	OP-1	OP-2	F1-A	F1-B	F1-C	F1-D	F2-C	F2-D
OP-1	84.1 ± 2.6							
OP-2	78.5 ± 2.4	86.1 ± 7.1						
F1-A	78.8 ± 2.8	84.4 ± 2.0	95.0 ± 1.8					
F1-B	76.4 ± 2.2	83.7 ± 1.7	87.2 ± 1.6	95.1 ± 1.5				
F1-C	78.6 ± 2.5	78.5 ± 1.8	79.5 ± 1.5	77.4 ± 1.6	95.6 ± 1.9			
F1-D	76.9 ± 2.4	75.6 ± 2.2	76.8 ± 1.4	76.4 ± 1.5	82.5 ± 2.2	93.1 ± 2.3		
F2-C	78.8 ± 2.4	78.8 ± 2.3	80.3 ± 1.8	78.1 ± 1.7	90.2 ± 2.5	81.2 ± 2.6	88.9 ± 2.5	
F2-D	77.7 ± 2.3	76.3 ± 2.1	77.4 ± 1.9	76.9 ± 1.6	81.4 ± 1.9	90.3 ± 2.5	80.2 ± 2.6	91.1 ± 2.3

Figure S1. Pairwise genetic similarity matrix of the eight analysed populations (in percentage) based on Rohlf's genetic similarity coefficient. The high genetic similarity values are labelled in red and the low values are labelled in green. Intermediate values are coloured in scale.

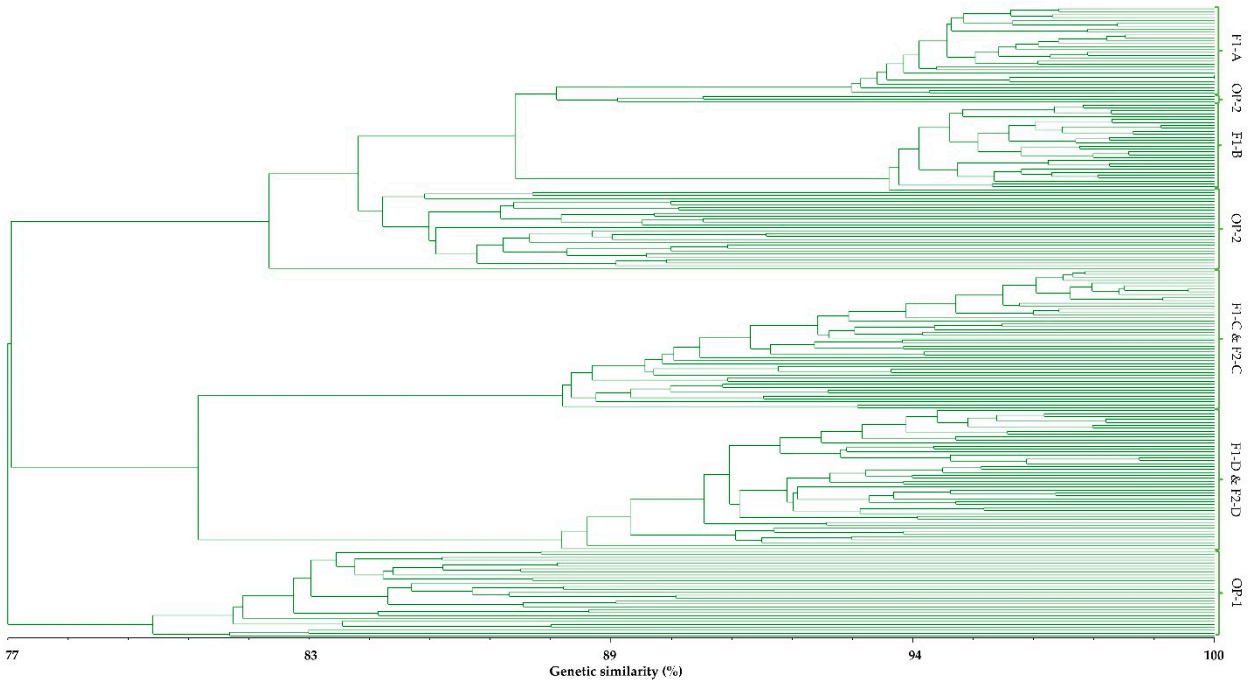

Figure S2. UPGMA tree of the 216 samples analysed. The dendrogram was computed using the symmetrical genetic similarity matrix of all pair-wise comparisons among samples.

Table S1. Number of alleles and PIC found across populations and loci for each of the F1 hybrids, F2 progenies and OP synthetics. In particular, statistics refer to the mean number of alleles (Na) and number of effective alleles (Ne) for each locus, population and type of population and for the whole population. Moreover, PIC values for each locus of each population are presented.

ID	Mean Na/Locus	Mean Ne/Locus	PIC	OP-1		OP-2		F1-A		F1-B		F1-C		F1-D		F2-C		F2-D	
Locus				Na	Ne	Na	Ne	Na	Ne	Na	Ne	Na	Ne	Na	Ne	Na	Ne	Na	Ne
M 2.4	3.1	2.2	0.7	5.0	3.1	8.0	5.1	2.0	1.0	2.0	2.0	2.0	1.1	2.0	2.0	4.0	1.7	2.0	2.0
M 4.10b	2.4	1.8	0.6	5.0	3.2	3.0	1.3	1.0	1.0	1.0	1.0	3.0	1.6	4.0	2.5	3.0	2.5	2.0	1.6
M 3.7	1.1	1.1	0.1	1.0	1.0	1.0	1.0	2.0	1.1	1.0	1.0	3.0	1.4	1.0	1.0	2.0	1.3	1.0	1.0
M 8.22	1.0	1.1	0.0	2.0	1.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
M 2.5	2.6	2.1	0.8	4.0	2.9	5.0	3.0	2.0	2.0	2.0	1.9	1.0	1.0	2.0	2.0	4.0	2.1	2.0	2.0
M 5.15	2.4	1.5	0.3	5.0	3.0	3.0	1.2	1.0	1.0	1.0	1.0	1.0	1.0	3.0	1.7	5.0	2.3	1.0	1.0
M 4.11a	3.1	2.1	0.7	4.0	1.8	6.0	1.7	2.0	1.7	2.0	1.7	3.0	2.6	3.0	2.3	4.0	2.0	4.0	2.6
M 1.1	3.9	2.3	0.8	9.0	3.4	7.0	3.1	2.0	1.8	1.0	1.0	2.0	2.0	3.0	2.1	4.0	2.8	3.0	2.1
M 9.26	3.0	2.0	0.6	6.0	2.3	3.0	1.9	2.0	1.0	2.0	1.9	3.0	2.1	4.0	3.2	4.0	2.3	3.0	1.5
M 4.10a	1.6	1.7	0.5	2.0	1.7	2.0	1.4	1.0	1.0	2.0	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.0	1.9
M 4.11b	2.0	2.1	0.5	3.0	2.6	3.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
M 5.14	1.1	1.1	0.1	2.0	1.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0
M 5.13	2.1	2.1	0.7	4.0	3.0	2.0	2.0	2.0	2.0	1.0	1.0	2.0	2.0	2.0	2.0	4.0	2.9	2.0	2.0
M 6.16	2.9	1.8	0.6	6.0	2.6	4.0	2.4	2.0	1.2	3.0	1.7	2.0	2.0	2.0	1.2	4.0	2.2	2.0	1.4
M 7.19	2.4	2.0	0.6	2.0	1.9	5.0	2.5	3.0	1.7	1.0	1.0	3.0	2.5	2.0	2.0	4.0	2.2	2.0	2.0
M 3.8	3.5	2.1	0.7	4.0	1.6	8.0	4.3	2.0	1.1	2.0	1.0	1.0	1.0	4.0	3.3	4.0	1.3	4.0	3.3
M 4.12	3.9	2.5	0.8	7.0	4.1	9.0	6.1	3.0	1.3	4.0	2.7	1.0	1.0	2.0	1.3	2.0	1.8	4.0	1.4
M 6.17	2.9	2.3	0.7	2.0	2.0	8.0	4.0	2.0	1.1	4.0	3.0	4.0	3.3	2.0	1.1	2.0	1.7	3.0	2.5
M 1.2	3.1	2.1	0.8	6.0	2.5	6.0	3.1	3.0	1.6	2.0	1.2	3.0	2.1	2.0	1.9	4.0	2.6	2.0	1.5
M 1.3	3.1	2.2	0.6	4.0	1.7	7.0	4.1	4.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	4.0	2.2	2.0	2.0
M 9.25	2.5	2.1	0.7	4.0	2.4	3.0	2.1	4.0	2.7	3.0	1.7	3.0	2.1	2.0	1.5	2.0	2.0	2.0	2.0
M 8.23	2.6	1.8	0.7	3.0	2.7	3.0	1.5	4.0	1.6	2.0	2.0	2.0	1.1	3.0	2.1	3.0	1.3	3.0	1.9
M 2.6	3.9	3.0	0.8	10.0	5.2	7.0	4.8	3.0	2.4	2.0	2.0	3.0	2.3	3.0	2.1	4.0	2.9	2.0	2.0
M 7.21	1.9	1.7	0.5	1.0	1.0	2.0	2.0	2.0	1.8	2.0	2.0	2.0	1.7	2.0	2.0	3.0	1.2	3.0	2.1
M 9.27	3.4	2.4	0.8	7.0	4.2	5.0	2.6	4.0	3.9	3.0	2.3	3.0	1.5	2.0	1.5	4.0	1.3	2.0	2.0
M 7.2	2.5	2.2	0.7	6.0	4.3	1.0	1.0	2.0	1.9	3.0	2.1	2.0	2.0	3.0	2.1	3.0	2.1	2.0	1.9

M 8.24	3.3	2.5	0.8	6.0	3.9	4.0	2.0	2.0	1.3	3.0	2.6	4.0	2.2	4.0	3.1	3.0	2.4	4.0	2.1
M 6.18	3.1	2.2	0.7	6.0	4.6	4.0	1.4	1.0	1.0	3.0	2.6	2.0	1.1	4.0	3.1	4.0	1.5	3.0	2.1
M 3.9	3.5	2.6	0.8	8.0	4.0	7.0	3.2	2.0	2.0	2.0	2.0	3.0	2.5	3.0	2.5	3.0	2.7	3.0	2.1
Mean/ Pop	2.7	2.0	0.6	4.6	2.8	4.4	2.5	2.2	1.6	2.1	1.7	2.3	1.8	2.5	2.0	3.2	2.0	2.4	1.9

Table S2. Frequency of private alleles and alleles size for each locus of the populations with frequencies ≥15% and population specific.

ID	Locus	Allele Size (bp)	Freq
OP-1	M8.22	204	16.1%
	M4.11b	196	16.7%
	M6.17	254	50.0%
	M1.3	256	16.7%
	M9.27	278	28.3%
	M 7.2	184	22.9%
	M 6.18	173	19.0%
		175	31.0%
OP-2	M2.4	172	15.0%
	M3.8	171	20.0%
F1-B	M2.4	139	50.0%
	M1.1	247	40.0%
	M4.12	240	15.0%
	M6.17	274	15.0%
F1-C	M6.17	298	25.0%

Table S3. The sizes and the frequencies of the most frequent alleles for each locus of all the varieties and F2 progenies are reported.

ID	OP-1		OP-2		F1-A		F1-B		F1-C		F1-D		F2-C		F2-D	
LOCUS	**Allele size**	**Freq**	**Allele size**	**Freq**	**Allele size**	**Freq**	**Allele size**	**Freq**	**Allele size**	**Freq**	**Allele size**	**Freq**	**Allele size**	**Freq**	**Allele size**	**Freq**
M2.4	166	22.0%	160 - 164 - 174	< 5.0 %	170	98.0%	139	50.0%	170	97.0%	166	47.0%	170	75.0%	166	58.0%
	168	43.0%	162 - 170 - 172	< 16.0 %							170	53.0%	164	12.0%	170	42.0%
	170	30.0%	166	20.0%	168	2.0%	166	50.0%	166	3.0%			168	10.0%		
	158 - 164	< 3.0 %	168	32.0%									166	3.0%		
M4.10b	253 - 257	> 30.0 %							271	78.0%	255	50.0%	271	48.0%		
	255	12.0%	255	86.5%	255	100.0%	255	100.0%	255	19.0%	271	38.0%	255	40.0%	255	75.0%
	259	4.0%	257	9.6%					253	3.0%	252	6.0%	252	13.0%	271	25.0%
	271	8.0%	253	3.8%							259	6.0%				
M3.7					162	93.0%			162	83.0%			162	87.0%		
	162	100.0%	162	100.0%	164	7.0%	162	100.0%	164	11.0%	162	100.0%	164	13.0%	162	100.0%
									157	6.0%						
M8.22	201	84.0%	201	100.0%	201	100.0%	201	100.0%	201	100.0%	201	100.0%	201	100.0%	201	100.0%
	204	16.0%														
M2.5	215	40.0%	215	47.0%	215	57.0%	215	62.0%			219	47.0%	225	67.0%	219	47.0%
	219	42.0%	219 - 225	10.0%	221	43.0%	221	38.0%	225	100.0%	221	53.0%	221	15.0%	221	53.0%
	225	10.0%	221	30.0%									215	12.0%	215	2.0%
	221	8.0%	223	3.0%									219	7.0%		
M5.15	257 - 271	40.0%	271	91.7%							255	22.0%	271	60.0%		
	272	6.7%	272	6.7%	271	100.0%	271	100.0%	271	100.0%	271	72.0%	265	24.0%	271	100.0%
	259	10.0%	269	1.7%							257	6.0%	255	12.0%		
	265	3.3%											261	2.0%		
M4.11a	187	58.3%	187	66.7%					191	61.0%	185	39.0%	191	57.0%	185	79.0%
	185	30.0%	185	28.3%	185	98.0%	185	60.0%	185	33.0%	191	36.0%	185	32.0%	183	16.0%
	172 - 183	3.3%	183	5.0%	187	2.0%	187	40.0%	187	6.0%	187	17.0%	187	7.0%	187	5.0%
	177	1.7%									183	8.0%	183	5.0%		
M1.1	253	70.0%	253	16.0%	255	100.0%	247	40.0%	253	50.0%	253	41.0%	253	57.0%	253	41.0%
	255	30.0%	255	84.0%			255	60.0%	255	50.0%	255	59.0%	255	43.0%	255	59.0%
M9.26	130	73.0%	130	75.0%	140	70.0%	140	72.0%	140	50.0%	130	33.0%	140	60.0%	140	55.0%
	132	17.0%	162	13.0%	162	30.0%	162	28.0%	130	31.0%	140	56.0%	130	37.0%	130	24.0%
	128 - 134	< 7.0 %	134 - 140 - 150 - 156	< 5.0 %					128	19.0%	132	11.0%	128 - 134	2.0%	132 - 143	10.0%
M4.10a	286	46.7%	247	51.7%	247	69.0%			249	50.0%	261	47.0%	249 - 265	37.0%	261	50.0%
	247 - 249 - 265 - 272	7.0 % -5.0 %	265	15.0%	265	31.0%	247	100.0%	265	50.0%	265	50.0%	286	12.0%	265	48.0%
	261 - 267 - 273 - 284	< 5.0 %	267 - 273	10.0 % - 11.0 %							267	3.0%	247	8.0%	270	2.0%
			249 - 255 - 269	< 0.08												
M4.11b	187	58.0%	187	67.0%	199	48.0%	199	50.0%	199	50.0%	199	50.0%	199	50.0%	199	50.0%
	185	30.0%	185	28.0%			203	50.0%								
	172 - 183	3.0%	183	5.0%	203	52.0%			203	50.0%	203	50.0%	203	50.0%	203	50.0%
	177	17.0%														
M5.14	217	30.0%	219	100.0%	219	100.0%	219	100.0%	219	100.0%	219	100.0%	219	98.0%	219	100.0%
	219	70.0%											217	2.0%		
M5.13	243	40.0%			243	55.0%	243	100.0%	245	50.0%	245	53.0%	245	43.0%	245	53.0%

	245	40.0%	245	57.0%	245	45.0%			247	50.0%	247	47.0%	247	31.0%	247	47.0%
	247	20.0%	243	43.0%									243	24.0%	241	2.0%
													241	2.0%		
M6.16	238	60.0%	268	60.0%	268	75.0%	268	75.0%	238	53.0%	238	91.0%	238	57.0%	238	81.0%
	246	30.0%	266	30.0%	270	18.0%	265	20.0%	268	47.0%	268	9.0%	268	31.0%	268	19.0%
	268 - 270	10.0%	238 - 270	10.0%	265	7.0%	244	5.0%					228 - 248	6.0%		
M7.19	195	60.0%	195	47.0%	195	71.0%	195	100.0%	195	53.0%	195	47.0%	195	50.0%	195	52.0%
	203	40.0%	199	7.0%	203	28.0%			203	33.0%	199	53.0%	203	45.0%	199	47.0%
			203	42.0%	193	2.0%			201	14.0%			201	3.0%	197	2.0%
													197	2.0%		
M3.8	169	20.0%	178	40.0%			169	98.0%	181	100.0%	181	36.0%	181	88.0%	181	34.0%
	181	80.0%	171	20.0%	169	93.0%	189	2.0%			185	36.0%	187	5.0%	185	34.0%
			169 - 181 - 183 - 189	< 20.0 %	189	7.0%					183	19.0%	183	5.0%	178	24.0%
											178	8.0%			183	7.0%
M4.12	224	40.0%	226	30.0%	226	87.0%	234	52.0%	228	100.0%	224	86.0%	228	68.0%	224	84.0%
	226	30.0%	232 - 234	> 10.0 %	228	12.0%	226	27.0%			216	14.0%	226	32.0%	216	9.0%
	220	20.0%	220 - 224 - 228 -230	< 10.0 %	224	2.0%	238	15.0%							219 - 225	4.0%
	214 - 222	10.0%					222	7.0%								
M6.17			264	38.0%			266	50.0%	298	25.0%	264	94.0%			264	44.0%
	254	50.0%	266	12.0%	264	98.0%	288	18.0%	304	44.0%			264	69.0%	304	44.0%
	264	50.0%	284	8.0%	284	3.0%	274	15.0%	264	19.0%	304	6.0%	304	31.0%	284	13.0%
							284	18.0%	296	13.0%						
M1.2	201	50.0%	201	7.0%	210	75.0%	210	91.0%	201	56.0%	195	36.0%	213	50.0%	201	80.0%
	206	10.0%	206	21.0%	206	23.0%			213	42.0%	201	64.0%	201	35.0%	195	20.0%
	213	40.0%	211	48.0%	215	2.0%			210	3.0%			206	10.0%		
			213	19.0%									199	5.0%		
M1.3	244	75.0%	250	31.0%	244	63.0%	244	55.0%	244	50.0%	242	53.0%	244	58.0%	242	52.0%
	250	7.0%	232	22.0%	232	25.0%	250	45.0%	250	50.0%	244	47.0%	250	35.0%	244	48.0%
	252	2.0%	244	29.0%	227	4.0%							248	2.0%		
	256	17.0%	246	10.0%									242	5.0%		
			242 - 248 - 252	< 3.0 %												
M9.25	177	57.0%	175	3.0%	177	34.0%	177	73.0%	169	47.0%	175	22.0%	169	50.0%	175	53.0%
	195	27.0%	177	48.0%	195	47.0%	183	25.0%	183	50.0%	177	78.0%	183	50.0%	177	47.0%
	199	13.0%	183	48.0%	183	17.0%	193	2.0%	177	3.0%						
	183	3.0%			187	2.0%										
M8.23	231	50.0%	221	81.0%	221	78.0%	221	50.0%	229	97.0%	229	53.0%	229	87.0%	229	62.0%
	229	27.0%	231	14.0%	223	14.0%	229	50.0%	231	3.0%	247	44.0%	231	13.0%	247	36.0%
	221	23.0%	229	5.0%	229	5.0%					243	3.0%			243	2.0%
					243	3.0%										
M2.6	187	35.0%	193	33.0%	193	50.0%	193	50.0%	193	44.0%	197	53.0%	207	42.0%	201	57.0%
	211	13.0%	197 - 205	17.0 % - 18.0 %	187	40.0%	205	50.0%	197	47.0%	201	44.0%	197	33.0%	197	43.0%
	183 - 185 - 193 - 197 - 199	5.0 %- 1.0 %	195 - 213	12.0 %- 13.0 %	205	10.0%			207	8.0%	203	3.0%	193	20.0%		
	175 - 205 - 213	< 7.0 %	187 - 199	< 5.0 %									199	5.0%		
M7.21	247	100.0%	237	47.0%	237	31.0%	237	50.0%	247	72.0%	237	47.0%	247	90.0%	237	54.0%
			247	53.0%	247	69.0%	247	50.0%	266	28.0%	247	53.0%	237 - 266	5.0%	247	46.0%
M9.27	264	59.0%	306	32.0%	266	36.0%	264	59.0%	301	81.0%	301	81.0%	301	87.0%	301	57.0%

	303 301	22.0% 19.0%	266 -278 262 - 301 - 303 - 308	21.0 % - 28.0 % < 8.0 %	301 264 305	25.0% 21.0% 14.0%	303 301	22.0% 19.0%	299 303	17.0% 3.0%	303	19.0%	303 297 299	7.0% 5.0% 2.0%	303	43.0%
M7.2	175 167 - 184 163 - 165 - 173	33.0% 23.0% < 8.0 %	167	100.0%	132 167	38.0% 62.0%	167 132 169	60.0% 35.0% 5.0%	132 175	58.0% 42.0%	132 175 162	50.0% 47.0% 3.0%	132 175 167	60.0% 33.0% 7.0%	132 175	63.0% 37.0%
M8.24	242 250 - 268 270 232 - 252	35.0% 20.0 %- 28.0 % 11.0% 4.0 % -2.0 %	242 252 268 270	67.0% 20.0% 5.0% 8.0%	242	86.0%	250 267 242	50.0% 30.0% 20.0%	242 267 244 251	47.0% 47.0% 3.0% 3.0%	267 273 269 271	39.0% 33.0% 25.0% 3.0%	242 267 251	52.0% 38.0% 10.0%	267 273 242 265	50.0% 47.0% 2.0% 2.0%
M6.18	175 187 173 - 179 183 - 191	31.0% 21.0% 19.0% < 7.0 %	187 181 - 191 179	83.0% 7.0% 2.0%	187	100.0%	187 191 189	50.0% 30.0% 20.0%	191 193	97.0% 3.0%	191 187 183 193	41.0% 31.0% 25.0% 3.0%	191 187 - 189 193	81.0% 9.0% 2.0%	187 189 181	54.0% 45.0% 2.0%
M3.9	223 - 239 221 - 233 217 227 - 229 - 231	32.0 %- 35.0 % 13.0 % - 8.0 % 5.0% < 3.0 %	223 239 225 221 - 227 - 229 - 231	40.0% 37.0% 12.0% < 5.0 %	223 225	52.0% 48.0%	225 239	50.0% 50.0%	223 239 221	36.0% 50.0% 14.0%	221 239 233	53.0% 28.0% 19.0%	223 239 221	48.0% 28.0% 23.0%	233 221 239	52.0% 47.0% 2.0%

Table S4. The sizes of the most frequent genotype, frequency (Freq) and observed heterozygosity (Ho) for each locus of all the varieties and F2 progenies are reported.

ID	OP-1			OP-2			F1-A			F1-B			F1-C			F1-D			F2-C			F2-D		
Locus	**Genotype**	**Freq**	**Ho Locus**	**Genotype**	**Freq**	**Ho Locus**	**Genotype**	**Freq**	**Ho Locus**	**Genotype**	**Freq**	**Ho Locus**	**Genotype**	**Freq**	**Ho Locus**	**Genotype**	**Freq**	**Ho Locus**	**Genotype**	**Freq**	**Ho Locus**	**Genotype**	**Freq**	**Ho Locus**
M2.4	168 - 168 166 - 168 168 - 170	26.7 % 26.7 % 23.3 %	66.7 %	163 - 168 170 - 170 166 - 170	20.0 % 13.3 % 13.3 %	80.0 %	170-170	96.7 %	3.3%	139-166	100.0%	100.0%	170-170	94.44 %	5.6%	166-170	94.4 %	94.4 %	170-170 170-164 170-168	50.0 % 23.3 % 20.0 %	50.0 %	166 - 170 166 - 166 170 - 170	50.0 % 33.3 % 16.7 %	50.0 %
M4.10b	257 - 257 253 - 253 255 - 255	30.0 % 23.3 % 6.7%	26.9 %	255 - 255 255 - 257 253 - 253	76.9 % 19.2 % 3.8%	19.2 %	255-255	100.0%	0.0%	255-255	100 %	0.0%	271-271	61.11 %	33.3 %	255-255	44.4 %	62.5 %	271-255 271-271 255-255	23.3 % 20.0 % 20.0 %	45.8 %	271 - 271 251 - 271 251 - 251	60.0 % 20.0 % 13.3 %	21.4 %
M3.7	162-162	100.0%	0.0 %	162 - 162	100.0%	0.0%	162-162	93.3 %	0.0%	162-162	100 %	0.0%	162-162	100%	0.0%	162-162	100.0%	0.0%	162-162 164-164	86.7 % 13.3 %	0.0%	162-162	100.0 %	0.0%
M8.22	201 - 201 201 - 204	71.4 % 25.0 %	25.0 %	201 - 201	100.0%	0.0%	201-201	100.0%	0.0%	201-201	100 %	0.0%	201-201	100%	0.0%	201-201	100.0%	0.0%	201-201	100.0 %	0.0%	201-201	100.0 %	0.0%

M2.5	215 - 221 219 - 219	32.1 % 25.0 %	56.7 %	215 - 215 221 - 221	32.1 % 25.0 %	33.3 %	215-215 221-221	46.7 % 33.3 %	17.2 %	215-215 215-221	0.5% 20.0 %	20.7 %	225-225	100%	0.0%	219-221	94.4 %	94.4 %	225-225 215-225	56.7 % 16.7 %	36.7 %	219 - 221 219 - 219	56.7 % 23.3 %	64.3 %
M5.15	257 - 257 271 - 271 259 - 271	26.7 % 26.7 % 6.7%	40.0 %	225 - 215 271 - 271 273 - 273	21.4 % 90.0 % 6.7%	3.3%	271-271	100.0%	0.0%	271-271	100 %	0.0%	271-271	100%	0.0%	255-271 271-271	33.3 % 50.0 %	44.4 %	271-271 265-265 255-271	53.3 % 20.0 % 10.0 %	17.2 %	271-271	100.0 %	0.0%
M4.11a	187 - 187 185 - 185	46.7 % 16.7 %	23.3 %	187 - 187 185 - 185	53.3 % 16.7 %	40.0 %	185-185	96.7 %	3.3%	185-187	73.3 %	73.3 %	185-185 191-191	61.11 % 33.33 %	0.0%	185-185 187-191	27.8 % 33.3 %	72.2 %	191 - 191 185 - 185	40.0 % 26.7 %	33.3 %	185 - 185 183 - 183	76.7 % 13.3 %	3.5%
M1.1	253 - 253 255 - 255	63.3 % 23.3 %	53.3 %	255 - 255 253 - 253	82.8 % 13.8 %	60.0 %	255-255	100.0%	0.0%	247-247 247-255	20.0 % 20.0 %	40.0 %	253-255	100%	100.0%	253-255	77.8 %	82.4 %	253 - 253 253 - 255	40.0 % 33.3 %	33.3 %	253 - 255 253 - 253	40.0 % 36.7 %	42.9 %
M9.26	130 - 130 132 - 132	66.7 % 10.0 %	33.3 %	130 - 130 130 - 162	63.0 % 18.5 %	26.7 %	140-162	60.0 %	60.0 %	140-140 140-162	43.3 % 56.7 %	56.7 %	130-140 128-140	61.11 % 38.89 %	100.0%	130-140	66.7 %	88.9 %	130 - 140 140 - 140	66.7 % 23.3 %	80.0 %	130 - 140 132 - 144	46.7 % 20.0 %	69.0 %
M4.10a	273 - 286 286 - 286 273 - 273	26.7 % 26.7 % 6.7%	13.3 %	247 - 247 247 - 265 247 - 267	33.3 % 13.3 % 13.3 %	3.5%	247-265	60.0 %	62.1 %	247-247	100.0%	0.0%	249-265	88.89 %	88.9 %	261-265	88.9 %	94.4 %	249 - 265 265 - 265 249 - 249	20.0 % 13.3 % 10.0 %	76.7 %	261 - 265 261 - 261	40.0 % 26.7 %	44.8 %
M4.11b	199 - 203 196 - 199	60.0 % 33.3 %	93.3 %	199 - 203 199 - 199	86.7 % 6.7%	90.0 %	199-203	96.7 %	96.7 %	199-203	100.0%	100.0%	199-203	100%	100.0%	199-203	100.0%	100.0%	199-203	100.0%	100.0%	199-203	100.0 %	100.0%
M5.14	219 - 219 217 - 219	56.7 % 20.0 %	20.7 %	219 - 219	100.0%	0.0%	219-219	100.0%	0.0%	219-219	100.0%	0.0%	219-219	100%	0.0%	219-219	100.0%	0.0%	219-219	96.7 %	3.3%	219-219	100.0 %	0.0%
M5.13	243 - 247 243 - 245 243 - 243	28.0 % 28.0 % 20.0 %	63.3 %	243 - 245 245 - 245 243 - 243	60.0 % 26.7 % 13.3 %	60.0 %	243-245	90.0 %	90.0 %	243-243	100.0%	0.0%	245-247	100.00%	100.0%	245-247	94.4 %	94.4 %	243 - 245 245 - 247 245 - 245	30.0 % 26.7 % 20.0 %	79.3 %	247 - 247 249 - 249 245 - 245	53.3 % 26.7 % 16.7 %	56.7 %
M6.16	238 - 238 246 - 246	43.3 % 20.0 %	27.6 %	268 - 268 238 - 268	33.3 % 16.7 %	50.0 %	268-268	30.0 %	21.4 %	268-268	43.3 %	31.8 %	238-268	94.44 %	94.4 %	238-238	77.8 %	17.7 %	238 - 238 268 - 268	46.7 % 20.0 %	20.7 %	238-238	63.3 %	31.0 %

	238 - 246	6.7%		266 - 266	16.7 %													238 - 268	16.7 %					
M7.19	195 - 203 195 - 195	73.3 % 23.3 %	73.3 %	195 - 203 195 - 195	73.3 % 6.7%	90.0 %	195-203	53.3 %	58.6 %	195	100.0%	0.0%	195-203	66.67 %	94.4 %	195-199	94.4 %	94.4 %	193 - 203	86.7 %	96.7 %	195 -199 195 - 195	43.3 % 30.0 %	46.7 %
M3.8	181 - 181 169 - 181 169 - 187	90.5 % 4.8% 28.6 %	36.7 %	178 - 178 171 - 171 171 - 181	30.0 % 10.0 % 10.0 %	53.3 %	169-169	86.7 %	13.3 %	169-169	93.3 %	3.5%	181-181	100.00%	0.0%	181-185	61.1 %	88.9 %	181 - 181	76.7 %	17.2 %	181 - 185 181 - 181 185 - 185	30.0 % 16.7 % 16.7 %	44.8 %
M4.12	224 - 224 226 - 226	36.7 % 23.3 %	10.0 %	226 - 234 220 - 220	13.3 % 6.7%	60.0 %	226-226	73.3 %	26.7 %	226-234 234-234	30.0 % 33.3 %	56.7 %	228-228	100%	0.0%	224-224	77.8 %	16.7 %	228 - 228 226 - 228	46.7 % 16.7 %	24.0 %	224 - 224 216 - 224	78.6 % 10.7 %	10.7 %
M6.17	254 - 254 264 - 264 254 - 264	42.3 % 42.3 % 15.4 %	15.4 %	264 - 264 286 - 286 266 - 266	32.0 % 24.0 % 12.0 %	12.0 %	264-264	63.3 %	5.0%	266-266 266-288	20.0 % 20.0 %	60.0 %	298-304 264-304	22.22 % 16.67 %	87.5 %	264-264	38.9 %	12.5 %	264 - 264 304 - 304 264 - 304	36.7 % 13.3 % 10.0 %	16.7 %	264 - 264 304 - 304 264 - 304	37.5 % 37.5 % 12.5 %	12.5 %
M1.2	201 - 201 201 - 213 213 - 213	32.1 % 32.1 % 21.4 %	44.8 %	211 - 211 206 - 206 213 - 213	44.8 % 20.7 % 17.2 %	6.9%	206-210 210-210	43.3 % 46.7 %	50.0 %	210-210	76.7 %	17.9 %	201-213	83.33 %	88.9 %	195-201	72.2 %	72.2 %	201 - 213 213 - 213 201 - 201	40.0 % 23.3 % 13.3 %	56.7 %	201 - 201 195 - 201	60.0 % 40.0 %	40.0 %
M1.3	244 - 244 244 - 256 244 - 250	53.3 % 30.0 % 10.0 %	46.7 %	244 - 244 232 - 250 250 - 250	20.7 % 20.7 % 17.2 %	44.8 %	232-244 244-244	33.3 % 36.7 %	60.7 %	244-244 244-250	33.3 % 43.3 %	43.3 %	244-250	100%	100.0%	242-244	94.4 %	94.4 %	244 - 250 244 - 244	40.0 % 33.3 %	53.3 %	242 - 242 244 - 244 242 - 244	36.7 % 33.3 % 30.0 %	30.0 %
M9.25	177 - 195 177 - 177 177 - 199	40.0 % 30.0 % 10.0 %	66.7 %	177 - 183 175 - 183 175 - 177	93.3 % 3.3% 3.3%	100.0%	177-195	56.7 %	89.7 %	177-177 177-183	50.0 % 43.3 %	46.7 %	169-183	94.4 %	100.0%	175-177	66.7 %	22.2 %	169 - 183	100.0%	100.0%	175 - 177 175 - 175 177 - 177	53.3 % 26.7 % 20.0 %	53.3 %
M8.23	231 - 231 221 - 221	37.5 % 16.7 %	29.2 %	169 - 169 169 - 183	65.5 % 24.1 %	34.5 %	221-221	66.7 %	17.2 %	221-229	100 %	100.0%	229-229	94.4 %	5.6%	229-247	88.9 %	94.4 %	229 - 229 221 - 229	73.3 % 23.3 %	26.7 %	229 - 247 229 - 229	72.4 % 24.1 %	75.9 %
M2.6	187 - 187	20.0 %	63.3 %	193 - 197	13.3 %	73.3 %	187-193	76.7 %	100.0%	193-205	100.0%	100.0%	193-197	77.8 %	94.4 %	197-201	88.9 %	94.4 %	193 - 207	40.0 %	73.3 %	197 - 201	53.3 %	53.3 %

	187 - 213 187 - 211	10.0 % 10.0 %		193 - 205 193 - 213	13.3 % 13.3 %													197 - 207 197 - 197	23.3 % 20.0 %		201 - 201 197 - 197	30.0 % 16.7 %	
M7.21	247 - 247	100.0%	0.0 %	237 - 247 247 - 247 237 - 237	37.9 % 34.5 % 27.6 %	37.9 %	237-247	60.0 %	62.1 %	237-247	100.0%	100.0%	247-266	55.6 %	55.6 %	237-247	94.4 %	94.4 %	247 - 247 247 - 266	80.0 % 10.0 %	20.0 %	237 - 247 237 - 237 247 - 247	40.0 % 33.3 % 23.3 %	43.3 %
M9.27	266 - 278 266 - 306 278 - 306	16.7 % 10.0 % 10.0 %	80.0 %	264 - 266 264 - 264 266 - 266	31.0 % 27.6 % 13.8 %	58.6 %	266-301	30.0 %	92.9 %	264-303 264-301	33.3 % 26.7 %	72.4 %	301-301	72.2 %	16.7 %	301-301 301-303	61.1 % 38.9 %	38.9 %	301 - 301	73.3 %	26.7 %	301 - 303 301 - 301 303 - 303	43.3 % 33.3 % 20.0 %	44.8 %
M7.2	174 - 184 167 - 167	26.1 % 21.7 %	37.5 %	167 - 167	100.0%	0.0%	132-167	70.0 %	70.0 %	132-167	66.7 %	70.0 %	132-175	83.3 %	83.3 %	132-175	94.4 %	100.0%	132 - 175 132 - 132	66.7 % 20.0 %	80.0 %	132 - 175 132 - 132	7333.3% 2666.7%	73.3 %
M8.24	242 - 268 250 - 268 242 - 270	22.2 % 18.5 % 11.1 %	70.4 %	242 - 242 252 - 270 252 - 252	60.0 % 13.3 % 10.0 %	26.7 %	242-242	70.0 %	27.6 %	250-267	60.0 %	100.0%	242-267	94.4 %	100.0%	269-273 267-273	38.9 % 27.8 %	83.3 %	242 - 267 242 - 242	40.0 % 26.7 %	60.0 %	269 - 273 269 - 269 273 - 273	4000.0% 2666.7% 2333.3%	48.3 %
M6.18	173 - 173 175 - 175	10.7 % 10.7 %	51.7 %	187 - 187 181 - 181	73.3 % 3.3%	3.7%	187-187	100.0%	0.0%	187-191	60.0 %	100.0%	191-191	94.4 %	5.6%	183-187 191-191	44.4 % 33.3 %	56.3 %	191 - 191 187 - 191	63.3 % 16.7 %	34.5 %	187-187 183-183	4000.0% 3333.0%	21.4 %
M3.9	223 - 239 239 - 239	20.0 % 16.7 %	70.0 %	223 - 239 225 - 225	73.3 % 6.7%	86.7 %	223-225	96.7 %	96.7 %	225-239	100.0%	100.0%	223-239	72.2 %	100.0%	221-239 233-239	55.6 % 38.9 %	94.4 %	223 - 223 221 - 239	40.0 % 40.0 %	56.7 %	221-233 233-233	5333.0% 2333.0%	56.7 %

Table S5. The mean degree of expected and observed heterozygosity (He ± Std.Dev. and Ho ± Std.Dev.) for each ID: F1 hybrids, F2 progenies and OPs, singularly and by category (*).

ID	He %	Ho %
OP-1	57 ± 0.04	43 ± 9.73
OP-2	49 ± 0.05	40 ± 8.29
F1-A	29 ± 0.40	39 ± 6.59
F1-B	35 ± 0.05	49 ± 5.23
F1-C	36 ± 0.05	53 ± 4.2
F1-D	45 ± 0.04	67 ± 11.9
F2-C	45 ± 0.03	46 ± 8.48
F2-D	42 ± 0.04	40 ± 10.19
F1 *	36 ± 6.42	52 ± 11.56
F2 *	44 ± 2.18	43 ± 4.35
OP *	53 ± 5.91	42 ± 1.75

Table S6. (**a**) Marker loci showing allele frequencies of the private alleles only present in year 2016 (italic-bold), compared to the 2 previous production years of the hybrid variety analysed. (**b**) Marker loci that show alleles with meaningful differential frequencies (italic-bold) among the 3 years.

(a)

Locus	M1.2			M1.3			M2.6			M8.24			M9.25		
Allele\year	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**
A_1	48.9%	50.0%	34.5%	26.6%	19.8%	22.8%	0.6%			99.5%	98.9%	87.4%	99.5%	100.0%	85.2%
A_2	51.1%	50.0%	50.0%			2.5%	30.8%	49.5%	39.0%			0.5%	0.5%		
A_3			***15.5%***	72.9%	79.3%	66.1%	0.6%				1.1%				***14.8%***
A_4				0.5%	0.9%		67.0%	50.5%	50.0%	0.5%					
A_5						***8.6%***	1.1%					***12.1%***			
A_6									***11.1%***						

(b)

Locus	M8.23			M9.26			M9.27		
Allele\year	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**
A_1	1.1%			***25.8%***	0.5%		30.8%	24.2%	25.0%
A_2	21.7%	50.0%	34.6%	48.4%	75.8%	30.3%	27.3%	49.5%	35.8%
A_3	0.5%			0.6%		***46.1%***		0.5%	
A_4	50.0%	50.0%	48.9%	24.7%	23.7%	23.6%	20.4%	25.8%	24.3%
A_5			1.1%	0.6%			0.6%		1.4%
A_6	1.6%						***19.8%***		***13.5%***
A_7	***24.5%***		***15.4%***				0.6%		
A_8	0.5%							0.6%	

Table S7. SSR primer tail and dye. List of the primer tails used with their sequence and corresponding dye.

Universal Primer	Sequence 5′–3′	Dye
M13	TTGTAAAACGACGGCCAGT	6-FAM
PAN1	GAGGTAGTTATTGTGGAGGAC	VIC
PAN2	GGAATTAACCGCTCACTAAAG	NED
PAN3	TGTAGAAAGACGAAGGGAAGG	PET