TABLE OF CONTENTS

Preface

Joe H. Cherry	
CHAPTER ONE: DROUGHT STRESS	1
Water Use Efficiency in Water and Salt Stressed Lycopersicon pennellii and Lycopersicon esculentum Plants Y. Vaadia	3
Water Stress and Stem Conductivity H.G. Jones	17
Metabolic Consequences of Seed Maturation Drying A.R. Kermode	25
Abscisic Acid as a Factor in Modifying Drought Resistance S.A. Quarrie	27
Breeding Methods for Drought Resistance A. Blum	39
Amino Acid Metabolism in Relation to Osmotic Adjustment in Plant Cells D. Rhodes and S. Handa	41
Betaine Synthesis as a Component of Osmoregulation A.D. Hanson, P. Weigel and C. Lerma	63
Biochemical and Genetic Characterization of Betaine Aldehyde Dehydrogenase E.A. Weretilnyk and A.D. Hanson	65
Osmotin: A Protein Associated with Osmotic Stress Adaptation in Plant Gells	
N.K. Singh, D.E. Nelson, P.C. LaRosa, C.E. Bracker, A.K. Handa, P.M. Hasegawa and R.A. Bressan	67
Salmonella typhimurium Mutants that are Not Stimulated by Glycinebetain Media of Elevated Osmolarity	ne
J.A. Gutierrez and L.N. Csonka	89
CHAPTER TWO: SALINITY STRESS	99
Effects of Salinity on Plant Growth and Crop Yields T.J. Flowers and A.R. Yeo	101
The Possible Role of Various Membrane Transport Mechanisms in Adaptation to Salinity	
L. Reinhold, Y. Braun, M. Hassidim and H.R. Lerner	121

The Role of Calcium in the Regulation of Membrane and Cellular Growth Processes under Salt Stress A. Lauchli and S. Schubert	131
Mechanisms of Adaptation to Salinity in Cultured Glycophyte Cells M.L. Binzel, F.D. Hess, R.A. Bressan and P.M. Hasegawa	139
Changes in Gene Expression Elicited by Salt Stress in Mesembryanthemu crystallinum H.J. Bohnert, J.A. Ostrem and J.M. Schmitt	m 159
Reduced Growth Rate and Changes in Cell Wall Proteins of Plant Cells Adapted to NaCl N.K. Singh, P.C. LaRosa, D. Nelson, N. Iraki, N.C. Carpita, P.M. Hasegawa and R.A. Bressan	173
CHAPTER THREE: ANAEROBIC STRESS	195
Aeration in Roots W. Armstrong	197
Adenylate Energy Charge and Anaerobic Proteins B. Mocquot	207
Anaerobic Induction of Lactate Dehydrogenase N.E. Hoffman, D. Hondred, A.H.D. Brown and A.D. Hanson	215
Characterization of Nuclear Factors that Regulate Alcohol Dehydrogena	se
Gene Expression R.J. Ferl	217
Identifying the Anaerobic Proteins of Maize P.M. Kelley	225
The Response to Anaerobic Stress: Transcriptional Regulation of Gene for Anaerobically Induced Proteins E.S. Dennis, J.C. Walker, D.J. Llewellyn, J.G. Ellis, K. Singh, J.G. Tokuhisa, D.R. Wolstenholme and W.J. Peacock	s 231
CHAPTER FOUR: LOW TEMPERATURE STRESS	247
Molecular Changes in Membrane Lipids During Cold Stress G.A. Thompson, Jr.	249
Plasma Membrane ATPase as a Key Site of Alteration by a Freeze-thaw Stress: Role in Recovery and Progressive Injury S. Ishwari and J.P. Palta	259
Membrane Assembly during Acclimation to Low Temperature: Lipid-prote Interaction	
N P A Huner M Krol I P Williams and F Maissan	267

Perturbation of Membrane Calcium as a Molecular Mechanism of Freezing Injury	
R. Arora and J.P. Palta	281
Alterations of Gene Expression during the Induction of Freezing Tolerar in a Brassica napus Cell Suspension Culture J. Singh and A.M. Johnson-Flanagan	nce 291
Osmotic Stress Causes Mechanical Freeze-Thaw Damage to Thylakoids In Vi and In Vivo D.K. Hincha, M. Muller, T. Hillmann and J.M. Schmitt	3 0 3
CHAPTER FIVE: HEAT STRESS	317
Genetic Diversity of Heat Shock Protein Synthesis in Gereal Plants H.T. Nguyen, M. Krishnan, J.J. Burke, D.R. Porter and R.A. Vierling	319
The Heat Shock Response in Plants: Short-Term Heat Treatment Regimes and Thermotolerance R.T. Nagao	331
Developmental Expression of Heat Shock Proteins in Higher Plants E. Vierling and A. Sun	343
Adaptation of Thermotolerance in Cowpea Suspension Cultures J.H. Cherry, K. Heuss-LaRosa and R.R. Mayer	355