

# Index

<b>Abstract.....</b>	<b>1</b>
<b>Resumen.....</b>	<b>3</b>
<b>Resum.....</b>	<b>6</b>
<b>General Introduction .....</b>	<b>9</b>
<b>1 Biotic and abiotic stresses .....</b>	<b>11</b>
<b>2 The Solanaceae family in the Andean region .....</b>	<b>12</b>
<b>3 Pepino .....</b>	<b>14</b>
3.1 Taxonomy .....	15
3.2 Relationships of wild pepino relatives.....	16
3.3 Origin and domestication .....	17
3.4 Geographical distribution.....	17
3.5 Genetic diversity .....	18
3.6 Physicochemical and bioactive properties.....	19
3.7 Bioactive compounds and their health benefits .....	22
3.8 Drought tolerance.....	23
3.9 Salinity .....	24
3.10 Pests and diseases.....	24
<b>4 Tree tomato .....</b>	<b>26</b>
4.1 Taxonomy .....	29
4.2 Relationships of wild tree tomato relatives .....	30
4.3 Origin and domestication .....	30
4.4 Geographical distribution.....	31
4.5 Genetic diversity .....	33
4.6 Physicochemical and bioactive properties.....	35
4.7 Bioactive compounds and their health benefits .....	37
4.8 Biotechnology and genomics .....	38
4.8.1 <i>In vitro</i> culture.....	38

4.8.2	Genetic transformation and genome editing .....	39
4.8.3	Next-generation sequencing (NGS).....	41
<b>Objectives.....</b>		<b>44</b>
<b>Chapter 1:</b>	Moderate and severe water stress effects on morphological and biochemical traits in a set of pepino ( <i>Solanum muricatum</i> ) cultivars.....	<b>47</b>
<b>1</b>	<b>Abstract .....</b>	<b>50</b>
<b>2</b>	<b>Introduction .....</b>	<b>52</b>
<b>3</b>	<b>Materials and methods.....</b>	<b>55</b>
3.1	Plant material and experimental design .....	55
3.2	Growth parameters .....	58
3.3	Photosynthetic pigments contents .....	59
3.4	Ion content measurements .....	59
3.5	Osmolyte quantification .....	60
3.6	Oxidative stress biomarkers and antioxidant compounds.....	61
3.7	Data analyses .....	62
<b>4</b>	<b>Results.....</b>	<b>63</b>
4.1	Substrate moisture analysis .....	63
4.2	Analysis of variance .....	64
4.3	Growth traits and identification of tolerant accessions.....	66
4.4	Photosynthetic Pigments .....	75
4.5	Ion Accumulation.....	75
4.6	Osmolytes, oxidative stress markers and antioxidants.....	80
<b>5</b>	<b>Discussion .....</b>	<b>84</b>
<b>6</b>	<b>Conclusions.....</b>	<b>90</b>
<b>7</b>	<b>Statements .....</b>	<b>91</b>
<b>8</b>	<b>References.....</b>	<b>92</b>
<b>Chapter 2:</b>	Screening of pepino ( <i>Solanum muricatum</i> ) and wild relatives against four major tomato diseases threatening its expansion in the Mediterranean region.....	<b>105</b>

<b>1</b>	<b>SUMMARY .....</b>	<b>109</b>
<b>2</b>	<b>Introduction .....</b>	<b>111</b>
<b>3</b>	<b>Materials and methods.....</b>	<b>115</b>
3.1	Plant materials and growing conditions.....	115
3.2	Pathogen preparation, inoculation and disease symptoms assessment .....	118
3.3	Data analyses .....	121
<b>4</b>	<b>Results.....</b>	<b>121</b>
4.1	Symptoms evolution .....	121
4.1.1	Fusarium oxysporum f. sp. lycopersici (FOL).....	121
4.1.2	Verticillium dahliae (VE).....	124
4.1.3	Pepino mosaic virus (PepMV).....	127
4.1.4	Tomato mosaic virus (ToMV).....	132
4.2	Hierarchical clustering analysis.....	134
<b>5</b>	<b>Discussion .....</b>	<b>137</b>
<b>6</b>	<b>Statements .....</b>	<b>142</b>
<b>7</b>	<b>References.....</b>	<b>142</b>
<b>Chapter 3: <i>De novo</i> Transcriptome Assembly and Comprehensive</b>		
<b>Annotation of Two Tree Tomato Cultivars (<i>Solanum betaceum</i> Cav.) with</b>		
<b>Different Fruit Color.....</b>		
		<b>157</b>
<b>1</b>	<b>Abstract: .....</b>	<b>161</b>
<b>2</b>	<b>Introduction .....</b>	<b>163</b>
<b>3</b>	<b>Materials and Methods .....</b>	<b>165</b>
3.1.1	Plant Material .....	165
3.2	RNA Extraction, Library Construction and RNA Sequencing ..	166
3.3	DNA Sequence Processing and <i>de novo</i> Transcriptome Assembly .....	167
3.4	Structural and Functional Annotation.....	168
3.5	Single-Nucleotide Variations (SNVs).....	169
<b>4</b>	<b>Results.....</b>	<b>170</b>

4.1	Transcriptome Sequencing and Assembly.....	170
4.2	Structural and Functional Annotation.....	172
4.3	COG Classification .....	180
4.4	Identification and Characterizacion of SNVs .....	182
<b>5</b>	<b>Discussion .....</b>	<b>187</b>
<b>6</b>	<b>Conclusions.....</b>	<b>192</b>
<b>7</b>	<b>Statements .....</b>	<b>193</b>
<b>8</b>	<b>References.....</b>	<b>195</b>
	<b>General Discussion.....</b>	<b>207</b>
	<b>Conclusions.....</b>	<b>217</b>
	<b>References (Introduction and General Discussion) .....</b>	<b>221</b>