

Table S1: List of SSR primers used for molecular screening with repeat motifs.

Name	Forward	Reverse	Motif	Chr	size	AT(°C)
Bmac0030	5' CCCAATCGGAGTTACAGATG 3'	5' GCCTCTCTGAGAATGGATC 3'	(AC) ₂₂	4H	155	60-66
Bmac0090	5' ACATCAACCCCTCCTGCTC 3'	5' CCGCACATAGTGGTTACATC 3'	(AC) ₂₀	1H	221	58
Bmac0093	5' CGTTTGGGACGTATCAAT 3'	5' GGGAGTCTTGAGCCTACTG 3'	(AC) ₂₄	2H	151	55
Bmac0096	5' GCTATGGCGTACTATGTATGGTTG 3'	5' TCACGATGAGGTATGATCAAAGA 3'	(AT) ₆ (AC) ₁₆	5H	173	58
Bmac0127	5' AACTATGTCCAGTCGTTTCC 3'	5' CTTGTCGTATCATCTTATTCAGA 3'	(AC) ₂₆	3, 6H	118	58
Bmac0144	5'TACGTGTACATACTCTACGATTTG 3'	5' ACTTATTCTGCATCCTGGGT 3'	(AT) ₄ (AC) ₂₀	1H	179	55
Bmac0154	5' CTGGGTGATGAATAGAGTTTC 3'	5' TATTCTTCAAAAGATGTTCTGC 3'	(AT) ₁₉ /(AC) ₆	1H	130	58
Bmac0282	5' CACACATACCACGCATGT 3'	5' ATGTAAAATGGACGTATCACC 3'	(AC) ₅	5, 7H	195	55
Bmac0284	5' GCACAAAGTCATTACATCAAA 3'	5' GATGCGTGAGTAGTTCACC 3'	(AC) ₁₈	5H	187	58
Bmac0297	5' ATAGAGGGGGTGAAGAATAAC 3'	5' AATAAGTGAATGATGTTGAGGA 3'	(AC) ₉ (AC) ₁₀	1, 4, 6, 7H	206	55
Bmac0303	5' CCTCCAAGATTAGATCTCTCTC 3'	5' CCGTATATTTAAGAAATGGTGA 3'	(AG) ₁₃ (AC) ₂₁	5H	138	58
Bmac0576	5' CAATTGTAGCCTAGCTGGTCG 3'	5' GGGTGTATGCAAGTGGGC 3'	(GT) ₁₀	2H	149	53
Bmag0009	5' AAGTGAAGCAAGCAAACAAACA 3'	5' ATCCTTCCATATTTTGATTAGGCA 3'	(AG) ₁₃	6H	172	58
Bmag0013	5' AAGGGGAATCAAAATGGGAG 3'	5' TCGAATAGGTCTCCGAAGAAA 3'	(CT) ₂₁	3H	155	58
Bmag0014	5' GCAGGGGTTGAACATCTCAT 3'	5' CACAGGGAAACAGCTATGACC 3'	(CT) ₁₅	4H	142	60-66
Bmag0105	5' AATCAGACCCATCAGAGGT 3'	5' CCGGTCTCATAGAAATGG 3'	(AG) ₁₀	1H	108	55
Bmag0113	5' GGAATCTTCTGGAACGTC 3'	5' TTAAGAAGATCATTGTATTGAAGA 3'	(AG) ₁₈	5H	153	55
Bmag0115	5' TGATCTGTGAGTAGTTCACCA 3'	5' AATTGAAGATGCGATGATC 3'	(AG) ₂₁	2H	134	63-69
Bmag0121	5' ATAAGATAGGTCACCGCAATA 3'	5' AGTAGTTCAATACAGACCTACAGG 3'	(AG) ₂₁ /(AC) ₁₂	3, 5, 7H	171	55
Bmag0173	5' CATTTTTGTTGGTGACGG 3'	5' ATAATGGCGGGAGAGACA 3'	(CT) ₂₉	6H	150	58
Bmag0219	5' ATATTTATGAAACGGTGAAGC 3'	5' GGGTTTATCCTCTGGTCC 3'	(AG) ₅ GG(AG) ₁₄	6H	181	58
Bmag0350	5' AGCTAGATCTCTCTGTCTCTGTC 3'	5' AAGAAACACACCACAAAGATT 3'	(AG) ₂₀	2H	139	58

Bmag0718	5'ATCGTGACATCTCAAGAACA 3'	5'CCTGATACTGCCTAGCATTAG 3'	N/A	1H	N/A	N/A
Bmag0808	5' TCATAGACTACGACGAAGATG 3'	5' TCTTTGGATGTGTGTTTACTG 3'	(GA) ₁₆	4H	177	55
Bmag0841	5' GGAAAGTACTTCAAACCTGAA 3'	5' CTTACAAGATGATGAGAACGA 3'	(TC) ₈ (CCTC) ₄ (CT) ₁₁	3H	125	55
Bmag0877	5' AAAGCTCATGGTAGATCAAGA 3'	5' TAGTTTTCCCAAAAGCTTCTA 3'	(GA) ₁₅	3H	153	55
Bmag0905	5' TTTATCTCCCCCTAGATAGAAG 3'	5' TCTCCGTATATTTAGGAAACG 3'	(TC) ₁₄	3H	177	55
EBmac0405	5' ATGTAGCTCGGAATGTGTAGT 3'	5' CATGTTGGATAAGAGTAGAGGA 3'	(GT) ₁₆	1H	123	55
HVOle	5' GATGGATGTCAGTCGGTC 3'	5' ATGAGCAGTAGTACAACCTCTAAGC 3'	(GCCT) ₄	4H	198	53

Table S2: Analyses of variances (ANOVA) of eleven morphological and physiological traits of 32 barley genotypes(V) growing under Saudi agricultural conditions for two years (Y) (2018 and 2019).

S.O.V	Pr > F										
	HD	PH	FLD	GFD	SPAD	SL	GN	KW	BIY	GY	HI
V	<.0001**	<.0001**	<.0001**	<.0001**	<.0001**	<.0001**	<.0001**	<.0001**	<.0001**	<.0001**	<.0001**
Y	.ns	0.6972 ^{ns}	.ns	0.0007**	0.6576 ^{ns}	<.0001**	<.0001**	0.6219 ^{ns}	0.3678 ^{ns}	0.3788 ^{ns}	0.0405*
Y*V	1.0000 ^{ns}	1.0000 ^{ns}	1.0000 ^{ns}	<.0001**	1.0000 ^{ns}	1.0000 ^{ns}	1.0000 ^{ns}	1.0000 ^{ns}	0.0002**	<.0001**	<.0001**

** Highly significant; * significant; ^{ns} not significant; V varieties; Y year of sowing; HD Heading date; PH Plant height; FLD Flag leaf death; GFD Grain filling duration; SPAD SPAD Value; SL Spike length; GN Grain number; KW 1000 kernel weight; BIY Biological yield; GY; Grain yield; HI Harvest

Table S3: Characteristics of thirty-two studied barely genotypes growing under Saudi agricultural conditions for eleven morphological and physiological traits during 2018 (first year of the study).

No.	Genotypes	HD (Days)	PH (cm)	FLD (cm ²)	GFD (days)	SPAD (nmol/cm)	SI (cm)	GN (Grain s per spike)	KW (g)	BY (kg ha ⁻¹)	GY (kg ha ⁻¹)	HI (%)
1	KSU-BR-G/G-3	64.67	65.57	104.33	41.00	26.11	5.83	33.87	40.35	17925.93	4780.74	26.98
2	KSU-BR-G/G-4	72.00	71.35	112.00	37.67	30.92	7.40	46.53	37.80	14074.07	4156.30	28.93
3	KSU-BR-C/G-2	73.33	87.75	111.33	35.33	32.90	6.45	41.07	43.63	12685.18	<u>6734.07</u>	53.69
4	KSU-BR-C/G-1	71.00	77.96	112.00	38.67	28.73	7.11	43.67	39.78	17481.48	4795.56	27.25
5	KSU-BR-30-7	75.67	78.70	109.33	37.33	27.21	7.16	39.47	47.23	19629.63	6504.44	32.98
6	KSU-BR-40-18-4	72.00	93.28	113.67	42.67	25.97	7.41	40.07	45.87	13851.85	5247.41	37.47
7	KSU-BR-88-29-10	72.33	96.61	108.33	38.00	27.71	6.49	38.13	38.18	20000.00	5820.74	29.42
8	KSU -BR-G121/L-4	68.00	76.61	94.33	34.33	23.74	5.63	26.40	42.31	11111.11	3973.33	35.76
9	KSU -BR-S/L-1	66.67	76.55	96.67	36.33	26.07	6.11	36.80	38.07	10740.74	4121.48	38.65
10	KSU -BR-G/L-1	71.67	74.66	100.33	37.33	25.47	6.85	37.00	35.53	11851.85	3653.33	31.12
11	KSU -BR-G/L-2	66.67	80.54	99.33	37.67	26.52	6.03	39.80	41.92	13333.33	5526.67	41.45
12	KSU -BR-G/L-3	66.67	86.90	98.67	38.67	23.68	5.75	35.07	41.83	15000.00	5420.74	37.15
13	KSU -BR-G/L-4	71.00	73.17	98.33	40.33	30.64	5.67	31.53	35.93	11333.33	4348.89	38.50
14	KSU -BR-L/L-3	69.00	72.93	110.00	46.67	27.95	5.06	36.80	31.80	13407.41	4205.93	31.38
15	Assir	68.00	80.40	97.00	36.00	27.31	7.05	31.93	51.60	16296.30	4187.41	26.52
16	Jazan-1	62.00	72.37	89.33	41.67	16.13	5.90	11.40	73.71	14222.22	3110.37	22.78

17	Jazan-2	62.00	65.27	89.33	41.33	13.74	5.81	14.00	57.97	8148.15	2162.22	26.84
18	Yemen	62.00	69.37	90.33	43.00	15.31	5.31	13.13	57.89	5481.48	2652.59	48.38
19	Giza124	71.00	81.33	112.33	54.00	32.17	6.23	52.80	39.15	14074.07	5209.63	37.20
20	Giza126	71.00	79.05	113.33	41.00	32.27	6.87	52.47	43.68	13703.70	5525.19	40.88
21	Giza126-1	70.00	84.33	114.00	41.67	30.54	6.89	50.33	49.80	17777.78	6057.78	34.07
22	Sahrawy	77.67	92.87	121.33	44.33	32.27	6.43	39.00	49.30	18962.96	6027.41	31.73
23	Giza123	67.67	88.67	113.00	44.00	25.04	6.71	45.20	44.05	12222.22	4223.70	35.98
24	Gusto	75.00	86.13	111.00	40.33	37.33	6.39	48.67	40.24	12962.96	3797.78	29.27
25	Rihana/Lignee	72.67	105.07	115.33	51.67	26.93	6.47	47.53	45.20	21851.85	<u>6817.78</u>	30.84
26	Assala-04	78.67	75.55	122.00	47.67	36.63	6.17	32.87	37.77	13481.48	5176.30	38.28
27	Er/Apm	66.67	73.90	112.00	45.67	26.12	7.17	22.47	28.17	10592.59	3290.37	31.00
28	Beecher	71.00	83.55	113.67	42.00	29.12	5.89	45.07	38.98	18518.52	4094.82	22.50
29	Carina/Moroc9-75	74.67	89.00	112.00	37.00	29.49	8.33	26.13	46.87	17037.04	4440.74	27.06
30	Rihane-03	78.67	91.24	116.33	39.33	30.47	4.93	36.80	38.70	19629.63	6100.00	30.77
31	Harmal	62.67	86.11	104.33	42.67	22.75	6.05	17.07	50.15	11481.48	3914.81	33.34
32	W12291	65.33	84.83	114.67	39.67	28.33	6.68	25.00	42.88	19111.11	5292.59	28.37
	Means	69.92	81.30	107.19	41.09	27.36	6.38	35.56	43.64	14624.42	4730.35	33.33
	C.V	3.38	14.42	2.29	8.48	19.01	9.67	12.63	9.11	13.94	26.55	22.98
	LSD	3.86	19.13	4.00	5.69	8.49	1.01	7.33	6.49	3328.20	2049.90	12.50

Heading date (HD), Plant height (PH), Flag leaf death (FLD), Grain filling duration (GFD), SPAD value (SPAD), Spike length (SL), Grain number (GN), 1000 kernel weight (TKW), Biological yield (BY), Grain yield(GY) and Harvest index (HI)

Table S4: Characteristics of thirty-two studied barely genotypes growing under Saudi agricultural conditions for eleven morphological and physiological traits during 2019 (second year of the study).

No.	Genotypes	HD (Days)	PH (cm)	FLD (cm ²)	GFD (Days)	SPAD (nmol/cm)	SL (cm)	GN (Grains per spike)	KW (g)	BY (kg ha-1)	GY (kg ha-1)	HI (%)
1	KSU-BR-G/G-3	64.67	65.88	104.33	39.67	26.07	5.83	33.87	40.72	11481.48	2355.55	20.81
2	KSU-BR-G/G-4	72.00	71.66	112.00	40.00	30.93	7.40	46.53	38.17	15555.55	2151.18	13.89
3	KSU-BR-C/G-2	73.33	88.06	111.33	38.00	32.87	6.45	41.07	44.00	14444.45	4463.48	31.25
4	KSU-BR-C/G-1	71.00	78.27	112.00	41.00	28.73	7.11	43.67	40.15	17037.04	2925.04	19.01
5	KSU-BR-30-7	75.67	79.01	109.33	33.67	27.23	7.16	39.47	47.60	27037.04	5551.77	21.65
6	KSU-BR-40-18-4	72.00	93.59	113.67	41.67	26.00	7.41	40.07	46.24	22962.96	6329.26	28.01
7	KSU-BR-88-29-10	72.33	96.92	108.33	36.00	27.70	6.49	38.13	38.55	19629.63	6158.59	31.59
8	KSU -BR-G121/L-4	68.00	76.92	94.33	26.33	23.73	5.63	26.40	42.68	15703.70	<u>8013.04</u>	51.07
9	KSU -BR-S/L-1	66.67	76.86	96.67	30.00	26.07	6.11	36.80	38.44	15814.81	6382.96	43.29
10	KSU -BR-G/L-1	71.67	74.97	100.33	28.67	25.47	6.85	37.00	35.90	12018.52	5033.19	41.98
11	KSU -BR-G/L-2	66.67	80.85	99.33	32.67	26.53	6.03	39.80	42.29	13333.33	4823.85	36.18
12	KSU -BR-G/L-3	66.67	87.21	98.67	32.00	23.67	5.75	35.07	42.20	14666.67	5872.22	40.56
13	KSU -BR-G/L-4	71.00	73.48	98.33	27.33	30.63	5.67	31.53	36.30	15407.41	4994.37	32.79
14	KSU -BR-L/L-3	69.00	73.24	110.00	41.00	27.93	5.06	36.80	32.17	17777.78	3368.82	18.96

15	Assir	68.00	80.71	97.00	29.00	27.33	7.05	31.93	51.97	16296.30	4959.78	30.86
16	Jazan-1	62.00	72.68	89.33	27.33	16.17	5.90	11.40	74.08	14592.59	3573.85	25.43
17	Jazan-2	62.00	65.58	89.33	27.33	13.73	5.81	14.00	58.34	8518.52	2799.48	32.93
18	Yemen	62.00	69.68	90.33	28.33	15.33	5.31	13.13	58.26	5214.81	2641.19	50.77
19	Giza124	71.00	81.64	112.33	41.33	32.17	6.23	52.80	39.52	11703.70	2884.44	24.63
20	Giza126	71.00	79.36	113.33	42.33	32.27	6.87	52.47	44.05	14814.81	3723.04	26.46
21	Giza126-1	70.00	84.64	114.00	44.00	30.57	6.89	50.33	50.17	13333.33	4544.67	34.93
22	Sahrawy	77.67	93.18	121.33	43.67	32.27	6.43	39.00	49.67	13703.70	2513.93	18.28
23	Giza123	67.67	88.98	113.00	45.33	25.03	6.71	45.20	44.42	16666.67	3435.78	20.84
24	Gusto	75.00	86.44	111.00	36.00	37.33	6.39	48.67	40.61	15555.55	3288.89	20.55
25	Rihana/Lignee	72.67	105.38	115.33	42.67	26.93	6.47	47.53	45.57	15185.18	3649.85	24.78
26	Assala-04	78.67	75.86	122.00	43.33	36.67	6.17	32.87	38.14	18518.52	3722.30	20.24
27	Er/Apm	66.67	74.21	112.00	45.33	26.13	7.17	22.47	28.54	17037.04	3869.04	23.07
28	Beecher	71.00	83.86	113.67	42.67	29.13	5.89	45.07	39.35	17407.41	4960.07	30.76
29	Carina/Moroc9-75	74.67	89.31	112.00	37.33	29.47	8.33	26.13	47.24	24444.45	<u>8607.85</u>	38.50
30	Rihane-03	78.67	91.55	116.33	37.67	30.47	4.93	36.80	39.07	17037.04	6457.33	38.35
31	Harmal	62.67	86.42	104.33	41.67	22.73	6.05	17.07	50.52	16296.30	2331.53	15.24
32	W12291	65.33	85.14	114.67	49.33	28.33	6.68	25.00	43.25	13333.33	4270.37	32.20
	Means	69.92	81.61	107.19	37.27	27.36	6.38	35.56	44.01	15704.05	4395.52	29.37
	C.V	3.38	14.36	2.29	10.13	19.03	9.67	12.63	9.03	25.93	19.09	21.08
	LSD	3.86	19.13	4.00	6.16	8.50	1.01	7.33	6.49	6645.70	1369.40	10.10

Heading date (HD), Plant height (PH), Flag leaf death (FLD), Grain filling duration (GFD), SPAD value (SPAD), Spike length (SL), Grain number (GN), 1000 kernel weight (TKW), Biological yield (BY), Grain yield(GY) and Harvest index (HI %)