

## Supplementary files

Table S1: Pedigree information of the genetic materials used for the study

S/N	Designation	Pedigree
1	TZEEIOR 142	2009 TZEE-0R1 STR S <sub>9</sub> 46-1/2-1/3-2/2-3/3-2/2
2	TZEEIOR 202	2009 TZEE-0R1 STR S <sub>9</sub> 68-3/3-1/3-1/2-3/4-1/1
3	TZEEIOR 205	2009 TZEE-0R1 STR S <sub>9</sub> 74-1/2-1/3-1/2-2/3-1/1
4	TZEEIOR 209	2009 TZEE-ORI STR S <sub>9</sub> 78-1/1-2/3-2/2-1/1-1/1
5	TZEEIOR 221	2009 TZEE-0R1 STR S <sub>9</sub> 80-3/3-1/3-1/1-1/6-1/1
6	TZEEIOR 24	2009 TZEE-0R1 STR S <sub>9</sub> 3-3/3-2/3-1/3-2/3-1/1
7	TZEEIOR 28	2009 TZEE-0R1 STR S <sub>9</sub> 3-3/3-3/3-4/4-2/2-1/1
8	TZEEIOR 41	2009 TZEE-0R1 STR S <sub>9</sub> 8-3/3-2/3-2/5-1/7-1/1
9	TZEEIOR 45	2009 TZEE-0R1 STR S <sub>9</sub> 8-3/3-2/3-4/5-4/4-2/2
10	TZEEIOR 289	(TZdEEI 12 × TZEEI 95)S <sub>8</sub> Inb 50-1/1-1/1-1/2-2/2-1/1
11	TZEEIOR 290	(TZdEEI 12 × TZEEI 95)S <sub>8</sub> Inb 50-1/1-1/1-2/2-2/2-1/1
12	TZEEIOR 305	(TZdEEI 12 × TZEEI 95)S <sub>8</sub> Inb 82-1/1-1/1-3/3-1/1-1/1
13	TZEEIOR 314	(TZdEEI 12 × TZEEI 95)S <sub>8</sub> Inb 106-1/1-2/2-1/2-2/2-1/1
14	TZEEIOR 321	(TZdEEI 12 × TZEEI 95)S <sub>8</sub> Inb 110-1/1-2/2-2/2-1/1-1/1
15	TZEEIOR 346	(TZdEEI 12 × TZEEI 95)S <sub>8</sub> Inb 147-1/1-1/1-2/2-1/2-1/1
16	TZEEIOR 349	(TZdEEI 12 × TZEEI 95)S <sub>8</sub> Inb 161-1/1-2/2-1/2-3/3-1/1
17	TZEEIOR 365	(TZdEEI 12 × TZEEI 95)S <sub>8</sub> Inb 181-1/1-2/2-2/2-1/1-1/1
18	TZEEIOR 381	(TZdEEI 12 × TZEEI 95)S <sub>8</sub> Inb 235-1/1-1/1-1/2-2/2-1/1
19	TZEEIOR 384	(TZdEEI 12 × TZEEI 95)S <sub>8</sub> Inb 246-1/1-1/1-1/2-1/1-1/1
20	TZEEIOR 396	(TZdEEI 12 × TZEEI 95)S <sub>8</sub> Inb 334-1/1-1/1-2/2-3/3-1/1
21	TZEEIOR 458	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 54-1/1-1/1-1/3-2/2-1/1
22	TZEEIOR 479	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 72-2/2-1/1-1/2-1/1-1/1
23	TZEEIOR 486	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 91-1/1-1/1-1/4-1/2-1/1
24	TZEEIOR 500	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 123-1/2-1/1-1/2-1/1-1/1
25	TZEEIOR 509	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 125-2/2-1/1-3/3-2/2-1/1
26	TZEEIOR 510	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 134-1/1-1/1-1/2-1/1-1/1

27	TZEEIOR 513	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 140-1/2-1/1-2/3-1/1-1/1
28	TZEEIOR 515	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 140-2/2-1/1-1/2-1/1-1/1
29	TZEEIOR 523	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 142-2/2-1/1-2/3-2/2-1/1
30	TZEEIOR 525	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 144-1/2-1/1-1/1-1/2-1/1
31	TZEEIOR 526	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 144-1/2-1/1-1/1-2/2-1/1
32	TZEEIOR 536	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 154-1/1-1/1-2/4-1/1-1/1
33	TZEEIOR 540	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 162-2/2-1/1-1/3-1/2-1/1
34	TZEEIOR 542	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 163-1/1-1/1-2/3-1/2-1/1
35	TZEEIOR 546	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 168-1/1-1/1-1/1-1/2-1/1
36	TZEEIOR 548	(TZdEEI 7 × TZdEEI 12)S <sub>8</sub> Inb 171-1/1-1/1-1/3-1/2-1/1
37	TZEEIOR 197 (Tester)	2009 TZEE-ORI STR S <sub>9</sub> 68-1/3-2/3-2/2-1/3-1/1
38	TZEEIOR 97(Tester)	2009 TZEE-ORI STR S <sub>9</sub> 15-2/2-1/2-1/3-3/3-1/1
39	TZEEIOR 9A (Tester)	
40	TZEEIOR 30 (Tester)	2009 TZEE-ORI STR S <sub>9</sub> 5-1/1-2/3-1/2-2/2-1/1
41	TZEEIOR 249 (Tester)	2009 TZEE-ORI STR S <sub>9</sub> 9100-3/3-1/3-1/1-1/3-1/3

Table S2: Ranking of 196 hybrids using the Multi-Trait Genotype-Ideotype Distance Index (MGIDI) and drought susceptibility index (DSI)

S/N	Entry	MGIDI	DSI	Hybrids
1	70	1.53	0.84	TZEEIOR 510 × TZEEIOR 97
2	106	1.85	0.71	TZEEIOR 510 × TZEEIOR 249
3	110	1.9	0.74	TZEEIOR 321 × TZEEIOR 197
4	149	1.96	0.8	TZEEIOR 384 × TZEEIOR 30
6	22	2.06	0.86	TZEEIOR 28 × TZEEIOR 9 A
5	118	2.06	0.79	TZEEIOR 458 × TZEEIOR 197
7	68	2.07	0.79	TZEEIOR 526 × TZEEIOR 97
8	164	2.08	0.87	TZEEIOR 202 × TZEEIOR 30
9	52	2.12	0.85	TZEEIOR 523 × TZEEIOR 97
10	121	2.17	0.74	TZEEIOR 509 × TZEEIOR 197
11	119	2.24	0.85	TZEEIOR 479 × TZEEIOR 197
12	192	2.26	0.59	CHECK 2 - TZEEI 79 × TZEEI 82
14	81	2.36	0.92	TZEEIOR 515 × TZEEIOR 249
13	159	2.36	0.88	TZEEIOR 540 × TZEEIOR 30
15	142	2.42	1.02	TZEEIOR 510 × TZEEIOR 197
16	109	2.59	1	TZEEIOR 346 × TZEEIOR 197

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17	86	2.6	0.81	TZEEIOR 540 × TZEEIOR 249
18	144	2.64	0.89	TZEEIOR 305 × TZEEIOR 197
19	19	2.65	1.12	TZEEIOR 202 × TZEEIOR 9 A
20	57	2.66	0.7	TZEEIOR 24 × TZEEIOR 97
21	135	2.66	0.92	TZEEIOR 142 × TZEEIOR 197
22	173	2.67	0.8	TZEEIOR 381 × TZEEIOR 30
23	98	2.68	0.95	TZEEIOR 221 × TZEEIOR 249
24	47	2.69	0.74	TZEEIOR 479 × TZEEIOR 97
25	165	2.76	1.01	TZEEIOR 205 × TZEEIOR 30
26	189	2.78	0.94	TZEEIOR 197 × TZEEIOR 249
27	93	2.83	0.88	TZEEIOR 24 × TZEEIOR 249
29	114	2.85	0.99	TZEEIOR 289 × TZEEIOR 197
28	120	2.85	0.97	TZEEIOR 513 × TZEEIOR 197
30	176	2.86	0.71	TZEEIOR 486 × TZEEIOR 30
31	23	2.87	0.98	TZEEIOR 41 × TZEEIOR 9 A
32	74	2.89	0.56	TZEEIOR 321 × TZEEIOR 249
33	96	2.91	0.85	TZEEIOR 45 × TZEEIOR 249
34	92	2.92	0.83	TZEEIOR 205 × TZEEIOR 249
36	38	2.93	0.93	TZEEIOR 321 × TZEEIOR 97
35	95	2.93	0.96	TZEEIOR 41 × TZEEIOR 249
37	128	2.95	1	TZEEIOR 205 × TZEEIOR 197
38	111	2.96	0.92	TZEEIOR 314 × TZEEIOR 197
39	97	2.98	0.92	TZEEIOR 209 × TZEEIOR 249
41	143	3.02	0.99	TZEEIOR 546 × TZEEIOR 197
40	158	3.02	0.7	TZEEIOR 509 × TZEEIOR 30
42	186	3.03	0.61	TZEEIOR 97 × TZEEIOR 249
43	20	3.04	0.98	TZEEIOR 205 × TZEEIOR 9 A
44	146	3.05	0.93	TZEEIOR 321 × TZEEIOR 30
45	136	3.06	1.12	TZEEIOR 381 × TZEEIOR 197
47	50	3.09	1	TZEEIOR 540 × TZEEIOR 97
46	79	3.09	1.04	TZEEIOR 365 × TZEEIOR 249
48	124	3.1	1.08	TZEEIOR 523 × TZEEIOR 197
50	94	3.13	0.84	TZEEIOR 28 × TZEEIOR 249
49	175	3.13	0.86	TZEEIOR 536 × TZEEIOR 30
51	188	3.13	0.99	TZEEIOR 197 × TZEEIOR 9A
52	185	3.15	0.96	TZEEIOR 97 × TZEEIOR 197
53	122	3.16	1.14	TZEEIOR 540 × TZEEIOR 197
54	162	3.17	1.1	TZEEIOR 542 × TZEEIOR 30
55	178	3.18	0.69	TZEEIOR 525 × TZEEIOR 30
56	91	3.21	1.17	TZEEIOR 202 × TZEEIOR 249
57	55	3.23	1.17	TZEEIOR 202 × TZEEIOR 97
58	129	3.26	1.05	TZEEIOR 24 × TZEEIOR 197
59	112	3.28	1.11	TZEEIOR 396 × TZEEIOR 197

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				CHECK 3 - TZEEIY Pop STR C5 × TZEEI
60	193	3.28	1.13	58
61	180	3.29	1.15	TZEEIOR 546 × TZEEIOR 30
62	190	3.29	0.59	TZEEIOR 249 × TZEEIOR 9 A
63	187	3.3	0.94	TZEEIOR 97 × TZEEIOR 9 A
64	134	3.31	1.12	TZEEIOR 221 × TZEEIOR 197
66	104	3.32	0.91	TZEEIOR 526 × TZEEIOR 249
65	131	3.32	0.96	TZEEIOR 41 × TZEEIOR 197
67	48	3.33	0.9	TZEEIOR 513 × TZEEIOR 97
68	39	3.37	0.79	TZEEIOR 314 × TZEEIOR 97
69	46	3.39	1.01	TZEEIOR 458 × TZEEIOR 97
70	67	3.4	1.08	TZEEIOR 486 × TZEEIOR 97
71	88	3.4	0.82	TZEEIOR 523 × TZEEIOR 249
72	41	3.41	0.96	TZEEIOR 384 × TZEEIOR 97
73	141	3.42	1.04	TZEEIOR 525 × TZEEIOR 197
74	153	3.43	1.02	TZEEIOR 290 × TZEEIOR 30
75	24	3.44	0.89	TZEEIOR 45 × TZEEIOR 9 A
78	54	3.45	0.89	TZEEIOR 500 × TZEEIOR 97
77	152	3.45	0.84	TZEEIOR 305 × TZEEIOR 30
76	182	3.45	1	TZEEIOR 30 × TZEEIOR 197
79	102	3.46	1.01	TZEEIOR 536 × TZEEIOR 249
81	45	3.51	1.17	TZEEIOR 515 × TZEEIOR 97
80	76	3.51	0.94	TZEEIOR 396 × TZEEIOR 249
82	21	3.55	1.14	TZEEIOR 24 × TZEEIOR 9 A
83	196	3.56	-0.19	CHECK 6 -TZdEEI 1 × TZdEEI 12
84	83	3.57	0.83	TZEEIOR 479 × TZEEIOR 249
85	147	3.57	0.85	TZEEIOR 314 × TZEEIOR 30
86	80	3.58	0.88	TZEEIOR 290 × TZEEIOR 249
87	89	3.58	1.01	TZEEIOR 542 TZEEIOR 249
88	10	3.59	0.7	TZEEIOR 458 × TZEEIOR 9 A
89	73	3.61	0.84	TZEEIOR 346 × TZEEIOR 249
90	139	3.61	1.21	TZEEIOR 486 × TZEEIOR 197
91	75	3.62	0.82	TZEEIOR 314 × TZEEIOR 249
92	27	3.63	0.9	TZEEIOR 142 × TZEEIOR 9 A
94	155	3.64	0.75	TZEEIOR 458 × TZEEIOR 30
93	179	3.64	0.66	TZEEIOR 510 × TZEEIOR 30
98	3	3.65	1	TZEEIOR 314 × TZEEIOR 9 A
95	99	3.65	1.18	TZEEIOR 142 × TZEEIOR 249
97	103	3.65	1.14	TZEEIOR 486 × TZEEIOR 249
96	108	3.65	1	TZEEIOR 305 × TZEEIOR 249
99	138	3.66	1.08	TZEEIOR 536 × TZEEIOR 197
100	172	3.66	1.17	TZEEIOR 142 × TZEEIOR 30
102	130	3.67	1.12	TZEEIOR 28 × TZEEIOR 197

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101	184	3.67	1	TZEEIOR 30 × TZEEIOR 9 A
103	11	3.68	0.76	TZEEIOR 479 × TZEEIOR 9 A
105	14	3.69	0.76	TZEEIOR 540 × TZEEIOR 9 A
104	105	3.69	0.83	TZEEIOR 525 × TZEEIOR 249
106	150	3.71	1.01	TZEEIOR 289 × TZEEIOR 30
107	82	3.73	0.84	TZEEIOR 458 × TZEEIOR 249
108	123	3.74	1.09	TZEEIOR 548 × TZEEIOR 197
109	77	3.75	0.94	TZEEIOR 384 × TZEEIOR 249
111	170	3.79	0.89	TZEEIOR 209 × TZEEIOR 30
110	183	3.79	1.09	TZEEIOR 30 × TZEEIOR 249
112	125	3.82	1.18	TZEEIOR 542 TZEEIOR 197
113	63	3.85	1.1	TZEEIOR 142 × TZEEIOR 97
114	90	3.86	1.08	TZEEIOR 500 × TZEEIOR 249
116	137	3.86	1.11	TZEEIOR 349 × TZEEIOR 197
115	140	3.86	1.07	TZEEIOR 526 × TZEEIOR 197
118	191	3.88	0.98	CHECK 1 TZEEIOR 109 × TZdEEI 12
117	194	3.88	0.89	CHECH 4 - TZdEEI 1 × TZdEEI 5
119	1	3.89	0.87	TZEEIOR 346 × TZEEIOR 9 A
120	37	3.9	0.93	TZEEIOR 346 × TZEEIOR 97
121	163	3.9	1.04	TZEEIOR 500 × TZEEIOR 30
122	151	3.93	0.99	TZEEIOR 365 × TZEEIOR 30
123	154	3.93	1.07	TZEEIOR 515 × TZEEIORV 30
124	177	3.95	1.05	TZEEIOR 526 × TZEEIOR 30
126	42	3.96	1.14	TZEEIOR 289 × TZEEIOR 97
125	116	3.96	1.13	TZEEIOR 290 × TZEEIOR 197
127	56	3.98	1.11	TZEEIOR 205 × TZEEIOR 97
128	66	3.98	1.05	TZEEIOR 536 × TZEEIOR 97
129	35	4	0.98	TZEEIOR 546 × TZEEIOR 9 A
130	100	4.02	0.9	TZEEIOR 381 × TZEEIOR 249
131	49	4.03	1.08	TZEEIOR 509 × TZEEIOR 97
132	161	4.04	1.15	TZEEIOR 523 × TZEEIOR 30
135	85	4.05	0.92	TZEEIOR 509 × TZEEIOR 249
134	126	4.05	1.16	TZEEIOR 500 × TZEEIOR 197
133	181	4.05	1.1	TZEEIOR 30 × TZEEIOR 97
136	117	4.06	1.2	TZEEIOR 515 × TZEEIOR 197
137	40	4.11	1.05	TZEEIOR 396 × TZEEIOR 97
138	34	4.13	0.99	TZEEIOR 510 × TZEEIOR 9 A
139	78	4.13	0.94	TZEEIOR 289 × TZEEIOR 249
140	61	4.16	1.17	TZEEIOR 209 × TZEEIOR 97
141	101	4.16	1.02	TZEEIOR 349 × TZEEIOR 249
143	71	4.2	1.12	TZEEIOR 546 × TZEEIOR 97
142	113	4.2	1.22	TZEEIOR 384 × TZEEIOR 197
144	84	4.23	0.89	TZEEIOR 513 × TZEEIOR 249

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145	87	4.23	1.1	TZEEIOR 548 × TZEEIOR 249
146	133	4.29	1.27	TZEEIOR 209 × TZEEIOR 197
147	43	4.34	1.04	TZEEIOR 365 × TZEEIOR 97
148	59	4.39	1.13	TZEEIOR 41 × TZEEIOR 97
149	62	4.42	1.22	TZEEIOR 221 × TZEEIOR 97
150	156	4.42	0.99	TZEEIOR 479 × TZEEIOR 30
151	127	4.44	1.15	TZEEIOR 202 × TZEEIOR 197
152	7	4.49	1.02	TZEEIOR 365 × TZEEIOR 9 A
153	51	4.5	1.1	TZEEIOR 548 × TZEEIOR 97
154	145	4.51	0.95	TZEEIOR 346 × TZEEIOR 30
157	8	4.53	0.96	TZEEIOR 290 × TZEEIOR 9 A
156	13	4.53	0.97	TZEEIOR 509 × TZEEIOR 9 A
155	171	4.53	1.24	TZEEIOR 221 × TZEEIOR 30
158	53	4.54	1.14	TZEEIOR 542 TZEEIOR 97
159	107	4.59	1.24	TZEEIOR 546 × TZEEIOR 249
160	15	4.62	1.03	TZEEIOR 548 × TZEEIOR 9 A
161	25	4.63	1.31	TZEEIOR 209 × TZEEIOR 9 A
162	132	4.64	1.24	TZEEIOR 45 × TZEEIOR 197
163	157	4.66	0.91	TZEEIOR 513 × TZEEIOR 30
164	4	4.69	0.97	TZEEIOR 396 × TZEEIOR 9 A
165	32	4.7	0.9	TZEEIOR 526 × TZEEIOR 9 A
166	115	4.73	1.1	TZEEIOR 365 × TZEEIOR 197
167	160	4.74	1.04	TZEEIOR 548 × TZEEIOR 30
168	64	4.77	0.94	TZEEIOR 381 × TZEEIOR 97
169	44	4.81	1.09	TZEEIOR 290 × TZEEIOR 97
170	36	4.82	0.9	TZEEIOR 305 × TZEEIOR 9 A
171	6	4.83	1	TZEEIOR 289 × TZEEIOR 9 A
172	60	4.83	1.26	TZEEIOR 45 × TZEEIOR 97
173	9	4.87	0.86	TZEEIOR 515 × TZEEIOR 9 A
174	12	4.92	1.13	TZEEIOR 513 × TZEEIOR 9 A
175	31	4.95	1.23	TZEEIOR 486 × TZEEIOR 9 A
176	2	5.04	1.13	TZEEIOR 321 × TZEEIOR 9 A
177	174	5.11	1.18	TZEEIOR 349 × TZEEIOR 30
178	5	5.12	1.02	TZEEIOR 384 × TZEEIOR 9 A
179	195	5.15	1.31	CHECK 5 - TZEEIOR 12 × TZEEIOR 223
180	33	5.16	1.11	TZEEIOR 525 × TZEEIOR 9 A
181	148	5.21	1.15	TZEEIOR 396 × TZEEIOR 30
182	28	5.29	1.26	TZEEIOR 381 × TZEEIOR 9 A
183	72	5.34	1.26	TZEEIOR 305 × TZEEIOR 97
184	17	5.47	1.18	TZEEIOR 542 TZEEIOR 9 A
185	58	5.48	1.22	TZEEIOR 28 × TZEEIOR 97
186	18	5.65	0.98	TZEEIOR 500 × TZEEIOR 9 A
187	30	5.77	1.09	TZEEIOR 536 × TZEEIOR 9 A

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188	167	5.78	0.77	TZEEIOR 28 × TZEEIOR 30
189	65	5.86	1.14	TZEEIOR 349 × TZEEIOR 97
190	69	5.92	1.25	TZEEIOR 525 × TZEEIOR 97
191	29	5.93	1.27	TZEEIOR 349 × TZEEIOR 9 A
192	16	5.97	1.25	TZEEIOR 523 × TZEEIOR 9 A
193	169	6.03	1	TZEEIOR 45 × TZEEIOR 30
194	166	6.21	1.38	TZEEIOR 24 × TZEEIOR 30
195	26	6.31	1.41	TZEEIOR 221 × TZEEIOR 9 A
196	168	6.79	1.45	TZEEIOR 41 × TZEEIOR 30

Table S3: Ranking of 196 hybrids using multiple trait base index (MBI)

S/N	Entry	Hybrids	MBI
1	121	TZEEIOR 509 × TZEEIOR 197	15.94
2	118	TZEEIOR 458 × TZEEIOR 197	15.91
3	179	TZEEIOR 510 × TZEEIOR 30	15.18
4	70	TZEEIOR 510 × TZEEIOR 97	15.07
5	106	TZEEIOR 510 × TZEEIOR 249	12.15
6	110	TZEEIOR 321 × TZEEIOR 197	11.24
7	149	TZEEIOR 384 × TZEEIOR 30	10.71
8	159	TZEEIOR 540 × TZEEIOR 30	10.69
9	52	TZEEIOR 523 × TZEEIOR 97	10.5
10	119	TZEEIOR 479 × TZEEIOR 197	10.41
11	81	TZEEIOR 515 × TZEEIOR 249	9.81
12	68	TZEEIOR 526 × TZEEIOR 97	9.69
13	74	TZEEIOR 321 × TZEEIOR 249	9.31
14	86	TZEEIOR 540 × TZEEIOR 249	9.02
15	164	TZEEIOR 202 × TZEEIOR 30	8.97
16	142	TZEEIOR 510 × TZEEIOR 197	8.9
17	178	TZEEIOR 525 × TZEEIOR 30	8.85
18	92	TZEEIOR 205 × TZEEIOR 249	8.46
19	39	TZEEIOR 314 × TZEEIOR 97	8.38
20	192	CHECK 2 - TZEEI 79 × TZEEI 82	7.91
21	22	TZEEIOR 28 × TZEEIOR 9 A	7.79
22	47	TZEEIOR 479 × TZEEIOR 97	7.7
23	114	TZEEIOR 289 × TZEEIOR 197	7.61
24	173	TZEEIOR 381 × TZEEIOR 30	6.97
25	158	TZEEIOR 509 × TZEEIOR 30	6.84
26	128	TZEEIOR 205 × TZEEIOR 197	6.71
27	109	TZEEIOR 346 × TZEEIOR 197	6.58
28	57	TZEEIOR 24 × TZEEIOR 97	6.41
29	175	TZEEIOR 536 × TZEEIOR 30	6.34
30	190	TZEEIOR 249 × TZEEIOR 9 A	6.14

31	144	TZEEIOR 305 × TZEEIOR 197	6.08
32	120	TZEEIOR 513 × TZEEIOR 197	6.03
33	135	TZEEIOR 142 × TZEEIOR 197	6.03
34	143	TZEEIOR 546 × TZEEIOR 197	5.83
35	83	TZEEIOR 479 × TZEEIOR 249	5.8
36	38	TZEEIOR 321 × TZEEIOR 97	5.61
37	54	TZEEIOR 500 × TZEEIOR 97	5.57
38	147	TZEEIOR 314 × TZEEIOR 30	5.49
39	19	TZEEIOR 202 × TZEEIOR 9 A	5.4
40	50	TZEEIOR 540 × TZEEIOR 97	5.24
41	165	TZEEIOR 205 × TZEEIOR 30	4.81
42	111	TZEEIOR 314 × TZEEIOR 197	4.72
43	10	TZEEIOR 458 × TZEEIOR 9 A	4.72
44	186	TZEEIOR 97 × TZEEIOR 249	4.59
45	75	TZEEIOR 314 × TZEEIOR 249	4.55
46	189	TZEEIOR 197 × TZEEIOR 249	4.53
47	155	TZEEIOR 458 × TZEEIOR 30	4.46
48	152	TZEEIOR 305 × TZEEIOR 30	4.39
49	98	TZEEIOR 221 × TZEEIOR 249	4.2
50	23	TZEEIOR 41 × TZEEIOR 9 A	4.17
51	95	TZEEIOR 41 × TZEEIOR 249	4.13
52	112	TZEEIOR 396 × TZEEIOR 197	4.1
53	180	TZEEIOR 546 × TZEEIOR 30	4.03
54	97	TZEEIOR 209 × TZEEIOR 249	3.95
55	96	TZEEIOR 45 × TZEEIOR 249	3.8
56	124	TZEEIOR 523 × TZEEIOR 197	3.71
57	185	TZEEIOR 97 × TZEEIOR 197	3.61
58	176	TZEEIOR 486 × TZEEIOR 30	3.57
59	146	TZEEIOR 321 × TZEEIOR 30	3.39
60	48	TZEEIOR 513 × TZEEIOR 97	3.29
61	104	TZEEIOR 526 × TZEEIOR 249	3.21
62	79	TZEEIOR 365 × TZEEIOR 249	3.15
63	11	TZEEIOR 479 × TZEEIOR 9 A	3.08
64	102	TZEEIOR 536 × TZEEIOR 249	3.07
65	136	TZEEIOR 381 × TZEEIOR 197	2.97
66	76	TZEEIOR 396 × TZEEIOR 249	2.96
67	41	TZEEIOR 384 × TZEEIOR 97	2.89
CHECK 3 - TZEEIY Pop STR C5 ×			
68	193	TZEEI 58	2.65
69	20	TZEEIOR 205 × TZEEIOR 9 A	2.63
70	82	TZEEIOR 458 × TZEEIOR 249	2.55
71	93	TZEEIOR 24 × TZEEIOR 249	2.29
72	14	TZEEIOR 540 × TZEEIOR 9 A	1.94



73	154	TZEEIOR 515 × TZEEIORV 30	1.92
74	94	TZEEIOR 28 × TZEEIOR 249	1.86
75	162	TZEEIOR 542 × TZEEIOR 30	1.71
76	77	TZEEIOR 384 × TZEEIOR 249	1.65
77	187	TZEEIOR 97 × TZEEIOR 9 A	1.6
78	131	TZEEIOR 41 × TZEEIOR 197	1.59
79	188	TZEEIOR 197 × TZEEIOR 9A	1.48
80	145	TZEEIOR 346 × TZEEIOR 30	1.47
81	56	TZEEIOR 205 × TZEEIOR 97	1.35
82	80	TZEEIOR 290 × TZEEIOR 249	1.22
83	88	TZEEIOR 523 × TZEEIOR 249	1.13
84	49	TZEEIOR 509 × TZEEIOR 97	1.12
85	141	TZEEIOR 525 × TZEEIOR 197	0.95
86	91	TZEEIOR 202 × TZEEIOR 249	0.89
87	122	TZEEIOR 540 × TZEEIOR 197	0.83
88	129	TZEEIOR 24 × TZEEIOR 197	0.82
89	156	TZEEIOR 479 × TZEEIOR 30	0.81
90	45	TZEEIOR 515 × TZEEIOR 97	0.72
91	182	TZEEIOR 30 × TZEEIOR 197	0.57
92	134	TZEEIOR 221 × TZEEIOR 197	0.55
93	196	CHECK 6 -TZdEEI 1 × TZdEEI 12	0.52
94	3	TZEEIOR 314 × TZEEIOR 9 A	0.43
95	85	TZEEIOR 509 × TZEEIOR 249	0.37
96	183	TZEEIOR 30 × TZEEIOR 249	0.31
97	46	TZEEIOR 458 × TZEEIOR 97	0.28
98	55	TZEEIOR 202 × TZEEIOR 97	0.14
99	150	TZEEIOR 289 × TZEEIOR 30	0.06
100	24	TZEEIOR 45 × TZEEIOR 9 A	0
101	153	TZEEIOR 290 × TZEEIOR 30	-0.06
102	34	TZEEIOR 510 × TZEEIOR 9 A	-0.08
103	67	TZEEIOR 486 × TZEEIOR 97	-0.09
104	27	TZEEIOR 142 × TZEEIOR 9 A	-0.16
105	1	TZEEIOR 346 × TZEEIOR 9 A	-0.2
106	21	TZEEIOR 24 × TZEEIOR 9 A	-0.26
107	191	CHECK 1 TZEEIOR 109 × TZdEEI 12	-0.27
108	73	TZEEIOR 346 × TZEEIOR 249	-0.46
109	170	TZEEIOR 209 × TZEEIOR 30	-0.48
110	78	TZEEIOR 289 × TZEEIOR 249	-0.48
111	151	TZEEIOR 365 × TZEEIOR 30	-0.56
112	177	TZEEIOR 526 × TZEEIOR 30	-0.62
113	137	TZEEIOR 349 × TZEEIOR 197	-0.64
114	84	TZEEIOR 513 × TZEEIOR 249	-0.72
115	108	TZEEIOR 305 × TZEEIOR 249	-0.74

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116	89	TZEEIOR 542 TZEEIOR 249	-0.74
117	138	TZEEIOR 536 × TZEEIOR 197	-0.79
118	123	TZEEIOR 548 × TZEEIOR 197	-0.92
119	90	TZEEIOR 500 × TZEEIOR 249	-0.97
120	66	TZEEIOR 536 × TZEEIOR 97	-0.99
121	130	TZEEIOR 28 × TZEEIOR 197	-1.09
122	157	TZEEIOR 513 × TZEEIOR 30	-1.15
123	105	TZEEIOR 525 × TZEEIOR 249	-1.17
124	116	TZEEIOR 290 × TZEEIOR 197	-1.22
125	139	TZEEIOR 486 × TZEEIOR 197	-1.78
126	35	TZEEIOR 546 × TZEEIOR 9 A	-1.83
127	194	CHECH 4 - TZdEEI 1 × TZdEEI 5	-1.86
128	172	TZEEIOR 142 × TZEEIOR 30	-2.02
129	44	TZEEIOR 290 × TZEEIOR 97	-2.12
130	163	TZEEIOR 500 × TZEEIOR 30	-2.25
131	99	TZEEIOR 142 × TZEEIOR 249	-2.27
132	63	TZEEIOR 142 × TZEEIOR 97	-2.3
133	101	TZEEIOR 349 × TZEEIOR 249	-2.32
134	140	TZEEIOR 526 × TZEEIOR 197	-2.53
135	103	TZEEIOR 486 × TZEEIOR 249	-2.78
136	184	TZEEIOR 30 × TZEEIOR 9 A	-2.83
137	61	TZEEIOR 209 × TZEEIOR 97	-2.88
138	117	TZEEIOR 515 × TZEEIOR 197	-2.99
139	42	TZEEIOR 289 × TZEEIOR 97	-3
140	125	TZEEIOR 542 TZEEIOR 197	-3.05
141	13	TZEEIOR 509 × TZEEIOR 9 A	-3.18
142	160	TZEEIOR 548 × TZEEIOR 30	-3.34
143	43	TZEEIOR 365 × TZEEIOR 97	-3.35
144	40	TZEEIOR 396 × TZEEIOR 97	-3.42
145	181	TZEEIOR 30 × TZEEIOR 97	-3.44
146	126	TZEEIOR 500 × TZEEIOR 197	-3.45
147	161	TZEEIOR 523 × TZEEIOR 30	-3.53
148	87	TZEEIOR 548 × TZEEIOR 249	-3.56
149	32	TZEEIOR 526 × TZEEIOR 9 A	-3.91
150	113	TZEEIOR 384 × TZEEIOR 197	-3.94
151	8	TZEEIOR 290 × TZEEIOR 9 A	-4.35
152	100	TZEEIOR 381 × TZEEIOR 249	-4.44
153	71	TZEEIOR 546 × TZEEIOR 97	-4.57
154	6	TZEEIOR 289 × TZEEIOR 9 A	-4.67
155	37	TZEEIOR 346 × TZEEIOR 97	-4.88
156	59	TZEEIOR 41 × TZEEIOR 97	-4.92
157	115	TZEEIOR 365 × TZEEIOR 197	-4.99
158	25	TZEEIOR 209 × TZEEIOR 9 A	-5.03

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159	7	TZEEIOR 365 × TZEEIOR 9 A	-5.09
160	15	TZEEIOR 548 × TZEEIOR 9 A	-5.75
161	4	TZEEIOR 396 × TZEEIOR 9 A	-5.82
162	171	TZEEIOR 221 × TZEEIOR 30	-5.91
163	133	TZEEIOR 209 × TZEEIOR 197	-6.08
164	53	TZEEIOR 542 TZEEIOR 97	-6.29
165	51	TZEEIOR 548 × TZEEIOR 97	-6.38
166	64	TZEEIOR 381 × TZEEIOR 97	-6.96
167	132	TZEEIOR 45 × TZEE OR 197	-6.96
168	62	TZEEIOR 221 × TZEEIOR 97	-7.11
169	107	TZEEIOR 546 × TZEEIOR 249	-7.18
170	127	TZEEIOR 202 × TZEEIOR 197	-7.18
171	9	TZEEIOR 515 × TZEEIOR 9 A	-7.33
172	148	TZEEIOR 396 × TZEEIOR 30	-8.01
173	58	TZEEIOR 28 × TZEEIOR 97	-8.06
174	60	TZEEIOR 45 × TZEEIOR 97	-8.16
175	33	TZEEIOR 525 × TZEEIOR 9 A	-8.88
176	36	TZEEIOR 305 × TZEEIOR 9 A	-9.18
177	174	TZEEIOR 349 × TZEEIOR 30	-9.26
178	5	TZEEIOR 384 × TZEEIOR 9 A	-9.36
179	17	TZEEIOR 542 TZEEIOR 9 A	-9.47
180	12	TZEEIOR 513 × TZEEIOR 9 A	-9.71
181	30	TZEEIOR 536 × TZEEIOR 9 A	-10.04
182	31	TZEEIOR 486 × TZEEIOR 9 A	-10.46
183	28	TZEEIOR 381 × TZEEIOR 9 A	-10.88
184	72	TZEEIOR 305 × TZEEIOR 97	-11.58
		CHECK 5 - TZEEIOR 12 × TZEEIOR	
185	195	223	-11.78
186	18	TZEEIOR 500 × TZEEIOR 9 A	-12.52
187	2	TZEEIOR 321 × TZEEIOR 9 A	-12.63
188	16	TZEEIOR 523 × TZEEIOR 9 A	-13.75
189	167	TZEEIOR 28 × TZEEIOR 30	-14.17
190	65	TZEEIOR 349 × TZEEIOR 97	-14.22
191	29	TZEEIOR 349 × TZEEIOR 9 A	-14.52
192	69	TZEEIOR 525 × TZEEIOR 97	-15.17
193	169	TZEEIOR 45 × TZEE OR 30	-17.58
194	26	TZEEIOR 221 × TZEEIOR 9 A	-18.78
195	166	TZEEIOR 24 × TZEEIOR 30	-18.83
196	168	TZEEIOR 41 × TZEIIIOR 30	-19.53

MBI: multiple trait base index

Table S4: Grain yield performance of 196 hybrids evaluated under managed drought and well-watered conditions at Ikenne during 2021-2022 and 2022-2023 dry season and 2022 and 2023 main season

Entries	Hybrids	Grain yield (kg/ha)	
		managed drought	well-watered
168	TZEEIOR 41 × TZEEIOR 30	198.22	1824.96
166	TZEEIOR 24 × TZEEIOR 30	364.53	2443.29
169	TZEEIOR 45 × TZEEIOR 30	508.99	1328.78
26	TZEEIOR 221 × TZEEIOR 9 A	653.19	4973.15
167	TZEEIOR 28 × TZEEIOR 30	657.07	1251.15
58	TZEEIOR 28 × TZEEIOR 97	935.36	3735.69
60	TZEEIOR 45 × TZEEIOR 97	974.87	4374.19
29	TZEEIOR 349 × TZEEIOR 9 A	1033.36	4716.99
195	CHECK 5 - TZEEIOR 12 × TZEEIOR 223	1113.66	5731.83
59	TZEEIOR 41 × TZEEIOR 97	1127.34	3675.55
28	TZEEIOR 381 × TZEEIOR 9 A	1127.99	5008.63
127	TZEEIOR 202 × TZEEIOR 197	1229.4	4232.97
31	TZEEIOR 486 × TZEEIOR 9 A	1247.4	5114.9
16	TZEEIOR 523 × TZEEIOR 9 A	1260.8	5497.54
133	TZEEIOR 209 × TZEEIOR 197	1313.55	6029.2
2	TZEEIOR 321 × TZEEIOR 9 A	1325.1	4354.65
17	TZEEIOR 542 TZEEIOR 9 A	1336.52	4913.74
25	TZEEIOR 209 × TZEEIOR 9 A	1337.7	6892.2
107	TZEEIOR 546 × TZEEIOR 249	1362.82	5713.03
62	TZEEIOR 221 × TZEEIOR 97	1367.15	5496.66
69	TZEEIOR 525 × TZEEIOR 97	1375.97	5985.97
132	TZEEIOR 45 × TZEEIOR 197	1410.69	5959.58
171	TZEEIOR 221 × TZEEIOR 30	1411.93	6031.58
130	TZEEIOR 28 × TZEEIOR 197	1430.01	4595.41
72	TZEEIOR 305 × TZEEIOR 97	1459.64	6597.91
174	TZEEIOR 349 × TZEEIOR 30	1479.28	5377.24
65	TZEEIOR 349 × TZEEIOR 97	1534.59	5131.68
148	TZEEIOR 396 × TZEEIOR 30	1555.16	5356.03
61	TZEEIOR 209 × TZEEIOR 97	1559.35	5573.76
139	TZEEIOR 486 × TZEEIOR 197	1563.48	6175.33
12	TZEEIOR 513 × TZEEIOR 9 A	1571.96	5210.66
21	TZEEIOR 24 × TZEEIOR 9 A	1602.87	5379.79
30	TZEEIOR 536 × TZEEIOR 9 A	1603.65	4884.47
181	TZEEIOR 30 × TZEEIOR 97	1621.49	5031.49

51	TZEEIOR 548 × TZEEIOR 97	1626.13	5059.35
193	CHECK 3 - TZEEIY Pop STR C5 × TZEEI 58	1645.14	5415.24
126	TZEEIOR 500 × TZEEIOR 197	1649.88	5793.58
91	TZEEIOR 202 × TZEEIOR 249	1661.4	5941.13
99	TZEEIOR 142 × TZEEIOR 249	1680.12	6086.11
33	TZEEIOR 525 × TZEEIOR 9 A	1683.34	5371.22
172	TZEEIOR 142 × TZEEIOR 30	1705.87	6053.82
18	TZEEIOR 500 × TZEEIOR 9 A	1708.1	4316.87
113	TZEEIOR 384 × TZEEIOR 197	1712.46	6825.93
196	CHECK 6 - TZdEEI 1 × TZdEEI 12	1745.76	1566.51
117	TZEEIOR 515 × TZEEIOR 197	1756.67	6776.22
55	TZEEIOR 202 × TZEEIOR 97	1758.75	6249
183	TZEEIOR 30 × TZEEIOR 249	1791.15	5452.96
36	TZEEIOR 305 × TZEEIOR 9 A	1801.15	4068.18
5	TZEEIOR 384 × TZEEIOR 9 A	1802.37	4850.13
40	TZEEIOR 396 × TZEEIOR 97	1820.7	5112.46
103	TZEEIOR 486 × TZEEIOR 249	1845.42	6177.58
87	TZEEIOR 548 × TZEEIOR 249	1852.08	5753.19
7	TZEEIOR 365 × TZEEIOR 9 A	1853.71	4960.96
15	TZEEIOR 548 × TZEEIOR 9 A	1858.75	5044.23
161	TZEEIOR 523 × TZEEIOR 30	1860.33	6399.62
13	TZEEIOR 509 × TZEEIOR 9 A	1860.69	4587.43
63	TZEEIOR 142 × TZEEIOR 97	1870.73	5826.36
163	TZEEIOR 500 × TZEEIOR 30	1873.33	5231.78
45	TZEEIOR 515 × TZEEIOR 97	1884.32	6706.66
129	TZEEIOR 24 × TZEEIOR 197	1886.22	5364.96
94	TZEEIOR 28 × TZEEIOR 249	1893.99	3907.16
137	TZEEIOR 349 × TZEEIOR 197	1902.6	6032.11
101	TZEEIOR 349 × TZEEIOR 249	1915.2	5189.64
97	TZEEIOR 209 × TZEEIOR 249	1919.1	4455.26
170	TZEEIOR 209 × TZEEIOR 30	1926.02	4270.6
32	TZEEIOR 526 × TZEEIOR 9 A	1926.94	4347.03
194	CHECK 4 - TZdEEI 1 × TZdEEI 5	1929.81	4270.19
44	TZEEIOR 290 × TZEEIOR 97	1940.09	5915.99
3	TZEEIOR 314 × TZEEIOR 9 A	1946.98	5066.15
122	TZEEIOR 540 × TZEEIOR 197	1948.14	6576.01
95	TZEEIOR 41 × TZEEIOR 249	1972.04	4813.1
125	TZEEIOR 542 TZEEIOR 197	1973.79	7187.5
93	TZEEIOR 24 × TZEEIOR 249	1988.74	4367.42

184	TZEEIOR 30 × TZEEIOR 9 A	1996.87	5200.02
8	TZEEIOR 290 × TZEEIOR 9 A	2012.07	4894.5
89	TZEEIOR 542 TZEEIOR 249	2018.29	5331.58
188	TZEEIOR 197 × TZEEIOR 9A	2026	5183.16
23	TZEEIOR 41 × TZEEIOR 9 A	2029.03	5083.29
134	TZEEIOR 221 × TZEEIOR 197	2029.28	6500.24
64	TZEEIOR 381 × TZEEIOR 97	2037.37	4832.9
34	TZEEIOR 510 × TZEEIOR 9 A	2046.81	5225.35
186	TZEEIOR 97 × TZEEIOR 249	2046.81	3280.3
123	TZEEIOR 548 × TZEEIOR 197	2048.22	6213.41
115	TZEEIOR 365 × TZEEIOR 197	2053.48	6360.64
37	TZEEIOR 346 × TZEEIOR 97	2067.77	4809.46
108	TZEEIOR 305 × TZEEIOR 249	2074.05	5426.58
191	CHECK 1 TZEEIOR 109 × TZdEEI 12	2074.39	5271.48
140	TZEEIOR 526 × TZEEIOR 197	2077.97	6045.97
6	TZEEIOR 289 × TZEEIOR 9 A	2080.29	5423.94
35	TZEEIOR 546 × TZEEIOR 9 A	2081.42	5253.2
160	TZEEIOR 548 × TZEEIOR 30	2082.03	5776.17
43	TZEEIOR 365 × TZEEIOR 97	2087.35	5795.26
177	TZEEIOR 526 × TZEEIOR 30	2091.35	5912.97
182	TZEEIOR 30 × TZEEIOR 197	2093.71	5437.88
180	TZEEIOR 546 × TZEEIOR 30	2095.2	7249.23
154	TZEEIOR 515 × TZEEIORV 30	2096.38	6130.94
19	TZEEIOR 202 × TZEEIOR 9 A	2098.17	6714.28
42	TZEEIOR 289 × TZEEIOR 97	2098.93	7088.25
131	TZEEIOR 41 × TZEEIOR 197	2107.18	5130.07
187	TZEEIOR 97 × TZEEIOR 9 A	2109.45	5033.37
77	TZEEIOR 384 × TZEEIOR 249	2115.28	5031.59
4	TZEEIOR 396 × TZEEIOR 9 A	2121.11	5301.57
20	TZEEIOR 205 × TZEEIOR 9 A	2121.72	5347.56
9	TZEEIOR 515 × TZEEIOR 9 A	2124.94	4524.61
96	TZEEIOR 45 × TZEEIOR 249	2127.52	4441.89
162	TZEEIOR 542 TZEEIOR 30	2130.32	6594.61
67	TZEEIOR 486 × TZEEIOR 97	2136.38	6405.55
90	TZEEIOR 500 × TZEEIOR 249	2146.55	6351.28
56	TZEEIOR 205 × TZEEIOR 97	2146.97	6735.32
98	TZEEIOR 221 × TZEEIOR 249	2156.96	5186.18
100	TZEEIOR 381 × TZEEIOR 249	2170.14	4870.87
53	TZEEIOR 542 TZEEIOR 97	2173.39	7304.07

79	TZEEIOR 365 × TZEEIOR 249	2177.7	6060.89
138	TZEEIOR 536 × TZEEIOR 197	2179.68	6464.66
136	TZEEIOR 381 × TZEEIOR 197	2208.73	7060.27
66	TZEEIOR 536 × TZEEIOR 97	2211.03	6251.63
78	TZEEIOR 289 × TZEEIOR 249	2235.42	5270.06
105	TZEEIOR 525 × TZEEIOR 249	2241.61	4570.43
84	TZEEIOR 513 × TZEEIOR 249	2242.82	4932.61
49	TZEEIOR 509 × TZEEIOR 97	2248.02	6681.76
116	TZEEIOR 290 × TZEEIOR 197	2257.64	7350.72
124	TZEEIOR 523 × TZEEIOR 197	2258.81	6697.25
1	TZEEIOR 346 × TZEEIOR 9 A	2277.42	4927.72
88	TZEEIOR 523 × TZEEIOR 249	2289.71	4603.36
164	TZEEIOR 202 × TZEEIOR 30	2297.08	4917.55
141	TZEEIOR 525 × TZEEIOR 197	2299.27	6422.35
71	TZEEIOR 546 × TZEEIOR 97	2299.37	7426.78
189	TZEEIOR 197 × TZEEIOR 249	2299.81	5464.1
156	TZEEIOR 479 × TZEEIOR 30	2305.94	5935.43
128	TZEEIOR 205 × TZEEIOR 197	2308.17	5989.75
27	TZEEIOR 142 × TZEEIOR 9 A	2312.23	5208.35
112	TZEEIOR 396 × TZEEIOR 197	2333.8	7437.02
176	TZEEIOR 486 × TZEEIOR 30	2335.76	4147.16
102	TZEEIOR 536 × TZEEIOR 249	2340.93	6194.54
165	TZEEIOR 205 × TZEEIOR 30	2359.71	6279.68
151	TZEEIOR 365 × TZEEIOR 30	2367.76	6024.76
146	TZEEIOR 321 × TZEEIOR 30	2401.44	5596.57
76	TZEEIOR 396 × TZEEIOR 249	2409.24	5721.09
111	TZEEIOR 314 × TZEEIOR 197	2412.94	5529.33
157	TZEEIOR 513 × TZEEIOR 30	2425.89	5516.58
109	TZEEIOR 346 × TZEEIOR 197	2438.1	6397.55
14	TZEEIOR 540 × TZEEIOR 9 A	2448.8	4577.73
155	TZEEIOR 458 × TZEEIOR 30	2453.72	4535.2
73	TZEEIOR 346 × TZEEIOR 249	2456.44	5105.66
153	TZEEIOR 290 × TZEEIOR 30	2467.47	6635.53
150	TZEEIOR 289 × TZEEIOR 30	2471.75	6488.98
185	TZEEIOR 97 × TZEEIOR 197	2481.4	6065.87
82	TZEEIOR 458 × TZEEIOR 249	2494.72	5173.65
46	TZEEIOR 458 × TZEEIOR 97	2498.29	6607.95
22	TZEEIOR 28 × TZEEIOR 9 A	2501.02	5341.02
57	TZEEIOR 24 × TZEEIOR 97	2502.56	4392.24

41	TZEEIOR 384 × TZEEIOR 97	2504.1	6101.5
145	TZEEIOR 346 × TZEEIOR 30	2533.34	6123.53
143	TZEEIOR 546 × TZEEIOR 197	2540.66	6534.09
24	TZEEIOR 45 × TZEEIOR 9 A	2543.12	5637.36
104	TZEEIOR 526 × TZEEIOR 249	2557.28	5800.14
92	TZEEIOR 205 × TZEEIOR 249	2558.98	5240.41
135	TZEEIOR 142 × TZEEIOR 197	2578.45	5953.68
80	TZEEIOR 290 × TZEEIOR 249	2601.6	5655.67
85	TZEEIOR 509 × TZEEIOR 249	2602.56	5992.04
142	TZEEIOR 510 × TZEEIOR 197	2628.79	7050.98
144	TZEEIOR 305 × TZEEIOR 197	2648.3	5885.05
48	TZEEIOR 513 × TZEEIOR 97	2686.68	5986.77
38	TZEEIOR 321 × TZEEIOR 97	2690.14	6331.05
75	TZEEIOR 314 × TZEEIOR 249	2696.18	5476.2
83	TZEEIOR 479 × TZEEIOR 249	2714.97	5521.17
50	TZEEIOR 540 × TZEEIOR 97	2717.56	7057.71
11	TZEEIOR 479 × TZEEIOR 9 A	2722.54	5092.78
152	TZEEIOR 305 × TZEEIOR 30	2730.79	5676.38
54	TZEEIOR 500 × TZEEIOR 97	2762.46	6097.54
190	TZEEIOR 249 × TZEEIOR 9 A	2780.56	4348
120	TZEEIOR 513 × TZEEIOR 197	2799.11	6953.46
10	TZEEIOR 458 × TZEEIOR 9 A	2833.6	4969
47	TZEEIOR 479 × TZEEIOR 97	2857.75	5247.55
114	TZEEIOR 289 × TZEEIOR 197	2873.28	7341.28
81	TZEEIOR 515 × TZEEIOR 249	2917.19	6722.3
86	TZEEIOR 540 × TZEEIOR 249	2922.97	5818.24
147	TZEEIOR 314 × TZEEIOR 30	2938.6	6132.9
173	TZEEIOR 381 × TZEEIOR 30	2999.96	5897.69
192	CHECK 2 - TZEEI 79 × TZEEI 82	3015.16	4720.41
52	TZEEIOR 523 × TZEEIOR 97	3054.03	6385.56
119	TZEEIOR 479 × TZEEIOR 197	3073.8	6428.36
158	TZEEIOR 509 × TZEEIOR 30	3096.97	5469.03
110	TZEEIOR 321 × TZEEIOR 197	3116.3	5714.04
74	TZEEIOR 321 × TZEEIOR 249	3207.81	4918.39
178	TZEEIOR 525 × TZEEIOR 30	3217.1	5617.52
159	TZEEIOR 540 × TZEEIOR 30	3261.14	7086.18
106	TZEEIOR 510 × TZEEIOR 249	3294.78	5845.61
68	TZEEIOR 526 × TZEEIOR 97	3318.75	6435.87
149	TZEEIOR 384 × TZEEIOR 30	3414.92	6752.58



175	TZEEIOR 536 × TZEEIOR 30	3498.09	7390.22
70	TZEEIOR 510 × TZEEIOR 97	3568.91	7379.62
39	TZEEIOR 314 × TZEEIOR 97	3604.17	6993.1
118	TZEEIOR 458 × TZEEIOR 197	3642.91	7062.23
179	TZEEIOR 510 × TZEEIOR 30	3805.47	6392.13
121	TZEEIOR 509 × TZEEIOR 197	4044.13	7454.93

MGIDI : Multi-Trait Genotype-Ideotype Distance Index

Table S5: traits reduction under managed drought compared to that under well-watered conditions

Entry	Hybrids	GY_WW	MD_GY	GY_RED	WW_ASI	MD_ASI	ASI_RED	WW_EPP	MD_EPP	EPP_red	WW_PASP	MD_PASP	PASP_RED	WW_EASP	MD_EASP	EASP_RED
1	TZEEIOR 346 × TZEEIOR 9 A	4927.72	2277.42	53.78	0.50	0.50	0.00	0.92	0.73	20.65	4.66	5.30	-13.73	5.00	5.25	-5.00
2	TZEEIOR 321 × TZEEIOR 9 A	4354.65	1325.10	69.57	0.50	3.06	-512.00	0.93	0.61	34.41	4.54	6.36	-40.09	4.50	6.00	-33.33
3	TZEEIOR 314 × TZEEIOR 9 A	5066.15	1946.98	61.57	0.25	0.53	-112.00	0.92	0.79	14.13	4.51	5.66	-25.50	4.75	5.25	-10.53
4	TZEEIOR 396 × TZEEIOR 9 A	5301.57	2121.11	59.99	0.00	0.74	-0.74	0.94	0.65	30.85	4.57	6.12	-33.92	4.75	5.25	-10.53
5	TZEEIOR 384 × TZEEIOR 9 A	4850.13	1802.37	62.84	0.75	1.79	-138.67	0.94	0.63	32.98	4.78	5.71	-19.46	4.75	6.00	-26.32
6	TZEEIOR 289 × TZEEIOR 9 A	5423.94	2080.29	61.65	0.25	0.75	-200.00	0.99	0.80	19.19	4.27	6.08	-42.39	4.75	5.25	-10.53
7	TZEEIOR 365 × TZEEIOR 9 A	4960.96	1853.71	62.63	0.50	2.22	-344.00	0.83	0.75	9.64	4.97	5.57	-12.07	4.50	5.50	-22.22
8	TZEEIOR 290 × TZEEIOR 9 A	4894.50	2012.07	58.89	0.00	1.69	-1.69	0.91	0.73	19.78	5.47	6.12	-11.88	4.25	5.50	-29.41
9	TZEEIOR 515 × TZEEIOR 9 A	4524.61	2124.94	53.04	0.50	2.19	-338.00	0.86	0.67	22.09	5.29	5.79	-9.45	5.50	5.50	0.00
10	TZEEIOR 458 × TZEEIOR 9 A	4969.00	2833.60	42.97	0.25	0.53	-112.00	0.94	0.78	17.02	4.74	4.68	1.27	5.25	4.50	14.29
11	TZEEIOR 479 × TZEEIOR 9 A	5092.78	2722.54	46.54	1.00	0.73	27.00	0.95	0.84	11.58	5.04	5.41	-7.34	5.25	4.50	14.29
12	TZEEIOR 513 × TZEEIOR 9 A	5210.66	1571.96	69.83	0.25	2.45	-880.00	0.97	0.72	25.77	4.26	6.05	-42.02	5.50	6.00	-9.09
13	TZEEIOR 509 × TZEEIOR 9 A	4587.43	1860.69	59.44	0.25	0.94	-276.00	0.88	0.67	23.86	4.69	5.23	-11.51	5.25	5.25	0.00
14	TZEEIOR 540 × TZEEIOR 9 A	4577.73	2448.80	46.51	0.50	0.69	-38.00	0.76	0.84	-10.53	4.26	5.39	-26.53	4.75	5.00	-5.26
15	TZEEIOR 548 × TZEEIOR 9 A	5044.23	1858.75	63.15	0.50	1.44	-188.00	0.93	0.65	30.11	4.71	5.36	-13.80	5.00	5.00	0.00
16	TZEEIOR 523 × TZEEIOR 9 A	5497.54	1260.80	77.07	0.50	2.00	-300.00	0.99	0.63	36.36	5.22	6.93	-32.76	5.00	6.25	-25.00
17	TZEEIOR 542 TZEEIOR 9 A	4913.74	1336.52	72.80	0.50	0.01	98.00	0.82	0.59	28.05	4.75	6.30	-32.63	5.00	5.75	-15.00
18	TZEEIOR 500 × TZEEIOR 9 A	4316.87	1708.10	60.43	0.50	2.30	-360.00	0.97	0.71	26.80	5.23	5.87	-12.24	4.50	5.50	-22.22
19	TZEEIOR 202 × TZEEIOR 9 A	6714.28	2098.17	68.75	0.50	0.51	-2.00	1.05	0.80	23.81	4.18	4.86	-16.27	4.25	4.75	-11.76
20	TZEEIOR 205 × TZEEIOR 9 A	5347.56	2121.72	60.32	0.25	1.95	-680.00	0.91	0.78	14.29	4.20	5.16	-22.86	4.50	4.75	-5.56
21	TZEEIOR 24 × TZEEIOR 9 A	5379.79	1602.87	70.21	0.25	0.34	-36.00	0.98	0.65	33.67	4.50	5.37	-19.33	4.50	5.25	-16.67
22	TZEEIOR 28 × TZEEIOR 9 A	5341.02	2501.02	53.17	0.25	0.98	-292.00	0.98	0.78	20.41	4.67	4.54	2.78	4.75	4.25	10.53
23	TZEEIOR 41 × TZEEIOR 9 A	5083.29	2029.03	60.08	0.50	0.53	-6.00	0.98	0.66	32.65	4.05	5.06	-24.94	5.00	5.25	-5.00
24	TZEEIOR 45 × TZEEIOR 9 A	5637.36	2543.12	54.89	0.75	2.51	-234.67	0.91	0.57	37.36	3.72	5.76	-54.84	5.00	4.75	5.00
25	TZEEIOR 209 × TZEEIOR 9 A	6892.20	1337.70	80.59	0.25	1.26	-404.00	1.07	0.70	34.58	3.72	6.26	-68.28	4.50	6.50	-44.44
26	TZEEIOR 221 × TZEEIOR 9 A	4973.15	653.19	86.87	0.75	3.97	-429.33	0.91	0.39	57.14	4.96	7.04	-41.94	3.75	7.00	-86.67
27	TZEEIOR 142 × TZEEIOR 9 A	5208.35	2312.23	55.61	0.00	1.74	-1.74	0.89	0.69	22.47	4.93	6.02	-22.11	3.75	5.25	-40.00

28	TZEEIOR 381 × TZEEIOR 9 A	5008.63	1127.99	77.48	1.25	0.50	60.00	0.85	0.53	37.65	4.75	6.65	-40.00	5.50	6.25	-13.64
29	TZEEIOR 349 × TZEEIOR 9 A	4716.99	1033.36	78.09	0.25	2.30	-820.00	0.86	0.63	26.74	5.02	6.57	-30.88	4.75	6.00	-26.32
30	TZEEIOR 536 × TZEEIOR 9 A	4884.47	1603.65	67.17	0.50	0.80	-60.00	0.95	0.70	26.32	4.52	6.57	-45.35	4.50	5.75	-27.78
31	TZEEIOR 486 × TZEEIOR 9 A	5114.90	1247.40	75.61	0.50	1.24	-148.00	0.80	0.57	28.75	4.24	6.27	-47.88	4.25	6.25	-47.06
32	TZEEIOR 526 × TZEEIOR 9 A	4347.03	1926.94	55.67	1.00	1.24	-24.00	0.94	0.83	11.70	5.51	5.78	-4.90	5.00	5.00	0.00
33	TZEEIOR 525 × TZEEIOR 9 A	5371.22	1683.34	68.66	0.50	1.17	-134.00	0.95	0.61	35.79	4.02	6.15	-52.99	5.00	6.00	-20.00
34	TZEEIOR 510 × TZEEIOR 9 A	5225.35	2046.81	60.83	0.00	0.28	-0.28	0.88	0.81	7.95	5.52	5.20	5.80	5.00	5.00	0.00
35	TZEEIOR 546 × TZEEIOR 9 A	5253.20	2081.42	60.38	0.25	0.79	-216.00	0.84	0.78	7.14	4.20	4.97	-18.33	5.50	5.50	0.00
36	TZEEIOR 305 × TZEEIOR 9 A	4068.18	1801.15	55.73	0.25	2.75	-1000.00	0.89	0.58	34.83	5.25	6.15	-17.14	5.75	6.00	-4.35
37	TZEEIOR 346 × TZEEIOR 97	4809.46	2067.77	57.01	0.00	3.10	-3.10	0.80	0.70	12.50	3.49	5.02	-43.84	4.50	5.50	-22.22
38	TZEEIOR 321 × TZEEIOR 97	6331.05	2690.14	57.51	0.75	0.48	36.00	0.91	0.75	17.58	3.67	5.29	-44.14	5.25	4.25	19.05
39	TZEEIOR 314 × TZEEIOR 97	6993.10	3604.17	48.46	0.50	0.77	-54.00	0.96	0.93	3.12	5.23	5.51	-5.35	4.50	4.50	0.00
40	TZEEIOR 396 × TZEEIOR 97	5112.46	1820.70	64.39	0.75	1.74	-132.00	0.98	0.69	29.59	4.22	5.75	-36.26	5.00	5.50	-10.00
41	TZEEIOR 384 × TZEEIOR 97	6101.50	2504.10	58.96	1.50	0.85	43.33	0.99	0.72	27.27	3.74	5.02	-34.22	4.75	4.25	10.53
42	TZEEIOR 289 × TZEEIOR 97	7088.25	2098.93	70.39	0.50	2.21	-342.00	0.93	0.73	21.51	4.00	5.83	-45.75	4.25	5.25	-23.53
43	TZEEIOR 365 × TZEEIOR 97	5795.26	2087.35	63.98	0.75	0.92	-22.67	0.94	0.63	32.98	4.02	5.90	-46.77	4.75	5.50	-15.79
44	TZEEIOR 290 × TZEEIOR 97	5915.99	1940.09	67.21	0.00	0.96	-0.96	0.91	0.63	30.77	5.50	5.83	-6.00	5.25	5.00	4.76
45	TZEEIOR 515 × TZEEIOR 97	6706.66	1884.32	71.90	0.50	0.50	0.00	0.93	0.70	24.73	3.04	5.34	-75.66	5.25	5.25	0.00
46	TZEEIOR 458 × TZEEIOR 97	6607.95	2498.29	62.19	1.25	1.94	-55.20	0.95	0.65	31.58	3.51	5.39	-53.56	5.50	4.50	18.18
47	TZEEIOR 479 × TZEEIOR 97	5247.55	2857.75	45.54	1.75	1.00	42.86	0.87	0.76	12.64	4.56	4.71	-3.29	4.50	4.50	0.00
48	TZEEIOR 513 × TZEEIOR 97	5986.77	2686.68	55.12	0.75	0.74	1.33	0.90	0.77	14.44	4.56	5.35	-17.32	4.50	4.75	-5.56
49	TZEEIOR 509 × TZEEIOR 97	6681.76	2248.02	66.36	0.25	0.41	-64.00	0.91	0.73	19.78	3.76	5.55	-47.61	4.75	5.25	-10.53
50	TZEEIOR 540 × TZEEIOR 97	7057.71	2717.56	61.50	1.00	1.21	-21.00	0.96	0.81	15.63	3.21	4.87	-51.71	4.75	4.75	0.00
51	TZEEIOR 548 × TZEEIOR 97	5059.35	1626.13	67.86	0.00	2.19	-2.19	0.98	0.61	37.76	4.22	5.87	-39.10	4.75	5.75	-21.05
52	TZEEIOR 523 × TZEEIOR 97	6385.56	3054.03	52.17	0.50	0.78	-56.00	0.96	0.84	12.50	3.95	4.32	-9.37	5.00	4.75	5.00
53	TZEEIOR 542 TZEEIOR 97	7304.07	2173.39	70.24	0.25	1.71	-584.00	0.94	0.53	43.62	3.52	6.10	-73.30	3.25	5.25	-61.54
54	TZEEIOR 500 × TZEEIOR 97	6097.54	2762.46	54.70	0.50	0.75	-50.00	0.99	0.91	8.08	4.74	5.56	-17.30	5.00	5.25	-5.00
55	TZEEIOR 202 × TZEEIOR 97	6249.00	1758.75	71.86	0.25	3.50	-1300.00	1.00	0.73	27.00	3.49	5.06	-44.99	3.75	5.00	-33.33
56	TZEEIOR 205 × TZEEIOR 97	6735.32	2146.97	68.12	1.25	2.17	-73.60	0.94	0.54	42.55	3.27	5.65	-72.78	4.25	5.25	-23.53
57	TZEEIOR 24 × TZEEIOR 97	4392.24	2502.56	43.02	0.75	2.03	-170.67	0.98	0.72	26.53	4.46	5.55	-24.44	5.00	4.75	5.00
58	TZEEIOR 28 × TZEEIOR 97	3735.69	935.36	74.96	0.50	3.76	-652.00	0.93	0.34	63.44	4.75	6.10	-28.42	4.50	6.25	-38.89

59	TZEEIOR 41 × TZEEIOR 97	3675.55	1127.34	69.33	1.00	2.90	-190.00	0.78	0.51	34.62	5.75	6.10	-6.09	5.25	5.75	-9.52
60	TZEEIOR 45 × TZEEIOR 97	4374.19	974.87	77.71	0.50	3.45	-590.00	0.85	0.50	41.18	4.49	5.75	-28.06	4.50	6.75	-50.00
61	TZEEIOR 209 × TZEEIOR 97	5573.76	1559.35	72.02	0.75	2.26	-201.33	0.84	0.58	30.95	3.50	5.71	-63.14	4.25	5.75	-35.29
62	TZEEIOR 221 × TZEEIOR 97	5496.66	1367.15	75.13	0.25	3.49	-1296.00	1.01	0.58	42.57	4.97	6.30	-26.76	5.00	5.75	-15.00
63	TZEEIOR 142 × TZEEIOR 97	5826.36	1870.73	67.89	1.25	2.50	-100.00	0.89	0.59	33.71	4.22	5.92	-40.28	5.25	5.50	-4.76
64	TZEEIOR 381 × TZEEIOR 97	4832.90	2037.37	57.84	1.25	1.24	0.80	0.87	0.60	31.03	4.76	6.28	-31.93	5.25	5.75	-9.52
65	TZEEIOR 349 × TZEEIOR 97	5131.68	1534.59	70.10	0.50	1.94	-288.00	0.84	0.51	39.29	3.48	7.11	-104.31	5.00	5.75	-15.00
66	TZEEIOR 536 × TZEEIOR 97	6251.63	2211.03	64.63	0.50	1.48	-196.00	0.99	0.64	35.35	3.74	5.94	-58.82	4.50	4.75	-5.56
67	TZEEIOR 486 × TZEEIOR 97	6405.55	2136.38	66.65	0.25	1.52	-508.00	0.93	0.54	41.94	3.50	5.06	-44.57	4.50	5.00	-11.11
68	TZEEIOR 526 × TZEEIOR 97	6435.87	3318.75	48.43	1.00	1.82	-82.00	0.92	0.72	21.74	3.41	4.23	-24.05	4.75	3.75	21.05
69	TZEEIOR 525 × TZEEIOR 97	5985.97	1375.97	77.01	0.25	2.69	-976.00	0.91	0.49	46.15	3.94	7.39	-87.56	4.75	5.75	-21.05
70	TZEEIOR 510 × TZEEIOR 97	7379.62	3568.91	51.64	0.25	0.28	-12.00	0.95	0.87	8.42	3.23	4.52	-39.94	4.50	3.75	16.67
71	TZEEIOR 546 × TZEEIOR 97	7426.78	2299.37	69.04	0.75	2.06	-174.67	0.93	0.68	26.88	3.46	6.00	-73.41	3.50	5.00	-42.86
72	TZEEIOR 305 × TZEEIOR 97	6597.91	1459.64	77.88	0.75	2.00	-166.67	0.91	0.55	39.56	3.00	6.69	-123.00	4.50	5.75	-27.78
73	TZEEIOR 346 × TZEEIOR 249	5105.66	2456.44	51.89	0.25	1.94	-676.00	0.95	0.77	18.95	4.50	5.38	-19.56	5.00	5.25	-5.00
74	TZEEIOR 321 × TZEEIOR 249	4918.39	3207.81	34.78	0.50	0.54	-8.00	0.99	0.83	16.16	4.77	4.91	-2.94	5.25	3.25	38.10
75	TZEEIOR 314 × TZEEIOR 249	5476.20	2696.18	50.77	0.50	0.20	60.00	0.90	0.75	16.67	4.45	4.91	-10.34	4.75	4.25	10.53
76	TZEEIOR 396 × TZEEIOR 249	5721.09	2409.24	57.89	0.50	0.50	0.00	0.89	0.79	11.24	5.26	5.15	2.09	4.75	5.25	-10.53
77	TZEEIOR 384 × TZEEIOR 249	5031.59	2115.28	57.96	0.25	0.19	24.00	0.86	0.73	15.12	4.51	5.06	-12.20	4.25	5.00	-17.65
78	TZEEIOR 289 × TZEEIOR 249	5270.06	2235.42	57.58	0.00	1.01	-1.01	0.85	0.83	2.35	5.47	5.06	7.50	5.00	5.25	-5.00
79	TZEEIOR 365 × TZEEIOR 249	6060.89	2177.70	64.07	0.00	1.03	-1.03	0.97	0.72	25.77	4.52	5.01	-10.84	5.00	4.50	10.00
80	TZEEIOR 290 × TZEEIOR 249	5655.67	2601.60	54.00	0.00	1.95	-1.95	0.81	0.89	-9.88	5.29	5.29	0.00	4.75	5.00	-5.26
81	TZEEIOR 515 × TZEEIOR 249	6722.30	2917.19	56.60	1.00	0.48	52.00	0.98	0.80	18.37	3.92	3.96	-1.02	4.75	4.50	5.26
82	TZEEIOR 458 × TZEEIOR 249	5173.65	2494.72	51.78	0.50	0.31	38.00	0.90	0.83	7.78	5.46	5.25	3.85	5.50	4.50	18.18
83	TZEEIOR 479 × TZEEIOR 249	5521.17	2714.97	50.83	0.25	0.52	-108.00	0.93	0.88	5.38	5.02	4.62	7.97	4.75	4.75	0.00
84	TZEEIOR 513 × TZEEIOR 249	4932.61	2242.82	54.53	0.25	0.72	-188.00	0.94	0.84	10.64	5.01	5.93	-18.36	5.00	5.00	0.00
85	TZEEIOR 509 × TZEEIOR 249	5992.04	2602.56	56.57	0.25	0.60	-140.00	0.89	0.82	7.87	5.25	5.04	4.00	4.75	5.25	-10.53
86	TZEEIOR 540 × TZEEIOR 249	5818.24	2922.97	49.76	0.25	1.48	-492.00	0.95	0.87	8.42	4.99	5.19	-4.01	4.75	4.25	10.53
87	TZEEIOR 548 × TZEEIOR 249	5753.19	1852.08	67.81	0.25	0.77	-208.00	0.81	0.74	8.64	5.02	5.05	-0.60	4.25	5.00	-17.65
88	TZEEIOR 523 × TZEEIOR 249	4603.36	2289.71	50.26	0.75	1.01	-34.67	0.91	0.72	20.88	5.81	5.48	5.68	4.50	4.75	-5.56
89	TZEEIOR 542 TZEEIOR 249	5331.58	2018.29	62.14	0.25	1.26	-404.00	0.94	0.62	34.04	5.00	4.85	3.00	4.75	5.25	-10.53

90	TZEEIOR 500 × TZEEIOR 249	6351.28	2146.55	66.20	1.25	1.49	-19.20	0.98	0.72	26.53	4.81	5.41	-12.47	4.75	5.50	-15.79
91	TZEEIOR 202 × TZEEIOR 249	5941.13	1661.40	72.04	0.50	3.28	-556.00	0.96	0.78	18.75	3.50	4.86	-38.86	4.50	5.25	-16.67
92	TZEEIOR 205 × TZEEIOR 249	5240.41	2558.98	51.17	1.25	2.21	-76.80	0.86	0.87	-1.16	5.02	4.67	6.97	4.75	5.00	-5.26
93	TZEEIOR 24 × TZEEIOR 249	4367.42	1988.74	54.46	1.50	1.29	14.00	0.90	0.78	13.33	5.31	5.37	-1.13	4.25	5.25	-23.53
94	TZEEIOR 28 × TZEEIOR 249	3907.16	1893.99	51.53	1.25	2.48	-98.40	0.81	0.70	13.58	5.53	5.16	6.69	4.50	5.75	-27.78
95	TZEEIOR 41 × TZEEIOR 249	4813.10	1972.04	59.03	0.75	1.69	-125.33	0.93	0.60	35.48	4.94	5.23	-5.87	4.50	5.00	-11.11
96	TZEEIOR 45 × TZEEIOR 249	4441.89	2127.52	52.10	1.25	1.54	-23.20	0.80	0.81	-1.25	5.24	5.18	1.15	4.00	5.00	-25.00
97	TZEEIOR 209 × TZEEIOR 249	4455.26	1919.10	56.93	0.50	1.44	-188.00	0.93	0.85	8.60	5.26	4.89	7.03	4.75	5.50	-15.79
98	TZEEIOR 221 × TZEEIOR 249	5186.18	2156.96	58.41	0.00	1.85	-1.85	0.94	0.85	9.57	4.00	5.32	-33.00	5.25	4.75	9.52
99	TZEEIOR 142 × TZEEIOR 249	6086.11	1680.12	72.39	0.50	2.21	-342.00	0.93	0.70	24.73	4.81	4.74	1.46	5.00	5.50	-10.00
100	TZEEIOR 381 × TZEEIOR 249	4870.87	2170.14	55.45	0.50	2.00	-300.00	0.84	0.71	15.48	5.02	5.48	-9.16	5.50	5.50	0.00
101	TZEEIOR 349 × TZEEIOR 249	5189.64	1915.20	63.10	0.25	0.69	-176.00	0.88	0.75	14.77	3.75	5.63	-50.13	5.00	5.50	-10.00
102	TZEEIOR 536 × TZEEIOR 249	6194.54	2340.93	62.21	0.25	0.54	-116.00	0.87	0.82	5.75	5.01	5.36	-6.99	4.50	4.75	-5.56
103	TZEEIOR 486 × TZEEIOR 249	6177.58	1845.42	70.13	0.25	1.53	-512.00	0.92	0.63	31.52	4.54	5.47	-20.48	4.75	5.25	-10.53
104	TZEEIOR 526 × TZEEIOR 249	5800.14	2557.28	55.91	0.00	1.26	-1.26	0.88	0.76	13.64	4.17	5.01	-20.14	4.50	4.75	-5.56
105	TZEEIOR 525 × TZEEIOR 249	4570.43	2241.61	50.95	1.00	1.29	-29.00	0.84	0.67	20.24	4.76	5.06	-6.30	4.75	5.00	-5.26
106	TZEEIOR 510 × TZEEIOR 249	5845.61	3294.78	43.64	0.25	0.99	-296.00	0.91	0.90	1.10	4.57	4.62	-1.09	5.00	3.75	25.00
107	TZEEIOR 546 × TZEEIOR 249	5713.03	1362.82	76.15	0.50	1.03	-106.00	0.87	0.68	21.84	4.78	5.97	-24.90	5.00	6.00	-20.00
108	TZEEIOR 305 × TZEEIOR 249	5426.58	2074.05	61.78	0.50	1.48	-196.00	0.85	0.74	12.94	4.42	5.21	-17.87	4.50	5.00	-11.11
109	TZEEIOR 346 × TZEEIOR 197	6397.55	2438.10	61.89	0.25	0.75	-200.00	0.95	0.78	17.89	3.97	3.89	2.02	4.75	4.50	5.26
110	TZEEIOR 321 × TZEEIOR 197	5714.04	3116.30	45.46	0.00	1.35	-1.35	0.96	0.86	10.42	3.50	4.29	-22.57	4.75	3.75	21.05
111	TZEEIOR 314 × TZEEIOR 197	5529.33	2412.94	56.36	0.50	0.75	-50.00	1.01	0.76	24.75	4.51	5.15	-14.19	4.75	4.75	0.00
112	TZEEIOR 396 × TZEEIOR 197	7437.02	2333.80	68.62	0.25	0.78	-212.00	0.99	0.78	21.21	3.23	5.52	-70.90	4.25	4.25	0.00
113	TZEEIOR 384 × TZEEIOR 197	6825.93	1712.46	74.91	0.50	1.00	-100.00	0.97	0.55	43.30	3.57	5.78	-61.90	4.75	5.00	-5.26
114	TZEEIOR 289 × TZEEIOR 197	7341.28	2873.28	60.86	0.25	2.18	-772.00	0.99	0.86	13.13	3.47	4.90	-41.21	4.25	4.50	-5.88
115	TZEEIOR 365 × TZEEIOR 197	6360.64	2053.48	67.72	0.75	2.25	-200.00	0.99	0.68	31.31	3.81	6.46	-69.55	4.00	5.00	-25.00
116	TZEEIOR 290 × TZEEIOR 197	7350.72	2257.64	69.29	0.50	1.49	-198.00	0.98	0.73	25.51	2.99	5.52	-84.62	4.50	5.25	-16.67
117	TZEEIOR 515 × TZEEIOR 197	6776.22	1756.67	74.08	0.25	0.98	-292.00	0.98	0.66	32.65	3.07	5.85	-90.55	4.25	6.00	-41.18
118	TZEEIOR 458 × TZEEIOR 197	7062.23	3642.91	48.42	0.25	0.25	0.00	0.94	0.90	4.26	3.71	3.83	-3.23	3.75	4.25	-13.33
119	TZEEIOR 479 × TZEEIOR 197	6428.36	3073.80	52.18	0.75	0.71	5.33	0.98	0.86	12.24	4.28	4.63	-8.18	4.25	4.25	0.00
120	TZEEIOR 513 × TZEEIOR 197	6953.46	2799.11	59.75	0.50	1.55	-210.00	0.97	0.80	17.53	3.76	5.00	-32.98	4.25	4.75	-11.76

121	TZEEIOR 509 × TZEEIOR 197	7454.93	4044.13	45.75	0.25	1.02	-308.00	0.97	0.98	-1.03	2.77	4.37	-57.76	4.50	3.50	22.22
122	TZEEIOR 540 × TZEEIOR 197	6576.01	1948.14	70.38	0.50	1.01	-102.00	1.00	0.74	26.00	4.08	5.59	-37.01	4.00	4.75	-18.75
123	TZEEIOR 548 × TZEEIOR 197	6213.41	2048.22	67.04	0.25	1.22	-388.00	0.92	0.72	21.74	3.76	5.36	-42.55	4.25	5.50	-29.41
124	TZEEIOR 523 × TZEEIOR 197	6697.25	2258.81	66.27	0.75	0.58	22.67	0.96	0.86	10.42	3.76	5.10	-35.64	3.75	5.00	-33.33
125	TZEEIOR 542 TZEEIOR 197	7187.50	1973.79	72.54	0.25	2.02	-708.00	1.00	0.58	42.00	3.46	5.95	-71.97	4.00	5.00	-25.00
126	TZEEIOR 500 × TZEEIOR 197	5793.58	1649.88	71.52	0.00	1.04	-1.04	0.95	0.62	34.74	4.95	5.74	-15.96	4.25	5.75	-35.29
127	TZEEIOR 202 × TZEEIOR 197	4232.97	1229.40	70.96	1.50	2.81	-87.33	0.91	0.62	31.87	4.79	6.32	-31.94	4.50	5.50	-22.22
128	TZEEIOR 205 × TZEEIOR 197	5989.75	2308.17	61.46	1.00	2.21	-121.00	0.95	0.83	12.63	3.52	4.92	-39.77	4.50	5.25	-16.67
129	TZEEIOR 24 × TZEEIOR 197	5364.96	1886.22	64.84	0.75	2.33	-210.67	0.91	0.82	9.89	4.51	5.60	-24.17	4.00	5.25	-31.25
130	TZEEIOR 28 × TZEEIOR 197	4595.41	1430.01	68.88	0.75	2.04	-172.00	0.90	0.76	15.56	4.96	5.59	-12.70	4.25	5.75	-35.29
131	TZEEIOR 41 × TZEEIOR 197	5130.07	2107.18	58.92	0.75	3.19	-325.33	0.92	0.77	16.30	4.23	4.86	-14.89	4.00	5.00	-25.00
132	TZEEIOR 45 × TZEE OR 197	5959.58	1410.69	76.33	0.25	1.50	-500.00	1.05	0.68	35.24	4.00	6.19	-54.75	4.50	5.75	-27.78
133	TZEEIOR 209 × TZEEIOR 197	6029.20	1313.55	78.21	0.75	2.06	-174.67	1.03	0.60	41.75	3.80	5.95	-56.58	4.50	5.50	-22.22
134	TZEEIOR 221 × TZEEIOR 197	6500.24	2029.28	68.78	0.50	2.44	-388.00	0.98	0.78	20.41	3.72	5.27	-41.67	5.00	5.50	-10.00
135	TZEEIOR 142 × TZEEIOR 197	5953.68	2578.45	56.69	1.25	4.02	-221.60	1.01	0.74	26.73	3.53	4.24	-20.11	5.00	4.50	10.00
136	TZEEIOR 381 × TZEEIOR 197	7060.27	2208.73	68.72	0.75	0.52	30.67	0.96	0.70	27.08	3.27	4.80	-46.79	4.50	5.00	-11.11
137	TZEEIOR 349 × TZEEIOR 197	6032.11	1902.60	68.46	0.75	0.74	1.33	0.97	0.70	27.84	4.31	5.66	-31.32	4.00	5.25	-31.25
138	TZEEIOR 536 × TZEEIOR 197	6464.66	2179.68	66.28	0.75	3.03	-304.00	1.01	0.81	19.80	4.21	5.80	-37.77	4.75	4.75	0.00
139	TZEEIOR 486 × TZEEIOR 197	6175.33	1563.48	74.68	1.50	3.04	-102.67	0.92	0.71	22.83	3.76	5.45	-44.95	4.00	5.50	-37.50
140	TZEEIOR 526 × TZEEIOR 197	6045.97	2077.97	65.63	1.25	2.27	-81.60	0.97	0.71	26.80	3.28	5.85	-78.35	4.50	5.25	-16.67
141	TZEEIOR 525 × TZEEIOR 197	6422.35	2299.27	64.20	1.00	1.29	-29.00	0.97	0.64	34.02	3.70	4.97	-34.32	5.25	4.75	9.52
142	TZEEIOR 510 × TZEEIOR 197	7050.98	2628.79	62.72	0.75	1.24	-65.33	0.98	0.87	11.22	3.76	4.57	-21.54	4.75	4.25	10.53
143	TZEEIOR 546 × TZEEIOR 197	6534.09	2540.66	61.12	0.50	2.26	-352.00	0.97	0.89	8.25	2.99	4.79	-60.20	4.00	5.00	-25.00
144	TZEEIOR 305 × TZEEIOR 197	5885.05	2648.30	55.00	0.25	1.04	-316.00	1.00	0.75	25.00	4.77	5.21	-9.22	3.75	4.50	-20.00
145	TZEEIOR 346 × TZEEIOR 30	6123.53	2533.34	58.63	1.00	0.80	20.00	0.98	0.77	21.43	4.73	5.37	-13.53	5.00	5.25	-5.00
146	TZEEIOR 321 × TZEEIOR 30	5596.57	2401.44	57.09	1.25	0.71	43.20	0.89	0.78	12.36	4.56	5.24	-14.91	5.50	4.75	13.64
147	TZEEIOR 314 × TZEEIOR 30	6132.90	2938.60	52.08	0.75	0.60	20.00	0.90	0.85	5.56	4.29	4.97	-15.85	4.75	4.25	10.53
148	TZEEIOR 396 × TZEEIOR 30	5356.03	1555.16	70.96	1.25	0.46	63.20	0.93	0.58	37.63	4.25	6.40	-50.59	3.75	5.75	-53.33
149	TZEEIOR 384 × TZEEIOR 30	6752.58	3414.92	49.43	1.75	1.52	13.14	0.95	0.81	14.74	3.96	4.21	-6.31	4.50	3.75	16.67
150	TZEEIOR 289 × TZEEIOR 30	6488.98	2471.75	61.91	1.25	2.19	-75.20	0.95	0.81	14.74	4.79	5.29	-10.44	4.00	5.25	-31.25
151	TZEEIOR 365 × TZEEIOR 30	6024.76	2367.76	60.70	1.00	2.30	-130.00	0.94	0.76	19.15	4.30	5.25	-22.09	3.75	4.75	-26.67

152	TZEEIOR 305 × TZEEIOR 30	5676.38	2730.79	51.89	0.75	0.72	4.00	0.93	0.79	15.05	4.50	5.09	-13.11	5.25	4.75	9.52
153	TZEEIOR 290 × TZEEIOR 30	6635.53	2467.47	62.81	1.50	2.02	-34.67	0.98	0.75	23.47	3.98	5.47	-37.44	4.25	5.00	-17.65
154	TZEEIOR 515 × TZEEIORV 30	6130.94	2096.38	65.81	1.25	0.80	36.00	0.97	0.78	19.59	4.27	4.82	-12.88	4.50	4.75	-5.56
155	TZEEIOR 458 × TZEEIOR 30	4535.20	2453.72	45.90	1.50	0.99	34.00	0.86	0.83	3.49	5.31	5.10	3.95	4.50	4.75	-5.56
156	TZEEIOR 479 × TZEEIOR 30	5935.43	2305.94	61.15	1.50	0.21	86.00	0.90	0.76	15.56	5.03	5.63	-11.93	4.75	5.00	-5.26
157	TZEEIOR 513 × TZEEIOR 30	5516.58	2425.89	56.03	1.25	1.06	15.20	0.91	0.69	24.18	4.50	5.95	-32.22	4.50	4.75	-5.56
158	TZEEIOR 509 × TZEEIOR 30	5469.03	3096.97	43.37	0.75	1.78	-137.33	0.90	0.77	14.44	4.47	4.42	1.12	5.25	4.25	19.05
159	TZEEIOR 540 × TZEEIOR 30	7086.18	3261.14	53.98	1.00	0.73	27.00	1.00	0.87	13.00	4.07	4.35	-6.88	3.75	3.50	6.67
160	TZEEIOR 548 × TZEEIOR 30	5776.17	2082.03	63.95	0.50	0.97	-94.00	0.95	0.67	29.47	4.96	5.68	-14.52	5.25	5.00	4.76
161	TZEEIOR 523 × TZEEIOR 30	6399.62	1860.33	70.93	0.75	1.58	-110.67	0.97	0.80	17.53	5.19	6.11	-17.73	4.75	5.50	-15.79
162	TZEEIOR 542 × TZEEIOR 30	6594.61	2130.32	67.70	1.00	1.00	0.00	0.89	0.61	31.46	4.49	4.56	-1.56	5.00	5.25	-5.00
163	TZEEIOR 500 × TZEEIOR 30	5231.78	1873.33	64.19	1.50	1.29	14.00	0.94	0.67	28.72	5.20	4.99	4.04	5.00	5.25	-5.00
164	TZEEIOR 202 × TZEEIOR 30	4917.55	2297.08	53.29	0.00	2.19	-2.19	0.93	0.82	11.83	5.21	4.36	16.31	5.00	4.50	10.00
165	TZEEIOR 205 × TZEEIOR 30	6279.68	2359.71	62.42	0.50	1.74	-248.00	0.93	0.72	22.58	3.93	5.52	-40.46	4.00	5.00	-25.00
166	TZEEIOR 24 × TZEEIOR 30	2443.29	364.53	85.08	0.75	1.52	-102.67	0.95	0.32	66.32	6.46	6.50	-0.62	5.50	6.50	-18.18
167	TZEEIOR 28 × TZEEIOR 30	1251.15	657.07	47.48	1.25	2.69	-115.20	0.44	0.35	20.45	5.69	6.89	-21.09	6.25	6.50	-4.00
168	TZEEIOR 41 × TZEEIOR 30	1824.96	198.22	89.14	1.75	3.58	-104.57	0.74	0.31	58.11	6.72	6.74	-0.30	5.50	7.00	-27.27
169	TZEEIOR 45 × TZEEIOR 30	1328.78	508.99	61.69	1.00	2.78	-178.00	0.70	0.39	44.29	6.53	6.72	-2.91	5.50	7.00	-27.27
170	TZEEIOR 209 × TZEEIOR 30	4270.60	1926.02	54.90	0.75	1.93	-157.33	0.92	0.69	25.00	4.97	5.65	-13.68	5.00	6.00	-20.00
171	TZEEIOR 221 × TZEEIOR 30	6031.58	1411.93	76.59	0.25	2.66	-964.00	0.89	0.59	33.71	4.72	5.80	-22.88	4.75	5.50	-15.79
172	TZEEIOR 142 × TZEEIOR 30	6053.82	1705.87	71.82	0.50	3.00	-500.00	0.95	0.61	35.79	4.32	5.53	-28.01	4.25	5.50	-29.41
173	TZEEIOR 381 × TZEEIOR 30	5897.69	2999.96	49.13	0.75	0.78	-4.00	0.89	0.70	21.35	5.00	4.61	7.80	5.00	5.00	0.00
174	TZEEIOR 349 × TZEEIOR 30	5377.24	1479.28	72.49	0.50	0.75	-50.00	0.97	0.64	34.02	5.04	6.55	-29.96	4.00	6.00	-50.00
175	TZEEIOR 536 × TZEEIOR 30	7390.22	3498.09	52.67	0.50	2.63	-426.00	0.99	0.75	24.24	4.26	5.25	-23.24	4.50	4.50	0.00
176	TZEEIOR 486 × TZEEIOR 30	4147.16	2335.76	43.68	0.25	1.33	-432.00	0.86	0.72	16.28	3.72	5.19	-39.52	5.25	5.00	4.76
177	TZEEIOR 526 × TZEEIOR 30	5912.97	2091.35	64.63	0.50	1.00	-100.00	0.89	0.61	31.46	4.82	5.53	-14.73	4.50	5.00	-11.11
178	TZEEIOR 525 × TZEEIOR 30	5617.52	3217.10	42.73	0.25	0.79	-216.00	0.95	0.80	15.79	5.02	4.66	7.17	5.00	4.25	15.00
179	TZEEIOR 510 × TZEEIOR 30	6392.13	3805.47	40.47	0.25	1.29	-416.00	0.97	0.91	6.19	5.02	4.16	17.13	5.00	3.25	35.00
180	TZEEIOR 546 × TZEEIOR 30	7249.23	2095.20	71.10	1.75	0.27	84.57	0.90	0.78	13.33	3.77	4.92	-30.50	4.00	5.00	-25.00
181	TZEEIOR 30 × TZEEIOR 97	5031.49	1621.49	67.77	0.75	2.05	-173.33	0.92	0.69	25.00	4.96	5.80	-16.94	5.25	5.75	-9.52
182	TZEEIOR 30 × TZEEIOR 197	5437.88	2093.71	61.50	0.25	2.16	-764.00	0.88	0.70	20.45	4.01	5.30	-32.17	4.25	5.50	-29.41

183	TZEEIOR 30 × TZEEIOR 249	5452.96	1791.15	67.15	0.50	3.03	-506.00	0.93	0.76	18.28	5.02	5.01	0.20	4.25	5.25	-23.53
184	TZEEIOR 30 × TZEEIOR 9 A	5200.02	1996.87	61.60	0.00	2.25	-2.25	0.93	0.66	29.03	5.02	5.08	-1.20	4.50	5.25	-16.67
185	TZEEIOR 97 × TZEEIOR 197	6065.87	2481.40	59.09	0.75	2.19	-192.00	0.87	0.82	5.75	4.22	5.77	-36.73	5.00	5.00	0.00
186	TZEEIOR 97 × TZEEIOR 249	3280.30	2046.81	37.60	1.50	0.75	50.00	0.90	0.68	24.44	5.75	5.19	9.74	4.75	4.75	0.00
187	TZEEIOR 97 × TZEEIOR 9 A	5033.37	2109.45	58.09	0.50	1.39	-178.00	0.85	0.75	11.76	4.78	5.48	-14.64	4.25	5.25	-23.53
188	TZEEIOR 197 × TZEEIOR 9A	5183.16	2026.00	60.91	0.50	1.53	-206.00	0.94	0.77	18.09	4.55	5.31	-16.70	5.25	5.00	4.76
189	TZEEIOR 197 × TZEEIOR 249	5464.10	2299.81	57.91	1.00	0.73	27.00	0.93	0.74	20.43	4.57	4.60	-0.66	4.75	4.75	0.00
190	TZEEIOR 249 × TZEEIOR 9 A	4348.00	2780.56	36.05	0.75	0.71	5.33	0.86	0.77	10.47	4.27	4.96	-16.16	4.75	4.25	10.53
191	CHECK 1 TZEEIOR 109 × TZdEEI 12	5271.48	2074.39	60.65	0.50	0.97	-94.00	0.94	0.74	21.28	4.81	5.77	-19.96	4.25	5.00	-17.65
192	CHECK 2 - TZEEI 79 × TZEEI 82	4720.41	3015.16	36.13	0.50	1.86	-272.00	0.95	0.84	11.58	3.78	4.41	-16.67	5.00	4.25	15.00
193	CHECK 3 - TZEEIY Pop STR C5 × TZEEI 58	5415.24	1645.14	69.62	0.50	1.28	-156.00	0.89	0.58	34.83	3.95	4.82	-22.03	4.75	5.25	-10.53
194	CHECH 4 - TZdEEI 1 × TZdEEI 5	4270.19	1929.81	54.81	0.50	0.52	-4.00	0.93	0.75	19.35	5.00	5.56	-11.20	5.50	5.50	0.00
195	CHECK 5 - TZEEIOR 12 × TZEEIOR 223	5731.83	1113.66	80.57	0.75	3.20	-326.67	0.95	0.37	61.05	4.01	6.05	-50.87	4.75	6.25	-31.58
196	CHECK 6 -TZdEEI 1 × TZdEEI 12	1566.51	1745.76	-11.44	0.00	1.23	-1.23	0.88	0.80	9.09	6.53	5.66	13.32	4.50	5.50	-22.22
	average reduction			61.10			-181.87			22.47			-24.97			-10.64

WW: well-watered; MD: managed drought, RED: reduction; GY: grain yield, ASI: anthesis-silking interval; PASP: plant aspect; EASP: ear aspect; EPP: ear per plant.