



Supplemental Table S1. Elemental concentrations in shoots and roots of wild-type and transgenic Arabidopsis lines expressing mutations of *SaNramp6* 

Genotype	Fe (g/Kg DW)		Mn (mg/Kg DW)	
	Shoot	Root	Shoot	Root
WT	0.144±0.046	1.51±0.24	0.206±0.024	1.012±0.21
Nrh	0.15±0.053	1.6±0.34	0.192±0.009	1.025±0.19
Nr1	0.146±0.043	1.503±0.17	0.181±0.029	1.058±0.23
Nr2	0.138±0.038	1.478±0.58	0.197±0.015	1.001±0.2
Nr3	0.153±0.015	1.493±0.46	0.213±0.027	1.055±0.15
Nrn	0.131±0.03	1.503±0.41	0.217±0.034	1.487±0.37
Nr4	0.13±0.051	1.357±0.19	0.204±0.048	1.08±0.22
Nr5	$0.141 \pm 0.04$	1.41 ±0.24	0.233±0.042	1.017±0.23
Nr6	0.13±0.062	1.543±0.12	0.214±0.071	1.063±0.24





5 Supplemental Figure S1.

- 6 Cd content of  $\Delta y cfl$  yeast cells expressing mutations of SaNramp6 grown for 48 h in liquid
- 7 SG-U supplemented with 5  $\mu$ M CdCl2. Bars indicate means  $\pm$  standard deviations (SDs) of
- 8 at least three independent biological experiments.







Biomass analyses and chlorophyll content of wild-type and transgenic Arabidopsis lines
expressing mutations of *SaNramp6*. (A-B) Biomass assay. Biomass analyses of shoot. (C-D)
Determination of total chlorophyll (chlorophyll a and chlorophyll b) content. Different small
letters indicate significant differences (p<0.05) between treatments.</li>





- 19 PCR identification of transgenic Arabidopsis thaliana lines. SaNramp6h, SaNramp6n
- 20 (named Nrh and Nrn in figure). Positive plasmids and WT used as positive and negative
- 21 control.



23 Supplemental Figure S4.

- 24 RT-PCR analysis of the SaNramp6 transcript in the wildtype (WT) and six site mutant
- 25 mutations plants. *AtEF1b* was used as the internal control.



26

27 Supplemental Figure S5.

28 Relative expression of *SaNramp6* in transgenic Arabidopsis lines expressing mutations of

29 SaNramp6. Expression levels were relative to Actin. Data are mean  $\pm$  SD, n=3.





- 33 Phenotypes of wild-type (WT) and overexpressing *SaNramp6h*, *SaNramp6n* (named Nrh
- 34 and Nrn in figure) and other six mutations of Arabidopsis thaliana under Cd stress. Five-
- 35 day-old plants grown on half-strength Murashige and Skoog's (1/2 MS) medium were
- 36 transferred to 1/2 MS medium without or with  $50\mu$ M CdCl<sub>2</sub>. Photographs were taken 12
- 37 days after the transfer.