Supplemental Figure 1. *OsHMA9* promoter-driven GUS expression pattern. A, Seven-day-old seedlings grown on ½-MS medium (control, left panel) or treated with 10 mM $ZnSO_4$ for 6 h (right panel). B, Seven-day-old seedlings grown on ½-MS medium (control, left panel) or treated with 500 μM $CuCl_2$ for 6 h (right panel).

Supplemental Figure 2. Spatial expression pattern of *OsHMA9* in wild-type spikelets. Samples were prepared from ~ 15 cm panicles, paleas/lemmas, stamens, and ovaries. *OsAct1* served as control.

Supplemental Figure 3. Heterologous expression of *OsHMA9* in *E. coli*. A, Growth of wild-type (W3110), *zntA* mutant transformed with vector alone (*zntA*-pSK), and *zntA* mutant transformed with *OsHMA9* (*zntA*-*OsHMA9*) in LB media containing indicated concentration of $ZnSO_4$. Representative results from two replicates are shown for each panel. In each experiment, four replicates were used for the growth test.

Supplemental Figure 4. RT-PCR analysis of the *OsHMA9* transcript in *oshma9* and wild type plants. A, Schematic diagram of *OsHMA9* and insertion positions of T-DNA. Horizontal arrows indicate primers (nFw and nRv) used for detecting the transcript. B, RT-PCR analysis of the *OsHMA9* transcript. Rice *actin1 (OsAct1)* mRNA was amplified to show an equal amount of RNA in each sample. Primers for RT-PCR: nFw (5'-TGCAAAAGGGAAAACTTCTG-3') and nRv (5'- ATGAAGGACACCATGCAAGT-3').

Supplemental Figure 5. Heights, fresh weights, and chlorophyll contents of plants grown on media containing different concentrations of Cu. Heights (A) and fresh weights (B) were measured; data is from two independent experiments. Representative results are shown from 2 independent experiments that produced similar data (height and fresh weight, n=8; chlorophyll content, n=4 in each experiment). Significant differences from wild type were determined by student's t test: * $P < 0.05$. Bars = SE.

Supplemental Figure 6. Heights, fresh weights, and chlorophyll contents of plants grown on

media containing different concentrations of Zn. Heights (A) and fresh weights (B) were measured; data is from two independent experiments. In each experiment, eight plants were used for measuring height and FW. Chlorophyll content (C) is average of four plants. Error bars represent SE. Significant differences from wild type were determined by student's t test: * $P < 0.05$.

Supplemental Figure 7. Heights, fresh weights, and chlorophyll contents of plants grown on media containing different concentrations of Pb. Heights (A) and fresh weights (B) were measured; data is from two independent experiments. In each experiment, eight plants were used for measuring height and FW. Chlorophyll content (C) is average of four plants. Error bars represent SE. Significant differences from wild type were determined by student's t test: * $P < 0.05$.

Supplemental Figure 8. Heights, fresh weights, and chlorophyll contents of plants grown on media containing different concentrations of Cd. Heights (A) and fresh weights (B) were measured; data is from two independent experiments. In each experiment, eight plants were used for measuring height and FW. Chlorophyll content (C) is average of four plants. Error bars represent SE. Significant differences from wild type were determined by student's t test: * $P < 0.05$.