

# **Genes Involved in Aspects of Plant Hormone Biosynthesis, Transport, Signal Transduction or Action**

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Note: The right hand column labeled Chap. gives the chapter in the above book where information on the gene can be found.

Where duplicate names or alleles exist they are listed in the gene name column. Note that abbreviations in different species are sometimes totally different genes. For compactness, numbers at the end of a gene name are sometimes omitted unless the gene is known to encode a protein of different function from the other numbers. In general the genes as listed as the wild-types in capital letters; mutants would be in lower case letters. In the species column will be found the main species of reference; if several the one in which it was found first is usually also listed, though some derive from e.g., yeast. For the sake of avoiding duplication the initials of the species name are omitted before the gene name in the table below, though sometimes included they are within the gene name. The species are listed in the species column:

*A*, animals; *Ac*, *Actinidia chinensis* (Kiwifruit); *Agt*, *Agrobacterium tumefaciens*; *Ar*, *A. rhizogenes*; *At*, *Arabidopsis thaliana*; *Bsp*, *Brassica species*; *Bo*, *B. oleracea* (Broccoli); *Cr*, *Catharanthus rosea* (Madagascar periwinkle); *Cm*, *Cucurbita maxima* (pumpkin); *Cme*, *Cucumis melo* (melon); *Cs*, *Cucumis sativus* (cucumber); *Cp*, *Cucurbita pepo* (zucchini); *Dc*, *Dianthus caryophyllus* (carnation); *Dm*, *Drosophila melanogaster*; *Ec*, *E. coli*; *Fa*, *Fragaria ananassa*

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(strawberry); *Gm*, *Glycine max* (soybean); *H*, human; *Hv*, *Hordeum vulgare* (barley); *Le*, *Lycopersicon esculentum* (tomato); *M*, Mammals; *Md*, *Malus domestica* (apple); *mi*, microbial; *Mt*, *Medicago truncatula* (alfalfa); *Np*, *Nicotiana plumbaginifolia*; *Nt*, *N. tabacum* (tobacco); *Os*, *Oryza sativa* (rice); *Pd*, *Prunus domestica* (plum); *Ph*, *Petunia hybrida*; *Pi*, *P. inflata*; *Ph*, *Phalenopsis sp.*; *Pa*, *Phaseolus aureus* (mung bean); *Pc*, *P. coccineus* (runner bean); *Pv*, *P. vulgaris* (bush bean); *Pl*, *P. lunatus* (lima bean); *Ps*, *Pisum sativum* (pea); *Pp*, *Pseudomonas putida*; *Psa*, *P. savastanoi*; *Psp*, *Pseudomonas sp.*; *Sc*, *Saccharomyces cerevisiae* (yeast); *Sp*, *Schizosaccharomyces pombe*; *Ssp*, *Solanum sp.*; *St*, *Solanum tuberosum* (potato); *So*, *Spinacea oleracea* (spinach); *Ta*, *Triticum aestivum* (wheat); *Vf*, *Vicia faba* (faba bean); *Vv*, *Vitis vinifera* (grape); *Zm*, *Zea mays* (maize); *Ze*, *Zinnia elegans*.

Other abbreviations: eh, eukaryotic homologues; plh, plant homologues S, several.

Gene symbol	Gene name meaning	Species	Function	Chap.
<i>AAO3</i>	<i>Absciscic Aldehyde Oxidase</i>	<i>At</i>	Oxidation of absciscic aldehyde to absciscic acid	B5
<i>AAPK</i>	<i>ABA-Activated Protein Kinase</i>	<i>Vf</i>	Serine threonine protein kinase activated by ABA	D6
<i>ABA1</i>	<i>Absciscic Acid Deficient 1</i>	<i>At; Np</i>	Zeaxanthin epoxidase; epoxidation of zeaxanthin to violaxanthin; the first step of ABA synthesis	B5,D6 E4
<i>ABA2</i>	<i>Absciscic Acid-Deficient</i>	<i>At; Np</i>	Oxidation of xanthoxin to absciscic aldehyde	B5
<i>ABA3</i>	<i>Absciscic Acid-Deficient</i>	<i>At</i>	Sulfurylation of molybdenum cofactor	B5
<i>ABC</i>	<i>ATP-Binding Cassette</i>	<i>A plants yeasts</i>	Large family of membrane transporters possessing wide substrate specificity	E1
<i>ABH1</i>	<i>ABA Hypersensitive 1</i>	<i>At</i>	RNA cap-binding protein; mutation of which confers an ABA hypersensitive phenotype	D6,E4
<i>ABH1,2</i>	<i>ABA-insensitive</i>	<i>At</i>	Protein phosphatases (PP2Cs); dominant mutations confer ABA-insensitivity	D6,E4 E7
<i>ABI3</i>	<i>ABA-insensitive</i>	<i>At</i>	Promotes embryonic development; B3 domain transcription factor; orthologous to maize Vp1	D6,E4 E7
<i>ABI4</i>	<i>ABA-insensitive</i>	<i>At</i>	Promotes embryo maturation and seedling stress response; AP2 domain transcription factor	D6,E4 E7
<i>ABI5</i>	<i>ABA-insensitive</i>	<i>At</i>	Promotes embryo maturation and seedling stress response; bZIP domain transcription	D6,E4 E7
<i>ABP1</i>	<i>Auxin Binding Protein 1</i>	many	Binds auxins; putative auxin receptor	D1

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<i>ABRK</i>	<i>ABA-Related Kinase</i>	<i>Vf</i>	Serine threonine protein kinase activated by ABA, probably identical to AAPK	D6
<i>ACC deaminase</i>	<i>ACC deaminase</i>	<i>Psp</i>	Conversion of ACC into $\alpha$ -ketoglutaric acid	B4
<i>ACO</i>	<i>ACC Oxidase</i>	<i>Le; Cme; Pi; M; De;Bo; Ph; many</i>	Oxidation of ACC to ethylene	B4,E7 D4,D5
<i>ACS</i>	<i>ACC Synthase</i>	<i>Le;Cp; Ph;Md Pd;At; many</i>	Conversion of S-adenosyl methionine to ACC in ethylene biosynthesis	D4,B4 D5,E7 D3
<i>AGL20</i> <i>SOC1</i>	<i>Agamous-Like20/Suppressor of Overexpression of Constans1</i>	<i>At</i>	Flowering time genes	E5
<i>AGPase</i>	<i>ADP-Glucose Pyrophosphorylase</i>	many	Starch synthesis	E5
<i>AGR1</i>	<i>Agravitropic1</i>	<i>At</i>	Identical to <i>EIR1</i> and <i>PIN2</i> auxin efflux regulators	E1
<i>AHK1</i>	<i>At Histidine Kinase</i>	<i>At</i>	Putative osmosensing histidine kinase	D3
<i>AHK2,3,4</i>	<i>At Histidine Kinase 2/3/4</i>	<i>At</i>	Membrane-bound histidine kinases; putative cytokinin receptors, <i>ahk4</i> is allelic to <i>cre1-1</i> and <i>wol</i>	C3,D3
<i>AHK5</i>	<i>At Histidine Kinase 5</i>	<i>At</i>	Unknown	D3
<i>AHP</i>	<i>At Histidine Phosphotransfer Protein</i>	<i>At</i>	Phosphorelay from AHKS to ARRS	D3
<i>AIR3</i>	<i>Auxin Induced Root3</i>	<i>At</i>	Putative subtilisin-like protease	D1
<i>AKIP1</i>	<i>AAPK-Interacting Protein 1</i>	<i>Vf</i>	Single-stranded RNA binding protein that is a substrate for AAPK	D6
<i>AKT1</i>	<i>At K<sup>+</sup> Transporter 1</i>	<i>At</i>	Shaker-like inwardly rectifying K <sup>+</sup> channel	D6
<i>AKT2/3</i>	<i>At K<sup>+</sup> Transporter 2</i>	<i>At</i>	K <sup>+</sup> channel	D6
<i>ALH1</i>	<i>ACC-Related Long Hypocotyl 1</i>	<i>At</i>	Ethylene and auxin crosstalk	D4
<i>AMP</i>	<i>Altered Meristem Program</i>	<i>At</i>	Regulates number of cotyledons formed; similar to glutamate carboxypeptidases	E4
<i>ANT</i>	<i>Aintegumenta</i>	<i>At</i>	Transcription factor modulating ovule and lateral organ development and embryogenesis	C4
<i>AOC</i>	<i>Allene Oxide Cyclase</i>	many	Conversion of 12,13-EOT to 12-OPDA in JA biosynthesis	F1

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AOS	<i>Allene Oxide Synthase</i>	<i>At</i> ; flax; many	Conversion of 13-hydroperoxylinolenic acid to 12,13-epoxy-octadecatrienoic acid, the first step specific to the octadecanoid pathway; JA biosynthesis	E5,E6 G1
AOX	<i>Amine Oxidase</i>	<i>mi</i>	Conversion of tryptamine to indole-3-acetaldehyde	B1
API,2	<i>Apetala 1,2</i>	<i>At</i>	Floral homeotic gene, specifies floral meristem and sepal identity; transcription factor	B2,D3
APRR 3,4,5	<i>At Pseudo-Response Regulator 3,4,5</i>	<i>At</i>	Circadianly regulated putative transcription factors	D3
APRR1/ TOC1	<i>At Pseudo-Response Regulator/Timing of CAB 1</i>	<i>At</i>	Regulator of circadian rhythm timing	D3
APRR2	<i>At Pseudo-Response Regulator 2</i>	<i>At</i>	Putative MYB transcription factor	D3
APT	<i>Adenine Phosphoribosyltransferase</i>	<i>At</i>	Cytokinin nucleotide formation via salvage pathway	B3
ARATH CDKA;1	<i>At Cyclin-Dependent Protein Kinase A;1</i>	<i>At</i> , plh	Cell cycle regulator, interacts with cyclin in cell cycle dependent manner to form serine/threonine specific protein kinase complex	C3
ARATH CYCD3;1	<i>At Cyclin D3;1</i>	<i>At</i> , plh	Cell cycle regulator, interacts with cyclin-dependent protein kinase in a cell cycle-dependent manner to form a serine/threonine specific protein kinase complex	C3
ArcB	<i>Aerobic Respiration Control B</i>	<i>Ec</i>	Response regulator; negative transcriptional regulator of genes in aerobic pathways	D3
ARF	<i>Auxin Response Factor</i>	<i>At</i> ; many	Transcription factor for auxin-dependent gene expression that binds to Auxin Response Elements	D1,E1 E4
ARF-GEF	<i>Guanine Nucleotide Exchange Factor for GTPases of the ARF Type</i>	many	Guanine nucleotide exchange factor for small ADP-ribosylation factor-type (ARF-type); GTPases involved in the regulation of intracellular vesicle trafficking	E1
ARR (other)	<i>At Response Regulator</i>	<i>At</i>	Type-As are negative regulators of cytokinin signaling; type-Bs are putative transcriptional activators	D3
ARR 1,2,11,10	<i>At Response Regulator 1, 2, 11, 10</i>	<i>At</i>	Transcription factor type response regulators	D3
ARR2	<i>At Response Regulator 2</i>	<i>At</i>	A type-B response regulator mediating cytokinin-induced expression of type-A ARRs	E6

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<i>ARR4</i>	<i>At Response Regulator 4</i>	<i>At</i>	Response regulator; stabilizes PHYB-fr and negatively regulates cytokinin signaling	C3,D3
<i>ARR7</i>	<i>At Response Regulator 7</i>	<i>At</i>	Response regulator; negatively regulates cytokinin signaling	C3
<i>ASK1</i>	<i>At SKP1-Like 1</i>	<i>Sc</i>	Subunit of SCF (E3 ligase)	D1
<i>ATR1</i>	<i>Altered Tryptophan Regulation</i>	<i>At</i>	Myb transcription factor	B1
<i>ATS</i>	<i>Aberrant Testa Shape</i>	<i>At</i>	Maternally inherited effects on seed shape	E4
<i>AUX/IAA</i>	<i>Auxin/Indole Acetic Acid</i>	many	Transcription factor involved in auxin signaling	D1,E4
<i>AUX1</i>	<i>Auxin-Resistant 1</i>	<i>At</i>	Similar to amino acid permeases; putative auxin influx carrier	D4,E1 E2
<i>AXR1</i>	<i>Auxin Resistant 1</i>	<i>At</i>	Subunit of the RUB activating enzyme Similar to the ubiquitin-activating enzyme E1 Involved in auxin action	D1,D4
<i>AXR 2 IAA7</i>	<i>Auxin Resistant 2,</i>	<i>At</i>	See <i>AUX/IAA</i>	D1
<i>AXR 4</i>	<i>Auxin Resistant 4</i>	<i>At</i>	Unknown	D1
<i>AXR 6 CUL1</i>	<i>Auxin Resistant 6</i>	<i>At</i>	Cullin subunit of SCF ubiquitin ligase complex	D1,E1 E4
<i>AZ34 NAR2A</i>		<i>Hv</i>	Conversion of ABA aldehyde to ABA	E3
<i>BAK1</i>	<i>Bri1-Associated Receptor Kinase</i>	<i>At</i>	Brassinosteroid signal transduction	D7
<i>BAS1-D</i>	<i>PhyB Activation-Tagged Suppressor 1 – Dominant</i>	<i>At</i>	Brassinosteroid-26-hydroxylase	B6
<i>b-CHI, ATHCHIB</i>	<i>At Basic Chitinase</i>	<i>At</i>	Class1 chitinase involved in ethylene and jasmonic acid signaling during systemic acquired resistance	D4
<i>BDL BODENLOS IAA12</i>	<i>Bodenlos (Bottomless)</i>	<i>At</i>	AUX/IAA-class transcriptional repressor ( <i>IAA12</i> ) for <i>ARF5</i> ; involved in regulation of embryo patterning	D1,E4 E1
<i>BES1</i>	<i>bri1-EMS-Suppressor 1</i>	<i>At</i>	Brassinosteroid signal transduction; can be nuclear localized	D7
<i>BIG</i>	<i>Big</i>	plants <i>A</i>	Identical to <i>DOC1</i> and <i>TIR3</i> , homologous to the <i>Drosophila</i> Calossin (calO)/Pushover protein. Involved in vesicle trafficking	E1
<i>BIN2</i>	<i>Brassinosteroid-Insensitive 2</i>	<i>At</i>	Shaggy-like kinase A negative regulator of brassinosteroid signaling	D7
<i>BR22ox CYP90B1 DWF4</i>	<i>Brassinosteroid 22-Oxidase</i>	<i>At</i>	C22 hydroxylation of campestanol	B7

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<i>BR23ox</i> <i>CYP90A1</i> <i>CPD</i>	<i>Brassinosteroid 23-Oxidase</i>	<i>At</i>	C23" -hydroxylation of cathasterone and 6 deoxocathasterone	B7
<i>BR24red</i> <i>DIM/DWF1</i> <i>LKB</i>	<i>Brassinosteroid 24-reductase</i>	<i>At; Ps</i>	Isomerization and reduction of the $\Delta^{24(28)}$ bond of 24-methylenecholesterol during BR biosynthesis	B7
<i>BR5red</i> <i>DET2; LK</i>	<i>Brassinosteroid 5-Reductase</i>	<i>At</i> <i>Ps</i>	C5 $\alpha$ -reduction of (24R)-ergost-4-en-3-one during BR biosynthesis	B7
<i>BR6ox</i> <i>CYP85A</i>	<i>Brassinosteroid-6-Oxidase</i>	<i>Le; At</i>	C6 oxidation of 6-deoxo intermediates in brassinosteroid biosynthesis	B6,B7
<i>BR11</i> <i>LKA(in Ps)</i>	<i>Brassinosteroid Insensitive</i>	<i>At; Ps;</i> many	Brassinosteroid receptor kinase involved in the perception of brassinosteroids; the <i>bri1</i> null mutants are extreme dwarfs with multiple developmental defects	B7,D7 E6,E4
<i>BRS1</i>	<i>Bri1-5 Suppressor 1</i>	<i>At</i>	Carboxypeptidase putatively involved in brassinosteroid signaling	D7
<i>BRZ1</i>	<i>Brassinazole Resistant 1</i>	<i>At</i>	Brassinosteroid signal transduction; can be nuclear localized	D7
<i>BSAS</i>	<i><math>\beta</math>-Substituted Alanine Synthase</i>	<i>At; So</i>	A family of genes with some of them capable of encoding $\beta$ -cyanoalanine synthase	B4
<i>BTB</i>	<i>Broad-Complex, Trimtrack And Bric-A-Brac</i>	<i>A</i>	Transcription factor	C2
<i>BX1</i>	<i>Benzoxazineless</i>	<i>Zm</i>	Indole synthase, tryptophan synthase alpha paralog	B1
<i>CAB</i>	<i>Chlorophyll a/b Binding Protein</i>	many	Platform of light-harvesting chlorophyll <i>a/b</i>	E6
<i>CAS</i>	<i><math>\beta</math>-Cyanoalanine Synthase</i>	<i>At; So</i>	See <i>BSAS</i>	B4
<i>CBP</i>	<i>Cytokinin Binding Protein</i>	<i>At</i>	Unknown	D3
<i>CCA1</i>	<i>Circadian Clock Associated1</i>	<i>At</i>	MYB transcription factor; negative regulator of TOC1	D3
<i>CCD</i>	<i>Carotenoid Cleavage Dioxygenase</i>	<i>At</i>	Oxidative cleavage of carotenoids	B5
<i>CDC2</i>	<i>Cell Division Cycle 2</i>	<i>Sp, eh</i>	Mitotic cyclin dependent protein kinase	C3
<i>CDC25</i>	<i>Cell Division Cycle 25</i>	<i>Sp, eh</i>	Protein phosphatase	C3
<i>CEV1</i>	<i>Constitutive Expression of VSP1</i>	<i>At</i>	Cellulose synthase A3 (CESA3)	F1
<i>CheY</i>	<i>Chemotaxis Y</i>	<i>Ec</i>	Response regulator; regulates direction of flagellar rotation	D3
<i>CHK</i>	<i>Cytokinin Hypersensitive</i>	<i>At</i>	Unknown	D3
<i>CHL1</i>	<i>Chlorate Resistant 1</i>	<i>At</i>	Mutant of <i>atnrt1</i> ; confers a chlorate-resistant phenotype	D6

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<i>CIM1</i>	<i>Cytokinin-Induced Message1, B-Expansin</i>	<i>Gm</i>	Cell-wall loosening	C4
<i>CIN</i>	<i>Cytokinin Insensitive</i>	<i>At</i>	Unknown	D3
<i>cisZOG1,2</i>	<i>Cis-Zeatin O-Glucosyltransferase</i>	<i>Zm</i>	O-glucosylation of <i>cis</i> -zeatin	B3
<i>CKI</i>	<i>Cytokinin independent 1-2 (gain of function mutants)</i>	<i>At</i>	Histidine protein kinase required for female gametophyte development	D3,E6
<i>CKX</i>	<i>Cytokinin Oxidase/Dehydrogenase</i>	many	Cytokinin degradation	B3
<i>CLA1</i>	<i>Cloroplastos Alterados (Altered Chloroplasts)</i>	<i>At</i>	1-deoxy-D-xylulose 5-phosphate synthase (DXS)	B2
<i>CLV1</i>	<i>Clavata Receptor Kinase</i>	<i>At</i>	CLV3 receptor; helps determine apical meristem cell fate	F3
<i>CLV2</i>	<i>Clavata Receptor-Like Protein</i>	<i>At</i>	Associates with CLV1 to produce an active receptor	F3
<i>CLV3</i>	<i>Clavata (club-like)</i>	<i>At</i>	Signaling peptide; 96AA ligand for CLV1/CLV2 receptor kinase; restricts SAM size	D3,F3
<i>CO</i>	<i>Constans</i>	<i>At</i>	Transcription factor; B-box type zinc finger protein; serves as link between the clock oscillator and flowering time genes; required for flowering in response to long days	B2,E5
<i>COI1</i>	<i>Coronatine Insensitive 1 (Phytotoxin)</i>	<i>At</i>	Required for response to jasmonates; protein contains 16 leucine-rich repeats and an F-box motif; component of E3 ubiquitin ligase; involved in wounding and parthenogenesis	D4,E6 F1
<i>COL</i>	<i>Constans-Like</i>	<i>St</i>	Unknown	E5
<i>COP1</i>	<i>Constitutive Photomorphogenesis 1</i>	<i>At</i>	Light-dependent regulator of HY5 protein stability; repressor of photomorphogenic development	D1,D3
<i>COP9</i>	<i>Constitutive Photomorphogenesis 9</i>	<i>At</i>	Subunit of the signalosome; regulates the 26S proteasome	D3
<i>CP1</i>	<i>Cysteine Proteinase1</i>	<i>At</i>	Protein turnover	B2
<i>CPD BR23ox CYP90A1</i>	<i>Constitutive Photomorphogenesis and Dwarfism</i>	<i>At</i>	C-23 $\alpha$ -steroid hydroxylase of cathasterone and 6 deoxocathasterone involved in brassinosteroid biosynthesis	B7,D7 B6
<i>CPH, ORC; SMT</i>	<i>Cephalopod</i>	<i>At</i>	Sterol methyltransferase; plant sterol biosynthesis	E1
<i>CPR5,6</i>	<i>Constitutive Expression of Pr Genes5,6</i>	<i>At</i>	Regulator of expression of pathogenesis-related (PR) genes	D4

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<i>CPS</i> <i>GAI</i> (in <i>At</i> ) <i>LS</i> (in <i>Ps</i> )	<i>ent-Copalyl</i> <i>Diphosphate</i> <i>Synthase</i>	<i>At; Ps</i> <i>S</i>	Converts geranylgeranyl diphosphate to <i>ent-copalyl</i> diphosphate	B2,B7
<i>CRE1</i>	<i>Cytokinin Response</i> <i>(resistant) 1</i>	<i>At</i>	Membrane-bound histidine kinase cytokinin receptor; <i>cre1-1</i> is allelic to <i>ahk4</i> and <i>wol</i>	C3,D3
<i>CSBP</i>	<i>Cytokinin Specific</i> <i>Binding Protein</i>	<i>Pa</i>	Unknown	D3
<i>CTR1</i>	<i>Constitutive Triple</i> <i>Response 1</i>	<i>At; Le</i>	Mitogen-activated protein kinase	D4,D5 E6,E4
<i>CTS</i>	<i>Comatose</i>	<i>At</i>	ATP binding cassette (ABC) transporter regulating transport of acyl-coAs into the peroxisome; promotes germination and represses embryo dormancy	E4
<i>CU3</i>	<i>Curl 3</i>	<i>Le sp</i>	Encodes tomato BRI1	D7
<i>CUC1</i>	<i>Cup-Shaped</i> <i>Cotyledon 1</i>	<i>At</i>	No apical meristem (NAM) domain protein; functions redundantly with <i>CUC2</i> to promote embryonic apical meristem formation, cotyledon separation and expression of <i>STM</i>	E4
<i>CUC2</i>	<i>Cup-Shaped</i> <i>Cotyledon 2</i>	<i>At</i>	Transcriptional activator of the NAC gene family modulating shoot apical meristem and cotyledon; see <i>CUC1</i>	C4,E4
<i>CVP1</i>	<i>Cotyledon Vascular</i> <i>Pattern 1</i>	many	Transferring a methyl group to C-24 <sup>1</sup> position to form C29 sterols	B6
<i>CYCD3</i>	<i>Cyclin D3</i>	gene family many	Control of the cell cycle at the G1 to S transition; however tobacco <i>CycD3;1</i> ( <i>Nicta CycD3;1</i> ) may have a role at mitosis; interacts with cyclin-dependent protein kinase in cell cycle dependent manner to form serine/ threonine specific protein kinase complex	C3,D3
<i>CYP79B2,3</i>	<i>Cytochrome P450</i>	<i>At</i>	Conversion of tryptophan to indole-3-acetaldoxime	B1
<i>CYP79F1</i>	<i>Cytochrome P450</i>	<i>At</i>	Synthesis of short-chain methionine-derived aliphatic glucosinolates abolished in mutant allele	B1
<i>CYP83B1</i>	<i>Cytochrome P450</i>	<i>At</i>	Synthesis of indole glucosinolates; N-hydroxylation of indole-3-acetaldoxime in vitro	B1
<i>CYR1</i>	<i>Cytokinin Resistant1</i>	<i>At</i>	Unknown	D3
<i>D1</i>	<i>Dwarf1</i>	<i>Os</i>	Putative $\alpha$ subunit of heterotrimeric G protein	D2
<i>D8</i>	<i>Dwarf8</i>	<i>Zm</i>	DELLA-class repressor of GA-inducible gene expression	D2,E4
<i>DAD1</i>	<i>Delayed Anther</i> <i>Dehiscence1</i>	<i>At</i>	Phospholipase A1 involved in JA biosynthesis in Arabidopsis anthers	F1



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<i>DAG1,2</i>	<i>DOF Affecting Germination (see DOF)</i>	<i>At</i>	Highly homologous zinc finger transcription factors with opposing effects on germination	E4
<i>DBP</i>	<i>At DNA Binding Protein</i>	<i>At</i>	Auxin-inducible DNA binding protein	D3
<i>DCT1</i>	<i>Divalent Cation Transporter 1</i>	<i>M</i>	Metal ion transporter, NRAMP2, similar to <i>Smf1</i> and <i>MVL</i>	D4
<i>DDE1</i>	<i>Delayed Dehiscence1</i>	<i>At</i>	12-OPDA reductase in JA biosynthesis; see OPR	F1
<i>DDE2</i>	<i>Delayed Dehiscence2</i>	<i>At</i>	Allene oxide synthase See AOS	F1
<i>DEF1</i>	<i>Defenseless 1</i>	<i>Le</i>	Unidentified gene involved in wound-inducible JA synthesis	F1
<i>DET2</i> <i>BR5red</i>	<i>De-Etiolated</i>	<i>At, Ps</i>	A steroid 5 $\alpha$ -reductase involved in the formation of campestanol from campesterol in BR biosynthesis	B7,D7 E6,E4 B6
<i>DFL1</i> <i>GH3-6</i>	<i>Dwarf in Light</i>	<i>At</i>	Adenylate-forming enzyme	D1
<i>DIM/DWF1</i> <i>BR24red</i>	<i>Diminutive/ Dwarf</i>	<i>At</i>	Isomerization and reduction of the $\Delta^{24(28)}$ bond of 24-methylenecholesterol	B7
<i>DIR1</i>	<i>Defective In Induced Resistance</i>	<i>At</i>	Putative lipid transport protein involved in SAR signaling	F2
<i>DOC1</i>	<i>Dark Overexpression of CAB</i>	plants <i>A</i>	Identical to <i>TIR3 (BIG)</i>	E1
<i>DOF</i>	<i>DNA-Binding with One Finger</i>	many	Transcription factor	C2
<i>DVL1</i>	<i>Devil 1</i>	<i>At</i>	Unknown	F3
<i>DWF1</i> <i>BR24red</i> <i>LKB</i>	<i>Dwarf 1</i>	<i>At, Ps</i>	$\Delta^5$ -sterol- $\Delta^{24}$ -oxidoreductase involved in sterol biosynthesis	B6,D7
<i>DWF4</i> <i>BR22ox</i> <i>CYP90B1</i>	<i>Dwarf 4</i>	<i>At</i>	C-22"-steroid hydroxylation of campestanol in brassinosteroid biosynthesis	B6,B7 D7
<i>DWF5</i>	<i>Dwarf 5</i>	<i>Sc, At, H</i>	$\Delta^{5,7}$ -sterol- $\Delta^7$ -reductase involved in sterol biosynthesis	B6,D7
<i>DWF7</i>	<i>Dwarf 7</i>	<i>At</i>	Desaturase involved in sterol biosynthesis	B6,D7
<i>E2F</i>	<i>E2 Promoter Binding Factor</i>	HeLa cells- H; eh	Transcription factor; originally isolated in human HeLa cells as binding promoter of adenovirus E2 protein	C3
<i>E8</i>	<i>Ethylene induced 8</i>	<i>Le</i>	Unknown; Fe(II) dioxygenase family Negative feedback regulation of ethylene biosynthesis	B4
<i>EBF1,2</i>	<i>Ein3-Binding F Box Protein 1,2</i>	<i>At</i>	F box proteins that interact with EIN3	D4
<i>ECR1</i>	<i>E1 C-Terminal Related 1</i>	<i>At</i>	Subunit of the RUB activating enzyme	D1

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<i>EDS1</i>	<i>Enhanced Disease Susceptibility 1</i>	<i>At</i>	Lipase-like protein involved in race-specific resistance	F2
<i>EDS16</i>	<i>Enhanced Disease Susceptibility 16</i>	<i>At</i>	See <i>SID2</i> Also known as <i>SID2</i>	F2
<i>EEL</i>	<i>Elevated Em Levels</i>	<i>At</i>	bZIP class transcription factor; same clade as <i>ABI5</i>	E4
<i>EER1</i>	<i>Enhanced Ethylene Response 1</i>	<i>At</i>	See <i>RCN1</i>	D4
<i>EFR1</i>	<i>Ethylene Response Factor 1</i>	<i>At</i>	AP2-domain transcription factor	F1
<i>EIL1,2</i>	<i>Ethylene-Insensitive 3-Like 1,2</i>	<i>At</i>	Ethylene signal transduction	D4
<i>EIN2</i>	<i>Ethylene Insensitive 2</i>	<i>At; Le</i>	Ethylene signal transduction; allelic to <i>ERA3</i>	E4,D4 D5,E6
<i>EIN3</i>	<i>Ethylene Insensitive 3</i>	<i>At</i>	Transcription factor involved in ethylene signal transduction	D4,D5
<i>EIN4</i>	<i>Ethylene Insensitive4</i>	<i>At</i>	Ethylene receptor	D4,D5
<i>EIN5,7</i>	<i>Ethylene Insensitive 5,7</i>	<i>At</i>	Ethylene signal transduction	D4
<i>EIN6/EEN</i>	<i>Ethylene Insensitive 6/Enhancer of Ethylene Insensitivity</i>	<i>At</i>	Ethylene insensitive double mutant associated with mechanical stimuli pathway and ethylene signal transduction	D4
<i>EIR1 PIN2</i>	<i>Ethylene Insensitive Root 1</i>	<i>At</i>	Identical to <i>AGR1</i> and <i>PIN2</i> auxin efflux regulators	E1
<i>EKO</i>	<i>See KO</i>			
<i>ENOD40</i>	<i>ENOD40 Nod Factor Precursor</i>	Leg-umes	Role in establishing symbiotic N-fixation	F3
<i>ERA1</i>	<i>Enhanced Response to ABA 1</i>	<i>At</i>	$\beta$ subunit of farnesyl transferase; ABA-hypersensitive phenotype	D6,E4
<i>ERA3</i>	<i>Enhanced Response To ABA</i>	<i>At</i>	Signal transduction for multiple hormones; allelic to <i>EIN2</i>	E4
<i>ERF1</i>	<i>Ethylene Response Factor 1</i>	<i>At</i>	Transcription factor mediating expression of ethylene-inducible genes; EREBP like protein that binds CGG box of ethylene regulated promoters	D4,D5 F1
<i>ERS1, 2</i>	<i>Ethylene Response Sensor</i>	<i>At</i>	Ethylene receptors	D4,D5
<i>ETO1</i>	<i>Ethylene Overproducing</i>	<i>At</i>	A protein that interacts with the C-terminal end of <i>AtACS5</i> and increases its stability	B4,D4
<i>ETO2/3</i>	<i>Ethylene Overproducing 2/3</i>	<i>At</i>	Forms of <i>AtACS5/9</i> (respectively) mutated within the C-terminal domain	B4,D4
<i>ETR1,2</i>	<i>Ethylene Response 1,2</i>	<i>At; Cme; Le</i>	Ethylene receptor histidine kinase; mutant form confers dominant ethylene insensitivity	D3,D4 D5,E6 E7

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<i>EXP</i>	"-Expansin	Cs; At; Le, Os; many	Cell-wall loosening	C4
<i>EXPB</i>	$\beta$ -Expansin	many	Cell-wall loosening	C4
<i>EXPL</i>	Expansin-Like	many	Unknown	C4
<i>EXPR</i>	Expansin-Related	many	Unknown	C4
<i>FAD</i>	Fatty Acid Desaturase	At; many	Introduction of double bonds into fatty acyl chain; the triple mutant (genes 3, 7 & 8 produces little linolenic acid (thus is unable to accumulate jasmonates)	F1,E6
<i>FK</i>	<i>Fackel (torch, flare)</i>	many	$\Delta^{8,14}$ -sterol- $\Delta^{14}$ -reductase	B6
<i>FLC</i>	<i>Flacca</i>	Le	Sulfurylation of molybdenum cofactor; conversion of ABA aldehyde to ABA	B5,E3
<i>FliM</i>	<i>Flagella M</i>	Ec	Subunit of the flagellar motor complex	D3
<i>FRY1</i>	<i>Fiery</i>	At	Phosphoinositide catabolism	E4
<i>FT</i>	<i>Flowering Locus T</i>	At	Control of floral transition	E5
<i>FUS3</i>	<i>Fusca (brown, dusky)</i>	At	Promotes embryonic development; B3 domain transcription factor	E4
<i>FUS9</i> <i>COP10</i>	<i>Fusca9/Constitutive</i> <i>Photomorphogenic10</i>	At	Similar to E2 ubiquitin-conjugating enzyme; interacts with COP1 and COP9	D3
<i>FZY</i>	<i>Floozy</i>	Ph	Flavin monooxygenase, overexpression results in IAA accumulation	B1
<i>GAI; CPS</i>	<i>GA-Deficient-1</i>	At	GA biosynthesis ( <i>ent</i> -CPP synthase)	E7
<i>GA20ox</i> <i>GA5 (in At)</i>	<i>Gibberellin 20-</i> <i>Oxidase</i>	Cm;At St; Ps; many	Converts GA <sub>12</sub> to GA <sub>9</sub> and GA <sub>53</sub> to GA <sub>20</sub> Converts GA <sub>12</sub> to GA <sub>25</sub> (in Cm)	B2,B7 E5,E7
<i>GA2ox</i> <i>GA 2<math>\beta</math>-</i> <i>Hydroxylase</i> <i>SLN (in Ps)</i>	<i>Gibberellin 2-</i> <i>Oxidase</i>	Pc; Ps; At; many	GA catabolism; converts C19-GAs to biologically inactive 2 $\beta$ -hydroxy analogs and to 2-oxo analogs (GA-catabolites); converts C20-GAs to 2 $\beta$ -hydroxy analogs	B2,B7 E7
<i>GA3ox</i> <i>GA 3<math>\beta</math>-</i> <i>hydroxylase</i> <i>GA4; GA4H</i> <i>(in At);</i> <i>Le (in Ps)</i>	<i>Gibberellin 3-</i> <i>Oxidase</i> <i>GA 3-hydroxylase</i>	many At	Converts GA <sub>9</sub> to GA <sub>4</sub> and GA <sub>20</sub> to GA <sub>1</sub>	A2,B1 B2,B7 E7
<i>GAI</i>	<i>GA-Insensitive</i>	At; Vv	DELLA protein, a negative regulator of GA signaling	C2,D2 E4,E7
<i>GAMYB</i>	<i>GA Regulated MYB</i>	Hv	MYB transcription factor	C2,E4
<i>GCA2</i>	<i>Growth Controlled</i> <i>By ABA 2</i>	At	Unknown, but <i>gca2</i> mutant has an ABA-insensitive phenotype	D6
<i>GCR1</i>	<i>G-Protein Coupled</i> <i>Receptor</i>	At	Promotes germination	E4
<i>GH3</i>	<i>(Isolated by)</i> <i>Gretchen Hagen 3</i>	Gm many	Auxin-responsive gene, <i>JAR1</i> -like; adenylate-forming enzyme	B1,D1 E2

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<i>GH45</i>	<i>Glycosyl Hydrolase Family-45</i>	many fungi	Hydrolysis of glycosidic bond	C4
<i>GID2</i>	<i>GA-Insensitive Dwarf 2</i>	<i>Os</i>	F-box factor that targets DELLA proteins for proteasomal degradation; a positive regulator of GA signaling; orthologous to <i>SLY</i>	C2,D2 E4
<i>GIN1,5</i>	<i>Glucose Insensitive</i>	<i>At</i>	See <i>ABA2/3</i> respectively	A2,B5
<i>GL2</i>	<i>Glabra2</i>	<i>At</i>	Homeodomain transcription factor modulating hair formation	C4
<i>GLUT4</i>	<i>Glucose Transporter4</i>	<i>M</i>	Insulin-regulated glucose transporter	E1
<i>GMPOZ</i>	<i>GAMYB Associated POZ</i>	<i>Hv</i>	Transcription factor	C2
<i>GN</i>	<i>Gnom</i>	many	ARF-GEF	E1
<i>GORK1</i>	<i>Guard cell Outwardly Rectifying K<sup>+</sup> Channel 1</i>	<i>At</i>	Outwardly rectifying K <sup>+</sup> channel	D6
<i>GPA1</i>	<i>G Protein <math>\alpha</math> Subunit 1</i>	<i>At</i> ; many	$\alpha$ subunit of heterotrimeric G protein; <i>gpa1</i> mutants show ABA-insensitivity in certain guard cell responses; promotes germination	D6,E4
<i>GRD2</i>	<i>GA-Responsive Dwarf 2</i>	<i>Hv</i>	Putative GA3ox, a GA biosynthetic enzyme	D2
<i>GSE</i>	<i>GA-Sensitivity</i>	<i>Hv</i>	A positive regulator of GA signaling	D2
<i>G<math>\alpha</math></i>	<i>G<math>\alpha</math> - A Subunit of Heterotrimeric G Proteins</i>	many	Signal transduction	B2
<i>HB</i>	<i>Homeobox HD-ZIP gene</i>	<i>At</i>	Encoding transcriptional regulator expressed early in procambial (or provascular) cells	E2
<i>HBT</i>	<i>Hobbit</i>	<i>At</i>	Homolog of the CDC27 subunit of the anaphase-promoting complex (APC); required for cell division and cell differentiation in meristems	E4
<i>HK1</i>	<i>Histidine Kinase 1</i>	<i>Zm</i>	Cytokinin receptor	B3
<i>HLS1</i>	<i>Hookless 1</i>	<i>At</i>	Ethylene regulated apical hook development, putative N-acetyltransferase	D4
<i>HOG1</i>	<i>High Osmolarity Glycerol Response 1</i>	<i>Sc</i>	MAP kinase central to the high-osmolarity signaling pathway	D3
<i>HRT</i>	<i>Hordeum Repressor of Transcription</i>	<i>Hv</i>	Transcription factor	C2
<i>HXK1</i>	<i>Hexokinase 1</i>	<i>At</i>	Conversion of glucose to glucose-6-phosphate and sense of sugar level	E6
<i>HYD1</i>	<i>Hydra 1</i>	<i>Sc, At</i>	Sterol $\Delta^8$ - $\Delta^7$ isomerase	B6

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<i>HYL1</i>	<i>HYponastic Leaves 1</i>	<i>At</i>	Double-stranded RNA binding protein; <i>hyl1</i> mutant shows reduced sensitivity to auxin and cytokinin and ABA hypersensitivity (although guard cell ABA responses are wild-type)	D6,E4
<i>IAA1-3</i>	<i>Indole Acetic Acid 1-3</i>	<i>At</i>	Auxin-inducible nuclear-localized proteins	D3
<i>IAA17</i> <i>AXR3</i>	<i>Indole Acetic Acid 17/Auxin Resistant 3</i>	<i>At</i>	Auxin-inducible nuclear-localized protein	D3
<i>IAA3</i> <i>SHY2</i>	<i>Indole Acetic Acid 3/Short Hypocotyl</i>	<i>At</i>	Auxin-inducible nuclear-localized protein (suppressor of <i>HY2</i> )	D3
<i>iaaL</i>	<i>IAA-lysine synthetase</i>	<i>Psa</i>	over-expression results in extremely low IAA concentrations	E2
<i>iaaM</i>	<i>tryptophan mono-oxygenase</i>	<i>Agt</i>	Produces indoleacetamide from tryptophan; over-expression results in high IAA concentrations	E2
<i>iaaspH</i>	<i>IAA-Aspartic Acid Hydrolase</i>	<i>mi</i>	Hydrolysis of IAA-Asp	B1
<i>IAGLU</i>	<i>IAA-Glucose Synthase</i>	<i>Zm</i>	UDP-glucosyl transferase specific to IAA-Glucose formation	B1
<i>IAH</i>	<i>IndoleAcetamide Hydrolase</i>	<i>mi</i>	Conversion of indole-3-acetamide to IAA	B1
<i>IAO</i>	<i>Indole-3-Acetaldehyde Oxidase</i>	<i>mi</i>	Conversion of indole-3-acetaldehyde to IAA	B1
<i>IAP1</i>	<i>IAA-Modified Protein</i>	<i>Pv</i>	IAA-modified protein	B1
<i>IBC6</i>	<i>Induced By Cytokinin 6 (Same as ARR5)</i>	<i>At</i>	Negative regulator of cytokinin signaling	D3
<i>IBC7</i>	<i>Induced By Cytokinin 7 (Same as ARR4)</i>	<i>At</i>	See <i>ARR4</i> above	D3
<i>ICK1</i>	<i>Cyclin-Dependent Kinase Inhibitor</i>	<i>At</i>	Suppress cell division	E4
<i>IGL</i>	<i>Indole-3-Glycerol Phosphate Lyase</i>	<i>Zm</i>	Indole synthase, tryptophan synthase alpha paralog	B1
<i>IPDC</i>	<i>Indole Pyruvate Decarboxylase</i>	<i>mi</i>	Conversion of indole-3-pyruvic acid to indole-3-acetaldehyde	B1
<i>IPT1,3-8</i>	<i>Isopentenyl Transferase 1,3-8</i>	<i>Agt;</i> <i>At;</i> many	Cytokinin biosynthesis; catalyses the rate-limiting step of cytokinin biosynthesis: the condensation of 2- $\Delta$ -isopentenyl PPi with AMP to form isopentenylAMP	B3,C3 E3,E5, E6
<i>IPT2,9</i>	<i>Isopentenyl-transferase 2,9</i>	<i>At</i>	Isopentenylation of tRNA	B3
<i>ISI4</i>	<i>Impaired Sucrose Induction</i>	<i>At</i>	See <i>ABA2</i>	B5
<i>JAI1</i> <i>COI1</i>	<i>Jasmonate-Insensitive 1</i>	<i>Le</i>	Regulator of JA signaling; see <i>COI1</i>	F1

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<i>JAR1</i> <i>FIN219</i> <i>GH3-11</i>	<i>Jasmonic Acid</i> <i>Resistant 1; Far Red</i> <i>Insensitive 219</i>	<i>At</i>	Adenylate-forming enzyme; acyl adenylate-forming firefly luciferase superfamily; adenylation of JA	B1,D1 F1
<i>JMT</i>	<i>Jasmonate Methyl</i> <i>Transferase</i>	<i>At</i>	Conversion of JA to methyl-JA	F1
<i>KAO1,2</i> <i>NA (in Ps)</i> <i>CYP88A6,7</i>	<i>Ent-Kaurenoic Acid</i> <i>Oxidase</i>	<i>Hv;</i> <i>Cm;</i> <i>Ps; At;</i> <i>many</i>	GA biosynthesis; oxidation of <i>ent</i> -kaurenoic acid to GA <sub>12</sub>	B2,E7 B7
<i>KAT1,2</i>	<i>Voltage-Gated K<sup>+</sup></i> <i>Channel of At1/2</i>	<i>At</i>	Inwardly rectifying K <sup>+</sup> channel	D6
<i>KGM</i>	<i>Kinase Associated</i> <i>With GAMYB</i>	<i>Hv</i>	Protein kinase	C2
<i>KIP</i>	<i>Kinase Inhibitory</i> <i>Protein</i>	<i>H; eh</i>	Inhibition of cyclin/CDK complexes, homologs in plants known as Kip-related proteins (KRP)	C3
<i>kn1</i>	<i>Knotted 1</i>	<i>Zm</i>	Homeobox transcription factor	D3
<i>KNAT1-2</i>	<i>Knotted-Like From</i> <i>At 1-2</i>	<i>At</i>	Homeobox transcription factor; class I <i>KNOX</i> gene	D3,E5
<i>KNOX</i>	<i>Knotted1-Like</i> <i>Homeobox</i>	<i>many</i>	Transcription factors involved in establishing organ identity	B2
<i>KO</i> <i>GA3 (inAt)</i> <i>LH (in Ps)</i> <i>CYP701A10</i>	<i>ent-Kaurene Oxidase</i>	<i>S</i> <i>At; Ps</i>	Oxidizes <i>ent</i> -kaurene to <i>ent</i> -kaurenoic acid	B2,B7 E7
<i>KS</i> <i>GA2(inAt)</i>	<i>ent-Kaurene</i> <i>Synthase</i>	<i>Cm;At;</i> <i>S</i>	Converts <i>ent</i> -copalyl diphosphate to <i>ent</i> -kaurene	B2,E7
<i>LAX</i>	<i>Like AUX1</i>	<i>At</i>	Homologue of <i>AUX1</i> ; putative auxin uptake carrier	E1
<i>LE</i> <i>GA3ox1</i>	<i>Length. Pea length</i> <i>genes (L-) are named</i> <i>in alphabetical order</i>	<i>Ps</i>	GA <sub>20</sub> 3-oxidation	B7,E5 E7
<i>LEC1</i>	<i>Leafy Cotyledon</i>	<i>At</i>	Promotes embryonic development; CCAAT-box binding factor	E4
<i>LEC2</i>	<i>Leafy Cotyledon</i>	<i>At</i>	Promotes embryonic development; B3 domain transcription factor	E4
<i>LFY</i>	<i>Leafy</i>	<i>At</i>	Transcription factor modulating floral organs; promotes transition from inflorescence to floral meristem	B2,C4
<i>LH; KO1</i> <i>CYP701A10</i>	<i>See LE</i>	<i>Ps</i>	<i>Ent</i> -kaurene oxidation	B7
<i>LHY</i>	<i>Late Elongated</i> <i>Hypocotyl</i>	<i>At</i>	MYB transcription factor; negative regulator of TOC1	D3
<i>LK</i> <i>BR5red</i>	<i>See LE</i>	<i>Ps</i>	C5 $\alpha$ -duction during BR biosynthesis (see <i>DET2</i> below)	B7
<i>LKA; BRI1</i>	<i>See LE</i>	<i>Ps</i>	BR receptor	B7

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LKB BR24red	See LE	Ps	C24 reduction during BR biosynthesis (see DIM/DWF1)	B7
LKC	See LE	Ps	Unknown BR mutant	B7
LKD	See LE	Ps	Unknown BR mutant	B7
LOS5,6	Low Expression of Osmotic Stress-Responsive Genes	At	See ABA3,1 respectively	B5
LOX	Lipoxygenase	St; many	Oxygenation of polyunsaturated fatty acids	E5,F1
LS; CPS	See LE	Ps	Synthesis of copalyl diphosphate	B7
LUC	Luciferase	Firefly	Catalyzes the oxidation of luciferin producing light	D3
MAN2	Endo-B-Mannanase	Le	Hydrolysis of mannan	C3
MDR1	Multidrug Resistance 1	many	Multi-drug resistance sub-family of ABC transporters. Some members involved in auxin transport	E1
MNK	Menkes Copper-Transporting ATPase	M	Substrate-regulated efflux transporter for Cu ions	E1
MP ARF5	Monopteros	At	Auxin response factor (ARF) transcription factor; regulator of embryo patterning; putative interactor with BDL	D1,E1 E2,E4
MPK4,6,13	Mitogen Activated Protein Kinase 4,6,13	At	Protein kinase (note: kinases of kinases repeat the K in the abbreviation)	D4,F1
MRP5	Multidrug Resistance-Related Protein 5	At	Closely related to MDR5	E1
MSG2 IAA19	Massugu	At	See AUX/IAA	D1
MSR1	Mitochondrial-Specific Arginyl-tRNA Synthetase 1	Sc	Arginyl-tRNA synthetase	D3
MVL MALVOLIO	Malvolio	Dm	NRAMP Metal-ion transporter similar to Smf1 and DCT1	D4
NA; KAO1 CYP88A6	Nana	Ps	Ent-kaurenoic acid oxidase	A2,B7 E5
NAC1	NAM,ATAF1,CUC2	Ph	Transcription factor	D1
NAHG	Salicylate Hydroxylase	Pp	Converts salicylic acid to catechol	E6,F2
NAR2A	Molybdenum Cofactor	Hv	Molybdenum cofactor synthesis	B5
NCED	Nine-Cis-Epoxy-Carotenoid Dioxygenase	Zm; Le; many	Cleavage of 9-cis-epoxy-carotenoids to xanthoxin in ABA biosynthesis	B5, E7
NIA1,2	Nitrate Assimilation 1,2	At	Cytokinin-inducible nitrate reductase	C3,D6

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<i>NIM1</i>	<i>Non-Inducible Immunity 1</i>	<i>At</i>	Ankyrin repeat protein that transduces the SA signal that activates SAR Also known as <i>NPRI</i> , <i>SAI1</i>	F2
<i>NIT1-4</i>	<i>Nitrilase 1-4</i>	<i>At</i>	Conversion of IAN (indole-3-acetonitrile) to IAA in vitro, null allele is resistant to inhibitory effects of IAN	B1,E6
<i>NOT NCED</i>	<i>Notabilis</i>	<i>Le</i>	See <i>NCED</i>	B5
<i>NPH4 MSG1 ARF7</i>	<i>Non-Phototropic Hypocotyl 4 Massugu 1</i>	<i>At</i>	Affects blue light and gravitropic and auxin mediated growth responses; see <i>ARF</i>	D1,D4
<i>NPQ2</i>	<i>Non-Photochemical Quenching</i>	<i>At</i>	See <i>ABA1</i>	B5
<i>NPRI NIM1, SAI1</i>	<i>Nonexpresser of Pr Genes 1 SA Insensitive</i>	<i>At</i>	Controls systemic acquired resistance (SAR) Confers resistance to pathogens; see <i>NIM1</i>	D4,F2
<i>NR</i>	<i>Never-Ripe</i>	<i>Le</i>	Ethylene receptor	D4,D5 E7
<i>NRT1</i>	<i>Nitrate/Chlorate Transporter 1</i>	<i>At</i>	Dual affinity nitrate transporter	D6
<i>ODC</i>	<i>Ornithine Decarboxylase</i>	many	Polyamine biosynthesis	E5
<i>OPR</i>	<i>12-Oxo-Phytodienoic Acid Reductase</i>	<i>At</i> ; many	Conversion of 12-oxo-PDA to 3-oxo-2-(2'(Z)-pentenyl)-cyclopentane-1-octanoic acid (OPC-8:0) in JA biosynthesis	E6;F1
<i>ORCA3</i>	<i>Octadecanoid-Responsive AP2-Domain Protein</i>	<i>Cr</i>	ERF/AP2-domain transcription factor	F1
<i>ORE12</i>	<i>Oresara 12 (delayed senescence)</i>	<i>At</i>	Gain of function mutation in AHK3	D3
<i>ORP</i>	<i>Orange Pericarp</i>	<i>Zm</i>	Tryptophan synthase beta	B1
<i>OST1</i>	<i>Open Stomata 1</i>	<i>At</i>	ABA-activated serine-threonine protein kinase; probably ortholog of <i>AAPK ost1</i> mutants show guard cell insensitivity to ABA	D6
<i>PAD4</i>	<i>Phytoalexin Deficient 4</i>	<i>At</i>	Lipase-like protein involved in race-specific resistance	F2
<i>PAS</i>	<i>Pasticcino (tartlet)</i>	<i>At</i>	Mutants show uncontrolled cell division	D3
<i>PAT</i>	<i>Parthenocarpic</i>	<i>Le</i>	Unknown; mutation promotes parthenocarp	E7
<i>PBF</i>	<i>Prolamin Box Binding Factor</i>	Cereals	Transcription factor	C2
<i>PDF1</i>	<i>Protodermal Factor 1</i>	<i>At</i>	Encodes a putative extracellular proline-rich protein	B2
<i>PDF1.2</i>	<i>Plant Defensin 1.2</i>	<i>At</i>	Encodes an ethylene- and jasmonate-responsive plant defensin	D4



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<i>PEP</i>	<i>Pepino (Same as Pasticcino 2)</i>	<i>At</i>	Unknown	D3
<i>PGP1</i>	<i>P-Glycoprotein 1</i>	<i>At</i>	Member of a sub-group of MDR proteins	E1
<i>PHOR1</i>	<i>Photoperiod Responsive 1</i>	<i>St</i>	U-box arm-repeat protein, a positive regulator of GA signaling	D2
<i>PHYA</i>	<i>Phytochrome A</i>	<i>At</i> ; many	Light labile red/far-red absorbing photoreceptor; serine-threonine kinase	D3,E5
<i>PHYB</i>	<i>Phytochrome B</i>	<i>At</i> ; many	Light stable red/far-red absorbing photoreceptor; putative histidine kinase	D3,E5
<i>PID</i>	<i>Pinoid</i>	<i>At</i>	Serine/threonine protein kinase involved in auxin transport and/or signaling	D1,E1
<i>PIF3</i>	<i>Phytochrome Interacting Factor 3</i>	<i>At</i>	Putative helix-loop-helix transcription factor	D3
<i>PIN</i>	<i>Pin-Formed</i>	<i>At</i>	Family of auxin efflux regulators	A2,E1 E2,E4
<i>PIN2</i>	<i>Proteinase Inhibitor II</i>	<i>Le</i>	Defense-related	E5,G1
<i>PIRIN1</i>	<i>Pirin1</i>	<i>At</i>	Interacts with $\alpha$ subunit of G-protein; promotes germination	E4
<i>PIS1</i>	<i>Polar Auxin Transport Inhibitor Sensitive 1</i>	<i>At</i>	Putative negative regulator of polar auxin transport	E1
<i>PKABA1</i>	<i>Protein Kinase Responsive To ABA 1</i>	<i>Hv</i>	Protein kinase; suppresses GA-inducible gene expression in aleurone	C2,E4
<i>PKL</i>	<i>Pickle</i>	<i>At</i>	Chromatin remodeling factor; suppresses embryonic development; a positive regulator of GA signaling?	D2,E4
<i>PLD</i>	<i>Phospholipase D</i>	<i>At</i>	Catalyzes hydrolysis of phosphatidylcholine to phosphatidic acid and choline	D3
<i>PLS</i>	<i>Polaris</i>	<i>At</i>	36AA peptide of unknown function	D3
<i>POTH1</i>	<i>Potato Homeodomain 1</i>	<i>St</i>	KNOX gene	E5
<i>POZ</i>	<i>Poxvirus Zinc Finger</i>	Virus; <i>A</i>	Transcription factor	C2
<i>PRO-SYSTEMIN</i>	<i>Systemin Precursor</i>	<i>Ssp</i>	Systemic wound signaling	F1,F3
<i>ProTomHys Sys</i>	<i>Hydroxyproline-Rich Glycopeptide Precursor</i>	<i>Nt</i> ; <i>Le</i>	Precursor of two hydroxyproline-rich peptide defense signals	F3
<i>Ps-IAA4/5</i>	<i>Ps Indole Acetic Acid 4/5</i>	<i>Ps</i>	See <i>AUX/IAA</i>	D1,C4
<i>PSKa precursor</i>	<i>Phytosulfokine-<math>\alpha</math> Precursor</i>	many	Regulates cellular de-differentiation and proliferation	F3
<i>PSY</i>	<i>Phytoene Synthase</i>	many	Converts geranylgeranyl diphosphate to phytoene	B2

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<i>RAC1</i>	ras-related C3 botulinum toxin substrate	<i>At</i>	RHO-like small GTPase; synonymous with <i>ROP6</i> ; negative regulator of guard cell ABA response	D6
<i>RALF precursor</i>	<i>Rapid Alkalinization Peptide Precursor</i>	many	Unknown	F3
<i>RAN1</i>	<i>Responsive-To-Antagonist 1</i>	<i>At</i>	ATP dependent copper transporter vital for ethylene response pathway	D4
<i>RB1</i>	<i>Retinoblastoma-Like Protein 1</i>	<i>Nt, eh</i>	Cell cycle regulator, hyperphosphorylated by cyclin-dependent protein kinase complex	C3
<i>RBX1</i>	<i>Ring Box 1</i>	<i>Sc</i>	SCF subunit	D1
<i>RCE1</i>	<i>Rub Conjugating Enzyme 1</i>	<i>At</i>	Conjugation of RUB to substrates	D1
<i>RCN1</i>	<i>Roots Curl In NPA 1</i>	<i>At</i>	Serine/Threonine protein phosphatase type 2A regulatory subunit; <i>rcn1</i> mutant shows impaired guard cell response to ABA	D4,D6 E1
<i>RcsC</i>	<i>Regulator of capsule synthesis C</i>	<i>Ec</i>	Sensor histidine kinase; regulates genes encoding envelope proteins	D3
<i>RDO</i>	<i>Reduced Dormancy</i>	<i>At</i>	Four loci of unknown cellular/molecular function	E4
<i>RGA</i>	<i>Repressor of gal-3</i>	<i>At</i>	DELLA protein, a negative regulator of GA signaling	C2,D2 E4
<i>RGL1,2,3</i>	<i>RGA-LIKE 1-3</i>	<i>At</i>	DELLA proteins, negative regulators of GA signaling	D2,E4
<i>RHD6</i>	<i>Root Hair Defective6</i>	<i>At</i>	Unknown	C4
<i>RHT1</i>	<i>Reduced Height 1</i>	<i>Ta</i>	DELLA-class repressor of GA-inducible gene expression	D2,E4 E7
<i>RIN</i>	<i>Ripening Inhibited</i>	<i>Le</i>	MADS box transcription factor Loss-of-function mutant fruits fail to ripen	E7,D4 D5
<i>ROLC</i>		<i>Ar</i>	Hydrolysis of CK conjugates	E5
<i>ROP6,10</i> <i>RAC1</i>	<i>RHO of Plants 6,10</i>	<i>At</i>	RHO-like small GTPase; <i>rop10</i> null mutants are ABA hypersensitive	D6
<i>RPN12</i>	<i>Regulatory Particle Non-ATPase 12</i>	<i>Sc; At; eh</i>	Regulatory component of the 26S proteasome complex	C3,D3
<i>RSP1,2</i> <i>RAS</i>	<i>Raspberry</i>	<i>At</i>	Promote embryonic morphogenesis; suppress embryonic development of suspensor	E4
<i>RUB1</i> <i>NEDD8</i>	<i>Related to Ubiquitin</i>	<i>Sc</i>	Modifier of CUL1; regulates SCF activity	D1
<i>SABP1</i>	<i>SA Binding Protein 1</i>	<i>Nt</i>	SA-sensitive catalase	F2
<i>SABP2</i>	<i>SA Binding Protein 2</i>	<i>Nt</i>	SA-stimulated lipase and putative SA receptor	F2
<i>SAD</i>	<i>Scutellum and Aleurone Expressed DOF</i>	<i>Hv</i>	Transcription factor	C2

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<i>SAD1</i>	<i>Supersensitive To ABA And Drought 1</i>	<i>At</i>	Sm-like small nuclear ribonucleoprotein; <i>sad1</i> mutants are ABA and drought hypersensitive	D6,E4
<i>SAG12</i>	<i>Leaf Senescence-Specific Gene 12</i>	<i>At</i>	Vacuole-targeted cysteine proteinase	E6
<i>SAG13</i>	<i>Leaf Senescence-Specific Gene 13</i>	<i>At</i>	Short-chain alcohol dehydrogenase	E6
<i>SAI1;NIMI, NPR1</i>	<i>SA Insensitive</i>	<i>At</i>	See <i>NIM</i>	F2
<i>SAMase</i>	<i>S-Adenosyl Methionine Hydrolase</i>	T3 bacteriophage	Conversion of S-adenosyl methionine into methylthioadenosine	B4
<i>SAMS</i>	<i>SAM Synthase</i>	<i>At; Le; Ac</i>	ATP:L-methionine S-adenosyltransferase involved in the transfer of the adenosyl moiety from ATP to methionine	B4
<i>SAUR</i>	<i>Small Auxin-Up RNA</i>	<i>Gm;At</i>	Unknown	D1
<i>SAUR-AC1</i>	<i>Small Auxin-Up RNA-Arabidopsis Columbia 1</i>	<i>At</i>	Unknown	D3
<i>SCR precursor</i>	<i>Brassica S-Locus Cysteine- Rich Peptide Precursor</i>	<i>Bsp</i>	Produces S-locus peptide signal for self incompatibility	F3
<i>SD1</i>	<i>Semidwarf-1</i>	<i>Os</i>	GA biosynthesis (GA 20-oxidase)	E7
<i>SDGs</i>	<i>Senescence-Down-Regulated Genes</i>	<i>At</i>	Expression is down-regulated during leaf senescence	E6
<i>SENs</i>	<i>Senescence-Associated Genes</i>	<i>At</i>	Expressed during leaf senescence in <i>At</i>	E6
<i>SHI</i>	<i>Short Internodes</i>	<i>At</i>	Zinc finger protein, a negative regulator of GA signaling?	D2
<i>SHO</i>	<i>Shooting</i>	<i>Ph</i>	See <i>IPT1</i>	B3
<i>SHY1,6 IAA6,3</i>	<i>Short Hypocotyl</i>	<i>At</i>	See <i>AUX/IAA</i>	D1
<i>SID2</i>	<i>SA-Deficient 2</i>	<i>At</i>	Encodes isochorismate synthase involved in SA synthesis Also known as <i>EDS16</i>	F2
<i>SIMKK</i>	<i>Salt Stress-Induced MAPKK</i>	<i>Mt</i>	Salt stress- and pathogen-induced <i>Medicago</i> MAPKK	D4
<i>SIS4</i>	<i>Sugar Insensitive 4</i>	<i>At</i>	See <i>ABA1</i>	B5
<i>SIT</i>	<i>Sitiens</i>	<i>Le</i>	Conversion of ABA-aldehyde to ABA	B5,E3
<i>SLG</i>	<i>Brassica S-Locus Glycoprotein</i>	<i>Bsp</i>	Activates SRK to trigger an incompatibility signaling cascade	F3
<i>SLN GA2ox1</i>	<i>Slender</i>	<i>Ps</i>	GA <sub>20</sub> 2-oxidation, GA <sub>1</sub> 2-oxidation	B7
<i>SLN1</i>	<i>Synthetic Lethal of N-End Rule 1</i>	<i>Sc</i>	Two-component histidine kinase involved in osmosensing	D3,D4 D5
<i>SLN</i>	<i>Slender</i>	<i>Hv</i>	DELLA protein, a negative regulator of GA signaling	C2,D2 E4

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<i>SLR1</i>	<i>Slender Rice 1</i>	<i>Os</i>	DELLA protein, a negative regulator of GA signaling	B2,C2 D2
<i>SLR1;IAA14</i>	<i>Solitary Root 1</i>	<i>At</i>	See <i>AUX/IAA</i>	D1
<i>SLY1</i>	<i>Sleepy 1</i>	<i>At</i>	F-box factor that targets DELLA proteins for proteasomal degradation; a positive regulator of GA signaling orthologous to <i>GID2</i>	D2,E4
<i>SMF1</i>	<i>Suppressor of MIF 1</i>	<i>Sc</i>	NRAMP Metal-ion transporter similar to <i>MVL</i> and <i>DCT1</i>	D4
<i>SMT1</i>	<i>Sterol C-24 Methyl Transferase 1</i>	<i>At</i> ; many	Synthesis of membrane sterols; transferring a methyl group to C-24 position of sterols, allelic to <i>ORC</i> , <i>CPH</i>	B6,E1
<i>SPR2</i> <i>FAD7</i>	<i>Suppressor of Prosystemin-Mediated Responses2</i>	many	Omega-3 Fatty acid desaturase involved in the production of linolenic acid for JA biosynthesis	F1
<i>SPY</i>	<i>Spindly</i>	<i>At</i>	O-linked GlcNAc transferase; a negative regulator of GA signaling	C2,D2 E4
<i>SR 160</i>	<i>Tomato Systemin Receptor</i>	<i>Le</i>	Interacts with systemin to initiate defense signaling	F3
<i>SRK</i>	<i>Brassica S-Locus Receptor Kinase</i>	<i>Bsp</i>	Interacts with <i>SLG</i> and <i>SCR</i> to initiate self incompatibility	F3
<i>SRK2E</i>	<i>SNF1-Related Protein Kinase 2E</i>	<i>At</i>	Snrk2-type protein kinase; synonymous with <i>OST1</i>	D6
<i>SSI1</i>	<i>Suppressor of Salicylic Acid Insensitive 1</i>	<i>At</i>	Activator of defense response gene expression and lesion formation	D4
<i>SSK1</i>	<i>Suppressor of Sensor Kinase 1</i>	<i>Sc</i>	Response regulator; negatively regulates the HOG1 pathway	D3
<i>SSU</i>	<i>Small Subunit Gene</i>	many	Component of ribulose-1,6-bisphosphate carboxylase/oxygenase (rubisco)	E6
<i>ST2A</i>	<i>Sulfotransferase</i>	<i>At</i>	Hydroxyjasmonate sulfotransferase	F1
<i>STE,DWF7</i>	<i>Sterol/Dwarf 7</i>	<i>At</i>	Steroid C-5 desaturase	B6
<i>STM</i>	<i>Shoot Meristemless</i>	<i>At</i>	KNOX homeobox transcription factor; regulator of shoot meristem formation and maintenance	B2,D3 E4,E5
<i>STP1</i>	<i>Stunted Plant 1</i>	<i>At</i>	Monosaccharide/H <sup>+</sup> symporter	D3
<i>SUS1</i>	<i>Abnormal Suspensor 1</i>	<i>At</i>	MicroRNA processing; allelic to Short integuments1 and Carpel factory	E4
<i>SUS2</i>	<i>Abnormal Suspensor</i>	<i>At</i>	Putative pre-mRNA splicing factor	E4
<i>SUSY</i>	<i>Sucrose Synthase</i>	many	Sucrose breakdown	E5
<i>SYR1</i>	<i>Syntaxin-Related 1</i>	<i>Nt</i>	Syntaxin	D6
<i>TAT</i>	<i>Tryptophan Amino transferase</i>	<i>mi</i>	Conversion of tryptophan to indole-3-pyruvic acid	B1
<i>TCH3</i>	<i>Touch 3</i>	<i>At</i>	Calmodulin-like protein, expression induced by touch and darkness	D4

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<i>TCH4</i>	<i>Touch 4</i>	<i>At</i>	Xyloglucan endotransglucosylase/hydrolase	D7
<i>TCP10</i>	<i>TB1/CYC/PCF10</i>	<i>At</i>	Putative transcription factor	D3
<i>TDC</i>	<i>Tryptophan Decarboxylase</i>	<i>mi, Cr</i>	Conversion of tryptophan to tryptamine	B1
<i>TED</i>	<i>Tracheary Element Differentiation</i>	<i>Ze</i>	Expressed during early stages of vessel element differentiation	E2
<i>THI2.1</i>	<i>Thionin</i>	<i>At</i>	Defense-related	E5
<i>TIR1</i>	<i>Transport Inhibitor Response1</i>	<i>At</i>	F-box protein; related to yeast GRR1P and human SKP2 proteins, involved in ubiquitin-mediated processes	D1,D4
<i>TIR3</i>	<i>Transport Inhibitor Response3</i>	<i>At</i>	Identical to <i>BIG</i> and <i>DOC1</i> . Putative NPA-binding protein	E1
<i>TMO</i>	<i>Tryptophan Monooxygenase</i>	<i>mi</i>	Conversion of tryptophan to indole-3-acetamide	B1
<i>TMR</i>	<i>Tumor Morphology of Roots</i>	<i>Agt</i>	See <i>IPT</i>	B3
<i>TRAB1</i>	<i>Transcription Factor Responsible for ABA Regulation 1</i>	<i>Os</i>	bZIP domain transcription factor; likely <i>ABI5</i> ortholog	E4
<i>TRIP1</i>	<i>Transforming Growth Factor-Beta Receptor Interacting Protein 1</i>	<i>At, Pv</i>	WD-domain protein, subunit of eif3 translation initiation factor Homolog of mammalian signaling protein	D7
<i>TT4</i>	<i>Transparent Testa 4</i>	<i>At</i>	Chalcone synthase, a key enzyme in flavonoid biosynthesis	E1
<i>TTG</i>	<i>Transparent Testa Glabrous</i>	<i>At</i>	WD40 repeat protein, binds transcription factors modulating the fate of root epidermal cells and testa structure	C4,E4
<i>TWN1</i>	<i>Twin 1</i>	<i>At</i>	Required for suppressing embryogenic development in suspensor cells	E4
<i>TWN2</i>	<i>Twin 2</i>	<i>At</i>	Valyl-tRNA synthetase; required for proper proliferation of basal cells	E4
<i>TZS</i>	<i>Trans-Zeatin Secretion</i>	<i>Agt</i>	See <i>IPT</i>	B3
<i>UBA2a</i>	<i>UBP1-Associated Protein 2a</i>	<i>At</i>	Single-stranded RNA binding protein	D6
<i>UCU1</i>	<i>Ultracurvata 1</i>	<i>At</i>	Allelic to <i>BIN2</i>	D7
<i>UGT84B1</i>	<i>UDP-Glucosyltransferase</i>	<i>At</i>	UDP-glucosyl transferase specific to IAA-Glucose formation	B1
<i>VH</i>	<i>Vascular highway</i>	<i>At</i>	A leucine-rich receptor kinase, expressed in provascular/procambium cells	E2
<i>VP1</i>	<i>Viviparous</i>	<i>Zm</i>	B3 domain transcription factor; <i>ABI3</i> ortholog, Embryo maturation	E4,E7
<i>VP14 NCED1</i>	<i>Viviparous</i>	<i>Zm</i>	See <i>NCED</i>	B5

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<i>Vp2,7,8 and 9</i>	<i>Viviparous</i>	<i>Zm</i>	ABA biosynthesis	E4
<i>VP5</i>	<i>Viviparous</i>	<i>Zm</i>	Defect in carotenoid biosynthesis; causing phytoene accumulation and ABA deficiency	E3,E4 E7
<i>WEE1</i>	<i>Wee 1 (i.e., small)</i>	<i>Sp, eh</i>	Protein kinase, cell cycle regulator active at G <sub>2</sub> /M transition	C3
<i>WEI2,3,4</i>	<i>Weak Ethylene Insensitive</i>	<i>At</i>	Ethylene signal transduction	D4
<i>WOL</i>	<i>Wooden Leg</i>	<i>At</i>	Membrane-bound histidine kinase, cytokinin receptor, wol mutant allele is impaired in cytokinin binding, see also <i>AHK4</i> and <i>CRE1</i>	C3,D3 E4
<i>WUS</i>	<i>Wuschel (ruffled, disheveled)</i>	<i>At</i>	Homeobox transcription factor for stem cell identity; shoot and floral meristem organization	D3,F3
<i>XET4</i>	<i>Xyloglucan Endo-transglycosylase</i>	<i>Le</i>	Endotransglycosylation of xyloglucan	C4
<i>XTH5</i>	<i>Xyloglucan Endo-transglycosylase/ Hydrolase</i>	<i>At</i>	Cell wall modification	B2
<i>YojN</i>	<i>Regulator of Capsule Synthesis (Same as RCSD)</i>	<i>Ec</i>	Sensor histidine kinase; regulates colanic capsule synthesis	D3
<i>YPD1</i>	<i>Tyrosine Phosphatase Dependent 1</i>	<i>Sc</i>	His-phosphotransfer protein in the HOG1 pathway	D3
<i>YUCCA</i>	<i>Yucca</i>	<i>At</i>	Flavin monooxygenase, conversion of tryptamine to N-hydroxyl tryptamine in vitro, overexpression results in IAA accumulation	B1
<i>ZEA3</i>	<i>Zeatin Resistant 3</i>	<i>At</i>	Unknown	D3
<i>ZmHP2</i>	<i>Zm Histidine Phosphotransfer Protein 2</i>	<i>Zm</i>	His-phosphotransfer protein	D3
<i>Zmp Zm -p60.1</i>		<i>Zm</i>	Cytokinin-glucoside specific $\beta$ -glucosidase; releasing free cytokinins from cytokinin-O-glucosides	C3,E3
<i>ZmRR1,2</i>	<i>Zm Response Regulator 1,2</i>	<i>Zm</i>	Response regulator involved in nitrogen signaling	D3
<i>ZOG1</i>	<i>Trans-Zeatin O-Glucosyltransferase1</i>	<i>Pl</i>	O-glucosylation of <i>trans</i> -zeatin	B3
<i>ZOX1</i>	<i>Trans-Zeatin O-Xylosyltransferase 1</i>	<i>Pv</i>	O-xylosylation of <i>trans</i> -zeatin	B3