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978-0-521-11179-9 - Antarctic Communities: Species, Structure and Survival

Edited by B. Battaglia, J. Valencia and D. W. H. Walton

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Understanding the development of communities, describing their structure and characterizing their function, are major objectives of ecologists worldwide. Such understanding is becoming increasingly important with the recognition that the conservation of biodiversity is best achieved through the management of natural communities. Progress remains slow, with community diversity still incompletely characterized, competitive interactions between species at only an early stage of understanding and the stability and resilience of any community the subject of debate. The study of Antarctic communities can provide a valuable step forward in investigating the controls on community development, the utilization of habitats and the interaction between species in both species-rich and species-poor communities. This book contains chapters characterizing the present approaches to both aquatic and terrestrial communities in the Antarctic. From biodiversity to trophic flows, from ecophysiological strategies to the impacts of environmental change and the effects of human disturbance, this volume provides an up-to-the-minute overview of community studies in terrestrial, marine and freshwater ecosystems of the Antarctic and the Southern Ocean.

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Preface

For many disciplines Antarctic science has been traditionally viewed as of regional interest only, and thus far removed from the vanguard of important advances. Its practitioners were often considered as narrowly focused with data of little general relevance to the discipline. In 1995 these ideas are very far from reality with Antarctica contributing both to the investigation of global problems and to major scientific advances. This is especially true of biology, where the development of commercial exploitation in fishing and tourism and the effects of enhanced UV on the biota have produced a wide range of new research programmes investigating both fundamental and applied science problems. Despite all the pressures towards increasing specialization it has still remained possible to organize meetings at which the Antarctic ecosystem can be treated as a whole. This holistic approach has been evident for the last 30 years and this symposium in Venice marked a further milestone in progress.

The meeting from which these papers were taken was the sixth biological symposium sponsored by the Scientific Committee on Antarctic Research (SCAR). It was held at "Le Zitelle" Centre in Venice, Italy from May 30 to June 3, 1994 at the invitation of the SCAR Italian Committee and the Programma Nazionale di Ricerche in Antartide (PNRA). Previous symposia were held in Paris, France, 1962, Cambridge, England, 1968, Washington DC, USA, 1974, Wilderness, South Africa, 1983 and Hobart, Australia, 1988. The proceedings were edited by Carrick & Prevost (1964), Holdgate (1970), Llano (1977), Siegfried, Condy & Laws (1985) and Kerry & Hempel (1990), respectively. Each stands as a major landmark in the development of biology in the Antarctic and provides a clear indication of what were some of the major science preoccupations of the time.

The earlier symposia addressed very general subjects and published all the papers offered. This has now become impossible and present policy is to decide on a key area of interest and organize the meeting around it. The central focus of this symposium was at the level of the community. A clear understanding of the community species composition, structural relationships and survival strategies is essential for an understanding of ecological processes. Major programmes on the effects of global change, the need to predict and monitor impacts, the importance of conservation and environmental management

measures, and the development of models have all made community research more important.

The meeting was attended by 334 registrants representing 25 nations. There were 53 oral papers, including 10 keynote papers. At the ten poster sessions 252 posters were displayed. From all of this material the Steering Committee selected 63 papers, chosen to illustrate in a coherent fashion the range of current research related to communities. All of these were peer reviewed and revised before inclusion in this volume.

At the end of the symposium in Hobart five people gave overviews of key groups and G. Hempel suggested what might constitute future research needs. In attempting to look forward Hempel suggested that, in the marine ecosystem, the benthos was in particular need of closer attention, long-term studies were required to 'observe the development of plankton blooms, grazing by krill swarms and to measure vertical fluxes' and sea ice should be a major focus for interdisciplinary studies utilizing shipborne work and remote sensing. He highlighted the gains to be expected from detailed comparisons between communities, their structure, dynamics and productivity, and recommended the value of ecophysiological studies on terrestrial communities as a useful contribution to global change studies. Noting the importance of taxonomy to all future studies on terrestrial and limnic systems he highlighted the need for basic descriptions of communities and better soils information as key constituents of any sound management and conservation policies.

How far have we come in these fields since Hobart? The structure of the symposium reflected some of Hempel's concerns. Sessions for oral presentations and posters were focused on: Biodiversity, Microbial Ecology, Planktonic Processes, Ecophysiology, Benthic Ecology, Bird and Mammal Population Dynamics, Biochemical Adaptations, Resources and Seasonality, Human Impact, and Environmental Change. There was strong emphasis on community research in each field and a strong showing for global change and human impact. Not presaged by Hempel was a significant number of contributions on molecular ecology and biology, clearly a developing field with a great deal to offer to evolution, population biology and adaptation. There was little evidence of a general increase in studies on soils, but the value of plants as indicators of climate change has been recognized. In the marine field there continued to be

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detailed studies on zooplankton and on phytoplankton with increased studies on benthos in shallow water. The lack of contributions to the meeting on birds and seals was not an indication of a decline in research on these groups but more a clash with other international meetings.

In preparing this volume we have selected important examples from the range of material presented in Venice to indicate progress in a wide variety of related fields. Each section is introduced by the Editors to indicate the way in which the papers answer key questions and how these many individual efforts take our understanding of community ecology forward.

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November 1995

B. Battaglia
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The organization of the Symposium was undertaken by an International Steering Committee, constituted by Professor J. Valencia (Chile) Chairman, Dr P. Shaughnessy (Australia) Secretary, Professor B. Battaglia (Italy), Dr D.W.H. Walton (UK), Dr R.I. Lewis Smith (UK), Dr G. Hubold (Germany), Dr J.P. Croxall (UK), Dr W. Arntz (Germany), Dr D. Siniff (USA), G. di Prisco (Italy) and Dr R.M. Laws (UK). A local organizing committee under the leadership of B. Battaglia and including P.M. Bisol, L. Dalla Venezia, A. Libertini, T. Patarnello, V. Varotto and A. Zitelli provided crucial assistance in preparing the programme of events, printing and distributing information on the meeting and making arrangements in Venice. Of particular relevance were, in this context, the contributions of Luisella Dalla Venezia and Vittorio Varotto, greatly helped by the effective cooperation of Francesca Pirazzoli of ENEA, Caterina Dal Pra of 'Le Zitelle' Centre, and Stefania Marcato of the Biology Department, University of Padova. Special administrative and secretarial assistance was efficiently provided by Francesco Gratteri and Cecilia Zattara, Biology Department, University of Padova.

The meeting was organized under the auspices of the Scientific Committee on Antarctic Research and the patronage of the Accademia Nazionale dei Lincei, Istituto Veneto di Scienze, Lettere ed Arti, University of Venice, University of Padova, Regione Veneto, Provincia di Venezia and Comune di Venezia. Considerable financial support was provided by the Italian Antarctic Research Program (MURST, ENEA, CNR). The administrative aspects were taken care of by ENEA. Other financial support was received from: Consorzio Venezia Nuova, Tecnomare S.p.A., Ligabue Catering S.p.A., Societa' Italiana per il Gas p.a., Assicurazioni Generali S.p.A., Italteam Shipping s.r.l. and Datamat Ingegneria dei Sistemi S.p.A. Certain events were made possible thanks to contributions of the Universities of Venezia and Padova.

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Producing a volume of this length and complexity is a time-consuming task in which the Editors need substantial help from authors and the community at large. The Editors wish to sincerely thank all those listed below who assisted in the refereeing process which has, as always, markedly improved the quality of the final contributions. It had been the Editors' expressed intention to publish the volume earlier but this depended on the timely co-operation of all the authors and reviewers involved. Unfortunately, there were significant delays in finding reviewers willing to undertake the task for many of the papers, many authors took considerable periods to provide the revisions of their manuscripts and many authors failed to follow the manuscript preparation instructions, greatly increasing the editorial work. We can only apologise for the delay to those who did make every effort to meet the original deadlines.

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