**Table S1.** Primers used for qRT-PCR.

**Table S2.** The average data statistics of the 15NO3– influx rate in roots of WT and *OsNRT2.1* transgenic lines under 0.5-mM 15NO3– conditions with NPA and without NPA.Significant differences are indicated by different letters (*p* < 0.05, two-way ANOVA).

**Figure S1.** Rice seed size.(**A**) Grain length, (**B**) grain width, (**C**) 1000-grain weight, (**D**) total nitrogen concentration.Error bars: SE (*n* = 10). Significant differences between transgenic lines and WT are indicated by different letters (*p* < 0.05, one-way ANOVA).

**Figure S2.** Plant growth of WT and *OsNRT2.1* transgenic lines under 0.5-mM NH4+ or NO3– conditions.Rice seedlings were grown in a quarter concentration of nutrient solution containing 0.5 mM of NH4+ or NO3– conditions at the beginning. The phenotype of the transgenic lines under (**A**) 0.5-mM NH4+, or (**D**) 0.5-mM NO3– conditions bar = 5 cm; length of shoot under (**B**) 0.5-mM NH4+ or (**E**) 0.5-mM NO3– conditions; length of root under (**C**) 0.5-mM NH4+ or (**F**) 0.5-mM NO3– conditions. Error bars: SE (*n* = 10). Significant differences between transgenic lines and WT are indicated by asterisks (*p* < 0.05, one-way ANOVA).

**Figure S3.**The expressions of *OsPINs* in the roots of WT and *OsNRT2.1* transgenic lines under 0.5-mM NO3− conditions with NPA treatment. WT and transgenic plants were shown in Figure 7. RNA was extracted from roots. Error bars: SE (*n* = 5). Significant differences between transgenic lines and WT are indicated by different letters (*p* < 0.05, one-way ANOVA).

**Figure S4.** 15NO3− influx rate in roots of WT and *OsNRT2.1* transgenic lines under 0.5-mM 15NO3− conditions. WT and transgenic plants. The seedlings were transferred to a quarter concentration of nutrient solution containing 0.5 mM of 15NO3– for 5 min. Error bars: SE (*n* = 5). Significant differences between transgenic lines and WT are indicated by different letters (*p* < 0.05, one-way ANOVA).

**Figure S5.** Effects of NPA on root growth under 0.5-mM NH4+ or 0.5 mM NO3− condition.Three-day-old normal grown *OE3/DR5::GUS* transgenic seedlings were transferred to nutrient solutions containing 1 μM of NPA from 100 mM of NPA that was dissolved in DMSO and the control containing the same amount of DMSO. Sampling was performed after seven days of treatment. (**A**) Scanning root morphology of rice plants under 0.5-mM NH4+ or 0.5 mM NO3− conditions with or without NPA treatment. (bar = 1 cm); (**B**) GUS expression in the root tips of *OE3/DR5::GUS* seedlings under 0.5-mM NH4+ or 0.5-mM NO3− conditions with or without NPA treatment. Root tips were stained for 2 h at 37 °C in the dark.