

## SUPPLEMENTARY DATA

TABLE S1. Orthologous genes associated with mineral QTLs detected in the B104-2 × Eyou Changjia RIL population by *in silico* mapping between *Arabidopsis thaliana* and *Brassica napus*. Genes are categorized by predicted function.

QTLs involved	Mineral trait	Gene*	Locus ID	Description on TAIR ( <a href="http://www.arabidopsis.org/">http://www.arabidopsis.org/</a> )
<i>CaNP-A5, MgNP-A5, PNP-A5</i>	Ca, Mg, P	<i>PAP16</i>	AT3G10150	acid phosphatase/protein serine/threonine phosphatase
<i>CaNP-A5, MgNP-A5, PNP-A5</i>	Ca, Mg, P	<i>PAP17</i>	AT3G17790	acid phosphatase/protein serine/threonine phosphatase
<i>CaLP-C2a, PLP-C2</i>	Ca, P	<i>PAP28</i>	AT5G57140	acid phosphatase/protein serine/threonine phosphatase
<i>CaLP-A4, MnLP-A4</i>	Ca, Mn	<i>CAX1</i>	At2g38170	calcium:hydrogen antiporter; encodes a high-affinity vacuolar calcium antiporter
<i>FeNP-A5, CaNP-A5, MgNP-A5, PNP-A5</i>	Fe, Ca, Mg, P	<i>CAX2</i>	At3g13320	Low-affinity calcium antiporter
<i>MnLP-A3, FeNP-A5, CaNP-A5, MgNP-A5, PNP-A5</i>	Mn, Fe, Ca, Mg, P	<i>CAX9</i>	At3g14070	involved in cation (K, Na, and Mn) homeostasis and transport
<i>MnNP-A1</i>	Mn	<i>YSL1</i>	At4g24120	oligopeptide transporter; member of a small family of oligopeptide transporters
<i>MnLP-A3, FeNP-A5, CaNP-A5, MgNP-A5, PNP-A5</i>	Mn, Fe, Ca, Mg, P	<i>YSL5</i>	At3g17650	oligopeptide transporter; <i>Arabidopsis thaliana</i> metal-nicotianamine transporter
<i>MgNP-C6a</i>	Mg	<i>YSL7</i>	At1g65730	oligopeptide transporter; <i>Arabidopsis thaliana</i> metal-nicotianamine transporter
<i>FeNP-A5, CaNP-A5, MgNP-A5, PNP-A5</i>	Fe, Ca, Mg, P	<i>ZIP1</i>	At3g12750	member of Zrt- and Irt-related protein (ZIP) family; transcript is induced in response to

<i>MnLP-A3, FeNP-A5, CaNP-A5, MgNP-A5, PNP-A5</i>	Mn, Fe, Ca, Mg, P	<i>MT3</i>	At3g15353	zinc deficiency in the root metallothionein; binds to and detoxifies excess copper and other metals
<i>CaLP-A3, CaNP-A5, MgNP-A5, PNP-A5</i>	Ca, Mg, P	<i>MT2A</i>	AT3G09390	metallothionein; binds to and detoxifies excess copper and other metals
<i>MnNP-A1</i>	Mn	<i>NRAMP5</i>	At4g18790	metal ion transporter; member of Nramp2 family
<i>MnNP-A1</i>	Mn	<i>IRT1</i>	At4g19690	Fe(II) transport protein
<i>MgLP-A1b, PLP-A1</i>	Mg, P	<i>UGP</i>	AT3G03250	thought to encode a cytosolic UDP-glucose pyrophosphorylase with a strong similarity to potato UTP--glucose-1-phosphate uridylyltransferase
<i>MnLP-A3</i>	Mn	<i>AZF2</i>	AT3G19580	encodes a zinc finger protein; mRNA levels are upregulated in response to ABA, high salt, and mild desiccation
<i>CaNP-A5, MgNP-A5, PNP-A5</i>	Ca, Mg, P	<i>MRS2-3</i>	At3g19640	magnesium transporter CorA-like family protein (MRS2-3)
<i>PLP-C3a</i>	P	<i>PHT3;1</i>	AT5G14040	mitochondrial phosphate transporter
<i>PLP-C3a</i>	P	<i>PHT4;5</i>	AT5G20380	encodes an inorganic phosphate transporter
<i>CaLP-C2a, PLP-C2</i>	Ca, P	<i>GPT1</i>	AT5g54800	encodes glucose6-Phosphate/phosphate transporter 1; essential for pollen maturation and embryo sac development
<i>CaNP-A5, MgNP-A5, PNP-A5</i>	Ca, Mg, P	<i>IPS1</i>	AT3G09922	cellular response to phosphate starvation

\* PAP, purple acid phosphatase; CAX, cation exchanger; YSL, yellow stripe-like; MT, metallothionein; ZIP, zinc regulated transporter, iron regulated transporter-like protein;

NRAMP, natural resistance-associated macrophage protein; IRT, ion-regulated transporter; UGP, UDP-glucose pyrophosphorylase; AZF, Arabidopsis zinc-finger protein; MRS, mitochondrial RNA splicing; PHT, phosphate transporter; GPT, glucose6-phosphate/phosphate transporter; IPS, induced by phosphate starvation.