



Table S2. Influence of Si supply on metabolite concentrations in roots of maize plants subjected to Mg deficiency.

	Metabolite	+Mg			-Mg		
		-Si	+Si 1.5	+Si 3	-Si	+Si 1.5	+Si 3
Amino acids	Asn	2.79 a	2.67 a	2.67 a	2.67 a	2.37 a	2.94 a
	His	0.25 a	0.23 b	0.23 bc	0.21 c	0.21 c	0.21 c
	Ser	1.30 a	1.23 a	1.14 a	1.29 a	1.19 a	1.34 a
	Gln	3.56 a	3.48 a	3.06 ab	2.91 ab	2.66 b	3.02 ab
	Gly	0.28 ab	0.28 ab	0.25 b	0.34 a	0.31 ab	0.34 ab
	Arg	2.41 a	2.24 ab	1.80 bc	1.51 c	1.57 c	1.62 c
	Asp	0.19 a	0.15 bc	0.16 b	0.13 c	0.14 bc	0.15 bc
	Thr	0.63 a	0.57 ab	0.57 ab	0.49 bc	0.44 c	0.51 bc
	Ala	1.25 a	1.13 a	1.05 a	1.31 a	1.26 a	1.34 a
	GABA	0.17 b	0.17 b	0.22 ab	0.26 a	0.26 a	0.28 a
	Pro	0.11 abc	0.09 c	0.09 bc	0.10 abc	0.12 ab	0.12 a
	Lys	0.14 a	0.14 ab	0.14 ab	0.12 b	0.13 ab	0.14 a
	Tyr	0.64 a	0.72 a	0.65 a	0.68 a	0.66 a	0.68 a
	Val	0.34 a	0.34 ab	0.32 abc	0.29 bc	0.29 c	0.31 abc
	Ile	0.17 a	0.17 a	0.18 a	0.16 a	0.17 a	0.17 a
	Leu	0.23 ab	0.23 ab	0.25 a	0.21 b	0.22 b	0.20 b
	Phe	0.18 a	0.20 a	0.18 a	0.17 a	0.16 a	0.16 a
TCA cycle	Fumarate	22.4 a	14.3 b	17.7 b	14.1 b	13.9 b	15.9 b
	Malate	16.3 a	9.05 c	12.9 b	10.1 bc	11.1 bc	13.0 b
	Citrate	6.75 a	5.19 ab	5.84 a	3.35 b	3.52 b	3.61 b
	Isocitrate	3.63 a	2.79 ab	3.08 ab	2.53 ab	1.59 b	3.12 ab
Glycolysis	Hexose-P	41.4 ab	41.5 ab	45.7 a	41.2 ab	37.5 b	43.5 ab
	PEP	0.94 b	1.20 a	0.92 b	1.05 ab	0.97 b	0.97 b
	Glutamate	94.3 a	91.1 ab	89.1 ab	76.4 bc	69.1 c	75.1 bc
	Aspartate	265.7 ab	275.7 a	213.2 bc	211.0 c	198.2 c	223.5 abc
	Acide Gluconique	7.82 c	7.74 c	7.83 c	9.11 bc	11.3 ab	12.9 a

Concentrations of amino acids and primary metabolites were measured in roots of maize. Plants were grown in hydroponic culture under low Mg (0.02 mM) or normal Mg (0.5 mM) supply and two concentrations of Si (1.5 and 3 mM). Si provided in the second week of plant growth in the hydroponic culture when Mg deficiency was applied. 21-days old plants were harvested 14 days after imposition of Mg deficiency. Bars indicate means \pm SE. Different letters denote significant differences according to LSD test ($p < 0.05$; $n = 4$). The concentration of metabolites calculated based on mg/g FW. Asn, asparagine; His, histidine; Ser, serine; Gln, glutamine; Gly, glycine; Arg, arginine; Asp, aspartate; Thr, threonine; Ala, alanine; GABA, gammaaminobutyricacid; Pro, proline; Lys, lysine; Tyr, tyrosine; Val, valine; Ile, isoleucine; Leu, Leucine; Phe, phenylalanine; Hexose-6-P, hexose-6-phosphate; PEP, phosphoenolpyruvate.

Table S3. Influence of Si supply on metabolite concentrations in shoots of maize plants subjected to Mg deficiency.

	Metabolite	+Mg			-Mg		
		-Si	+Si 1.5	+Si 3	-Si	+Si 1.5	+Si 3
Amino acids	Asn	0.89 ab	0.74 b	0.96 ab	1.03 ab	0.97 ab	1.09 a
	His	0.10 c	0.10 c	0.10 c	0.16 b	0.19 a	0.18 ab
	Ser	1.85 c	1.73 c	1.84 c	2.76 b	3.10 ab	3.43 a
	Gln	0.82 b	0.88 b	0.94 ab	1.07 ab	1.04 ab	1.16 a
	Gly	1.00 c	0.65 c	0.79 c	2.04 b	3.59 a	3.15 a
	Arg	2.01 a	1.95 a	1.99 a	1.46 b	1.19 b	1.30 b
	Asp	0.09 ab	0.10 a	0.10 a	0.09 ab	0.07 b	0.08 ab
	Thr	0.48 bc	0.44 c	0.47 c	0.55 ab	0.58 a	0.61 a
	Ala	2.19 ab	1.85 b	1.96 b	2.20 ab	2.60 a	2.61 a
	GABA	0.07 bc	0.05 d	0.07 c	0.07 bc	0.09 ab	0.10 a
	Pro	0.06 b	0.05 b	0.05 b	0.13 a	0.16 a	0.14 a
	Lys	0.14 a	0.14 a	0.15 a	0.17 a	0.18 a	0.18 a
	Tyr	0.18 c	0.25 c	0.18 c	1.14 b	1.51 a	1.25 ab
	Val	0.12 b	0.11 b	0.11 b	0.34 a	0.44 a	0.40 a
	Ile	0.07 c	0.06 c	0.06 c	0.27 b	0.38 a	0.34 ab
	Leu	0.06 b	0.06 b	0.06 b	0.28 a	0.35 a	0.33 a
	Phe	0.04 c	0.04 c	0.04 c	0.11 b	0.16 a	0.15 ab
TCA cycle	Fumarate	82.9 a	77.6 ab	74.0 ab	66.2 b	52.3 c	68.7 ab
	Malate	62.1 a	42.9 bc	45.6 b	37.7 bc	32.3 c	44.1 b
	Citrate	14.0 ab	15.4 a	13.7 ab	9.66 c	11.7 bc	11.9 bc
	Isocitrate	4.94 c	5.47 c	4.60 c	24.4 b	42.8 a	44.5 a
Glycolysis	Hexose-P	32.7 b	33.8 b	32.5 b	40.1 b	51.6 a	58.5 a
	PEP	6.49 a	6.68 a	5.83 a	3.20 b	2.91 b	3.03 b
	Glutamate	81.8 a	75.4 a	73.4 a	57.4 b	56.2 b	74.3 a
	Aspartate	197.6 a	182.1 a	179.8 a	125.9 b	102.6 b	133.8 b
	Acide Gluconique	4.99 c	5.08 c	4.66 c	5.94 bc	7.86 a	7.27 ab

Concentrations of amino acids and primary metabolites were measured in shoots of maize. Plants were grown in hydroponic culture under low Mg (0.02 mM) or normal Mg (0.5 mM) supply and two concentrations of Si (1.5 and 3 mM). Si provided in the second week of plant growth in the hydroponic culture when Mg deficiency was applied. 21-days old plants were harvested 14 days after imposition of Mg deficiency. Bars indicate means \pm SE. Different letters denote significant differences according to LSD test ($p < 0.05$; $n = 4$). The concentration of metabolites calculated based on mg/g FW. Asn, asparagine; His, histidine; Ser, serine; Gln, glutamine; Gly, glycine; Arg, arginine; Asp, aspartate; Thr, threonine; Ala, alanine; GABA, gammaaminobutyric acid; Pro, proline; Lys, lysine; Tyr, tyrosine; Val, valine; Ile, isoleucine; Leu, Leucine; Phe, phenylalanine; Hexose-6-P, hexose-6-phosphate; PEP, phosphoenolpyruvate.

Table S4. Influence of Si supply on hormone concentrations in roots and shoots of maize plants subjected to Mg deficiency.

	Hormones	+Mg			-Mg		
		-Si	+Si 1.5	+Si 3	-Si	+Si 1.5	+Si 3
Roots	ABA	4.35 a	3.26 a	3.49 a	4.31 a	3.41 a	3.67 a
	SA	12.6 a	5.80 c	5.27 c	7.17 b	6.01 bc	12.9 a
	GA19	8.84 a	7.97 a	7.00 a	7.25 a	4.27 a	7.30 a
	ACC	65.9 a	69.3 a	74.7 a	69.1 a	79.2 a	67.0 a
	IAA	2.84 a	2.67 a	2.43 ab	2.26 ab	2.19 ab	2.05 b
Shoots	ABA	9.93 a	10.4 a	9.55 a	9.30 a	9.42 a	9.53 a
	SA	10.0 a	8.72 a	11.3 a	9.86 a	9.12 a	9.37 a
	GA19	26.3 a	21.4 ab	25.5 a	21.2 ab	18.6 b	21.1 ab
	ACC	42.1 a	38.3 ab	39.8 a	31.6 c	32.7 bc	31.7 c
	IAA	3.84 a	4.16 a	3.91 a	4.81 a	4.31 a	4.31 a

Concentrations of hormones were measured in roots and shoots of maize. Plants were grown in hydroponic culture under low Mg (0.02 mM) or normal Mg (0.5 mM) supply and two concentrations of Si (1.5 and 3 mM). Si provided in the second week of plant growth in the hydroponic culture when Mg deficiency was applied. 21-days old plants were harvested 14 days after imposition of Mg deficiency. Bars indicate means \pm SE. Different letters denote significant differences according to LSD test ($p < 0.05$; $n = 4$). The concentration of hormones calculated based on pg/mg FW. ABA, abscisic acid; SA, salicylic acid; GA19, gibberellic acid 19; ACC, 1-Aminocyclopropane-1-carboxylic acid; IAA, Indole-3-acetic acid.

Table 5. List of primers used in this study.

Gene	Accession No.	Forward Primer	Reverse Primer	Amplicon Size (bp)
<i>ZmSLN1-like</i>	NM_001322273	5'-ATGCTGGTTGGGCTCTTCT-3'	5'-CTGCTCCTGCTGTCACCT-3'	143
<i>ZmD9</i>	DQ903073	5'-TTCTACGAGTCCTGCCCC-3'	5'-CCCTGCTTGATGCCGAAG-3'	116
		5'-GCTGGTCAAGAAGGACTACGA-		
<i>ZmAOS1</i>	XM_008646248	3'	5'-AAGCACATGGCGAAGAGGA-3'	132
<i>ZmOPR1</i>	NM_001112429	5'-ACCGCTCCACCTTCTACAC-3'	5'-CTGACTCCTCATTCTTGCCATC-3'	90
<i>ZmSUT1</i>	NM_001111370	5'-TTTCTGGTGGCTGTGGTGT-3'	5'-TTTGTGGGAGGTTCTGGTT-3'	98
<i>ZmSWEET13a</i>	NM_001155615	5'-GGCGTTTGCTTTCGGTCT-3'	5'-CTTGCTCTTGTAGATGCGGT-3'	91
<i>ZmSWEET13b</i>	NM_001148182	5'-ATCCAGACGAAGAGCGTAGA-3'	5'-CCGTAGAGGAACCAGACGA-3'	83
			5'-AGAAGGGTGAGGAGAAGGATG-	
<i>ZmSWEET13c</i>	NM_001147634	5'-ACCAAGAAGGGCAGGATGTT-3'	3'	86
<i>ZmEIF4A</i>	AF007580	5'-GACAAGATGAGGAGCAGGGA-3'	5'-CAATACCACGAGCAAGCAGG-3'	142
		5'-ACAGCGACATCACACTCAAGG-		
<i>ZmGAPDH</i>	NM_001111943	3'	5'-GACTCCACGACATACTCAGCG-3'	127
<i>ZmCYP</i>	M55021	5'-ACGGCTCCAGTTCTTCATC-3'	5'-CAGCGACCTTGACCACCTT-3'	156
<i>Zmβ-tub</i>	NM_001111987	5'-GAGGTGGACGAGCAGATGA-3'	5'-CACACGCTGGACTTGACATT-3'	89

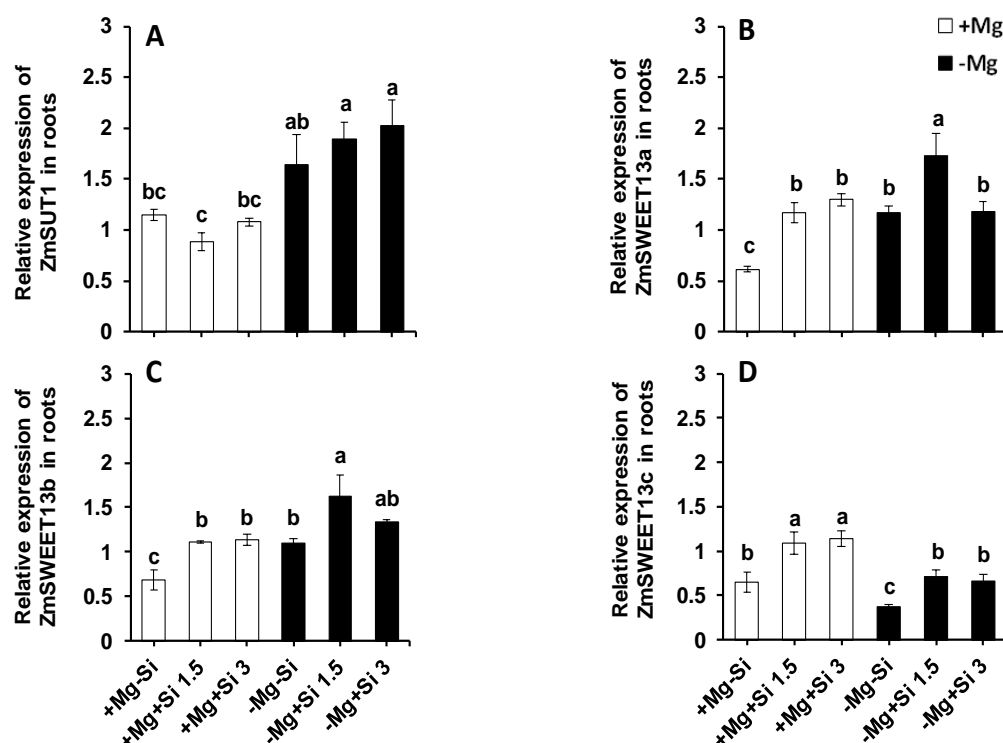


Figure S1. Influence of Si supply on the expression of the genes involved in Suc and sugar transporter of maize plants subjected to Mg deficiency. (A) Relative expression of ZmSUT1 in roots, (B) relative expression of ZmSWEET13a in roots, (C) relative expression of ZmSWEET13b in roots and (D) relative expression of ZmSWEET13c in roots of maize. Plants were grown in hydroponic culture under low Mg (0.02 mM) or normal Mg (0.5 mM) supply and two concentrations of Si (1.5 and 3 mM). Si provided in the second week of plant growth in the hydroponic culture when Mg deficiency was applied. 21-days old plants were harvested 14 days after imposition of Mg deficiency. The white and black bars represent Mg-sufficient and Mg-deficient plants, respectively. Bars indicate means \pm SE. Different letters denote significant differences according to LSD test ($p < 0.05$; $n = 4$).