

THE USE OF NULL MODELS TO EXPLAIN CRUSTACEAN  
ZOOPLANKTON ASSOCIATIONS IN SHALLOW WATER BODIES  
OF THE MAGELLAN REGION, CHILE

BY

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ABSTRACT

Southern Patagonia is characterized by the presence of numerous shallow ponds with variable trophic and conductivity conditions, and a relatively high species richness of Crustacea. In the present study, published information and data collected in field work on shallow ponds in the Magellan region was reviewed and analysed using co-occurrence of null models, with the aim to determine potential random factors as regulators on crustacean zooplankton assemblages, using a presence-absence matrix. The results of C-score analysis revealed the existence of non-random effects mainly in data collected in 1989-1990 for Torres del Paine National Park, and in data on coastal shallow ponds close to Punta Arenas, collected in October 2006. A different situation is reported for shallow ponds located in other zones of the Magellan region, including also some in the Torres del Paine National Park collected in October 2001, and for shallow ponds close to Porvenir on Tierra del Fuego Island, collected in April 2007. The existence of non-random effects was probably due to markedly different zooplankton assemblages, assumed to be caused mainly by the conductivity gradient and trophic level. Random effects can probably be explained by the condition that a few species occur practically at all localities studied, in many of which species richness is very low. This obviously means the variability in species composition is very limited, yielding similar zooplankton assemblages in the many ponds sampled. Ecological and biogeographical topics are also discussed.

RESUMEN

La zona sur de la Patagonia se caracteriza por la presencia de numerosas lagunas poco profundas, con diferentes condiciones tróficas y de conductividad y relativamente alta riqueza de especies. En el presente estudio se consideró información publicada y datos colectados en trabajos de campo en la región de Magallanes, esta información fue analizada sobre la base de modelos nulos de co-ocurrencia, con el objetivo de determinar potenciales efectos aleatorios en la composición de los ensambles de crustáceos zooplanctónicos, usando una matriz de presencia y ausencia. Los resultados del factor C-score, revelaron la no existencia de efectos aleatorios principalmente en datos colectados para el Parque Nacional Torres del Paine en 1989-1990, y lagunas costeras cercanas a Punta Arenas

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en Octubre de 2006. Una situación diferente se reportó en lagunas superficiales en diferentes lagunas de la región de Magallanes, incluido el Parque Nacional Torres del Paine colectados en Octubre de 2001, y lagunas superficiales cercanas a Porvenir en la Isla de Tierra del Fuego colectadas en Abril de 2007. La ausencia de efectos aleatorios se debió probablemente al gradiente de conductividad y de condiciones tróficas. Mientras que la existencia de efectos aleatorios, se debió probablemente a pocas especies que se encontraron en prácticamente todos las localidades estudiadas, muchas de las cuales tuvieron bajo número de especies, esto obviamente significa que la variabilidad en composición de especies es limitada, obteniéndose similares patrones en las asociaciones de especies zooplanctónicas en los sitios estudiados. Se discutieron aspectos ecológicos y biogeográficos en el presente estudio.

### INTRODUCTION

Zooplankton assemblages in the shallow water bodies of southern Patagonia are characterized by their marked dominance of calanoid copepods, especially in conditions of oligotrophy and low to moderate conductivity (Soto & De los Ríos, 2006). Also, there is a marked endemism in the species found, some of which have been described mainly from southern South America and the Subantarctic islands (Bayly, 1992a, b; Menu-Marque et al., 2000). Ecological studies on southern Patagonian shallow ponds have established that in permanent water bodies conductivity and chlorophyll *a* concentration are the main regulatory factors for the structure of crustacean zooplankton communities (Soto & De los Ríos, 2006). In fact, at low conductivity and mesotrophy, daphnids are dominant and a relatively high species richness is found, whereas if those two conditions are absent, low species richness (De los Ríos, 2005) and a high dominance of calanoid copepods are observed (Soto & De los Ríos, 2006). A similar condition

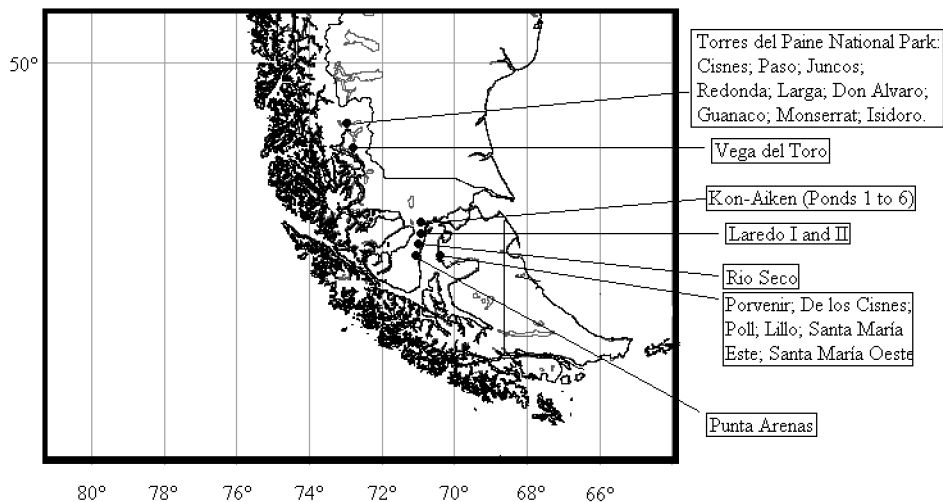


Fig. 1. Map of the Magellan region with indication of the sites (ponds) included in the present study.