

CONTENTS

INTRODUCTION

Foreword to the Symposium on Genetic Engineering of Osmoregulation	xiii
Alexander Hollaender	
Biological Strategies for Osmoregulation	1
D. W. Rains and R. C. Valentine	
Response of Plants to Saline Environments (Plenary Lecture)	7
E. Epstein	
Agrobacterium Ti Plasmids as a Tool for Genetic Engineering in Plants (Recent Advances in Genetic Engineering)	23

SECTION I -- OSMOREGULATION IN PROKARYOTIC MICROORGANISMS

The Role of L-Proline in Response to Osmotic Stress in <u>Salmonella typhimurium</u> : Selection of Mutants with Increased Osmotolerance as Strains Which Over- Produce L-Proline	35
Laszlo N. Csonka	
Effect of Electrolytes on Growth of Mutant Bacteria	53
T. Kohno, M. Schmid, and J. R. Roth	
β -Galactosidase from Osmotic Remedial Lactose Utilization Mutants of <u>E. coli</u>	59
R. T. Vinopal, S. A. Wartell, and K. S. Kolowsky	

SECTION II -- OSMOREGULATION IN EUKARYOTIC ORGANISMS

Osmoregulation in Yeast	75
A. D. Brown and Margaret Edgley	

Osmoregulation in the Halophilic Algae	
<u>Dunaliella</u> and <u>Asteromonas</u>	91
Ami Ben-Amotz and Mordhay Avron	

Ions and Osmoregulation	101
J. A. Raven, F. A. Smith, and S. E. Smith	

PANEL DISCUSSION

Molecular Biology of Osmoregulation	119
Discussants: R. C. Valentine (Chair), J. Roth, R. T. Vinopal, L. Csonka, A. D. Brown, J. Raven, and A. Ben-Amotz	

SECTION III -- OSMOREGULATORY MECHANISMS IN PLANTS

The Role of Organic Solutes in Osmoregulation in Halophytic Higher Plants	135
R. L. Jefferies	

An Assessment of Quaternary Ammonium and Related Compounds as Osmotic Effectors in Crop Plants	155
R. Gareth Wyn Jones	

Integration of Photosynthetic Carbon Metabolism During Stress	171
C. B. Osmond	

Energy Cost of Ion Transport	187
B. W. Veen	

SECTION IV -- MECHANISMS OF DROUGHT AND COLD TOLERANCE IN PLANTS

Osmoregulation in Plants During Drought	199
J. S. Boyer and R. F. Meyer	

Membrane Dynamics: Effects of Environmental Stress	203
M. J. Saxton, R. W. Breidenbach, and J. M. Lyons	

A Unified Concept of Stress in Plants?	235
Peter J. Steponkus	

PANEL DISCUSSION

Osmoregulation in Higher Plants	257
Discussants: R. H. Nieman (Chair), J. S. Boyer, R. W. Breidenbach, R. Jefferies, C. B. Osmond, P. Steponkus, and R. G. Wyn Jones	

SECTION V -- APPLICATIONS FOR PLANT IMPROVEMENT

Selection of Salt-Tolerant Plants Using Tissue Culture	279
D. W. Rains, T. P. Croughan, and S. J. Stavarek	
Breeding Salt-Tolerant Crop Plants	293
J. Norlyn	
Genetic Methods to Breed Salt Tolerance in Plants	311
R. T. Ramage	

SECTION VI -- NSF - CORNELL WORKSHOP

Genetic Engineering of Halotolerance in Microorganisms: A Summary	321
A. A. Szalay and R. E. MacDonald	

SECTION VII -- DISCUSSION BY NATIONAL RESEARCH AGENCIES

Introductory Statements	335
A. Hollaender, Associated Universities, Inc.	
G. Brosseau, National Science Foundation	
The Biosaline Concept: An Opportunity for Research and Development	339
O. Zaborsky, National Science Foundation	
The IBR Concept and Plant Sciences	345
Lewis G. Mayfield, National Science Foundation	
Osmoregulation and Biological Energy Production	351
R. Rabson, Department of Energy	
Research Programs of the U. S. Salinity Laboratory	355
Richard H. Nieman, U. S. Department of Agriculture	

POSTER SESSION -- ABSTRACTS FROM CONTRIBUTORS	359
---	-----

LIST OF PARTICIPANTS	369
--------------------------------	-----

INDEX	375
-----------------	-----