

## TABLE OF CONTENTS

	<u>Page</u>
DEDICATION . . . . .	ii
ACKNOWLEDGEMENTS . . . . .	iii
TABLE OF CONTENTS . . . . .	v
THESIS STATEMENT . . . . .	1
Literature Cited . . . . .	7
THESIS ABSTRACT . . . . .	9
SECTION I: The effect of turgor pressure on water permeability of <u>Allium cepa</u> epidermis cell membranes . . . . .	
Abstract . . . . .	13
Introduction . . . . .	14
Materials and Methods . . . . .	16
Results and Discussion . . . . .	19
Appendix . . . . .	30
Literature Cited . . . . .	36
Table . . . . .	39
Figures . . . . .	41
SECTION II: On simultaneous transport of water and solute through cell membranes . . . . .	
Abstract . . . . .	51
Introduction . . . . .	52
Materials and Methods . . . . .	53
Results . . . . .	56
Discussion . . . . .	60
Appendix for list of symbols . . . . .	62
Literature Cited . . . . .	67
Tables . . . . .	68
Figures . . . . .	70

SECTION III: Freezing tolerance of onion bulbs  
and significance of freeze-induced  
tissue infiltration . . . . . 75

Abstract . . . . . 76

Introduction . . . . . 77

Materials and Methods . . . . . 78

Results . . . . . 80

Discussion . . . . . 85

Literature Cited . . . . . 88

Tables . . . . . 89

Figures . . . . . 91

SECTION IV: Freezing injury in onion bulb cells. I.  
The conductivity as a measure of  
freezing tolerance: Does it measure  
cell death or injury to living cells? . . . 94

Abstract . . . . . 95

Introduction . . . . . 97

Materials and Methods . . . . . 98

Results . . . . . 102

Discussion . . . . . 111

Literature Cited . . . . . 115

Tables . . . . . 116

Figures . . . . . 119

SECTION V: Freezing injury in onion bulb cells:

II. Post thawing injury or recovery . . 124

Abstract . . . . . 125

Introduction . . . . . 127

Materials and Methods . . . . . 127

Results . . . . . 131

Discussion . . . . . 139

Literature Cited . . . . . 144

Tables . . . . . 146

Figures . . . . . 149

SECTION VI: The dehydration of onion cells: A comparison of (i) freezing vs. desiccation and (ii) of living vs. dead cells . . . . .	152
Abstract . . . . .	153
Introduction . . . . .	155
Materials and Methods . . . . .	157
Results . . . . .	162
Discussion . . . . .	167
Literature Cited . . . . .	172
Tables . . . . .	174
Figures . . . . .	176
 SECTION VII: Alternate method of onion storage without the application of a growth inhibitor . . . . .	 180
Abstract . . . . .	181
Introduction . . . . .	182
Materials and Methods . . . . .	184
Results . . . . .	184
Conclusions . . . . .	186
Literature Cited . . . . .	188
Tables . . . . .	190
Figures . . . . .	191
 SECTION VIII: Appendices . . . . .	 192