

Table S3. Ratios of metabolite abundance in R2 of the elongation zone between water-stressed and well-watered primary roots of cotton and maize.

Sub Pathway	Metabolite	Cotton Region 2	Maize Region 2
Amines and polyamines	5-methylthioadenosine (MTA)	0.57 / 0.63	NS
	N-acetylputrescine	0.55 / 0.4	NS
	agmatine	0.17 / 0.11	NS
	spermidine	0.09 / 0.07	NS
	putrescine	0.03 / 0.02	NS
	nicotianamine	NS	0.36 / 0.56
Aromatic amino acid metabolism (PEP derived)	3-(4-hydroxyphenyl)lactate	6.42 / 4.16	0.51 / 0.44
	tryptamine	3.89 / 1.95	NS
	tyramine	3.36 / 1.85	NS
	tryptophan	1.81 / 1.34	NS
	quinat	0.49 / 0.54	2.02 / 2.31
	phenylalanine	0.47 / 0.37	0.78 / 0.53
	phenylpyruvate	0.29 / 0.28	0.17 / 0.29
	N-acetylphenylalanine	0.51 / 0.55	0.30 / 0.38
	tyrosine	NS	0.62 / 0.38
	4-hydroxyphenylpyruvate	NS	0.25 / 0.17
	N-methylphenylalanine		10.73 / 7.04
	O-methyl tyrosine		0.58 / 0.66
Aspartate family (OAA derived)	N-methylpipercolate	4.62 / 4.72	NS
	2-hydroxyadipate	2.22 / 2.63	NS
	N-acetyl-β-alanine	2.17 / 2.65	NS
	lysine	1.85 / 1.25	NS
	6-oxopiperidine-2-carboxylate	2.7 / 1.77	2.72 / 2.6
	alanine	0.77 / 0.45	NS
	N-acetylasparagine	0.54 / 0.63	0.16 / 0.24
	N-acetylmethionine	0.53 / 0.56	NS
	N-formylmethionine	0.5 / 0.7	0.11 / 0.17
	S-adenosylmethionine (SAM)	0.47 / 0.46	1.57 / 1.65
	S-adenosylhomocysteine (SAH)	0.29 / 0.45	NS
	aspartate	0.54 / 0.7	NS
	asparagine	NS	2.41 / 1.77
	homoserine	NS	0.73 / 0.63
	homoserine lactone	NS	0.7 / 0.41
	methionine	NS	0.37 / 0.26
	N-acetylaspartate (NAA)	NS	0.32 / 0.43
	methionine sulfoxide	NS	0.28 / 0.23
	2-piperidinone		1.23 / 1.22

Branched Chain Amino Acids (pyruvate derived)	methysuccinate	2.15 / 1.62	NS
	α-hydroxyisovalerate	1.56 / 2.32	NS
	3-methyl-2-oxobutyrate	0.52 / 0.8	1.98 / 2.05
	3-methyl-2-oxovalerate	0.48 / 0.78	NS
	4-methyl-2-oxopentanoate	0.48 / 0.69	NS
	2-isopropylmalate	0.3 / 0.4	NS
	2,3-dihydroxyisovalerate	0.19 / 0.18	0.32 / 0.24
	leucine	NS	0.57 / 0.39
	N-acetylleucine	NS	0.36 / 0.45
	N-methylleucine		4.62 / 3.4
	norvaline		0.47 / 0.57
BCAA-isoleucine catabolism	2-methylglutarate	1.65 / 1.74	NS
Glutamate family (α-ketoglutarate derived)	1-methylhistidine	4.6 / 3.76	NS
	pyroglutamine	7.8 / 6.65	NS
	N-acetylproline	3.97 / 6.12	NS
	stachydrine	3.53 / 3.57	NS
	homocitrulline	2.44 / 2.49	NS
	3-methylhistidine	1.72 / 1.82	NS
	carboxyethyl-GABA	1.51 / 1.77	NS
	N-monomethylarginine	0.58 / 0.43	NS
	arginine	0.56 / 0.38	NS
	N-acetylarginine	0.4 / 0.51	NS
	N-acetylglutamine	0.32 / 0.39	0.17 / 0.45
	trans-4-hydroxyproline	NS	2.21 / 2.26
	N-methylglutamate	NS	1.43 / 1.6
	dimethylarginine (SDMA + ADMA)	NS	0.53 / 0.58
	2-pyrrolidinone		4.73 / 8.51
	1,3-diaminopropane		0.35 / 0.49
	4-hydroxy-2-oxoglutaric acid		0.27 / 0.61
Glutathione metabolism	γ-glutamyltyrosine	1.95 / 3.48	NS
	γ-glutamyltryptophan	1.91 / 2.44	4.43 / 5.53
	γ-glutamylleucine	1.32 / 1.53	NS
	cysteine-glutathione disulfide	0.51 / 0.35	NS
	glutathione, oxidized (GSSG)	0.49 / 0.47	NS
	glutathione, reduced (GSH)	0.38 / 0.49	NS
	γ-glutamylglutamine	0.2 / 0.41	NS
	γ-glutamylalanine	NS	2.98 / 3.85
	γ-glutamylthreonine	NS	2.22 / 3.28
	γ-glutamylphenylalanine	NS	1.46 / 1.86
betaine		2.85 / 2.59	NS

Serine family (phospho-glycerate derived)	sulfate	0.65 / 0.44	1.22 / 1.14
	glycine	0.5 / 0.3	NS
	<i>N</i> -acetylserine	0.35 / 0.45	NS
	<i>N</i> -acetyltaurine	NS	2.32 / 2.61
	serine	NS	2.12 / 1.52
	homocysteine		0.16 / 0.13
	O-acetylserine		0.14 / 0.16
Amino sugar and nucleotide sugar	arabonate	1.44 / 1.4	NS
	xylose	0.72 / 0.55	NS
	ribose	0.53 / 0.51	NS
	UDP-galactose	0.47 / 0.23	NS
	UDP- <i>N</i> -acetylglucosamine	0.37 / 0.67	NS
	UDP- <i>N</i> -acetylgalactosamine	0.55 / 0.71	NS
	ribonate	NS	0.44 / 0.49
	xylitol		0.63 / 0.65
	xylulose		0.51 / 0.65
	ribulose/xylulose 5-phosphate		0.31 / 0.45
	maltol		0.25 / 0.59
C5 branched dibasic acid metabolism	itaconate (methylenesuccinate)		0.35 / 0.42
Calvin cycle and pentose phosphate	ribose 5-phosphate		0.34 / 0.54
	ribose 1-phosphate		0.27 / 0.41
Glycolysis	glucuronate	0.53 / 0.5	0.71 / 0.62
	pyruvate	NS	0.5 / 0.7
	fructose-6-phosphate	NS	0.22 / 0.2
Photorespiration	oxalate (ethanedioate)	0.78 / 0.77	NS
Sucrose, glucose, fructose metabolism	galactinol	17.49 / 18.17	
	methyl glucopyranoside ($\alpha + \beta$)	2.64 / 2.41	NS
	3-deoxyoctulosonate	0.52 / 0.5	NS
	maltose	0.48 / 0.57	NS
	mannose-6-phosphate	NS	0.44 / 0.47
	1-kestose		5.55 / 5.37
	sucrose-6-phosphate		1.92 / 1.92
TCA cycle	succinate	0.6 / 0.52	NS
	fumarate	0.6 / 0.52	NS
	malate	0.52 / 0.48	NS
	maleate	0.34 / 0.39	NS
	α -ketoglutarate	NS	2.27 / 2.89
	2-methylcitrate	NS	5.02 / 4.43

	aconitate	NS	0.74 / 0.84
	citrate	NS	0.4 / 0.53
	mesaconate (methylfumarate)		0.73 / 0.69
Ascorbate metabolism	gulonate	NS	0.48 / 0.47
Carnitine metabolism	deoxycarnitine	7.37 / 5.38	NS
Nicotinate and nicotinamide metabolism	trigonelline (N'-methylnicotinate)	2.99 / 2.65	NS
	nicotinate ribonucleoside	0.65 / 0.65	NS
	nicotinate	0.55 / 0.44	1.85 / 2.33
	nicotinamide adenine dinucleotide (NAD+)	0.39 / 0.48	NS
	nicotinamide riboside	NS	0.43 / 0.35
Oxidative phosphorylation	acetylphosphate	NS	0.4 / 0.37
Riboflavin and FAD metabolism	flavin adenine dinucleotide (FAD)	0.43 / 0.55	NS
	flavin mononucleotide (FMN)	0.49 / 0.57	NS
Thiamine metabolism	thiamin (Vitamin B1)	0.61 / 0.52	2.17 / 2.41
Tocopherol metabolism	α-tocopherol	0.5 / 0.52	NS
Vitamin B metabolism (B6 or B12)	pyridoxate	2.51 / 1.88	NS
	pyridoxal	0.37 / 0.46	NS
Auxin metabolism	indoleacetate	0.59 / 0.41	NS
	2-oxindole-3-acetate	NS	0.58 / 0.55
Fatty acid, Amino	2-aminoheptanoate	3.32 / 2.85	NS
Fatty acid, Dicarboxylate	pimelate (heptanedioate)	4.60 / 5.19	NS
	malonate	1.98 / 1.56	NS
	azelate (nonanedioate)	0.53 / 0.76	2.24 / 2.44
	adipate	NS	0.6 / 0.79
	dodecanedioate		0.2 / 0.33
Free fatty acid	2-hydroxyglutarate	0.52 / 0.52	NS
	3-hydroxybutyrate (BHBA)	0.37 / 0.49	NS
	linolenate [α or γ; (18:3n3 or 6)]	0.11 / 0.16	NS
	linoleate (18:2n6)	0.1 / 0.14	NS
	oleate (18:1n9)		0.45 / 0.71
Phospholipids	glycerophosphoethanolamine	1.67 / 2.08	15.74 / 8.8
	glycerophosphoinositol	1.35 / 2.36	3.77 / 3.92

	choline	0.73 / 0.77	NS
	1-palmitoyl-GPA (16:0)	0.42 / 0.47	NS
	ethanolamine	0.42 / 0.45	NS
	1-oleoyl-GPA (18:1)	0.25 / 0.33	NS
	1-palmitoyl-2-oleoyl-GPE (16:0/18:1)	0.25 / 0.46	NS
	1-oleoyl-GPE (18:1)	0.21 / 0.38	NS
	1-oleoyl-GPC (18:1)	0.18 / 0.42	NS
	1-palmitoyl-GPI (16:0)	0.39 / 0.49	2.61 / 3
	1-palmitoyl-2-linoleoyl-GPE (16:0/18:2)	0.38 / 0.56	NS
	1-palmitoyl-GPG (16:0)	0.25 / 0.51	1.80 / 4.05
	glycerophosphoglycerol	NS	8.08 / 6.62
	glycerol 3-phosphate	NS	2.16 / 2.45
Sphingolipid	phytosphingosine	0.43 / 0.54	NS
	sphingosine	0.24 / 0.46	NS
	sphinganine	0.22 / 0.38	0.1 / 0.13
Sterols	3-hydroxy-3-methylglutarate	NS	0.52 / 0.58
	stigmasterol	NS	0.45 / 0.52
	campesterol	NS	0.5 / 0.65
	fucosterol	NS	0.3 / 0.38
	ergosterol		1.29 / 1.29
Purine metabolism	adenosine 3'-monophosphate (3'-AMP)	9.08 / 6.86	NS
	guanosine 3'-monophosphate (3'-GMP)	6.57 / 2.48	0.15 / 0.07
	adenosine-2',3'-cyclic monophosphate	2.90 / 3.28	0.52 / 0.24
	allantoin	0.66 / 0.53	1.88 / 1.17
	N2,N2-dimethylguanosine	0.6 / 0.56	1.73 / 4
	7-methylguanosine	0.56 / 0.36	NS
	inosine	0.44 / 0.4	0.19 / 0.58
	adenosine 5'-monophosphate (AMP)	0.43 / 0.57	NS
	allantoic acid	0.42 / 0.32	0.17 / 0.2
	guanosine 5'- monophosphate (5'-GMP)	0.38 / 0.51	NS
	guanosine	0.32 / 0.42	NS
	adenine	0.26 / 0.29	NS
	inosine 5'-monophosphate (IMP)	0.23 / 0.49	NS
	2'-deoxyguanosine	0.20 / 0.48	NS
	2'-deoxyadenosine	0.18 / 0.35	NS
	2'-deoxyadenosine 5'-monophosphate	0.11 / 0.37	NS
	hypoxanthine	0.6 / 0.39	NS
	adenosine 2'-monophosphate (2'-AMP)	NS	0.55 / 0.51
	guanosine-2',3'-cyclic monophosphate	NS	0.55 / 0.27
	xanthine	NS	0.28 / 0.25
	urate	NS	0.41 / 0.35
	guanosine 2'-monophosphate (2'-GMP)		0.75 / 0.72

Pyrimidine metabolism	cytidine 2',3'-cyclic monophosphate	2.90 / 2.06	0.67 / 0.44
	uridine-2',3'-cyclic monophosphate	1.91 / 2.02	0.59 / 0.39
	uridine 5'-monophosphate (UMP)	0.47 / 0.58	NS
	5-methylcytidine	0.37 / 0.32	NS
	uridine	0.36 / 0.47	NS
	thymidine	0.27 / 0.35	NS
	thymidine 5'-monophosphate	0.23 / 0.51	NS
	cytidine 5'-monophosphate (5'-CMP)	0.23 / 0.33	NS
	uracil	0.2 / 0.35	NS
	2'-deoxycytidine 5'-monophosphate	0.19 / 0.46	NS
	uridine 3'-monophosphate (3'-UMP)	NS	0.7 / 0.76
	cytosine	NS	0.14 / 0.24
	cytidine 3'-monophosphate (3'-CMP)	NS	0.8 / 0.71
	cytidine	NS	0.71 / 0.77
	uridine 2'-monophosphate (2'-UMP)	NS	0.61 / 0.69
ectoine			0.13 / 0.2
Dipeptide	alanylleucine	0.75 / 0.66	NS
	valylglycine	0.74 / 0.69	NS
	glycylleucine	0.61 / 0.71	NS
	cys-gly, oxidized	NS	6.57 / 7.58
	phenylalanylalanine	NS	0.5 / 0.62
Benzenoids	hydroquinone β -D-glucopyranoside	0.42 / 0.36	NS
Fatty acid and sugar derivatives	galactarate (mucic acid)	NS	0.6 / 0.81
Phenylpropanoids	4-hydroxycinnamate	0.31 / 0.44	NS
	vanillate	0.34 / 0.5	2.26 / 2.27
	3,4-dimethoxycinnamic acid		11.88 / 10.84
Terpenoids	mevalonate		0.38 / 0.69
	mevalonolactone		0.22 / 0.49
Chemicals	succinimide		0.31 / 0.43

In the water stress treatments, vermiculite water potentials were -1.0 MPa (cotton) and -1.6 MPa (maize), which resulted in equivalent root tip water potentials in the two species (Figure 2). The fold changes are the averages of comparisons of the water-stressed treatment to well-watered developmental and temporal controls. Comparisons of water-stressed R2 (WSR2) to both well-watered R2 (WWR2) and R3 (WWR3) are shown in each cell as (WSR2/WWR2) / (WSR2/WWR3). Yellow and blue cells indicate significant increases or decreases in abundance, respectively (darker shades, $p < 0.05$ in all comparisons; lighter shades, $0.05 < p < 0.10$ in at least one comparison). White cells indicate non-significant (NS) changes in at least one comparison. Gray cells indicate that the metabolite was not detected. No minimum cutoff value was applied to the fold changes.