

**Table S1.** Description of the evaluated Iranian pomegranate genotypes consisting of their name and identification code.

NO.	Genotype Code*	Genotype Name	NO.	Genotype Code	Genotype Name	NO.	Genotype Code	Genotype Name
1	1-180	Jazireh	75	5-111	Sefid-Shahreza	149	10-174	Poost-Nazok-Darjazin
2	2-108	Murdi	76	5-140	Sorkh-Malas-Shahreza	150	10-177	Ardestani-Darjazin
3	2-134	Do-Mazeh	77	5-143	Makhmal-Ghermez	151	10-178	Shahvar-Sefid
4	2-137	Sefid-Rabi	78	5-190	Sorkh-Torsh-Shahreza	152	10-179	Ardestani-Lasjerd
5	2-184	Sefid-Bakhtiari	79	5-193	Torsh-Shahreza	153	10-187	Mamuli-Lasjerd
6	2-195	Khodroo	80	5-206	Siah-Dastjerd	154	10-188	Shahvar-Ghermez
7	3-156	Mesri	81	5-209	Savehei-Dastjerd	155	11-205	Sarjou
8	3-119	Robab-Kazerun	82	5-220	Najafabad	156	11-213	Ghermez-Bazmani
9	3-183	Sabz-kazerun	83	5-226	Esfahani-Danehsiah	157	11-208	Torsh-Vashik
10	3-204	Farugh-Estahban	84	5-239	Bazri-Dastjerd	158	11-221	Malas-Vashik
11	3-212	Sabz-Sarvestan	85	5-248	Ardestani-Ghermez	159	11-223	Bihasteh-Sangan
12	3-222	Shabestan-Poost-Koloft	86	5-249	Geli-danehsfid-Naein	160	11-224	Yek-Kiluei
13	3-214	Oud-Ghermez	87	5-262	Abdandan	161	11-228	Golabi-Haste-Riz
14	3-215	Bihasteh-Jahrom	88	5-269	Ghermez-Dastjerd	162	11-231	Sib-Hoshak
15	3-217	Bihasteh-Sarvestan	89	5-276	Ghermez-Mamuli	163	11-236	Meikhosh-Sangan
16	3-219	Atabaki-Sarvestan	90	5-282	Keivani	164	11-240	Golabi-Haste-Dorosht
17	3-229	Sabz-Ghasrdasht	91	5-288	Yek-Kashan	165	11-245	Bazmani-Poost-Nazok
18	3-230	Ghalatoon	92	5-285	Shahvar-Torsh	166	11-246	Porbar-Saravan

19	3-234	Kadroo-Shahri	93	5-293	Binam-Dastjerd	167	11-250	Malas-Sarjoo
20	3-235	Porbar-Estahban	94	5-322	Naein	168	11-260	Narak-Vahshi-Sistan
21	3-237	Sefid-Seyedan	95	5-329	Danehsiah-Dastjerd	169	11-261	Mamuli-Zabol
22	3-238	Berit-Ghermez	96	5-336	Malas-Dastjerd	170	11-268	Savehei-Ghermez
23	3-242	Kolukhi-Sarvestan	97	5-345	Homaabad	171	11-272	Savehi-Sistan
24	3-244	Sakeli-Seyedan	98	5-354	Ardestani-Sefid	172	11-277	Nahug
25	3-251	Panje-Aroos-khafar	99	5-362	Shahvar-Malas	173	11-274	Savehei-Sefid
26	3-253	Shoor	100	5-256	Shahvar-poostghermez	174	11-284	Golabi-Poost-Nazok
27	3-255	Tashtoo-Estahban	101	6-225	Sefid-Babak	175	11-298	Maamuli-Baluch
28	3-258	Gelo-kande-Neiriz	102	6-259	Baft	176	11-300	Kuhak
29	3-263	Shahvar-Sarvestan	103	6-227	Meikhosh-Babak	177	11-303	Torsh-Nukjub
30	3-266	Bihaste-Ghsrdasht	104	6-264	Ghermez-Babak	178	11-307	Orumieh-Sarjou
31	3-267	Golnar-Sarvestan	105	6-291	Sarjanganl-Bam	179	11-308	Nukjub
32	3-270	Sheitooni-Seyedon	106	6-295	Golabi-Bam	180	11-309	Sefid-Bazmani
33	3-271	Khafari-Jahrom	107	6-317	Meikhosh-Kerman	181	11-311	Malisak-Hoshak
34	3-273	Por-pea-Seyedan	108	6-327	Mers-Bam	182	11-318	Poost-Ghermez-Bazman
35	3-275	Khafari-Ghermez	109	6-346	Sarjanganl	183	11-325	Malas-Nukjub
36	3-278	Abdolrahimk hani	110	6-347	Sabi-Bam	184	11-334	Meikhosh-Ladiz
37	3-287	Oud-Neiriz	111	6-355	Ghermez-Bam	185	11-343	Bihaste-Ladiz
38	3-281	Bazri-Neiriz	112	7-112	Izeh	186	11-344	Sefid-Bazmani
39	3-289	Robbab-Malas	113	7-113	Kaviri	187	11-350	Khorasani-Sefid
40	3-290	Shabestan-Poost-Nazok	114	7-120	Danehsiah-Ramhormoz	188	11-358	Bazmani-Poost-Koloft

41	3-292	Sefid-Estahban	115	7-122	Sinehpahn-Daneh-Ghermez	189	11-363	Sabz-Hoshak
42	3-297	Robab-Torsh	116	7-127	Bitalaf-Daneh-Sefid	190	11-368	Vashik-Shirin
43	3-305	Narak-Marvdasht	117	7-131	Sefid-Dezful	191	12-129	Golabi-Pishva
44	3-306	Remeich-Estahban	118	7-135	Zaj-Ramhormoz	192	12-132	Siah-Daneh-Kan
45	3-301	Poostghermesz-Neiriz	119	7-154	Sorkh-Daneh-Sefid	193	12-139	Toughi-Varamin
46	3-302	Kam-pea-Seyedan	120	7-161	Marmar-Ramhormoz	194	12-145	Narak-Kan
47	3-312	Narak-Ghasrdasht	121	7-164	Malas-Ramhormoz	195	12-148	Sabz-Varamin
48	3-314	Gelo-Boland-Estahban	122	7-189	Yusefi-Dezful	196	12-153	Shirin-Kan
49	3-316	Hastehriz-Seyedoon	123	8-116	Sefid-Boyer	197	12-160	Vahshi-Kan
50	3-319	Khajei-Ghasrdasht	124	8-162	Shirin-Boyer	198	12-169	Ghahveh-Daneh-Kan
51	3-320	Shahvar-Ghsrdasht	125	8-171	Vahshi-Boyer	199	12-170	Shahpar-Pishva
52	3-321	Narak-Sarvestan	126	8-182	Sabz-Boyer	200	12-173	Malas-Pishva
53	3-323	Robab-Malas	127	9-107	Khooshenar-Baharestan	201	12-181	Shahpar-Varamin
54	3-328	Atabaki-Sefid	128	9-126	Mandali-Gorgan	202	12-191	Malas-Kan
55	3-330	Robab-Sarvestan	129	9-128	Lamsari	203	13-265	Bi-Nam
56	3-331	Torsh-Sarvestan	130	9-138	Sisangan	204	13-280	Bi-Nam
57	3-332	Bihaste-Neiriz	131	9-141	Siahnar-Behshahr	205	13-286	Bi-Nam
58	3-333	Asali-Sarvestan	132	9-147	Mohseni-Gorgan	206	14-109	Ghermez-Harabarjan
59	3-335	Zard-poost-Koloft	133	9-155	Shekarnaz	207	14-110	Garch-Shahvar

60	3-337	Robab-Sefid	134	9-158	Kabdar-Behshahr	208	14-114	Tough-Gardan
61	3-339	Farugh-Neiriz	135	9-163	Torsh-Behshahr	209	14-118	Zagh
62	3-340	Vahshi-Estahban	136	9-165	Babolsar	210	14-121	Shirin-Shahvar
63	3-348	Shahvar-Marvdasht	137	9-166	Ghermez-Gorgan	211	14-125	Malas-Yazdi
64	3-357	Berit-Sarvestan	138	9-175	Savadkuh	212	14-130	Shirin-Harati
65	3-352	Khafari-Sefid	139	9-185	Khoram-Deer-Gorgan	213	14-144	Aban-Mahi
66	3-359	Robab-Ghasrdasht	140	9-186	Zir-Ab	214	14-151	Zagh-Harabarjan
67	3-366	Kadroo-Ghasrdasht	141	9-194	Shahi-Gorgan	215	14-233	Abarnadabad
68	3-367	Shahvar-Estahban	142	9-196	Shirin-Behshahr	216	14-247	Marvast
69	3-369	Kalaghi	143	10-115	Sag-Nar-Lasjerd	217	14-296	Poost-sefid-Abarnadabad
70	3-376	Atabaki-Ghermez	144	10-117	Shahvar-Lasjerd	218	14-338	Ghermez-Harati
71	4-136	Lushan	145	10-124	Porbar-Darjazin	219	14-342	Mehr-Mahi
72	4-168	Ramsar	146	10-133	Gharancho k-Lasjerd	220	14-361	Khormaei
73	4-210	Jangali-Rudbar	147	10-149	Abdandan-Lasjerd	221	14-370	Zagh-Marvast
74	4-353	Kuhi-Rudbar	148	10-152	Narak-Lasjerd			

\*The identification code include location: (1) Bushehr, (2) Chaharmahal and Bakhtiari, (3) Fars, (4) Gilan, (5) Isfahan, (6) Kerman , (7) Khuzestan , (8) Kohgiluyeh and Boyer-Ahmad, (9) Mazandaran, (10) Semnan, (11) Sistan and Baluchestan (12) Tehran , (13) Unknown, (14) Yazd, number of genotype in collection.

**Table S2.** Description of the various phenotypic traits and their frequency in the entire and core collection of the evaluated 221 pomegranate genotypes.

Descriptor	Abbreviation	Scores	phenotype	Entire Count	Frequency (%)	Core Count	Frequency (%)
Tree: Tree Crown Shape	TCS	1	Perfectly upright	0	0	0	0
		2	Upright	34	15.38	4	33.33
		3	Wide	187	84.61	8	66.66
		4	Downward	0	0	0	0
		5	Quite downward	0	0	0	0
Tree: Tree Growth Power	TGP	1	Weak	29	13.12	1	8.33
		2	Medium	68	30.76	3	25
		3	Strong	124	56.10	8	66.66
Tree: Thorn in Mature wood Branch	TMB	1	Very few	160	72.39	8	66.66
		3	Few	40	18.09	1	8.33
		5	Medium	13	5.88	1	8.33
		7	A lot	8	3.61	2	16.66
		9	Too many	0	0	0	0
Leaf: Length-to-Width Leaf Ratio	LWLR	1	Very few	0	0	0	0
		3	Few	0	0	0	0
		5	Medium	117	52.94	7	58.33
		7	A lot	104	47.05	5	41.66
		9	Too many	0	0	0	0
flower: Flower Position	FP	1	Lateral	128	57.91	5	41.66
		3	End	68	30.76	4	33.33
		5	Lateral and end	25	11.31	3	25
flower: Flower Formation Site	FFS	1	More on a yearly branch	147	66.51	8	66.66
		2	More on perennial branches	74	33.48	4	33.33
flower: Dominant Flowering Habit	DFH	1	Regular	115	52.03	6	50
		2	Irregular	106	47.96	6	50
flower: Fruitful Flowers Percentage	FFP	1	Less than 50%	129	58.37	5	41.66
		2	More than 50%	92	41.62	7	58.33
flower: Flower Cup Diameter	FCD	3	Small	18	8.14	3	25
		5	Medium	186	84.16	6	50
		7	Large	17	7.69	3	25

Fruit: Fruit Size	FS	1	Very small	0	0	0	0
		3	Small	6	2.71	2	16.66
		5	Medium	209	94.57	8	66.66
		7	Big	4	1.80	1	8.33
		9	Very big	2	0.9	1	8.33
Fruit: Fruit Skin Thickness	FST	1	Thin	15	6.78	1	8.33
		3	Medium	193	87.33	9	75
		5	Thick	12	5.42	1	8.33
		7	Very thick	1	0.45	1	8.33
Fruit: Fruit Skin Sensitivity to Burst	FSSB	1	Very low	0	0	0	0
		3	Low	25	11.31	2	16.66
		5	Medium	22	9.95	1	8.33
		7	High	174	78.73	9	75
		9	Very high	0	0	0	0
Fruit: Fruit Skin Sensitivity to Sunburn	FSSS	1	Very low	0	0	0	0
		3	Low	8	3.61	1	8.33
		5	Medium	213	96.38	11	91.66
		7	High	0	0	0	0
		9	Very high	0	0	0	0
Fruit: Fruit Flavor	FF	1	Sour	52	23.53	5	41.66
		2	Sour-Sweet	147	66.51	5	41.66
		3	Sweet	22	9.95	2	16.66
Fruit: Fruit Ripening Time	FRT	3	Soon	2	0.9	1	8.33
		5	Moderate	207	93.66	10	83.33
		7	Late	12	5.42	1	8.33
Fruit: Fruit Skin Color	FSC	1	White to Yellow	0	0	0	0
		2	Yellow	0	0	0	0
		3	Yellow-red	113	51.13	6	50
		4	Light red	0	0	0	0
		5	Red	85	38.46	4	33.33
		6	Dark red	23	10.4	2	16.66
		7	Red-black	0	0	0	0
Fruit: Fruit Shape	FSH	1	Spherical	94	42.53	5	41.66
		2	Oval	104	47.05	5	41.66
		3	Ovoid	23	10.40	2	16.66
		4	Broad	0	0	0	0
Fruit: Fruit Crown Shape	FCS	1	Long neck	107	48.41	6	50
		2	Normal	114	51.58	6	50
		3	Short neck	0	0	0	0

		4	Without neck	0	0	0	0
		1	Hexagonal symmetry,	0	0	0	0
		2	Pentagonal symmetry	44	19.90	2	16.66
Fruit: Fruit Symmetry	FSY	3	Asymmetric No bold	42	19	3	25
		4	and symmetrical	122	55.20	5	41.66
		5	Smooth and symmetrical	13	5.88	2	16.66
Aril: Aril Size	AS	1	Small	10	4.52	2	16.66
		3	Medium	211	95.47	10	83.33
		5	Large	0	0	0	0
Aril: Aril Color	AC	1	White	2	0.9	1	8.33
		2	Pink	3	1.35	1	8.33
		3	Light red	213	96.38	9	75
		4	Dark red	3	1.35	1	8.33
Seed: Seed Hardness	SH	1	Very soft	2	0.9	1	8.33
		3	Soft	0	0	0	0
		5	Hard	219	99.09	11	91.66
		7	Very hard	0	0	0	0
Yield: Number of Fruits in Tree	NFT	1	0-9	3	1.35	1	8.33
		3	10-19	43	19.45	1	8.33
		5	20-29	9	4.07	2	16.66
		7	30-39	145	65.61	4	33.33
		9	40-49	21	9.5	4	33.33
Yield: Fruit Mean Weight	FMW	1	0-99	16	7.23	1	8.33
		3	100-199	177	80.09	7	58.33
		5	200-299	23	10.40	2	16.66
		7	300-399	4	1.80	1	8.33
		9	400-499	1	0.45	1	8.33
Yield: Tree Mean Yield	TMY	1	Low	78	35.29	6	50
		3	Medium	95	42.98	4	33.33
		5	High	48	21.71	2	16.66