

Supplementary Data

Comparison of phenotypic and molecular characterizations of some important wheat cultivars and advanced breeding lines

Supplementary data. Mean values \pm standard error of phenological and agro-morphological traits measured in present study

Genotype code	HEM (day)	HE (day)	FL (day)	PM (day)	GFP (day)	AL (cm)	FLA (cm ²)	LCC	PL (cm)	PH (cm)
1	171.70 ± 0.67	177.00 ± 0	180.00 ± 0	221.30 ± 0.33	41.30 ± 0.33	0.51 ± 0.06	18.77 ± 2.53	51.07 ± 1.10	29.70 ± 2.11	80.00 ± 2.15
2	171.00 ± 0	176.00 ± 0	179.00 ± 1	220.70 ± 0.33	41.70 ± 0.67	4.73 ± 0.2	10.87 ± 0.59	51.53 ± 0.98	39.10 ± 2.55	106.20 ± 7.94
3	173.00 ± 0	180.70 ± 0.67	181.70 ± 0.33	220.00 ± 0.58	38.30 ± 0.33	0.00 ± 0	24.97 ± 1.68	54.77 ± 0.68	29.55 ± 0.77	82.20 ± 2.9
4	173.00 ± 1	175.70 ± 0.33	182.00 ± 0	221.00 ± 0	39.00 ± 0	5.88 ± 0.27	18.5 ± 1.00	53.67 ± 1.2	52.04 ± 1.08	109.40 ± 5.2
5	173.00 ± 0	176.30 ± 0.33	184.00 ± 0	223.30 ± 0.67	39.30 ± 0.67	5.56 ± 0.61	21.27 ± 1.84	51.17 ± 1.01	44.67 ± 4.8	104.70 ± 3.8
6	171.70 ± 0.67	176.30 ± 0.33	183.30 ± 0.33	222.00 ± 0	38.70 ± 0.33	5.02 ± 0.65	18.20 ± 2.16	52.13 ± 1.99	35.93 ± 4.48	88.20 ± 6.84
7	173.00 ± 0	177.30 ± 0.33	180.70 ± 0.88	221.70 ± 0.67	41.00 ± 0.58	5.18 ± 0.23	22.68 ± 0.63	55.4 ± 1.25	44.64 ± 2.37	95.80 ± 3.22
8	170.00 ± 1	174.70 ± 1.2	180.00 ± 1.15	221.00 ± 0	41.00 ± 1.15	5.66 ± 0.41	25.50 ± 1.80	55.33 ± 0.72	40.19 ± 1.07	107.02 ± 1.19
9	171.00 ± 0	176.00 ± 0	181.30 ± 0.33	221.30 ± 0.88	40.00 ± 1	6.29 ± 0.51	20.20 ± 0.48	53.7 ± 1.21	37.33 ± 2.52	87.30 ± 7.33
10	168.00 ± 0	173.70 ± 0.33	177.00 ± 1	217.00 ± 1	40.00 ± 0	5.33 ± 0.29	19.67 ± 1.82	52.33 ± 1.94	39.64 ± 3.67	93.50 ± 3.23
11	172.00 ± 1	181.30 ± 0.67	183.70 ± 0.33	221.00 ± 0.58	37.30 ± 0.33	5.06 ± 0.67	20.38 ± 2.07	52.50 ± 0.55	39.33 ± 2.95	104.70 ± 2.94
12	173.00 ± 0	177.70 ± 0.67	182.70 ± 0.33	220.70 ± 0.33	38.00 ± 0.58	5.79 ± 0.54	19.97 ± 1.22	53.43 ± 1.53	47.04 ± 1.43	120.10 ± 6.85
13	168.00 ± 0	173.30 ± 0.33	176.30 ± 0.33	217.70 ± 0.88	41.30 ± 1.2	6.11 ± 0.49	14.75 ± 2.75	54.00 ± 1.06	30.24 ± 4.29	80.20 ± 5.87
14	168.30 ± 0.33	173.00 ± 0	175.70 ± 0.33	216.70 ± 0.33	41.00 ± 0.58	5.46 ± 0.44	16.26 ± 0.85	52.03 ± 2.13	38.02 ± 2.70	95.70 ± 2.46
15	171.70 ± 0.67	176.00 ± 0.58	179.00 ± 1	221.70 ± 0.88	42.70 ± 0.67	4.74 ± 0.19	21.66 ± 2.44	51.07 ± 2.48	36.70 ± 1.69	90.20 ± 4.92
16	171.00 ± 0	175.70 ± 0.33	180.00 ± 0	222.30 ± 0.67	42.30 ± 0.67	5.94 ± 0.25	15.63 ± 0.80	53.3 ± 1.5	36.70 ± 0.85	80.70 ± 1.27
17	179.30 ± 0.33	183.70 ± 0.67	187.00 ± 0	223.30 ± 0.33	36.30 ± 0.33	5.49 ± 0.36	19.10 ± 1.13	54.23 ± 1.01	33.89 ± 0.86	107.30 ± 3.64
18	169.30 ± 0.88	174.00 ± 1	178.00 ± 1.53	220.70 ± 0.33	42.70 ± 1.45	6.24 ± 0.84	17.88 ± 2.05	53.77 ± 1.12	40.70 ± 3.61	94.60 ± 3.43
19	171.70 ± 0.67	177.00 ± 0.58	180.30 ± 0.88	222.30 ± 0.88	42.00 ± 0	5.69 ± 0.29	17.62 ± 0.32	53.20 ± 1.54	37.34 ± 0.37	91.80 ± 2.19
20	168.00 ± 0.33	173.70 ± 0.34	179.10 ± 0.59	218.90 ± 0.11	39.80 ± 0.62	6.22 ± 0.19	20.46 ± 1.74	55.02 ± 0.70	33.58 ± 0.80	81.40 ± 1.18
21	172.30 ± 0.67	177.70 ± 0.33	182.00 ± 0	221.00 ± 0	39.00 ± 0	5.64 ± 0.27	26.34 ± 1.68	55.53 ± 0.57	37.54 ± 1.91	87.20 ± 2.25
22	171.70 ± 0.67	176.70 ± 0.67	182.3 \pm 0.67	221.30 ± 0.33	39.00 ± 1	4.01 ± 0.2	24.19 ± 2.58	54.27 ± 1.31	37.24 ± 1.35	95.20 ± 3.54
23	171.70 ± 0.67	177.00 ± 0.58	181.30 ± 1.2	221.30 ± 0.33	40.00 ± 1	5.57 ± 0.42	16.53 ± 1.00	52.50 ± 2.25	33.22 ± 1.85	81.00 ± 2.73
24	172.00 ± 1	178.00 ± 2	180.30 ± 1.86	220.30 ± 1.33	40.00 ± 0.58	5.02 ± 0.44	20.36 ± 1.65	52.40 ± 1.80	34.80 ± 1.03	90.00 ± 1.84
25	170.00 ± 1	174.00 ± 0	178.00 ± 1	219.70 ± 0.67	41.70 ± 0.33	5.46 ± 0.59	23.12 ± 1.46	52.70 ± 1.93	35.98 ± 2.55	87.50 ± 0.99
26	171.00 ± 0	174.00 ± 0	177.30 ± 0.33	221.00 ± 0.58	43.70 ± 0.33	5.03 ± 0.19	22.74 ± 0.81	54.37 ± 0.83	35.41 ± 1.06	75.00 ± 4.3
27	172.3 \pm 0.67	177.30 ± 0.33	180.00 ± 0	221.30 ± 0.33	41.30 ± 0.33	5.48 ± 0.31	23.09 ± 1.6	53.30 ± 1.44	36.77 ± 1.27	84.90 ± 2.31
28	170.30 ± 0.67	174.00 ± 0.58	177.00 ± 1	221.00 ± 0.58	44.00 ± 0.58	4.32 ± 0.38	17.96 ± 4.18	54.13 ± 1.35	33.97 ± 1.93	74.30 ± 1.82
29	171.00	176.00	179.00	216.30	37.30	4.73	13.43	56.33	32.31	88.50

	± 0	± 0.58	± 1.53	± 1.33	± 0.33	± 0.92	± 2.50	± 0.18	± 7.43	± 9.87
30	170.00	176.00	177.00	221.30	44.30	6.30	25.67	57.63	36.08	74.60
	± 1	± 0.58	± 0.58	± 0.33	± 0.67	± 0.29	± 1.86	± 0.82	± 1.39	± 1.69
Average	171.30	176.30	180.20	220.60	40.50	5.08	19.93	53.56	37.32	91.00
Minimum	167.90	173.00	175.70	216.30	36.30	0	10.87	51.07	29.55	74.30
Maximum	179.30	183.70	187.00	223.30	44.30	6.30	26.34	57.63	52.04	120.10
LSD 0.05	1.72	1.73	2.30	1.78	1.79	1.13	4.80	3.12	7.46	13.30

HEM, head emergence; HE, days to heading; FL, days to flowering; PM, physiological maturity date; GFP, grain filling period; AL, awn length; FLA, flag leaf area; LCC, leaf chlorophyll content; PL, peduncle length; PH, plant height

Supplementary data (continued)

Genotype code	SPL (cm)	PL/PH	FSPD	NSP	NSSP	TSW (g)	GY (ton/ha)	SY (ton/ha)	BY (ton/ha)	HI
1	8.97	0.37	4.54	642.70	40.70	33.47	8.17	9.56	17.73	0.46
	± 0.34	± 0.03	± 0.19	± 59.11	± 2.00	± 0.69	± 0.49	± 1.14	± 1.56	± 0.02
2	7.86	0.38	2.95	743.30	23.30	45.19	7.51	14.29	21.8	0.34
	± 0.32	± 0.05	± 0.22	± 79.14	± 2.70	± 0.28	± 0.81	± 0.26	± 0.69	± 0.03
3	9.12	0.36	4.92	536.70	44.90	35.43	5.89	10.65	16.53	0.35
	± 0.81	± 0.01	± 0.44	± 75.9	± 1.52	± 0.81	± 0.82	± 0.64	± 1.44	± 0.02
4	9.71	0.48	3.69	571.30	35.70	46.91	6.60	10.47	17.07	0.39
	± 0.54	± 0.02	± 0.23	± 43.46	± 1.67	± 0.64	± 0.33	± 1.09	± 1.34	± 0.02
5	9.44	0.43	2.75	682.70	26.50	48.95	7.28	11.72	19.00	0.38
	± 1.33	± 0.03	± 0.22	± 66.78	± 5.66	± 0.79	± 1.09	± 1.45	± 2.53	± 0.01
6	10.28	0.40	4.87	568.70	50.20	36.40	8.82	12.58	21.40	0.41
	± 0.19	± 0.04	± 0.62	± 48.2	± 6.88	± 0.79	± 0.23	± 0.78	± 0.92	± 0.01
7	9.68	0.47	4.74	554.70	46.00	42.25	6.65	12.89	19.53	0.35
	± 0.08	± 0.01	± 0.17	± 73.69	± 2.00	± 0.72	± 0.53	± 2.38	± 2.10	± 0.05
8	9.59	0.38	4.20	478.70	40.60	44.53	6.26	10.07	16.33	0.38
	± 0.72	± 0.01	± 0.26	± 39.06	± 5.27	± 0.72	± 0.75	± 0.37	± 1.09	± 0.02
9	8.65	0.43	5.45	554.00	46.40	35.80	7.26	9.27	16.53	0.44
	± 0.83	± 0.03	± 0.44	± 98.33	± 0.51	± 1.00	± 0.28	± 1.31	± 1.05	± 0.05
10	10.58	0.42	3.43	556.70	36.50	44.57	6.71	12.03	18.73	0.36
	± 0.48	± 0.03	± 0.71	± 100	± 7.98	± 0.32	± 0.85	± 1.80	± 2.33	± 0.04
11	10.17	0.38	4.24	536.70	43.20	34.06	6.70	11.17	17.87	0.37
	± 0.68	± 0.02	± 0.03	± 26.03	± 3.07	± 1.10	± 0.96	± 0.89	± 1.84	± 0.02
12	9.80	0.39	3.09	483.30	30.30	44.13	4.22	9.51	13.73	0.31
	± 1.26	± 0.01	± 0.35	± 59.74	± 7.51	± 0.90	± 0.76	± 1.90	± 2.63	± 0.02
13	9.24	0.37	3.91	594.00	36.80	37.46	5.91	11.82	17.73	0.33
	± 0.89	± 0.03	± 0.51	± 11.55	± 8.13	± 1.10	± 1.12	± 0.63	± 1.35	± 0.04
14	8.35	0.40	3.99	540.70	33.40	37.78	6.95	9.59	16.53	0.41
	± 0.19	± 0.03	± 0.23	± 86.83	± 2.27	± 0.74	± 1.72	± 0.38	± 2.07	± 0.06
15	8.99	0.41	4.56	642.00	41.40	36.01	8.92	12.39	21.32	0.42
	± 0.59	± 0.02	± 0.37	± 45.21	± 6.20	± 0.52	± 0.65	± 1.33	± 1.97	± 0.01
16	7.94	0.45	4.21	689.30	33.30	33.07	8.05	9.48	17.53	0.46
	± 0.27	± 0	± 0.15	± 64.09	± 0.15	± 0.41	± 0.58	± 1.33	± 1.77	± 0.03
17	10.27	0.33	3.02	716.70	30.90	32.23	5.81	12.92	18.73	0.31
	± 1.12	± 0.02	± 0.13	± 120.1	± 3.16	± 1.00	± 0.76	± 1.42	± 2.17	± 0.01
18	9.18	0.43	3.63	538.00	34.90	43.83	6.04	8.83	14.87	0.40
	± 1.40	± 0.04	± 0.55	± 47.43	± 9.96	± 0.10	± 1.23	± 1.22	± 2.40	± 0.02
19	8.46	0.41	5.47	563.30	46.30	33.91	8.39	10.94	19.33	0.43
	± 0.53	± 0.01	± 0.17	± 82.74	± 3.32	± 0.44	± 0.59	± 0.71	± 1.25	± 0.01
20	8.76	0.42	4.62	504.70	40.20	42.73	8.19	13.40	21.59	0.38
	± 0.56	± 0.01	± 0.08	± 10.48	± 2.45	± 0.38	± 2.64	± 4.21	± 6.84	± 0.01
21	9.33	0.43	5.30	445.30	49.40	33.27	6.99	9.75	16.73	0.41
	± 0.17	± 0.01	± 0.28	± 83.46	± 1.72	± 0.74	± 1.84	± 2.36	± 4.17	± 0.02
22	9.14	0.39	4.29	550.00	40.30	36.63	5.08	9.92	15.00	0.34
	± 0.97	± 0.01	± 0.71	± 80.43	± 10.74	± 1.41	± 0.60	± 0.84	± 1.33	± 0.02
23	8.75	0.41	5.33	457.30	46.60	40.01	8.22	10.18	18.40	0.44
	± 0.65	± 0.01	± 0.26	± 65.01	± 3.81	± 0.18	± 1.25	± 0.67	± 1.91	± 0.03
24	8.32	0.39	4.78	468.70	42.60	32.65	4.93	10.20	15.13	0.41
	± 1.77	± 0.01	± 1.03	± 42.81	± 16.33	± 0.36	± 1.61	± 0.74	± 1.35	± 0.02
25	9.12	0.46	4.96	449.30	45.80	40.40	6.49	8.71	15.20	0.43
	± 0.5	± 0.03	± 0.60	± 54.46	± 8.17	± 1.13	± 0.51	± 0.33	± 0.72	± 0.02
26	8.39	0.47	4.80	666.70	40.30	35.10	8.51	10.76	19.27	0.44
	± 0.09	± 0.02	± 0.64	± 29.24	± 5.57	± 0.67	± 0.62	± 0.68	± 1.27	± 0.01
27	8.14	0.43	6.42	528.00	52.20	36.39	8.14	10.52	18.67	0.43
	± 0.02	± 0	± 0.13	± 84.32	± 1.06	± 0.58	± 1.06	± 0.82	± 1.85	± 0.02
28	7.05	0.46	4.91	726.00	35.40	37.94	7.83	10.23	18.07	0.43
	± 0.64	± 0.02	± 0.70	± 139.1	± 8.03	± 0.25	± 1.44	± 1.31	± 2.71	± 0.02

29	7.08 ± 1.24	0.36 ± 0.04	2.89 ± 0.21	711.30 ± 144.8	21.00 ± 5.11	40.15 ± 1.74	6.15 ± 1.27	9.65 ± 1.28	15.80 ± 1.75	0.39 ± 0.07
30	10.06 ± 0.19	0.48 ± 0.02	5.83 ± 0.35	584.00 ± 79.66	58.80 ± 4.24	36.40 ± 0.40	10.13 ± 1.82	11.67 ± 1.85	21.80 ± 3.67	0.46 ± 0.01
Average	9.01	0.41	4.39	576.20	39.80	38.59	7.09	10.84	17.93	0.40
Minimum	7.05	0.33	2.75	449.30	21.00	32.23	4.22	8.71	13.73	0.31
Maximum	10.58	0.48	6.42	743.30	58.80	48.95	10.13	14.29	21.80	0.46
LSD 0.05	2.17	0.07	1.22	202.80	17.10	2.11	2.57	3.84	5.76	0.08

SPL, spike length; PL/PH, ratio of peduncle length to plant height; FSPD, fertile spikelets density; NSP, number of spikes per m²; NSSP, number of seeds per spike; TSW, thousand seed weight; GY, grain yield; SY, straw yield; BY, Biological yield; HI, harvest index