

Table S1 The monthly maximum and minimum temperature (°C) as well as relative humidity (%) at four locations during 2021 and 2022 rice seasons.

Month	Kafr EL-Sheikh Governorate						Gharbya Governorate						Alexandria Governorate						New Valley Governorate					
	Air Temp. 2021		RH % 2021	Air Temp. 2022		RH % 2022	Air Temp. 2021		RH % 2021	Air Temp. 2022		RH % 2022	Air Temp. 2021		RH % 2021	Air Temp. 2022		RH % 2022	Air Temp. 2021		RH % 2021	Air Temp. 2022		RH % 2022
	Max	Min		Max	Min		Max	Min		Max	Min		Max	Min		Max	Min		Max	Min		Max	Min	
May	32.5	24.8	49.55	30.0	21.8	53.85	37.1	17.9	46.4	34.1	16.8	51.3	28.30	19.00	56.47	26.3	17.96	61.22	41.1	23.3	17.04	37.8	22.3	20.33
June	32.1	25.5	51.54	33.0	25.7	53.04	36.9	19.8	50.1	37.8	21.1	50.8	28.88	20.45	60.39	27.9	19.35	62.61	41.9	24.6	22.44	40.2	24.7	23.10
July	34.7	28.0	52.94	33.4	25.9	53.53	39.7	22.8	51.0	38.9	22.1	51.1	29.02	25.82	60.77	28.27	25.05	61.36	42.4	25.9	22.08	40.7	24.1	22.87
August	35.6	28.3	55.11	34.4	25.9	55.52	40.4	23.5	52.8	38.6	23.2	54.0	31.65	26.06	63.02	30.34	25.77	61.44	42.1	25.2	22.70	41.2	25.5	25.40
September	32.5	25.1	55.99	33.0	25.9	55.36	36.3	21.9	55.4	37.0	22.2	54.6	31.40	25.95	61.19	32.22	26.00	60.50	38.2	24.4	30.88	39.8	23.9	27.03

Table S2 Physical and chemical properties of experimental field soils at four locations in the rice growing seasons.

Characters	Kafr EL-Sheikh Governorate		Gharbya Governorate		Alexandria Governorate		New Valley Governorate	
	2021	2022	2021	2022	2021	2022	2021	2022
chemical analysis								
PH	8.00	8.30	7.98	8.12	8.10	7.98	7.25	7.50
Organic matter (%)	1.45	1.58	--	--	1.60	1.67	--	--
Soluble Cations, meq/l.								
Ca ⁺⁺	7.40	7.20	2.05	2.70	8.50	9.54	1.03	0.95
Mg ⁺⁺	2.85	2.65	1.85	2.30	10.50	9.35	1.00	1.20
Na ⁺	13.10	14.10	3.55	4.48	59.10	58.94	0.98	1.05
K ⁺	1.03	1.21	0.31	0.28	1.10	0.93	0.19	0.17
Soluble Anions, meq/l.								
CO ₃ ⁻⁻	--	--	--	--	--	--	--	--
HCO ₃ ⁻	4.85	5.40	3.03	4.29	4.00	5.76	0.90	0.88
SO ₄ ⁻⁻	7.80	8.28	1.58	2.61	8.49	10.10	1.49	1.20
Cl ⁻	11.50	11.75	2.15	2.86	74.5	70.78	0.75	1.43
Physical analysis								
Sand (%)	13.28	13.73	13.61	12.11	44.20	44.15	59.32	41.98
Clay (%)	56.05	55.55	49.63	50.69	29.76	30.25	21.48	32.00
Silt (%)	32.49	30.44	28.31	30.60	26.10	26.84	10.13	10.58
CaCO ₃	3.85	3.35	4.05	3.77	4.85	4.57	2.15	1.75
Soil texture	Clay	Clay	Clay	Clay	Sand clay loam	Sand clay loam	Loam sandy	Clay sandy

Table S3 Genotypes mean performance under the eight different environments

GEN	Kafr EL-Sheikh Governorate		Alexandria Governorate		Gharbya Governorate		New Valley Governorate		Mean
	Env1	Env2	Env3	Env4	Env5	Env6	Env7	Env8	
G1	956.13	943.21	244.88	238.47	970.20	967.98	263.33	247.08	603.91
G2	1082.49	1106.09	636.67	654.13	1164.23	1150.00	864.50	834.00	936.51
G3	1117.28	1173.48	690.40	692.50	1198.76	1209.91	766.50	746.83	949.46
G4	1080.37	1103.34	438.67	423.78	1102.34	1052.19	478.00	496.58	771.91
G5	1010.26	1026.16	349.51	354.96	1040.65	1058.25	440.68	433.92	714.30
G6	1036.95	1072.50	498.55	512.11	1122.37	1123.80	540.33	539.58	805.78
G7	1017.43	1026.65	401.47	400.60	1003.77	1025.50	420.28	410.67	713.30
G8	1008.38	1046.45	395.80	397.18	1043.09	1049.54	422.50	432.50	724.43
G9	1036.45	1039.94	485.59	487.47	1132.82	1103.17	688.25	698.08	833.97
G10	1087.34	1100.60	464.03	456.60	1172.00	1173.89	488.17	477.25	802.48
G11	1103.74	1140.28	502.64	496.65	1193.71	1154.55	512.68	527.68	828.99
G12	919.42	942.61	700.58	683.86	872.67	871.55	688.42	643.58	790.34
G13	914.32	940.11	515.37	515.59	956.26	982.87	677.25	681.58	772.92
G14	821.68	841.54	423.53	414.99	889.79	893.23	585.75	583.75	681.78
G15	1035.00	1052.96	690.68	677.47	1023.89	1028.85	905.67	893.75	913.53
G16	905.47	903.30	511.88	510.64	999.79	981.91	629.33	615.68	757.25
G17	806.39	829.56	401.91	407.13	858.99	864.18	485.83	503.85	644.73
G18	1001.77	1002.62	776.58	779.73	989.08	994.21	717.31	710.89	871.52
G19	801.32	803.29	595.87	597.04	873.99	878.17	742.25	767.93	757.48
G20	800.93	800.49	459.81	469.33	844.84	866.52	606.17	593.83	680.24
G21	977.03	987.55	600.93	600.04	955.20	947.51	922.33	899.15	861.22
G22	1005.99	1057.55	606.55	592.30	1062.83	1091.11	802.42	783.27	875.25
G23	814.95	815.60	537.14	553.35	883.60	870.86	646.43	621.94	717.98
G24	1008.46	1027.03	583.62	585.37	1069.51	1070.58	754.67	753.00	856.53
G25	908.32	914.34	560.36	558.69	924.56	930.94	637.83	659.54	761.82
G26	801.91	814.18	500.42	500.08	793.66	851.56	647.05	659.00	695.98
G27	1017.16	1031.17	601.76	595.53	1043.27	1078.26	758.58	730.00	856.97
G28	1015.52	1020.59	585.40	580.56	1034.80	1024.20	729.75	767.08	844.74
G29	1016.34	1044.40	484.09	489.32	966.85	978.82	532.83	548.17	757.60
G30	796.15	804.46	598.68	600.40	860.13	873.80	748.37	753.08	754.38
G31	735.50	745.76	494.01	493.27	770.16	733.51	592.92	651.67	652.10
G32	808.17	817.21	295.46	298.43	776.90	791.47	327.67	326.68	555.25
G33	893.87	896.98	594.84	597.45	965.19	966.85	769.33	777.92	807.80
G34	826.65	821.27	653.17	653.38	872.50	894.20	765.09	750.92	779.65

Table S4 Genotypes and environments overall mean performance and their PC1.

Entry	Name	PC1
G1	Giza 177	-12.5
G2	Giza 178	0.9
G3	Giza 179	-2.6
G4	Sakha 101	-9.1
G5	Sakha 102	-9.4
G6	Sakha 104	-7.0
G7	Sakha 105	-8.8
G8	Sakha 106	-9.2
G9	Sakha 107	-3.1
G10	Sakha 108	-10.6
G11	Sakha Super 300	-9.8
G12	IRAT 170	5.4
G13	A22	1.6
G14	Nerica 9	1.3
G15	IET 1444	5.9
G16	Nerica 7	0.3
G17	Moroberekan	-0.2
G18	GZ 1368	4.0
G19	Azucena	8.5
G20	IRAT 112	3.5
G21	N22	7.6
G22	IR65600-77	1.5
G23	IR69116	4.7
G24	IR12G3213	0.8
G25	IR69432	2.5
G26	IR6500-127	5.7
G27	IR11L236	0.8
G28	IR12G3222	1.4
G29	Sakha 109	-4.1
G30	Vandana	12.0
G31	Dular	7.4
G32	Sakha 103	-4.1
G33	Giza 181	5.6
G34	Giza 182	9.0
E1	Kafrelsheikh-2021	-13.0
E2	Kafrelsheikh-2022	-13.7
E3	Alexandria-2021	8.8
E4	Alexandria-2022	8.9
E5	Gharbya-2021	-12.9
E6	Gharbya-2022	-12.2
E7	New Valley-2021	16.9
E8	New Valley-2022	17.1

Table S5 Genotypes rankings based on yield performance and several stability indices.

GEN	Y_R	Shukla_R	Wi_g_R	Wi_f_R	Wi_u_R	Ecoval_R	Sij_R	Pi_a_R	Pi_f_R	Pi_u_R	Gai_R	S1_R	S2_R	S3_R	S6_R	N1_R
Giza 177	33	34	34	17	34	34	33	33	19	34	34	4	34	31	34	34
Giza 178	2	10	2	3	3	10	18	1	4	2	2	33	9	1	1	7.5
Giza 179	1	9	1	1	4	9	9	2	1	3	1	4	10.5	8	4	11
Sakha 101	18	29	29	7	28	29	27	23	7	28	24	20.5	29	28	26	29
Sakha 102	26	31	32	9	30	31	15	30	12	32	31	12	30	30	31	30
Sakha 104	13	20	18	5	24	20	23	14	5	23	15	4	17	21	18	19
Sakha 105	27	25	31	15	32	25	32	29	15	31	29	26.5	22	29	30	24
Sakha 106	24	28	30	12	31	28	28	26	11	30	27	12	25	32	32	25
Sakha 107	10	15	10	6	22	15	13	10	6	18	11	20.5	15	16	14	16
Sakha 108	14	33	28	4	29	33	31	20	3	27	21	12	32	33	25	32
Sakha Super 300	11	32	22	2	25	32	30	15	2	25	14	20.5	27	24	21	27
IRAT 170	15	22	21	26	18	22	21	12	24	14	12	31.5	24	23	20	18
A22	17	7	9	18	17	7	8	13	20	16	17	20.5	4	5	7	5
Nerica 9	29	5	19	24	27	5	10	27	25	26	28	4	2	7	10	3.5
IET 1444	3	19	7	14	1	19	29	3	13	1	3	20.5	19	11	9	20.5
Nerica 7	22	3	8	22	16	3	5	18	21	20	20	12	7	9	8	7.5
Moroberekan	32	1	26	25	26	1	1	32	28	29	32	26.5	5	6	11	3.5
GZ 1368	5	21	13	16	15	21	26	7	16	5	4	12	20	14	13	15
Azucena	21	24	24	31	7	24	25	19	29	10	16	26.5	28	27	27	28
IRAT 112	30	12	16	29	21	12	6	28	31	22	26	20.5	14	18	23	14
N22	6	26	14	20	12	26	34	9	18	4	6	4	23	20	16	20.5
IR65600-77	4	8	5	10	9	8	17	4	8	7	5	12	8	10	6	9
IR69116	25	16	17	28	14	16	3	24	27	17	23	29.5	16	17	19	17
IR12G3213	8	4	4	8	10	4	7	6	9	12	8	12	3	3	5	2
IR69432	19	11	11	21	13	11	2	17	23	15	19	29.5	10.5	12	12	10

IR6500-127	28	18	20	32	19	18	16	25	32	19	25	12	21	22	28	23
IR11L236	7	2	3	11	6	2	4	5	10	11	7	26.5	1	2	2	1
IR12G3222	9	6	6	13	11	6	11	8	14	13	9	34	6	4	3	6
Sakha 109	20	14	15	19	23	14	24	21	17	24	22	4	13	15	15	13
Vandana	23	27	25	30	5	27	19	22	30	9	18	20.5	31	34	29	31
Dular	31	23	27	34	20	23	14	31	34	21	30	31.5	26	26	33	26
Sakha 103	34	13	33	33	33	13	22	34	33	33	33	4	12	13	24	12
Giza 181	12	17	12	23	8	17	20	11	22	8	10	12	18	19	17	22
Giza 182	16	30	23	27	2	30	12	16	26	6	13	20.5	33	25	22	33

Table S6: Favorable and unfavorable classification of the environments

ENV	Y	index	class
E1	946.1507	171.6767	favorable
E2	961.5667	187.0927	favorable
E3	525.907	-248.567	unfavorable
E4	525.5417	-248.932	unfavorable
E5	983.306	208.832	favorable
E6	986.2924	211.8184	favorable
E7	634.0729	-140.401	unfavorable
E8	632.9546	-141.519	unfavorable