

Table of Contents

Abstract (English)	i
Abstract (Spanish)	vii
Abstract (Catalan)	xiii
Table of Contents	xxii
Chapter 1: General Introduction.....	1
1.1. Drought and soil salinity, and their effects on crop production worldwide	3
1.2. Effects of salt and water stress on plants.....	5
1.3. Glycophytes and halophytes: the importance of comparative studies.....	7
Chapter 2: Objectives.....	13
Chapter 3: Plant Material.....	18
3.1. <i>Solanum lycopersicum</i>	20
3.2. <i>Phaseolus</i> species	21
3.3. <i>Plantago</i> species	23
3.4. <i>Juncus</i> species	25
Chapter 4: Results	31
Subchapter: 4.1. Effects of Salt and Water Stress on Plant Growth and on Accumulation of Osmolytes and Antioxidant Compounds in Cherry Tomato	33
4.1.1. Introduction.....	34
4.1.2. Material and Methods	38
4.1.3. Results	42
4.1.4. Discussion	50
4.1.5. Conclusions.....	55
4.1.6. References.....	56
Subchapter: 4.2. Selection and characterisation of salt and drought-resistant <i>Phaseolus</i> cultivars: a ‘proof-of-concept’ study	70
4.2.1. Introduction.....	72
4.2.2. Material and Methods	77
4.2.3. Results	81
4.2.4. Discussion	95
4.2.5. Conclusions.....	100
4.2.6. References.....	102
Subchapter: 4.3. Effects of Salt and Water Stress on Three Ecologically Distinct <i>Plantago</i> Species	114
4.3.1. Introduction.....	116
4.3.2. Material and Methods:	119
4.3.3. Results	123
4.3.4. Discussion	135
4.3.5. Conclusions.....	142
4.3.6. References.....	145
Subchapter: 4.4. Growth and Reproductive Success Under Saline Conditions of Three <i>Plantago</i> Species with Different Levels of Stress Tolerance	154
4.4.1. Introduction.....	155
4.4.2. Material and methods.....	158
4.4.3. Results and Discussion.....	161
4.4.4. Conclusions.....	167
4.4.5. References.....	169
Subchapter: 4.5. Expression of the Vacuolar Na ⁺ /H ⁺ Antiporter Gene (<i>NHX1</i>) in Three <i>Plantago</i> Species Differing in Salt Tolerance	173
4.5.1. Introduction.....	174

4.5.2. Material and Methods	177
4.5.3. Results	179
4.5.4. Discussion	183
4.5.5. Conclusion	186
4.5.6. References.....	187
Subchapter: 4.6. Stress tolerance mechanisms in <i>Juncus</i> : Responses to salinity and drought in three <i>Juncus</i> species adapted to different natural environments.....	191
4.6.1. Introduction.....	193
4.6.2. Material and Methods	196
4.6.3. Results	199
4.6.4. Discussion	211
4.6.5. Conclusions.....	215
4.6.6. References.....	217
Subchapter: 4.7. Differential anti-oxidative responses under salinity and drought challenges in two halophytes and one glycophyte of the genus <i>Juncus</i>	224
4.7.1. Introduction.....	226
4.7.2. Materials and Methods.....	229
4.7.3. Results	232
4.7.4. Discussion	240
4.7.5. Conclusions.....	245
4.7.6. References.....	247
Subchapter: 4.8. Anatomical Modifications in Two <i>Juncus</i> Species Under Salt Stress Conditions.....	261
4.8.1. Introduction.....	262
4.8.2. Material and Methods	265
4.8.3. Results	266
4.8.4. Discussion	273
4.8.5. Conclusions.....	275
4.8.6. References.....	276
Chapter 5: General Discussion	282
5.1. Stress-induced growth inhibition	285
5.2. Control of ion transport	287
5.3. Osmolyte accumulation	289
5.4. Activation of antioxidant systems.....	296
5.5. Cloning and characterisation of <i>Plantago NHX1</i> genes.....	297
5.6. Inducible vs. constitutive tolerance mechanisms.....	299
Chapter 6: Conclusions	302
Bibliography	307
Appendix.....	324