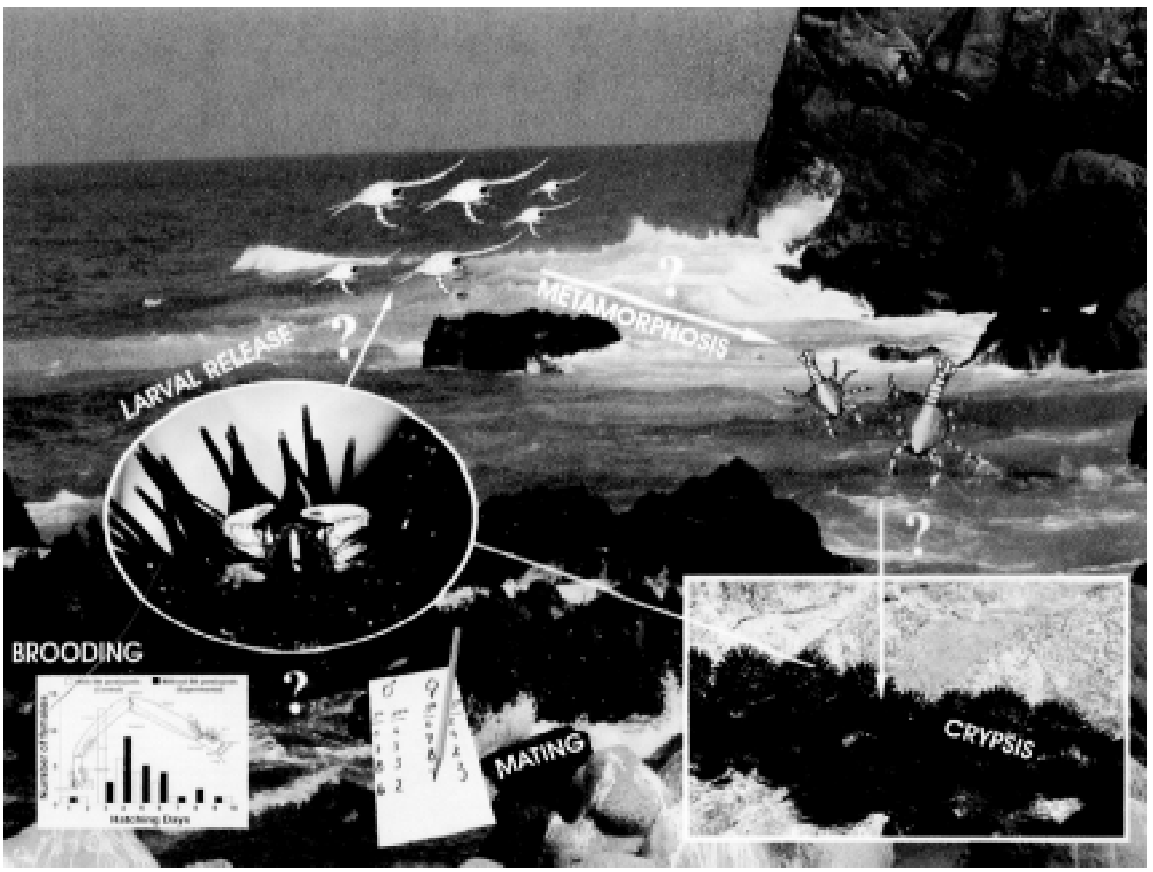

Fig. 1: The life history of *Liopetrolisthes mitra*, a common crab from the Pacific coast of Chile, illustrating some of the important problems in crustacean behavioral ecology; insert on lower left modified after Förster & Baeza (2001); figure prepared by Iván Hinojosa.

Historia de vida de *Liopetrolisthes mitra*, un cangrejo común de la costa Pacífica de Chile, ilustrando alguno de los tópicos importantes del comportamiento en crustáceos; inserto modificado según Förster & Baeza (2001); figura preparada por Iván Hinojosa.