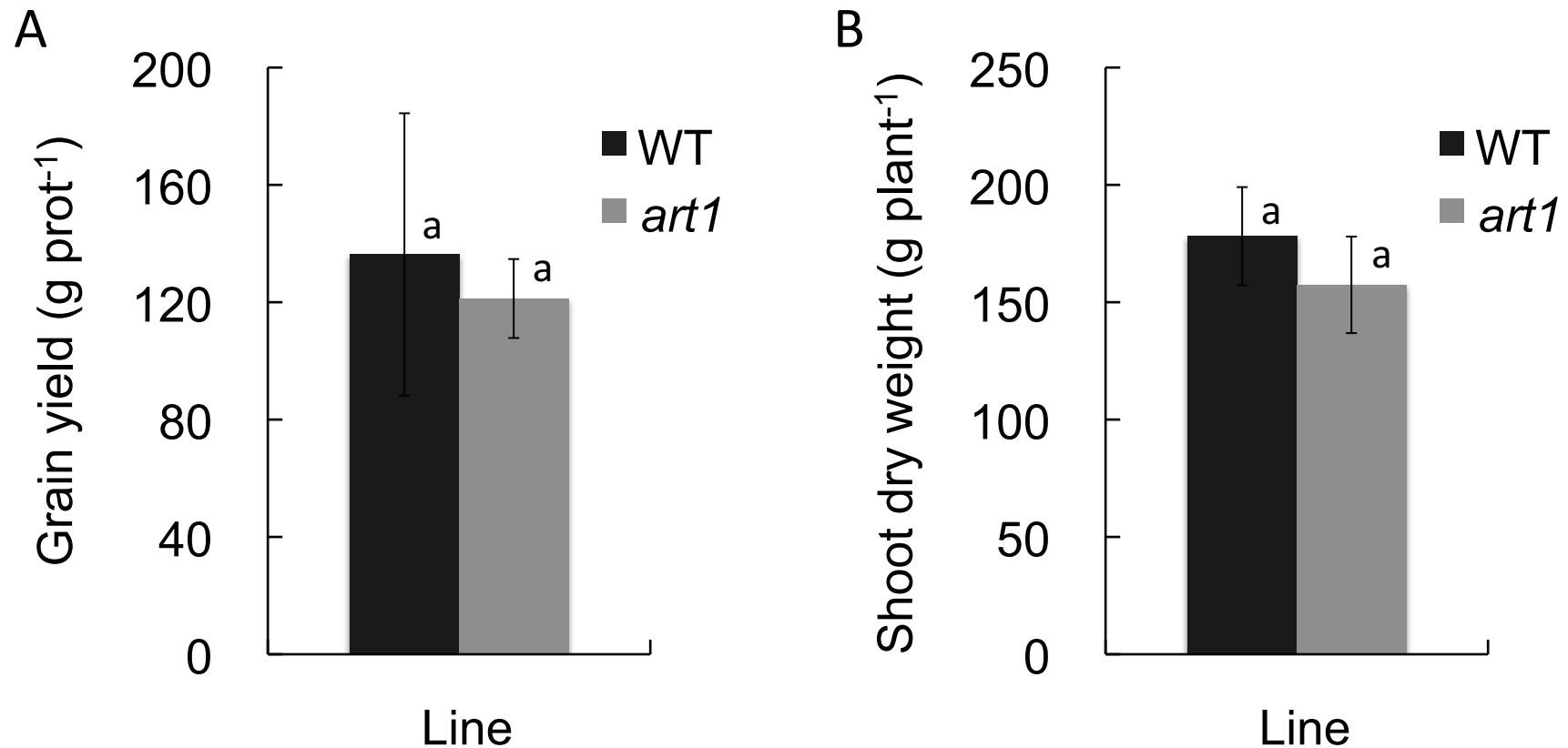
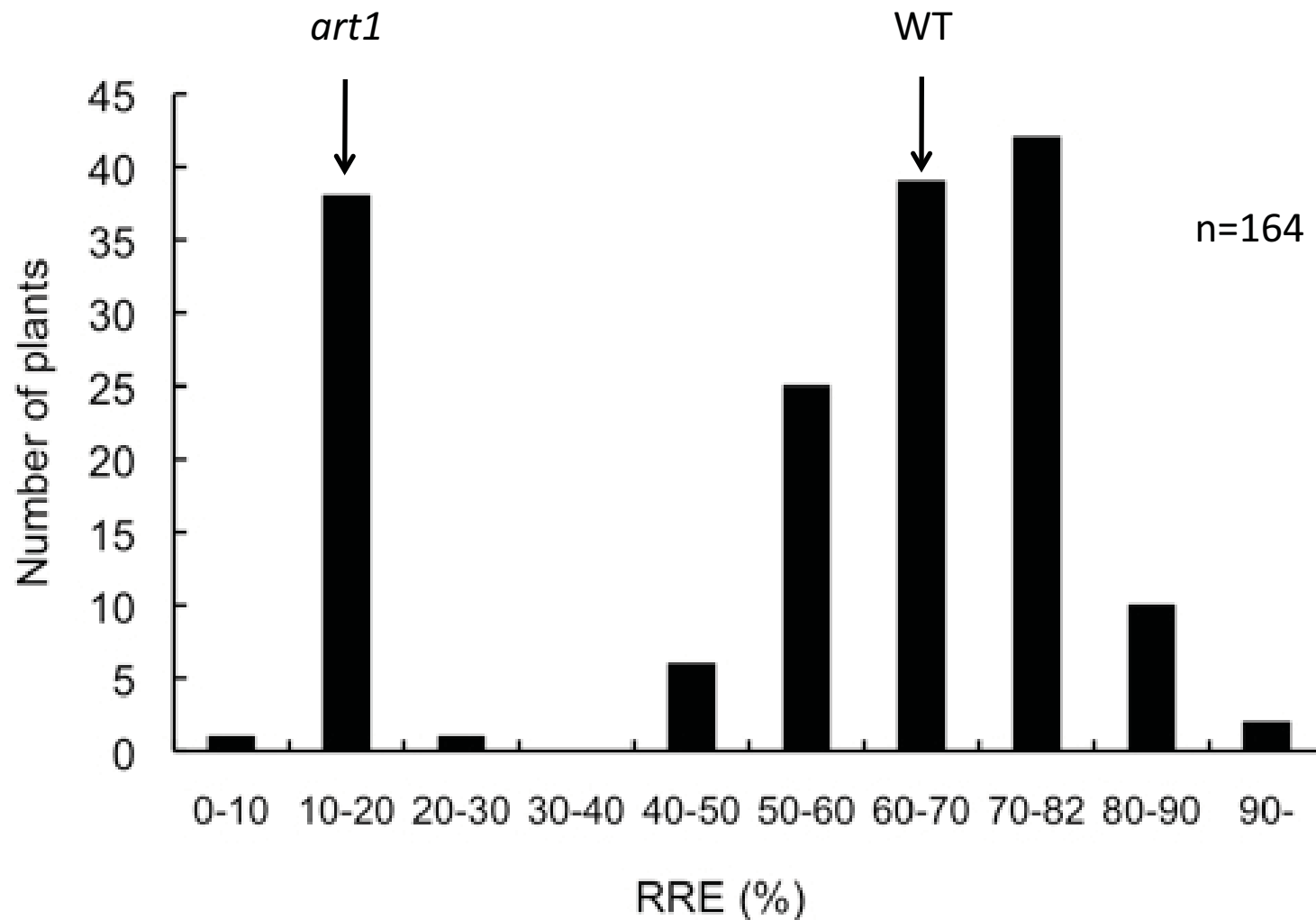


Supplemental Data. Yamaji et al. (2009). A Zn-finger transcription factor ART1 regulates multiple genes implicated in aluminum tolerance in rice.



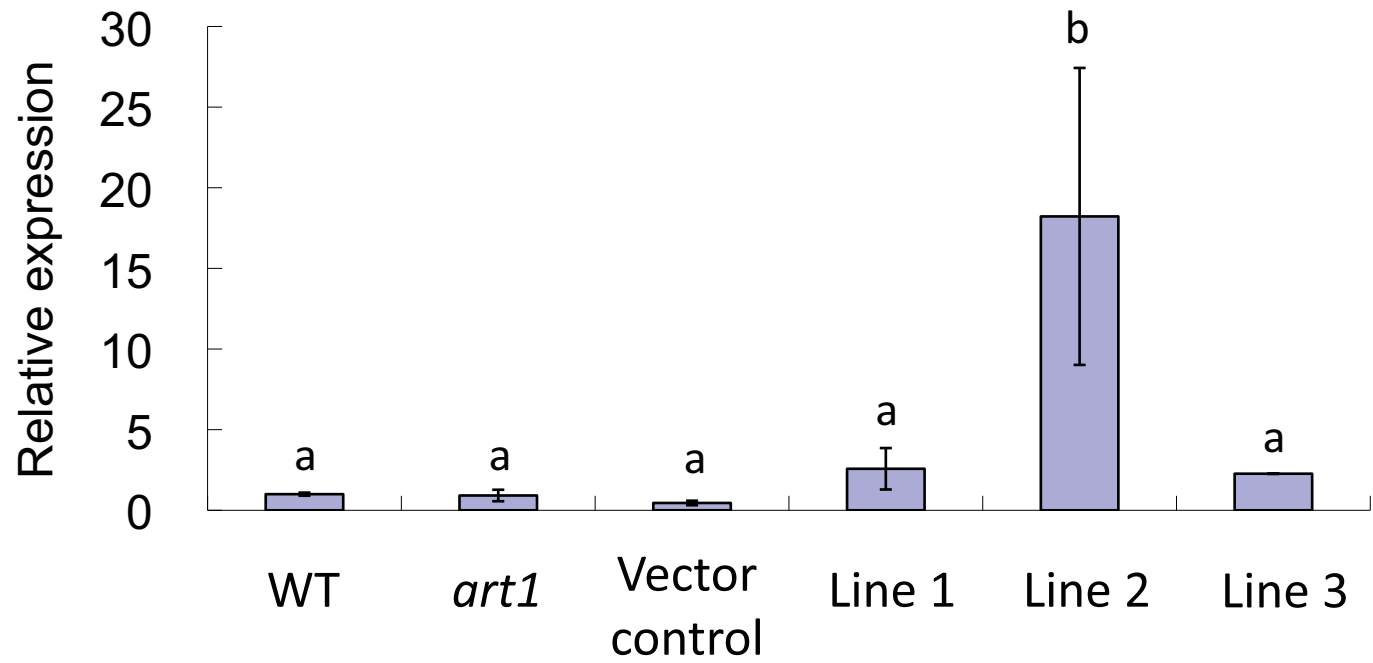
**Supplemental Figure 1.** Air-dried weight of shoot and grain yield of both WT rice and *art1* grown in a field. Both WT rice (cv. Koshihikari) and *art1* mutant were cultivated in a field (soil pH 6.5) at an experimental farm of Okayama University in 2006. Three replicates of a plot (1 m × 0.4 m) were made for each line. Plant growth and yield were investigated at harvest. (A) Grain yield. (B) Shoot dry weight. Data are means ± SD (n = 3 biological replicates). Same letters indicate no significant differences at P > 0.05 by Student t test.



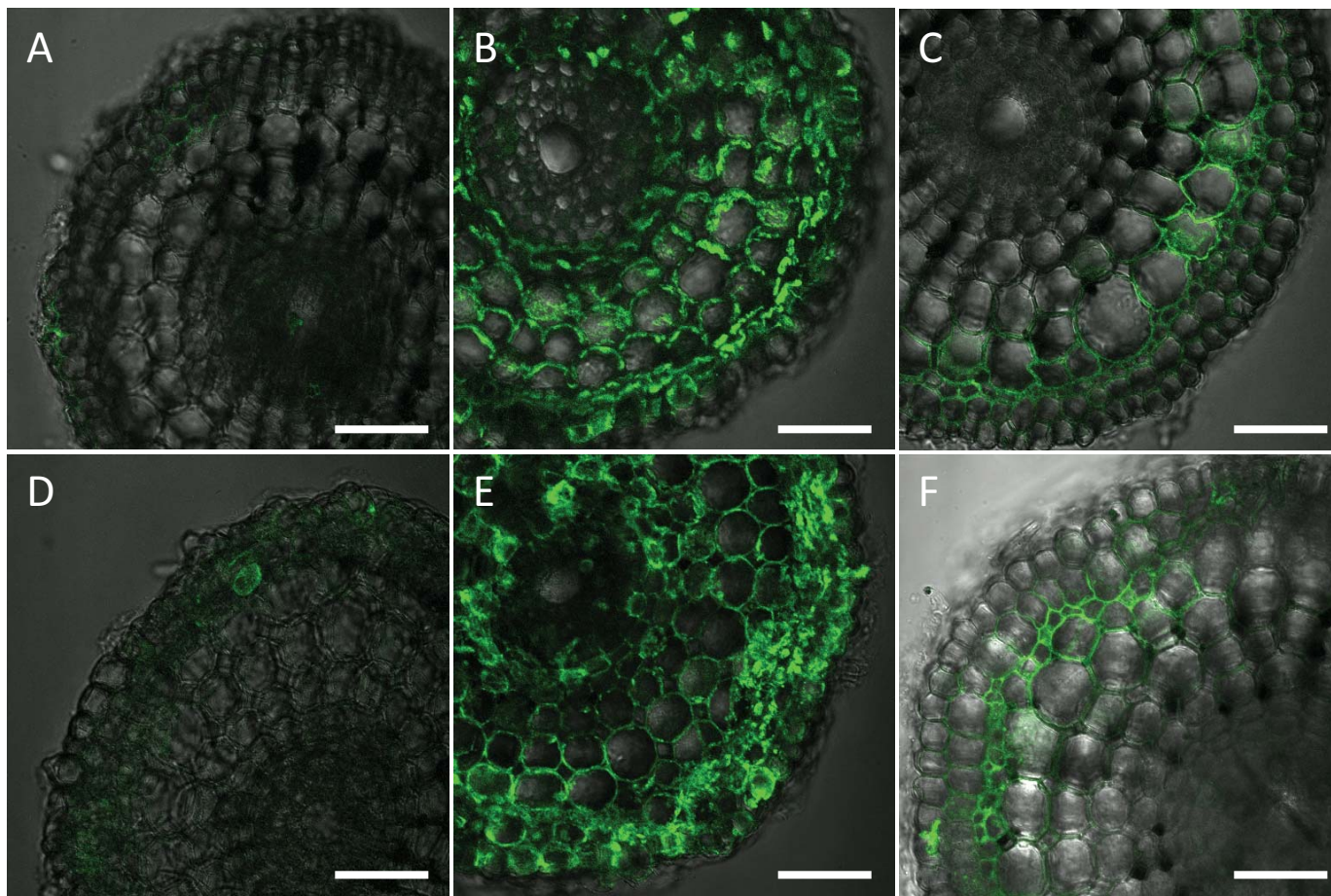
**Supplemental Figure 2.** Frequency distributions of Al sensitivities in an F<sub>2</sub> population from a backcross between the mutant (*art1*) and WT.

Four-day-old seedlings were exposed to a 0.5 mM CaCl<sub>2</sub> solution (pH 4.5) for 24 h and then transferred to 20 μM Al solution containing 0.5 mM CaCl<sub>2</sub> (pH 4.5) for a further 24 h. Relative root elongation (RRE) used for evaluation of their sensitivities to Al was calculated as: root elongation with Al / root elongation without Al × 100.





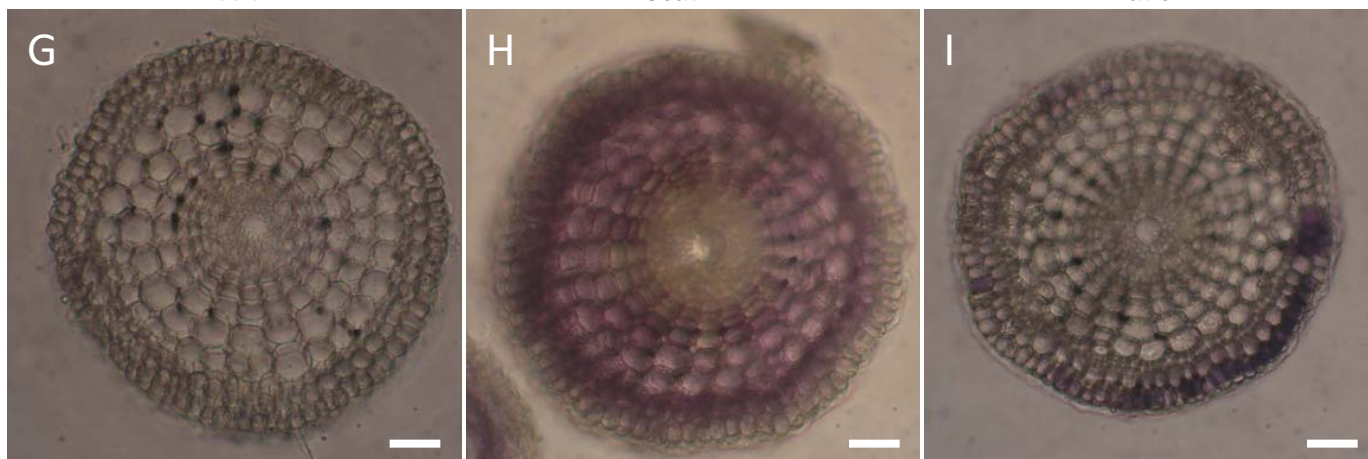
**Supplemental Figure 4.** Expression levels of *ART1/art1* in complementation lines and the control plants. Root of WT rice (cv. Koshihikari), *art1* mutant, three independent transgenic complementation lines with genomic fragment of *ART1* (Line 1 to 3) and vector control line of complementation test were used for quantitative RT-PCR to determine relative expression of *ART1/art1*. Histone H3 was used as an internal control. These expression levels include both endogenous *ART1/art1* and transgenic *ART1*. Data are means  $\pm$  SD (n = 3 biological replicates). Different letters indicate significant differences at P < 0.05 by Tukey's test.



WT

*star1*

*art1*



G

H

I

**Supplemental Figure 5.** Root Al staining in WT(A,D,G), *star1* (B,E,H) and *art1* (C,F,I). Four-day-old seedlings were exposed to 30  $\mu$ M Al in 0.5 mM  $\text{CaCl}_2$  solution (pH 4.5) for 9 h (A-C) or 24 h (D-I) and then free-hand cross sections at 2 mm from the root tip were stained by Morin (A-F) or Eriochrome cyanine R. Bars = 50  $\mu$ m.

**Supplemental Table 1.** Primers for InDel markers used in mapping ART1

<b>Primer Name</b>	<b>Forward (5'-----3')</b>	<b>Reverse (5'-----3')</b>
C62896	GAGAAATCAAATCGGGCCAC	AAGGGCAAGATGCATTGAC
MaOs1210	CGCAGGGAAGCAAAATTAAC	CACCTTATGGAGCATTGAGTTGTA
MaOs1219	CCCATGTAGAAGCCAAAGATAAG	CGTTGGATGATGATGGAAGG
MaOs1221	CTGCCTGCTGGATAGGACTTT	GTTTTCGCTGGATCTTTTGGTA
MaOs1229	TTCCTCATGGGATCACTTGC	TGGTGCATCAGCCATAAACT
MaOs1237	GGCTACACTTATTTTGCAGC	ACCTCCAACACTCCCACTCACC
MaOs1239	TGAGGGCACAAATGAATGG	AAATCTGACGAGCGACAAAAG
MaOs1244	TTATTCCACCAAAGATTAAGGG	GGTTCTGATTCCAAGTCACAGG
MaOs1246	TTACGGTCAACAATTCACCAA	CAAGAATTTAGAAACGAAAGGGAG
MaOs1248	GCCCGCTTCTTCTTGTGG	CCTCCGTCCTCTGGTGCTAC
MaOs1249	GAGCATTGCCCTTTTACACC	CCACTGGGATTCTCACTTCG
MaOs1250	GTTTCATAGGGCAAATGGTTAAG	TACCGAGCAGGCGAGTAGG