Supplementary Table 1. Days to maturity, biomass and grain Zn concentration of Field Experiment 1. Each data point shows the average ±standard deviation of 3 replicates. Summary of the ANOVA table is also shown below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Genotype** | **Days to maturity** | **Grains Zn concentration (ppm)** | **Biomass (g/plant)** |
| Areumbyeo (IR) | 85 | 23.0±1.73 | 5.00±2.26 |
| Daesanbyeo | 85 | 26.3±3.06 | 6.12±2.49 |
| Hwaseongbyeo | 85 | 25.0±1.73 | 8.12±0.900 |
| Ilpumbyeo | 85 | 22.3±1.15 | 5.22±0.870 |
| SWHOO (25-1) | 85 | 30.0±2.00 | 4.97±0.850 |
| Joryeongbyeo | 88 | 26.3±1.15 | 10.1±1.31 |
| Areumbyeo (KR) | 101 | 19.0±3.00 | 20.2±2.70 |
| IR 68144-2B-2-2-3-1-120 | 101 | 20.7±4.04 | 21.7±8.63 |
| IR 68144-2B-2-2-3-1-127 | 101 | 22.3±1.15 | 18.4±3.37 |
| IR 68144-2B-2-2-3-1-166 | 101 | 22.3±3.76 | 16.5±9.06 |
| IR 78809-2B-31-2-2 | 101 | 18.0±1.73 | 25.2±2.36 |
| IR 78809-2B-38-1-2 | 101 | 19.7±1.53 | 29.5±2.26 |
| IR64 | 101 | 18.3±1.53 | 23.9±3.99 |
| PSB Rc28 | 101 | 21.0±3.00 | 22.1±3.85 |
| IR 79805-2-2-2-2 | 106 | 19.0±1.00 | 33.2±2.71 |
| IR 79821-5-3-1-3 | 106 | 19.3±0.580 | 25.7±7.21 |
| IR 82247-5-3-3-2 | 116 | 26.3±2.52 | 16.1±0.950 |
| IR69428-6-1-1-3-3 | 120 | 33.7±4.04 | 19.0±2.49 |
| IR75862-206-2-8-3-B-B-B | 120 | 26.3±4.73 | 15.3±4.43 |
| IR75862-221-2-1-2-B-B-B | 120 | 24.3±4.16 | 21.0±11.6 |
| IR 75920-3-3-4 | 127 | 27.0±3.61 | 12.4±3.51 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Biomass | Biomass | Grain Zinc concentration | Grain Zinc concentration |
|  | F-Value | Pr(> F) | F-value | Pr(> F) |
| Genotype | 8.83 | 0 | 8.87 | 0 |

Supplementary Table 2. Grain yield and grain Zn concentration of Field Experiment 2. Each data point shows the average ±standard deviation of 3 replicates. Summary of the ANOVA table is also shown below.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Genotype** | | Days to Maturity | **Grain Yield** | | | | **Grain Zn concentration** | | |
|  | |  | **Z0** | | **Z1** | | **Z0** | | **Z1** |
|  | |  |
| A69-1 | | 130 | 5720±1240 | | 6050±148077 | | 22.7±8.14 | | 20.3±1.53 |
| IR 68144-2B-2-2-3-1-166 | | 119 | 2760±221 | | 3590±702 | | 32.7±2.89 | | 31.0±2.00 |
| IR 69428-6-1-1-3-3 | | 136 | 4480±725 | | 4950±268 | | 23.3±5.51 | | 23.3±0.580 |
| IR 83286-22-1-2-1-1 | | 132 | 5020±1050 | | 6460±799 | | 22.7±2.31 | | 24.7±1.15 |
| IR 83663-20-3-2-2 | | 127 | 5370±286 | | 6530±1110 | | 20.7±0.580 | | 21.3±3.21 |
| IR 84020-84-2-3-2 | | 127 | 5070±766 | | 6170±1060 | | 28.7±1.53 | | 26.3±1.15 |
| IR 84750-12-1-2-3-1 | | 132 | 5220±336 | | 6220±693 | | 17.7±0.580 | | 16.7±2.08 |
| IR 84848-84-1-3-2 | | 127 | 5550±2060 | | 4780±660 | | 22.3±2.08 | | 25.0±1.00 |
| IR 85849-33-1-2-1-2 | | 125 | 4980±345 | | 5760±327 | | 22.7±1.15 | | 22.0±1.73 |
| IR 85850-47-1-1-3-1 | | 126 | 5380±1240 | | 5470±661 | | 23.7±3.06 | | 23.7±2.52 |
| IR 85850-75-2-2-3-2 | | 127 | 5120±1170 | | 5160±1990 | | 23.7±1.15 | | 25.3±1.53 |
| IR 91143 AC-239 | | 122 | 3070±858 | | 3950±667 | | 33.3±2.31 | | 31.0±3.00 |
| IR 91152 AC-317 | | 134 | 3890±533 | | 4820±824 | | 25.7±2.08 | | 24.0±2.00 |
| IR 91152 AC-443 | | 135 | 1360±628 | | 2730±493 | | 32.7±7.77 | | 34.3±5.69 |
| IR 91152 AC-819 | | 127 | 4760±496 | | 6190±1650 | | 23.7±3.21 | | 20.7±2.89 |
| IR55179-3B-11-3 | | 129 | 6520±1190 | | 6150±1050 | | 23.3±0.580 | | 21.7±1.53 |
| IR64 | | 123 | 5550±2450 | | 5260±491 | | 23.7±1.15 | | 22.3±1.15 |
| Local check A-NSIC158 | | 128 | 5680±1310 | | 7300±545 | | 21.3±6.66 | | 18.3±1.15 |
| Local check B-NSIC214 | | 133 | 6100±348 | | 6250±390 | | 23.3±2.52 | | 22.3±2.52 |
| NSICRc222 | | 127 | 5590±696 | | 6320±550 | | 18.3±1.53 | | 18.0±1.00 |
| PSBRc82 | | 123 | 5040±434 | | 5800±645 | | 22.7±0.58 | | 21.0±1.00 |
|  | | | | | | | | | |
|  |  | | |  | |  | |  | |
|  | Grain Yield F-value | | | Grain Yield Pr(> F) | | Grain Zinc concentration  F-value | | Grain Zinc concentration  Pr(> F) | |
| Treatment | 13.72 | | | 0.0004 | | 1.91 | | 0.1703 | |
| Genotype | 7.57 | | | 0.0000 | | 12.33 | | 0.0000 | |
| Treatment:Genotype | 0.66 | | | 0.8530 | | 0.48 | | 0.9690 | |
|  |  | | |  | |  | |  | |

Supplementary Figure 1. Average redox potential of each water management treatment for the greenhouse experiment 2 for the whole season. P-values of the slopes for CF vs AWD are also shown before and after terminal drying. (Continuously flooded through harvest (CF-nTD), continuously flooded with 2-3 weeks terminal drainage (CF-TD), alternate wetting and drying with CF from flowering to harvest (AWD-nTD), and alternate wetting and drying with flooding at flowering followed by 2-3 weeks terminal drainage (AWD-TD).)