**Supplemental Table 1.** Mean values and IPCA scores from AMMI analysis of grain quality attributes among heat and drought tolerant wheat genotypes across four test environments.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Genotype | Gliadin (mg ml-1) | IPCA1 | IPCA2 |  | Gluten (mg ml-1) | IPCA1 | IPCA2 |  | Glutenin (mg ml-1) | IPCA1 | IPCA2 |
| LM02 | 0.58 | -0.26 | 0.01 |  | 10.30 | -0.34 | -0.37 |  | 9.71 | -0.43 | -0.40 |
| LM03 | 0.61 | 0.09 | 0.19 |  | 10.56 | 0.10 | -0.18 |  | 9.95 | 0.13 | -0.07 |
| LM04 | 0.42 | -0.01 | -0.04 |  | 10.71 | -0.48 | 0.50 |  | 10.29 | -0.48 | 0.49 |
| LM07 | 0.52 | 0.10 | 0.04 |  | 10.66 | -0.43 | 0.10 |  | 10.15 | -0.39 | 0.16 |
| LM13 | 0.93 | -0.15 | 0.01 |  | 9.40 | -0.06 | 0.75 |  | 8.47 | -0.12 | 0.73 |
| LM22 | 0.97 | -0.08 | 0.34 |  | 10.48 | -0.49 | 0.15 |  | 9.51 | -0.59 | 0.23 |
| LM23 | 0.93 | -0.08 | 0.28 |  | 11.45 | 1.08 | 0.47 |  | 10.52 | 1.04 | 0.55 |
| LM31 | 0.32 | 0.12 | -0.09 |  | 10.89 | -0.02 | 0.08 |  | 10.57 | 0.05 | 0.09 |
| LM32 | 0.68 | -0.20 | -0.20 |  | 11.37 | 0.11 | 0.41 |  | 10.69 | 0.06 | 0.30 |
| LM35 | 0.36 | 0.03 | -0.05 |  | 11.87 | -0.35 | 0.35 |  | 11.52 | -0.34 | 0.33 |
| LM41 | 0.54 | 0.10 | -0.30 |  | 12.15 | 0.46 | 0.62 |  | 11.61 | 0.57 | 0.57 |
| LM44 | 0.88 | -0.08 | 0.07 |  | 12.16 | 0.06 | 0.14 |  | 11.29 | -0.01 | 0.11 |
| LM55 | 0.34 | 0.15 | 0.07 |  | 10.80 | -0.02 | -0.20 |  | 10.46 | 0.04 | -0.11 |
| LM60 | 0.60 | 0.07 | -0.32 |  | 10.68 | -0.28 | -0.03 |  | 10.08 | -0.20 | -0.09 |
| LM62 | 0.84 | -0.21 | -0.29 |  | 11.25 | 0.25 | 0.15 |  | 10.41 | 0.21 | 0.00 |
| LM64 | 0.28 | 0.05 | -0.05 |  | 10.47 | 0.07 | 0.12 |  | 10.19 | 0.11 | 0.13 |
| LM69 | 0.42 | 0.05 | 0.03 |  | 9.19 | 0.05 | -0.25 |  | 8.77 | 0.06 | -0.23 |
| LM71 | 1.16 | -0.21 | 0.02 |  | 11.94 | 0.30 | -1.32 |  | 10.77 | 0.20 | -1.37 |
| LM72 | 0.73 | 0.73 | 0.05 |  | 9.23 | -0.48 | -0.34 |  | 8.50 | -0.33 | -0.32 |
| LM73 | 0.67 | -0.19 | 0.19 |  | 11.72 | 0.52 | -0.62 |  | 11.05 | 0.44 | -0.58 |
| LM75 | 0.38 | -0.05 | 0.06 |  | 9.83 | -0.33 | -0.31 |  | 9.45 | -0.37 | -0.31 |
| LM81 | 0.85 | -0.25 | -0.12 |  | 9.85 | 0.88 | 0.11 |  | 9.00 | 0.81 | 0.01 |
| LM82 | 0.37 | 0.23 | -0.10 |  | 11.57 | 0.49 | -0.95 |  | 11.20 | 0.59 | -0.94 |
| LM85 | 0.94 | -0.09 | 0.12 |  | 10.91 | 0.22 | 0.41 |  | 9.97 | 0.17 | 0.43 |
| LM88 | 0.58 | 0.05 | 0.16 |  | 10.78 | 0.09 | -0.09 |  | 10.19 | 0.10 | -0.02 |
| LM90 | 0.72 | 0.05 | -0.09 |  | 11.50 | -0.68 | -0.01 |  | 10.78 | -0.66 | -0.02 |
| LM95 | 0.69 | 0.04 | 0.07 |  | 11.07 | 0.46 | 0.38 |  | 10.39 | 0.49 | 0.43 |
| LM100 | 0.32 | 0.00 | -0.05 |  | 11.55 | -1.15 | -0.09 |  | 11.23 | -1.15 | -0.08 |

IPCA; interaction principal component axis

**Supplemental Table 1. Continued.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
| Genotype | TPC (%) | IPCA1 | IPCA2 |  | Gli: Glu ratio | IPCA1 | IPCA2 |
| LM02 | 21.24 | 0.14 | 0.80 |  | 0.06 | 0.08 | 0.06 |
| LM03 | 24.75 | -0.05 | 0.30 |  | 0.07 | 0.02 | -0.03 |
| LM04 | 22.28 | 0.61 | 0.46 |  | 0.04 | 0.03 | 0.06 |
| LM07 | 20.46 | 0.83 | 0.19 |  | 0.05 | 0.02 | 0.02 |
| LM13 | 20.94 | 0.49 | 0.22 |  | 0.12 | 0.01 | -0.09 |
| LM22 | 23.90 | -0.75 | 0.07 |  | 0.10 | 0.00 | 0.06 |
| LM23 | 20.76 | 0.33 | 0.40 |  | 0.10 | 0.00 | -0.08 |
| LM31 | 21.58 | -0.66 | 0.54 |  | 0.03 | 0.02 | 0.02 |
| LM32 | 21.57 | -0.45 | 0.35 |  | 0.07 | 0.03 | 0.01 |
| LM35 | 23.87 | -0.48 | 0.15 |  | 0.03 | 0.02 | 0.07 |
| LM41 | 23.00 | 0.05 | 0.72 |  | 0.05 | 0.02 | -0.07 |
| LM44 | 24.16 | -0.15 | 0.18 |  | 0.08 | -0.03 | 0.04 |
| LM55 | 25.71 | -0.41 | -0.95 |  | 0.04 | 0.02 | 0.02 |
| LM60 | 25.72 | -1.04 | -0.36 |  | 0.07 | 0.01 | -0.09 |
| LM62 | 23.06 | -0.03 | 0.02 |  | 0.09 | 0.01 | -0.05 |
| LM64 | 16.13 | 1.02 | -1.04 |  | 0.03 | 0.03 | 0.05 |
| LM69 | 11.55 | 0.15 | 0.22 |  | 0.05 | -0.01 | 0.03 |
| LM71 | 24.26 | -0.51 | -0.98 |  | 0.12 | 0.00 | -0.08 |
| LM72 | 19.91 | 0.92 | -0.38 |  | 0.10 | -0.38 | 0.04 |
| LM73 | 23.50 | -0.45 | -0.12 |  | 0.06 | 0.05 | 0.03 |
| LM75 | 18.85 | 1.32 | 0.09 |  | 0.04 | 0.03 | 0.10 |
| LM81 | 19.55 | 0.58 | 0.49 |  | 0.11 | -0.02 | -0.16 |
| LM82 | 25.18 | -1.42 | 0.29 |  | 0.04 | -0.03 | 0.00 |
| LM85 | 24.21 | 0.45 | -0.67 |  | 0.10 | 0.00 | -0.03 |
| LM88 | 21.75 | 0.06 | 0.10 |  | 0.06 | 0.01 | 0.04 |
| LM90 | 24.13 | -0.81 | -0.57 |  | 0.07 | 0.01 | 0.01 |
| LM95 | 24.30 | -0.79 | -0.17 |  | 0.07 | 0.01 | -0.05 |
| LM100 | 13.23 | 1.05 | -0.36 |  | 0.03 | 0.05 | 0.08 |

IPCA; interaction principal component axis, TPC, total protein content; Gli: Glu ratio, Gliadin Glutenin ratio