

Table 1 List of candidate genes providing drought tolerance in plants

S.No	Gene	Function	Species	References
1	CA7	ABA dependent expression	Common bean	Khodambashi et al., 2013
2	NCED	ABA dependent expression	Common bean	Khodambashi et al., 2013
3	bZIP	transcription factor	Common bean	Rodriguez-Uribe L., and O'Connell M. A., 2006
4	PvLEA3	protein stabilization	Common bean	Barrera-Figueroa et al., 2007
5	Aquaporin	water allocation	Common bean	Montalvo-Hernández et al., 2008
6	Asr1	ABA signaling pathway	Common bean	Cortés et al., 2012a
7	Asr2	ABA signaling pathway	Common bean	Cortés et al., 2012a
8	Dreb2A	non-ABA dependent responses	Common bean	Cortés et al., 2012b
9	Dreb2B	non-ABA dependent responses	Common bean	Cortés et al., 2012b
10	PvLEA18	protein stabilization	Common bean	Colmenero-Flores et al., 1997
11	LTP	lipid transfer protein (LTP) is ABA induced responsive to environmental factors like water	Common bean	Yang et al., 2012a
12	P5CS	proline biosynthesis	Soyabean	Porcel et al., 2004
13	GmPAP3	reduces ROS accumulation and thereby alleviates osmotic stress	Soyabean	Li et al., 2008b
14	GsAPK	ABA- mediated signal transduction	Soyabean	Yang et al., 2012b
15	GmCaM4	activates a R2R3 type MYB transcription factor which in turn up-regulates several drought-responsive genes	Soyabean	Yoo et al., 2005
16	CDPK	phosphorylates aquaporin thereby enhancing water permeability across the membranes	Soyabean	Guenther et al., 2003; Rivers et al., 1997
17	G93	lipid signaling	Soyabean	Drobak, 2002
18	GmUBC2	up-regulates the expression of genes encoding ion transporters (AtNHX1 and AtCLCa), a proline biosynthetic enzyme (AtP5CS), and a copper chaperone (AtCCS)	Soyabean	Zhou et al., 2010
19	G93	lipid signaling via interaction with phosphatidylinositol 3-phosphate	Soyabean	Clement et al., 2006
20	GmPAP3	enhances ROS scavenging activity	Soyabean	Li et al., 2008b
21	Histidine kinases (GmHK) and receptor-like protein kinases (GmCLV1A, GmCLV1B, GmRLK1, GmRLK2, GmRLK3 and GmRLK4)	candidates of osmosensors	Soyabean	Yamamoto et al., 2000; Yamamoto and Knap, 2001; Le et al., 2011
22	GmCAM4	up-regulation of drought responsive genes	Soyabean	Yoo et al., 2005
23	GsAPK (SnRK-type) kinase	ABA-mediated signal transduction	Soyabean	Yang et al., 2012b
24	HSPs	prevent the aggregation of denatured proteins	Soyabean	Horwitz, 1992
25	GmDREB, GmDREB, GmDREB3	transcription factors	Soyabean	Gao et al., 2010; Chen et al., 2007; Chen et al., 2009
26	GmERF3 b, GmERF4, GmERF089	transcription factors	Soyabean	Zhang et al., 2009; Zhang et al., 2010; Liao et al., 2008
27	GmbZIP1	transcription factors	Soyabean	Gao et al., 2011
28	GmGT-2A, GmGT-2B	transcription factors	Soyabean	Xie et al., 2009
29	GsZFP1	transcription factors	Soyabean	Luo et al., 2011
30	GmWRKY54, GmWRKY57B	transcription factors	Soyabean	Zhou et al., 2008; Zhang et al., 2008a
31	VuNCED1	ABA biosynthesis	Cowpea	Iuchi et al., 2000
32	VuABA1 (ZEP gene)	ABA biosynthesis	Cowpea	Iuchi et al., 2000
33	NCED genes	ABA biosynthesis	Maize, bean and tomato	Burbidge et al., 1997

Continued Table 1

S.No	Gene	Function	Species	References
34	LeNCED1	elevates endogenous ABA	Tomato	Thompson et al., 2000
35	ADC (Arginine decarboxylase)	polyamine biosynthesis	Oat	Masgran et al., 1997
36	SOD (Superoxide dismutase)	synthesis of polyamines	Pea	Sengupta et al., 1993
37	hva1	LEA proteins	Barley	Xu et al., 1996
38	TPS1 (from yeast)	encodes trehalose-6-phosphate	Transgenic Tobacco	Holmstrom et al., 1996; Romero et al., 1997
39	SacB (from <i>Bacillus subtilis</i> )	encodes for levan sucrose, which takes part in fructan synthesis	Transgenic tobacco	Pilon-Smith et al., 1995
40	bet B (from E.coli)	encodes for betaine aldehyde dehydrogenase, involved in the biosynthesis of glycine betaine	Transgenic Tobacco	Holmstrom et al., 1994
41	ODC (from Yeast and mouse)	encodes ornithine decarboxylase	Transgenic tobacco	Hamill et al., 1990; Descenzo and Minocha , 1993
42	SAMDC (from human)	encodes S-adenosyl methionine decarboxylase	Transgenic tobacco	Noh and Minocha , 1994
43	AtNCED3	controls the level of endogenous ABA	Arabidopsis	Iuchi et al., 2001
44	rab18	cold and ABA induced stress genes	Arabidopsis	Lang, V. and Palva, E.T. (1992)
45	kin1	cold and ABA induced stress genes	Arabidopsis	Kurkela and Franck,1990
46	rd298	cold and ABA induced stress genes	Arabidopsis	Yamaguchi-Shinozaki, K. and Shinozaki, K. 1993
47	Rd29a	stress induced genes through ABA-independent pathway	Arabidopsis	Maruyama et al., 2004
48	LEA14	encodes late embryogenesis abundant proteins provide tolerance to abiotic stresses	Arabidopsis	Singh et al., 2002
49	m-RNA binding protein (glycine rich proteins)	encodes galactinol synthase (synthesis of raffinose family oligosaccharides) and 1-pyrroline-5-carboxylate synthetase (Proline biosynthesis)	Eucalyptus	Bocca et al., 2005
50	gols (galactinol synthase) genes	encodes galactinol synthase responsible for biosynthesis of raffinose	Arabidopsis	Taji et al., 2004
51	ABF3/ABF4	reduced transpiration and better survival under drought condition	Arabidopsis	Kang et al., 2002
52	DREB1A (AP2 Transcription factor)	activated the expression of genes involved in stress tolerance (rd29A)	Arabidopsis	Kasuga et al., 1999; Liu et al., 1998
53	CBF1 (DREB1B)	activated gene expression, catalase1 coupled with decreased accumulation of H <sub>2</sub> O <sub>2</sub>	Tomato	Hsieh et al., 2002
54	AtMYC2/AtMYB2	less electrolyte leakage in transgenic plants	Arabidopsis	Abe et al., 2003
55	ERECTA	improves water use efficiency/transpiration efficiency	Arabidopsis	Masle et al., 2005
56	DREB2C	non-ABA dependent responses	Arabidopsis	Lee et al., 2010
57	ERD11	drought tolerance	Arabidopsis	Chini et al., 2004
58	GST	drought tolerance	Arabidopsis	Chini et al., 2004
59	ERA1	mutant of ERA1 stimulate stomatal closure and enhance drought tolerance (negative effect)	Arabidopsis	Cutler et al., 1996
60	NFYA5	ABA dependent expression	Arabidopsis	Li et al., 2008a
61	NF-YB1	improve drought tolerance	Arabidopsis	Nelson et al., 2007
62	HDG11	improve drought tolerance	Arabidopsis	Yu et al., 2008
63	SDIR1	improve drought tolerance	Arabidopsis	Zhang et al., 2008b
64	CYP707A3	involved in ABA catabolism pathway (negative effect on drought tolerance)	Arabidopsis	Umezawa et al., 2006
65	Sall	negative regulator of drought tolerance	Arabidopsis	Manmathan et al., 2013