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Phylogenetic Relationship Among Wild and Cultivated Grapevine in Sicily: A Hotspot in the Middle of the Mediterranean Basin

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Grapevine (*Vitis vinifera* ssp. *sativa*) is a perennial crop especially important for wine and fruit production. The species is highly polymorphic with thousands of different varieties selected by farmers and clonally propagated. However, it is still debated whether grapevine domestication from its wild ancestor (*V. vinifera* ssp. *sylvestris*) has been a single event or rather it occurred on multiple occasions during the diffusion of its cultivation across the Mediterranean. Located in the center of the Basin, Sicily is its largest island and has served as a hotspot for all civilizations that have crossed the Mediterranean throughout history. Hundreds of unique grapevine cultivars are still cultivated in Sicily and its surrounding minor islands, though most of them are menaced by extinction. Wild grapevine is also present with isolated populations thriving along riverbanks. With the aim to evaluate the phylogenetic relationships among Sicilian varieties, and to assess the possible contribution of indigenous wild populations to the genetic makeup of cultivated grapevine, we analyzed 170 domestic cultivars and 125 wild plants, collected from 10 different populations, with 23 SSR markers. We also compared our data with published dataset from Eurasia. Results show that Sicilian wild populations are related to the cultivated Sicilian and Italian germplasm, suggesting events of introgression and/or domestication of local varieties.

Keywords: grapevine, *Vitis vinifera* subsp. *sativa*, *Vitis vinifera* subsp. *sylvestris*, domestication, SSR

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INTRODUCTION

Grapevine (*Vitis vinifera* L.) is one of the most widespread and economically important perennial crops on the planet. It was estimated that in 2016 the world vineyard area was 7.4 million hectares, with a production of 76 million tons of fresh grapes and 269 million hectoliters (mhl) of wine (http://www.oiv.int/). The cultivation of the domesticated grape (*V. vinifera* L. subsp. *sativa* (DC.) Hegi) is believed to have started at least 7,000–8,000 years ago from its wild progenitor (*V. vinifera* L. subsp. *sylvestris* (Gmel.) Hegi (McGovern, 2003). Archaeological and historical studies evidenced that the primary center of domestication of the grapevine is located between the Near East (Zohary et al., 1996) and the Transcaucasian region (Olmo, 1976), then the grapevine spread around the Mediterranean, following the main civilizations (Carthaginians, Etruscans, Phoenicians, Greeks, and Romans) (McGovern, 2003). During its spreading across the Western Mediterranean regions, the grapevine increased its genetic variability due to the contribution of multiple genetic pools and progressive human selection (Bacilieri et al., 2013). Different studies support the presence of secondary domestication centers, where spontaneous hybridizations among cultivated forms and local wild plants, or direct selection, generated the pattern of the modern Western European cultivars (Grassi et al., 2003; Arroyo-García et al., 2006; Myles et al., 2011; De Andrés et al., 2012; Riaz et al., 2018). Nowadays, more than 6,000 cultivated varieties are recorded (Lacombe et al., 2013; in OIV, 2017). The genotypes of the cultivated vine are highly heterozygous and most of the modern cultivars are hermaphrodite, self-fertile, and easily crossed (This et al., 2006). Several authors reported a high genetic diversity within the subsp. *sativa*, although it was recently demonstrated that such variability is included within a complex network of close pedigree relationships, derived by crosses among elite cultivars (Myles et al., 2011).

The domestic and the wild vine can be distinguished by morphological differences concerning leaves, flowers, and fruits, although in most cases the distinction of wild grape is hampered by the gene flow between the two subspecies (Di Vecchi-Staraz et al., 2009). The wild grapevine is a dioecious liana that grows in northern Africa, Europe, and the Near and Middle East, in areas between 30° and 50° north latitude. In central and eastern Europe, it thrives in mixed deciduous forests in correspondence with warmer (southern exposure) and humid (valleys of the Rhine, the Loire, the Rhone, the Danube, etc.) microclimates, while in the Mediterranean region it mainly participates in the riparian woodlands (pure or mixed populations dominated by poplars, willows, elms, ash trees, alders in areas with shallow water; pioneer shrub communities with tamarisks and oleanders along the middle-terminal section of the streams; mixed stands with holm and downy oak; shrubby mantle assemblages). At present time wild grapevine has become rather rare due to several forms of human disturbance, such as habitat destruction and fragmentation, silvicultural practices, diffusion of pathogens (e.g., oïdium, phylloxera, mildew, and viruses), improper management of natural environment, and hybridization with domestic forms (Arrigo and Arnold, 2007; Zecca et al., 2010; Garfì et al., 2013; Pacifico et al., 2016; Arnold et al., 2017). Gene flow between wild and cultivated grapevines was confirmed in several countries such as Spain (Arroyo-García et al., 2006; De Andrés et al., 2012), Italy (Zecca et al., 2010) and Georgia (Ekhvaia et al., 2014). In the last years, molecular methods based on the use of microsatellite (SSR) (This et al., 2004; Grassi et al., 2008; Carimi et al., 2011; Lacombe et al., 2013; Emanuelli et al., 2013) and, more recently, on single-nucleotide polymorphism (SNP) markers (Salmaso et al., 2004; Myles et al., 2011; Emanuelli et al., 2013; Laucou et al., 2018; De Lorenzis et al., 2019), as well as on genome sequencing (Zhou et al., 2017) allowed not only to improve the discrimination between wild and cultivated populations, but also to study the relationships among different cultivated varieties and wild accessions.

In Italy, grapevine cultivation is reported since the second half of the 2nd millennium BCE, starting from the Southern regions and then moving northward in the second part of the 1st millennium (Hopf, 1991; Forni, 2012). However, the recent discovery of a large storage jar containing tartaric acid could date back to the Copper Age (early 4th–3rd millennium BCE) the origin of winemaking in Sicily (Tanasi et al., 2017). Sicily and its satellite islets host a rich vascular flora and due to its central position in the Mediterranean, the island has played and still plays a key role in connecting both plant and human populations of neighboring Mediterranean countries. Among plant species *V. vinifera* subsp. *sylvestris* is also present in the region with isolated populations mainly thriving along riverbanks (Garfì et al., 2013). Moreover, the island boasts a very ancient and rich tradition of viticulture practices and more than 70 different cultivars have been found in mainland Sicily (Carimi et al., 2010; Carimi et al., 2011). In addition, the Sicilian minor islets have recently emerged as a hotspot of genetic diversity for grapevine. Genetic analyses of this germplasm showed that at least 75 different genetic profiles are present in the Aeolian and Pelagie archipelagos, and the isles of Pantelleria and Ustica. Most of these genetic profiles (39) were not listed in national and international grapevine databases (Gristina et al., 2017). Such notable variety may have originated from domestication of wild autochthonous grapevines as well as from introduction of domesticated varieties from different regions during various historical periods.

In order to provide meaningful insights into grapevine evolution and domestication in the Mediterranean Basin, in this work, we compared the unique plant material constituted by the relict populations of Sicilian wild grapevine to the cultivated local germplasm, as well as to grapevine accessions from Western Europe and Central Asia. To evaluate the phylogenetic relationships among Sicilian varieties, and to assess the possible contribution of indigenous wild populations to the genetic makeup of cultivated grapevines, we analyzed with 23 nuclear SSR markers 170 local cultivars (*V. vinifera* spp. *sativa*), from the main Island and surrounding archipelagos, and 125 wild plants (*V. vinifera* spp. *sylvestris*) collected from 10 different Sicilian populations.

MATERIALS AND METHODS

Plant Materials, Study Sites, and Sampling

The list of cultivated and wild accessions analyzed in this study includes all the cultivars that had already been described as traditionally cultivated in Sicily and its minor islands (Carimi et al., 2010; Carimi et al., 2011; Gristina et al., 2017) and all the natural populations identified so far (Garfì et al., 2013), plus other cultivated and wild accessions collected in subsequent surveys.

Most part of the grapevine cultivars and the wild germplasm collected in the field is conserved in the germplasm repository for perennial plants by the Institute of Biosciences and BioResources of the National Research Council of Italy (CNR-IBBR) located in Collesano district (province of Palermo), Italy (37°59'19.9"N, 13°54'55.8"E, 80 m a.s.l.).

Wild *Vitis* germplasm was collected during several surveys between 2007 and 2016 in the main mountainous and protected areas of Sicily (**Figure 1**). Considering the morphologic resemblance of wild and cultivated grapevines, in order to reduce as much as possible the risk of collecting plants deriving from naturalized grapevine cultivars or rootstocks, the sampling strategy for *V. sylvestris* was based on the main

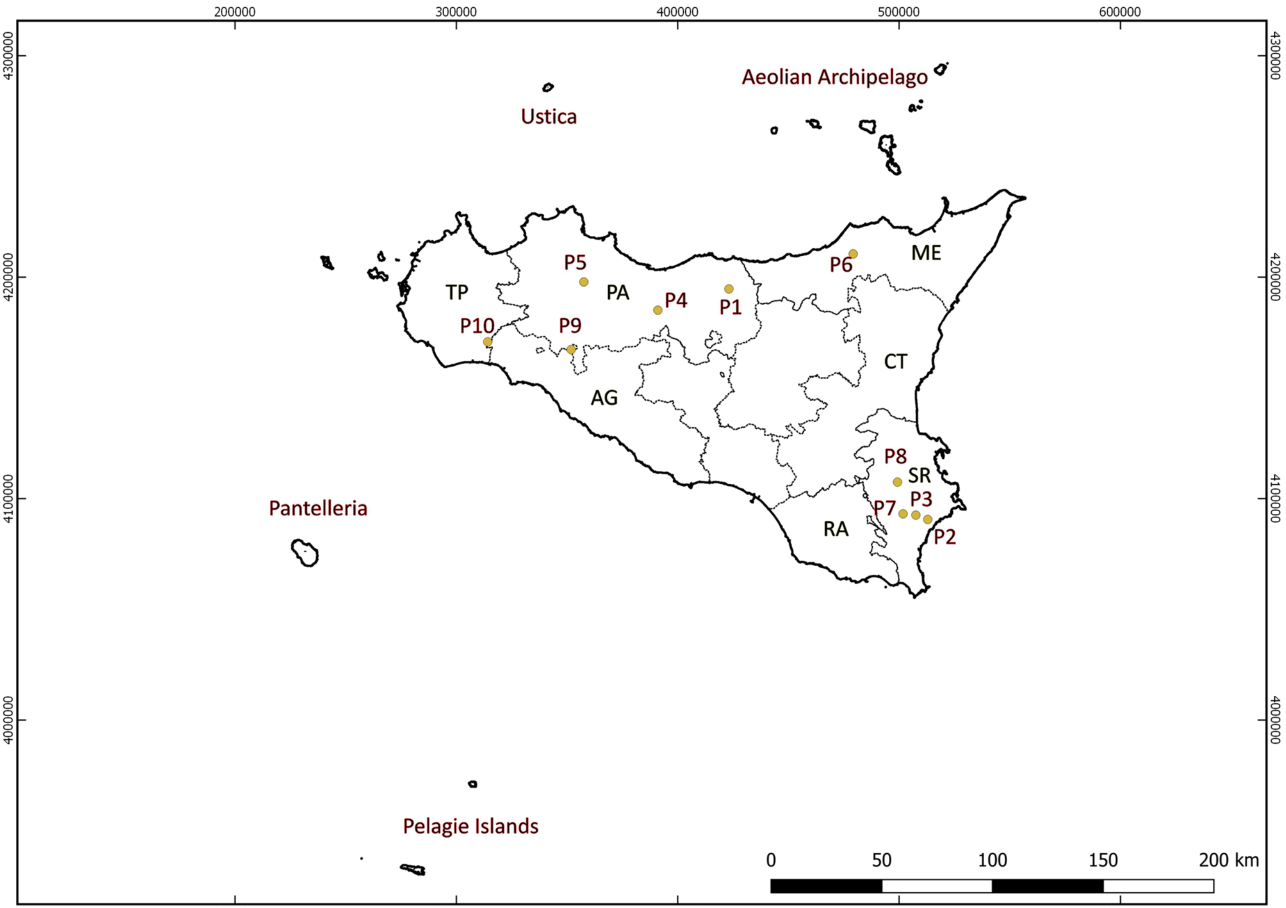

FIGURE 1 | Map of Sicily indicating the collection sites of wild grapevine.

differentiating reference traits used to distinguish wild grapevines from domesticated ones (Olmo, 1976; Garfì et al., 2013). Morphological data acquired *in situ* were integrated by 3–5 years of ampelographic studies carried out on grafted plants at the CNR-IBBR germplasm repository. In total, we collected 131 plants (**Supplementary Table S1**) from 10 different populations (**Supplementary Table S2**). Following molecular screening, four clones (3076 = 3074-P6, 3045 = 3058 = 3059 P4, 3139 = 3140-P10) and two feral forms (3109-P8, 3143-P10) were excluded from further analysis (final wild samples analyzed = 125).

Cultivated germplasm was collected between 2006 and 2017 directly from old vineyards. The cultivated accessions were selected following the indications of farmers and labeled for subsequent analysis and plant propagation. In total, 104 accessions were collected from Sicily and 66 from the surrounding minor islands (**Table 1**).

DNA Extraction and SSR Analysis

Total genomic DNA was extracted from young leaves or inner wood of young cuttings. Tissues were ground into fine powder with liquid nitrogen and stored at −80°C until use. The extraction was carried out following the CTAB method (Doyle and Doyle, 1987). DNA was diluted in water to a final concentration of 10 ng/µl, and its quality assessed by spectrophotometric measurements.

Samples were analyzed at 23 SSR loci (Simple Sequence Repeat), i.e., VVS2 (Thomas and Scott, 1993), VVMD5, VVMD6, VVMD7, VVMD17, VVMD21, VVMD24, VVMD25, VVMD27, VVMD28, VVMD32 (Bowers et al., 1996; Bowers et al., 1999), VrZAG62, VrZAG79 (Sefc et al., 1999), VMC1b11 (Zyprian and Töpfer, 2005), VMC4f3.1 (Di Gaspero et al., 2000), VVIb01, VVIh54, VVIn16, VVIn73, VVIp31, VVIp60, VVIq52, and VVIv67 (Merdinoglu et al., 2005). Forward primers were labeled with one of four fluorescent dyes: 6-FAM, ATTO550, ATTO565, or Yakima Yellow. SSRs were grouped in six multiplex pools, each comprising three or four SSRs marked by different dyes, and characterized by similar annealing temperatures (**Supplementary Table S3**). Twenty-ng DNA per sample were amplified in 96 wells plates by using either the MyTaq HS (Bioline) or the DreamTaq HS (ThermoFisher) DNA polymerases with the following conditions: 15 min at 95°C (Taq activation step), followed by seven cycles consisting of 30 s at 94°C (denaturation), 90 s at the appropriate annealing temperature (**Supplementary Table S3**; touch-down step, with temperature decreasing by 1°C each cycle), 1 min at 72°C (extension). Additional 25 cycles with the same conditions maintained the final annealing temperature constant (**Supplementary Table S3**). Finally, the final PCR step

TABLE 1 | List of cultivated and wild accessions of *Vitis vinifera* (295) grouped into groups based on their geographic origin and analyzed by 23 SSR markers. The number of samples for each group is presented in brackets.

***V. vinifera* subsp. *sativa* (170)**	***V. vinifera* subsp. *sylvestris* (125)**
Sicily main Island (104)	**P1** Castelbuono, Madonie Mts., Palermo (16)
Agrigento (8)	**P2** Cava Grande Cassibile, Iblei Mts. Syracuse (14)
Catania (19)	**P3** Cava Sturia, Iblei Mts. Syracuse (4)
Messina (9)	**P4** Riserva Boschi Favara and Granza, Torto Valley Palermo (16)
Palermo (22)	**P5** Bosco della Ficuzza, Sicani Mts. Palermo (9)
Ragusa (7)	**P6** Stretta di Longi, Nebrodi Mts. Messina (12)
Syracuse (21)	**P7** Fiume Manghisi, Iblei Mts. Syracuse (14)
Trapani (18)	**P8** Riserva Pantalica and Valle Anapo, Iblei Mts. Syracuse (13)
Circum-Sicilian Islands (66)	**P9** Fiume Sosio, Sicani Mts. Agrigento (20)
Aeolian Archipelago (39)	**P10** Riserva Zangara, Belice Valley Trapani (7)
Pelagie Islands (3)	
Pantelleria Island (18)	
Ustica Island (6)	

In bold the wild populations code.

was set for 30 min at 60°C. PCR products were size-separated by capillary electrophoresis performed on a genetic analyzer (ABI Data analysis Prism3130, Applied Biosystems, Inc.) by an external service (Eurofins Genomics, Germany). Electropherograms were visually verified by Gene Mapper v. 5.0 software. Allele size was estimated by comparing the fragment peaks with the internal size standard, using the default method for size calling with SSR and the expected repeat size. To correct for amplification shifts among different PCRs, SSR profiles were normalized by including in each amplification run the DNA of standard cultivars Pinot Noir, Sauvignon Blanc, and Zibibbo. For comparison with the published dataset from Riaz et al. (2018), we used a subset of common core of 17 SSRs, excluding VrZAG62, VrZAG69, VVS2, VVMD5, VVMD17, and VVMD6 from our profiles. For normalization among datasets, we used two common varieties, namely Sangiovese (present with the synonym Minutidda in our dataset) and Zibibbo.

Data Analysis

To identify ferals, i.e., wild accessions with at least one cultivated parent, we performed a parentage analysis between Sicilian *sylvestris* and cultivated accessions using Bayes' theorem with the R/Solomon package (Christie et al., 2013). The identified ferals (2) were removed from the set of genotypes on which the analyses were performed.

Several diversity parameters were estimated using GenAlEx 6.5 (Peakall and Smouse, 2012): the number of alleles per locus (Na), the number of effective alleles per locus (Ne), the observed (Ho) and expected (He) heterozygosity (Nei, 1978; Nei, 1987), and the fixation index (F). At population level, pairwise Nei's genetic distances and Fst value were calculated. Inbreeding coefficients Fis and Fit were calculated using Arlequin ver. 3.5.2.2 (Excoffier and Lischer, 2010).

The NJ (Neighbor-Joining) phylogenetic tree was designed by using R/ggtree package (Yu et al., 2017) with Nei's distance. The bootstrap analysis was performed based on 1,000 resamplings.

Genetic relationships among the studied genotypes were investigated by Discriminant Analysis of Principal Components (DAPC). DAPC, implemented in the R/adegenet (Jombart, 2008), was performed to infer population subdivision of the analyzed collection, regardless of the geographic origin. The number of principal components (PCs) retained was evaluated using the cross-validation procedure.

Principal coordinates analysis (PCoA) was performed by GenAlEx 6.5 *via* Covariance matrix with data standardization.

To identify the number of genetic groups in the wild populations and to investigate their relationships with domesticated cultivars we used the software STRUCTURE version 2.3.4 (Pritchard et al., 2000) that employs a model-based Bayesian clustering method. The estimate of the most likely number of genetic groups (Ks) was performed following Pritchard and Wen (2003) and the simulation study by Evanno et al. (2005), which proposed an *ad hoc* statistic, DELTA K. For each K, 20 independent runs (100,000 burn-in, 1,000,000 Marchov Chain Monte Carlo) were carried out. All runs were performed with the admixture model. The 20 runs were averaged using the software CLUMPP (CLUster Matching and Permutation Program; Jakobsson and Rosenberg, 2007), and shown in histograms using the program Distruct (Rosenberg, 2004). For the hierarchical analysis, samples showing an ancestry value lower than 0.80 to any cluster were removed. The remaining subsets, one for each cluster, were independently subject to a second round of STRUCTURE analysis, as in Emanuelli et al. (2013), following the procedure described above.

RESULTS

Flower Characterization

One of the most obvious traits distinguishing *sativa* vs. *sylvestris* subspecies is the flower structure, since wild grapevine is dioecious whereas flowers of *V. vinifera* subs. *sativa* are usually hermaphroditic. In order to verify that plants collected in putative wild populations showed the dioecious phenotype, we analyzed flower morphology either during collection, or in subsequent years for those plants that had been transferred in the germplasm repository. **Supplementary Table S1** indicates the flower morphology for each plant. As expected, all the 170 cultivated plants had hermaphroditic flowers. Among the wild plants, we could assign a gender only to 122 out of 131 plants (93%), since in nine plants flowers and fruits were not evident at the collection time, and the scions did not survive grafting in the germplasm repository. Among the remainders, 68 plants were clearly females and 54 males, thus allowing us to exclude hermaphrodite plants that are usually considered feral or naturalized forms.

Genetic Diversity in the Sicilian Germplasm

The Sicilian wild and cultivated germplasm was first screened to identify clones and ferals. The four clones and two ferals identified by parentage analysis were then removed from our dataset.

The genetic profiles of the 170 cultivated and 125 wild accessions at 23 nuclear SSR loci are shown in **Supplementary Table S4**, and their statistics in **Table 2**. The total number of alleles (Na) was 314,

TABLE 2 | Genetic diversity indices calculated for 295 distinct Sicilian genotypes belonging to *sativa* and *sylvestris* accessions.

Locus	N	Na	Ne	Ho	He	F
VVS2	281	14	5.6	0.829	0.821	–0.011
VVMD5	278	17	7.4	0.662	0.865	0.235
VVMD6	284	11	4.8	0.673	0.793	0.151
VVMD7	288	18	5.3	0.823	0.812	–0.014
VVMD17	287	10	3.2	0.408	0.683	0.403
VVMD21	286	15	2.8	0.570	0.646	0.118
VVMD24	283	9	2.9	0.572	0.654	0.124
VVMD25	278	12	4.6	0.705	0.782	0.098
VVMD27	290	13	6.0	0.807	0.833	0.032
VVMD28	262	24	8.8	0.748	0.887	0.156
VVMD32	276	13	5.7	0.783	0.825	0.052
VrZag62	283	11	7.4	0.859	0.865	0.007
VrZag79	281	13	5.2	0.722	0.809	0.107
VMC1b11	285	16	4.5	0.821	0.778	–0.056
VMC4f3.1	291	17	8.7	0.832	0.885	0.061
VVIb01	280	11	2.9	0.639	0.656	0.026
VVIh54	281	16	3.7	0.541	0.727	0.255
VVIn16	283	8	3.4	0.640	0.704	0.092
VVIn73	295	8	1.4	0.268	0.308	0.131
VVIp31	276	17	7.7	0.793	0.870	0.088
VVIp60	282	15	4.3	0.745	0.769	0.031
VVIq52	284	9	3.5	0.739	0.712	–0.039
VVIv67	284	17	6.5	0.768	0.846	0.092
Mean	282.5	13.7	5.06	0.693	0.762	0.093
Standard Error	1.348	0.809	0.418	0.030	0.026	0.022
Total		314				

Mean value over total samples for each Locus: N, sample size; Na, Number of alleles per locus; Ne, Number of effective alleles; Ho, Observed heterozygosity; He, Expected heterozygosity; F, Fixation index.

with a mean value per locus of 13.7. The marker VVIn73 showed the lowest values of Na, effective alleles (Ne), observed and expected heterozygosity (Ho and He), whereas the marker VVMD28 the highest values, with the exception of Ho, where the maximum was present in VrZag62. The F value ranged from −0.056 (VMC1b11) to 0.403 (VVMD17), with a mean value of 0.093.

Genetic diversity analysis at population level shows that the number of alleles (Na) was similar between the cultivated pool (11.8) and the wild pool (10.8 as average), with wild populations ranging from 2.8 (P3, P4) to 7.0 (P9) (**Table 3**). For the number of effective alleles (Ne), the lowest value was in P4. In the cultivated pool, the observed and expected heterozygosity (Ho and He) were similar (0.697 and 0.741, respectively). The fixation index (F) and the inbreeding coefficient (Fis) were close to zero (0.067 and 0.025, respectively). In wild populations, P1 showed a marked positive F value (0.143), while in the other populations F was negative or close to zero, with P4 showing the lowest value (−0.567). Similarly Fis was strongly negative in P4 showing the lowest Fis value (−0.715).

The pairwise Nei's genetic distances and Fst values for all the wild populations and the cultivated pool is shown in **Table 4**. Nei's genetic distance ranged from 0.926 (P4-P5) to 0.083 (P8-cultivated). Fst values confirmed the pattern, with the highest value 0.324 for the pair P5-P4 and the lowest value 0.025 for cultivated-P8. Comparing the wild accessions altogether with the cultivated pool, Nei's genetic distance was 0.147, Fst 0.042 ($p < 0.001$), Fis 0.02667 ($p < 0.001$) and Fit 0.07406 ($p < 0.001$).

The genetic diversity of wild and cultivated Sicilian grapevines was first assessed by DAPC analysis of the SSR profiles (**Figure 2A**). The cultivated samples formed a compact cluster in the upper right part of the graph, whereas the wild samples were scattered along the left and the lower sides of the axes. Populations 4 and 5 were the most divergent along the y and x axes, respectively. P4 formed a separate pool, neither related to the other wild populations nor to the cultivated cluster; P5 was less homogeneous and it was clearly connected to other wild populations, yet it stood the furthest apart from the cultivated pool. Interestingly, three samples from wild populations, from P1, P6, and P8, lied amidst the cluster of *sativa*, possibly indicating cases of genetic introgression. Conversely, few cultivated samples fell close to *sylvestris* pools. These cultivars were: Bracaù, Lorisi, Mantonico B, and Tintorè (**Supplementary Dataset S1**).

Samples were also discriminated by PCoA analysis, that is based on genetic distances (**Figure 2B**). The distribution pattern closely resembled the one originated by DAPC, with P4 forming an isolated pool, and the cultivated samples clustering on one side of the main axis. Interestingly, the PCoA confirmed that individual plants from P1, P6, and P8 were admixed within the cultivated cluster.

A third independent analysis of the genetic diversity in Sicilian wild and cultivated germplasm was performed by using STRUCTURE. With this method, the most likely sorting indicated two genetic clusters, A and B (**Figure 2C, Supplementary Dataset S1**). Almost all the cultivated plants (98%) belonged to the cluster B (**Figure 2D**). Of these, most of them (95%) had an ancestry value higher than 0.65, and 86% higher than 0.80, indicating a strong link to this cluster (**Supplementary Dataset S1**). Cluster B also included all samples

TABLE 3 | Genetic diversity estimates for wild populations and cultivated grapevines accessions analyzed from Sicily.

Population		N	Na	Ne	Ho	He	F	Fis
P1 -sylvestris (16)	Mean	15.1	5.7	3.5	0.578	0.670	0.143	0.076
	SE	0.3	0.4	0.3	0.043	0.026	0.054	0.054
P2 -sylvestris (14)	Mean	13.9	5.9	3.8	0.684	0.698	0.024	0.054
	SE	0.1	0.4	0.3	0.039	0.025	0.040	0.039
P3 - sylvestris (4)	Mean	3.6	2.8	2.3	0.699	0.527	–0.343	–0.300
	SE	0.1	0.2	0.1	0.056	0.034	0.080	0.092
P4 - sylvestris (16)	Mean	15.7	2.8	2.0	0.739	0.452	–0.567	–0.715
	SE	0.2	0.2	0.1	0.080	0.035	0.105	0.107
P5 - sylvestris (9)	Mean	8.8	4.2	3.0	0.750	0.632	–0.176	–0.122
	SE	0.1	0.2	0.2	0.047	0.027	0.048	0.049
P6 - sylvestris (12)	Mean	12.0	5.7	3.3	0.612	0.653	0.072	0.089
	SE	0.0	0.3	0.3	0.042	0.026	0.044	0.043
P7 - sylvestris (14)	Mean	13.6	4.4	3.1	0.760	0.634	–0.200	–0.233
	SE	0.1	0.3	0.2	0.042	0.027	0.046	0.046
P8 - sylvestris (13)	Mean	12.5	6.0	3.9	0.699	0.710	0.015	–0.006
	SE	0.2	0.4	0.3	0.034	0.026	0.035	0.035
P9 - sylvestris (20)	Mean	19.2	7.0	4.1	0.680	0.691	0.012	–0.037
	SE	0.1	0.6	0.4	0.038	0.035	0.033	0.033
P10 - sylvestris (7)	Mean	7.0	3.8	2.9	0.737	0.627	–0.179	–0.120
	SE	0.0	0.2	0.2	0.052	0.024	0.070	0.070
Total sylvestris (125)	Mean	121.2	10.8	4.6	0.689	0.748	0.082	0.029
	SE	0.7	0.8	0.3	0.029	0.025	0.021	0.020
sativa (170)	Mean	161.3	11.8	4.7	0.697	0.741	0.067	0.025
	SE	1.3	0.6	0.4	0.037	0.028	0.031	0.031
range		3.6–161.3	2.7–11.7	1.9–4.6	0.57–0.76	0.45–0.74	–0.56-0.14	–0.71–0.08

Mean value over loci for each population. N, number of samples; Na, number of alleles per population; Ne, number of effective alleles; Ho, Observed heterozygosity; He, Expected heterozygosity; F, Fixation index; Fis, inbreeding coefficient (within individuals relative to the rest of their subpopulation); SE, standard error. Numbers in brackets represent the number of accessions per group.

TABLE 4 | Estimates of pairwise Fst values (below the diagonal) and Unbiased Nei's genetic distance (above the diagonal) within overall wild and cultivated Sicilian accessions.

	P1 *sylvestris*	P2 *sylvestris*	P3 *sylvestris*	P4 *sylvestris*	P5 *sylvestris*	P6 *sylvestris*	P7 *sylvestris*	P8 *sylvestris*	P9 *sylvestris*	P10 *sylvestris*	*sativa*
P1 *sylvestris*		0.161	0.319	0.596	0.270	0.285	0.298	0.182	0.202	0.326	0.291
P2 *sylvestris*	**0.054**		0.192	0.380	0.423	0.210	0.170	0.112	0.134	0.281	0.225
P3 *sylvestris*	**0.094**	**0.061**		0.592	0.377	0.382	0.393	0.270	0.257	0.397	0.334
P4 *sylvestris*	**0.241**	**0.191**	**0.288**		0.926	0.635	0.325	0.298	0.606	0.582	0.315
P5 *sylvestris*	**0.093**	**0.124**	**0.134**	**0.324**		0.467	0.486	0.452	0.300	0.347	0.575
P6 *sylvestris*	**0.096**	**0.071**	**0.125**	**0.268**	**0.148**		0.377	0.243	0.170	0.415	0.361
P7 *sylvestris*	**0.097**	**0.062**	**0.122**	**0.182**	**0.155**	**0.128**		0.193	0.268	0.309	0.263
P8 *sylvestris*	**0.049**	**0.037**	**0.070**	**0.172**	**0.128**	**0.080**	**0.068**		0.167	0.193	0.083
P9 *sylvestris*	**0.061**	**0.043**	**0.072**	**0.233**	**0.095**	**0.059**	**0.088**	**0.049**		0.221	0.310
P10 *sylvestris*	**0.104**	**0.090**	**0.133**	**0.277**	**0.125**	**0.135**	**0.115**	**0.066**	**0.073**		0.268
sativa	**0.079**	**0.062**	**0.081**	**0.138**	**0.137**	**0.100**	**0.078**	**0.025**	**0.080**	**0.077**	

In bold significant Fst values with $p \leq 0.01$ calculated over 999 permutations.

from wild population P4, all of them with ancestry values higher than 0.80, and few individuals from P1, P6, and P8. Cluster A included the majority (76%) of wild plants. Looking in detail the ancestry values of each population, P3, P5, P7, and P10 had all individuals belonging to cluster A. The remaining populations, with the exception of the above mentioned P4, showed variable degrees of association to cluster A (ranging from 95% of P9 to 54% of P8). The association strength to cluster A was high for all wild populations, with ancestry values higher than 0.80 in most cases. The exceptions were P4, as discussed above, and P8, that was equally mixed between the two clusters, and showed low ancestry values (<0.65) in most cases. Interestingly, the cluster A also included four cultivated plants (2% of all cultivated). These varieties are Austina bianca, Bracaù, Giugnatica, and Mantonico B. However, the ancestry values were lower than 0.65 for all these plants, indicating a weak association to the cluster.

Since STRUCTURE did not differentiate among the wild populations, except P4, and between P4 and the cultivated pool, we performed a hierarchical STRUCTURE analysis on the outcome of the first round. In the second round, samples from cluster A split into four subclusters (**Figure 2E**, **Supplementary Dataset S1**). Only two populations, P3 and P10, were equally

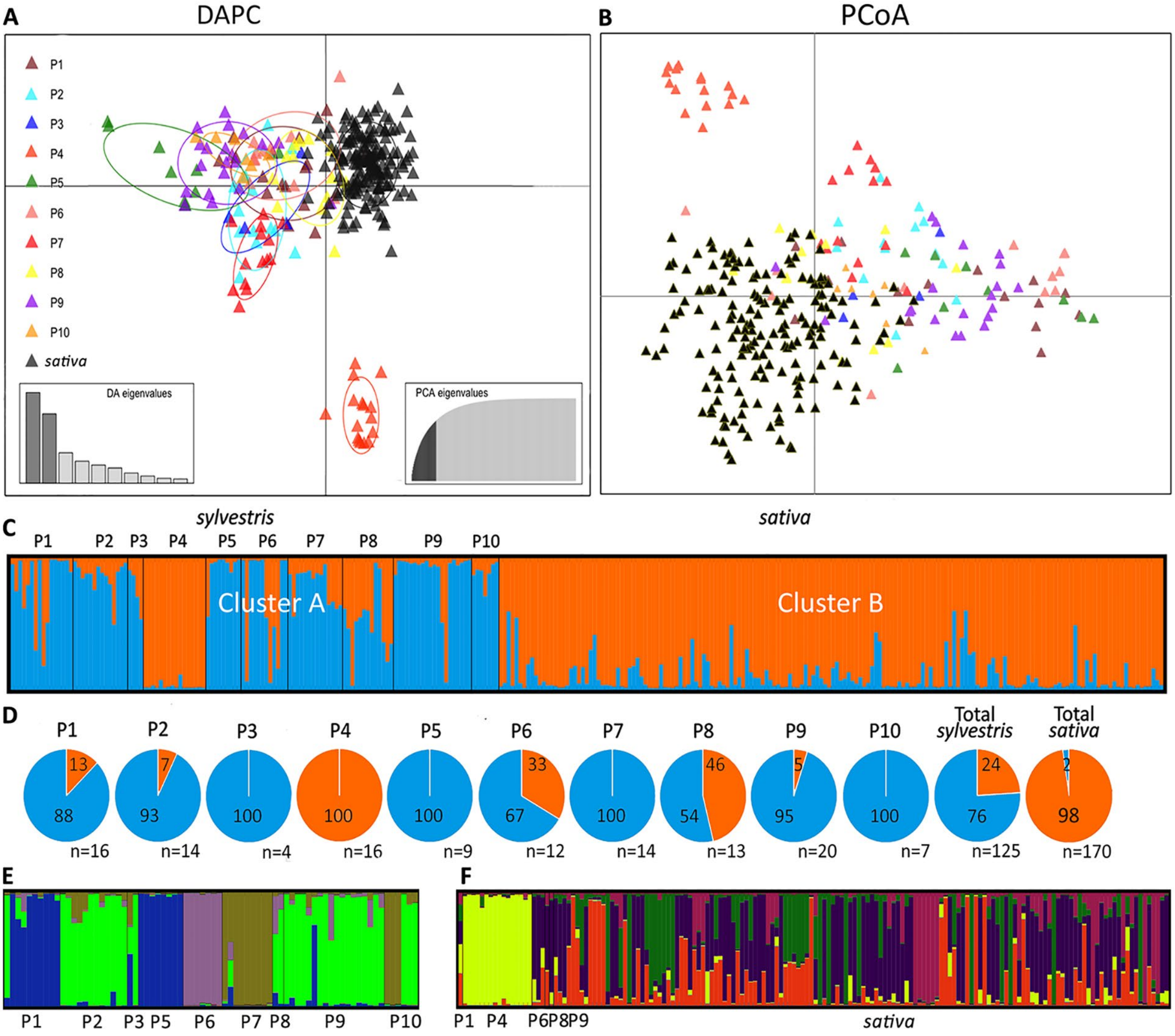

FIGURE 2 | Analyses of Sicilian *sativa* and *sylvestris* germplasm. Discriminant Analysis of Principal Components (DAPC) **(A)**; Principal coordinates analysis (PCoA) **(B)**; first round of STRUCTURE **(C)** with percentage (pies) for each cluster and population **(D)**; second round of STRUCTURE for cluster A **(E)** and cluster B **(F)**.

split between two subclusters. Each remaining population belonged exclusively (P2, P5, P6, P7, P8) or predominantly (90% P1; 94% P9) to single subclusters. For cluster B, the second round of STRUCTURE revealed five subclusters (**Figure 2F**, **Supplementary Dataset S1**). While the cultivated accessions and the few wild individuals of P1, P6, P8, and P9 (that in the first round grouped in cluster B) showed a very mixed pattern among the five subclusters, all individuals from P4 strongly grouped together in a private subcluster (ancestry value > 0.80 in all cases; **Supplementary Dataset S1**).

Finally, genetic distances among the Sicilian samples were also visualized in a phylogenetic tree (**Supplementary Figure S1**). The tree confirmed that most of *sylvestris* populations formed compact branches, indicating that individuals within a population were closely related with each other. The exception was P8 and a small part of P1, P6, and P9, whose individuals were interspersed among the cultivated samples.

Relationship of Sicilian vs. Mediterranean and Central Asian Germplasm

Recently, Riaz et al. (2018) analyzed a large set of cultivated and wild grapevine accessions from across the Mediterranean basin and Central Asia by 20 nuclear SSRs. In order to frame the genetic structure of the Sicilian germplasm within the geographical distribution of the species, we compared the profiles of 17 SSRs, that represented a common set in the two datasets. The genetic parameters for the markers analyzed are shown in **Table 5**. Overall, ranges and mean values of each parameter were similar to those of the Sicilian germplasm. In the wider survey, we observed a higher number of alleles (Na and Ne), indicating an increased polymorphism in the largest dataset, as expected, especially since Central Asian populations are characterized by high genetic diversity (Riaz et al., 2018).

Since the dataset by Riaz et al. (2018) contains 289 Italian wild accessions, we first compared our Sicilian wild samples

TABLE 5 | Genetic diversity indices calculated for 1,673 genotypes from Europe to Asia belonging to *sativa* and *sylvestris* accessions.

Locus	Na	Ne	Ho	He	F
VVMD7	20	8.531	0.771	0.883	0.127
VVMD21	21	3.350	0.489	0.702	0.303
VVMD24	13	4.304	0.648	0.768	0.156
VVMD25	23	5.342	0.738	0.813	0.092
VVMD27	22	5.823	0.686	0.828	0.172
VVMD28	32	8.850	0.730	0.887	0.177
VVMD32	19	11.006	0.732	0.909	0.195
VMC1b11	24	6.919	0.702	0.855	0.179
VMC4f3.1	32	8.038	0.796	0.876	0.091
VVIb01	20	3.637	0.635	0.725	0.125
VVIh54	25	5.781	0.653	0.827	0.210
VVIn16	14	3.173	0.602	0.685	0.121
VVIn73	15	2.170	0.423	0.539	0.216
VMIp31	26	11.012	0.791	0.909	0.130
VVIp60	20	7.152	0.729	0.860	0.152
VVIq52	13	3.927	0.559	0.745	0.250
VVIv67	27	9.553	0.754	0.895	0.158
Mean	21.529	6.387	0.673	0.806	0.168
Standard Error	1.420	0.675	0.026	0.024	0.013
Total	366				

Na, Number of alleles per locus; Ne, Number of effective alleles; Ho, Observed heterozygosity; He, Expected heterozygosity; F, Fixation index.

against this subset. PCoA analysis showed that the two pools were clearly separated, and that the Sicilian samples were characterized by higher diversity along the second axis (**Supplementary Figure S2**). Therefore, the Sicilian wild dataset was not redundant with the Italian dataset, and it could be compared with all the other samples.

The DAPC analysis of all the cultivated and wild accessions from the Mediterranean and Central Asia, including the Sicilian populations, showed a triangle-shaped distribution (**Figure 3A**). The center of the triangle was populated by the wild samples from Croatia and the cultivated accessions from all the regions. The exceptions were Italy and Sicily, which clustered in the lowest vertex, together with all the Sicilian wild populations. The upper vertex included the *sylvestris* samples from Western Countries (Spain, France, Italy), whereas the rightmost vertex included the Eastern *sylvestris* populations (Armenia, Azerbaijan, Georgia). Similarly, the PCoA graph differentiated the Eastern from the Western wild samples. However, all the cultivated samples, including the Sicilian and the Italian, and the wild Sicilian grouped together in this analysis (**Figure 3B**).

We then analyzed all data by STRUCTURE. The addition of the Sicilian germplasm did not vary the most likely number of clusters compared to the original analyses by Riaz et al. (2018), with K = 3 (**Figure 3C**). As in Riaz et al. (2018), one cluster (B) dominated all the cultivated samples, regardless of their origin (**Figure 3D**). A second cluster (C) characterized Asian wild samples. The third cluster (A) was the most abundant for almost all the wild Spanish, French, and Italian samples. The Croatian and Georgian wild samples were especially mixed between cluster A-B and B-C, respectively. A similar situation was observed for the Sicilian wild samples: the major component was cluster B, but many samples showed an important contribution of cluster A. When the major contribution for each sample was considered, 90% of Sicilian wild samples were dominated by cluster B, and 10% by cluster A. Among the 12 samples belonging to cluster A, seven had an ancestry value higher than 0.65, and three exceeded 0.80 (**Supplementary Dataset S2**). When we looked at the distribution within each Sicilian population, only P5 had a large amount of samples (6 out of 9, 67%) belonging to cluster A; six populations (P3, P4, P6, P7, P8, P10) clustered entirely in cluster B; the remaining populations had a few samples in cluster A. All the cultivated Sicilian samples showed cluster B as major component. Nevertheless, Bracaù also had 22% association with cluster A, Austina bianca 19%, and Giugnatica 18%. For all the other samples, the ancestry value for cluster B was higher than 0.80.

Finally, we run a second round of STRUCTURE on the samples closely associated to cluster B, which included most of the Sicilian germplasm and the *sativa* accessions from all the regions. We identified three subclusters (**Figures 3E, F**, **Supplementary Dataset S2**). Subcluster BA included most of the Eastern *sativa* (Georgia 98%; Turkmenistan 83%; Pakistan 70%) and the residual Italian, Croatian, and Georgian *sylvestris* that were grouped in cluster B in the first round. Subcluster BB included most of the Sicilian germplasm, both *sylvestris* (98%) and *sativa* (94%), and more than half of the Italian *sativa* accessions (58%). Subcluster BC included almost all the Spanish and French cultivated accessions (98% and 93%, respectively).

DISCUSSIONS

For millennia, grapevine cultivation has been central in the culture and economy of many regions across the Mediterranean Basin and Middle East, with thousands of different varieties

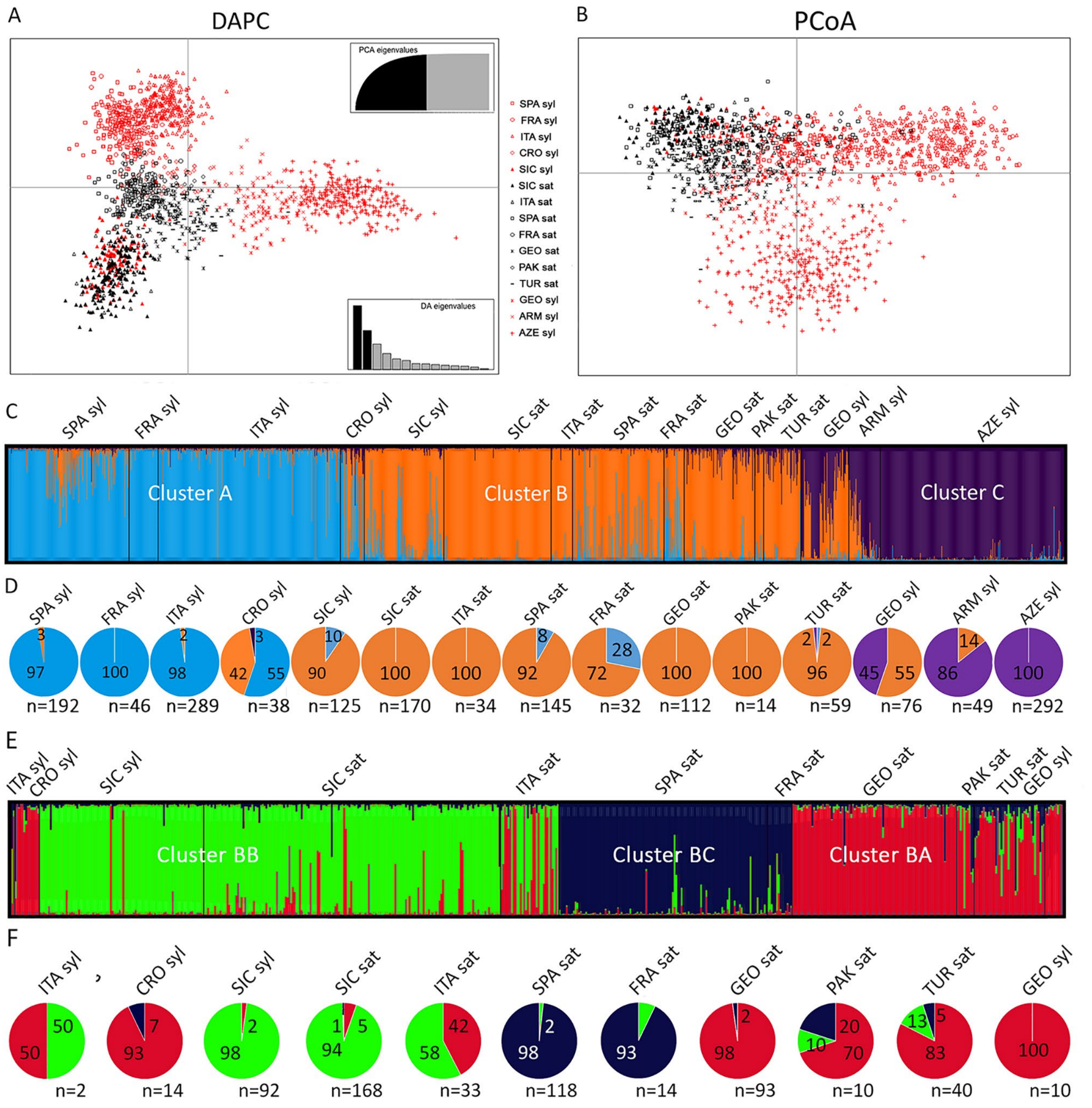

FIGURE 3 | Analyses of Sicilian, Mediterranean and Central Asian *sativa* and *sylvestris* germplasm. Discriminant Analysis of Principal Components (DAPC) **(A)**; Principal coordinates analysis (PCoA) **(B)**; first round of STRUCTURE **(C)** with percentage (pies) for each cluster and population **(D)**; Second round of STRUCTURE for cluster B **(E)** with percentage (pies) for each subcluster and population **(F)**.

selected. Yet, the exact dynamics of grapevine domestication remains elusive, and subject of a passionate debate among scholars of different fields. In the last decades, molecular techniques have expanded our ability to dig into the genetic signatures left along the history of crossing and migrations. Recent studies have generated genetic profiles for hundreds of cultivated and wild grapevine accessions, though the geographical origin of the sampled material is generally unequal, with Eastern and Southern populations highly underrepresented. In this study, we compared the genetic structure of wild and cultivated grapevine germplasm from Sicily, a region that has been so far overlooked. Due to its size and its central position in the Mediterranean, bridging between Europe and Africa, Sicily has always played a key role in the migration routes crossing the Mediterranean basin, both for natural dispersion of species and during human migrations. The recent discovery of a jar containing wine residues dates back the winemaking culture in Sicily to the 4th–3rd millennium BCE, i.e., at approximately the same time of the oldest wine traces found in the Armenia, and about 2,000 years later than the oldest evidence of wine production in Georgia, considered the primary domestication center for grapevine (Areshian et al., 2012; Tanasi et al., 2017; McGovern et al., 2017). For all these reasons, Sicily might have potentially played a major role in the domestication history of grapevine.

We first focused on the comparison between cultivated and wild populations within the Sicilian germplasm. The DAPC and the PCoA distinguished the cultivated from the wild germplasm along the main axis, reflecting major genetic distances between the two groups. Wild samples were especially scattered, indicating a high degree of diversity, probably due to the genetic isolation of most of the populations. The exception was the wild population P4, which separated from the cultivated pool only along the secondary axis, and was not connected with the other wild populations. STRUCTURE confirmed the major divergence between cultivated and wild samples. However, P4 initially grouped together with the cultivated pool, validating the affinity suggested by DAPC and PCoA. Only a second round of STRUCTURE separated P4 from *sativa*, matching the segregation observed along the secondary axis of DAPC and PCoA. These results, together with the Fst, and Nei values, that were highest in the pairwise comparisons of P4 with the other wild groups, suggest that P4 is very different from the other Sicilian wild populations, as confirmed by the Fis value, and that is related to the cultivated accessions. We had already noticed the peculiar genetic makeup of P4 before, though using only six SSR markers (Garfì et al., 2013). It was speculated that the isolation and the unique ecological context of P4 (i.e., a scree-type instead than the usual riparian habitat, **Supplementary Table S2**) likely affected its propagation strategy, relying more on specialized faunal dispersion of seeds than on hydraulic dynamics. In this study, we also observed that P4 was the population showing the highest excess of heterozygosity (F and Fis index), suggesting that it might suffer from genetic introgression from external sources, for example by fertilization of female *sylvestris* plants with pollen from cultivated plants growing nearby, as prompted by the presence of abandoned fields in the surroundings. Intriguingly, all 18 individuals sampled in P4 turned out to be females (**Supplementary Table S1**), a pattern that cannot be explained by random sampling in a natural population of this size. Moreover, we excluded that P4 was a clonal population, spreading by vegetative propagation or apomixy, since genetic analysis revealed that only two plants were clones. All the other individuals were genetically different, though closely related to each other, as evident in the DAPC, PCoA, the second round of STRUCTURE and phylogenetic tree. A possible explanation would be that P4 derives from old dioecious varieties, an uncommon feature in modern cultivated plants, or from hybrids *V. vinifera* x *Vitis* spp., during the early attempts to transfer phylloxera resistance traits to European grapes. That would explain the dioecious phenotype and the affinity with cultivated varieties. We also have to consider that SSRs are neutral molecular markers, whereas the expression of phenotypic traits can be influenced by environmental conditions. Therefore, it is possible that natural settings (forest or riverbank environment, as opposed to agricultural environment) can favor the expression of a more *sylvestris*-like morphology, while more *sativa*-type traits are masked. Finally, during our collection surveys, we deliberately sought plants possessing all the typical *sylvestris* features, such as a dioecious flower, ignoring those with hermaphroditic flowers, that could randomly appear at each generation in some individuals if a population maintains a significant *sativa* contribution. Yet, P4 forms a compact cluster in all the analyses we have performed, therefore the putative introgression events must have occurred in a common ancestor of all current individuals. Alternatively, P4 might represent the residues of an ancient *sylvestris* population that contributed to the genetic structure of many modern Sicilian and Italian cultivars, as discussed below.

Stronger evidence of introgression from the *sativa* pool characterizes P8, since this population largely mixed with the cultivated pool in all our analyses. Moreover, the STRUCTURE ancestry values of most accessions from P8 were weak, indicating mixed profiles between the *sativa* and *sylvestris* clusters. Confirming this hypothesis, the pairwise genetic distance between P8 and the cultivated pool was very low, and individuals from P8 were dispersed among *sativa* accessions in the phylogenetic tree. Population P8 is located in the Anapo Valley at Pantalica, a site with a large Neolithic necropolis that is known to be actively inhabited since ancient times, and that is currently surrounded by cultivated fields. To a minor extent, we also observed evidence of introgression in single individuals of P1 and P6, since a few samples clustered together with the *sativa* group in the DAPC, PCoA, STRUCTURE, and the phylogenetic tree. The genetic isolation of these populations was also confirmed by the positive inbreeding coefficient value (Fis). We suspect introgression with cultivated germplasm also for P3, P5, P7, P10 given that the observed heterozygosity (Ho) values are higher than the expected (He). Nevertheless, the negative Fis value showed by the latter populations, indicating an excess of heterozygosity, could be also due to the following different factors: the small population size, overdominant selection favoring heterozygote survival (heterosis) self-incompatibility system effect, proportion of asexual reproduction and effect of clonal reproduction on the number of heterozygotes (asexuality effect) (Stoeckel et al., 2006). All the other *sylvestris* samples are more isolated, showed different cluster distribution compared to the *sativa* pool and grouped together in the phylogenetic tree, suggesting that their genetic connection with the cultivated pool was weaker. In particular, P5 was the population less related to the *sativa* group, and more similar to the *sylvestris* germplasm from Italy, France, and Spain.

Taking advantage of the extensive study by Riaz et al. (2018), we compared the Sicilian germplasm to cultivated and wild accessions from Western Europe and Central Asia. The dataset used by Riaz et al. (2018) comprises a large number of Italian *sylvestris* (289 accessions). The exact geographical origin of each accession is not specified in the paper, yet we ascertained that Riaz et al.'s dataset does not comprise any Sicilian sample (De Lorenzis, personal communication), as opposed to the larger collection from which the wild Italian samples from Riaz et al. derived (Biagini et al., 2014). Accordingly, we did not find any clone between our dataset and the one from Riaz et al. (2018). Moreover, DAPC and PCoA showed that the Sicilian *sylvestris* samples were very distantly related to the other wild Italian populations, including also those from the neighboring region Calabria, suggesting that the Sicilian wild populations are genetically isolated from the rest of Italy.

By using the combined dataset, the DACP, PCoA, and STRUCTURE analyses confirmed what observed by these authors, with three main clusters discriminating: *i*) a Western *sylvestris* pool, *ii*) an Eastern *sylvestris* pool, and *iii*) the cultivated germplasm, regardless of their origin. The latter cluster also contained the wild Croatian samples. The samples falling in the transition zones among these clusters might suggest events of gene flow between wild populations and the cultivated germplasm in these regions, as previously reported from several investigations (Arroyo-García et al., 2006; Myles et al., 2011; De Andrés et al., 2012; Riaz et al., 2018). In addition to these three main pools, the DAPC also showed a fourth cluster which included most of the Sicilian *sylvestris* plants and all the Sicilian and Italian cultivated samples, suggesting that Sicilian and Italian cultivars are closely related, as expected due to the close geographical proximity, the deep historical connections between the two areas, and the intense commercial exchanges. Moreover, the Sicilian and Italian cultivars were more related with each other, and with the Sicilian *sylvestris*, than with other cultivars worldwide, suggesting events of genetic isolation and/or local secondary domestication, with introgression of genetic material from the Sicilian wild germplasm (possibly, from populations related to current P4) into the cultivated Italian pool. The latter hypothesis is consistent with the assumption that grapevine cultivation in Italy spread from the Southern regions northward since the second part of the 1st millennium BCE (Hopf, 1991; Forni, 2012).

The two-step analysis through STRUCTURE provided some additional information. In the first round of STRUCTURE, the cultivated Sicilian germplasm clustered together with most of the other *sativa* accessions; on the contrary, the wild populations showed a mixed distribution, clustering in part with the cultivated accessions and in part with the Western *sylvestris* pool, a situation similar to what observed in Croatia and, as for the Eastern cluster, in Georgia and Armenia. The different results obtained from STRUCTURE in the analysis of the Sicilian germplasm alone (where the cultivated pool clearly differed from the wild populations) and the wide scale analysis, might depend on the number of SSR markers used (23 in the first analysis and 17 in the second) and on the larger genetic diversity present in the world dataset, that may hinder the smaller differences within the Sicilian accessions. However, the second round of STRUCTURE clearly distinguished a cluster including nearly all the Sicilian germplasm, both *sylvestris* and *sativa*, and more than half of the Italian cultivated accessions, thus confirming the affinity among these groups, already observed in the DAPC analysis. The hierarchical STRUCTURE also separated the cultivated accessions from other regions of the world in two additional clusters. One included almost all samples from Western Europe (Spain and France); a third cluster included the Eastern *sativa* accessions (Georgia, Pakistan, Turkmenistan) plus *sylvestris* form Georgia, Croatia and Italy. Interestingly, about half of the Italian (42%) cultivated accessions also showed affinity for this cluster. Therefore, the Italian cultivars are very different from the rest of Western Europe, and appear as mix between the Eastern group and the Sicilian pool. Accordingly, the list of Italian *sativa* accessions grouping together with the Sicilian germplasm consists predominantly (15 out of 18) of cultivars from Southern regions (Aglianico, Aglianicone, Catarratto Foglia tonda, Frappato, Grillo, Magliocco, Malvasia, Malvasia del Lazio, Malvasia nera di Brindisi, Montonico, Nerello cappuccio, Primitivo, Sangiovese, Sciaccarello, Zibibbo) with the exception of three cultivars that are from Northern Italian regions (Glera, Ribolla gialla, and Schiava lombarda), pointing to a close relationship of this group with the Sicilian germplasm. Conversely, the remaining Italian cultivars, which show affinity with the Eastern pool, are varieties mostly cultivated in the Northern regions (Albarola, Barbera, Brugnola, Butascera, Croatina bianca, Croatina int. corto, Luglienga bianca, Marzemino, Merlina, Moradella di Montalto, Rossara, Rossola, Schiava grossa, Sirica).

The close relationship between the Sicilian *sylvestris* and the Sicilian and Italian *sativa* pools, observed in the wide DAPC, PCoA, and STRUCTURE analyses, is intriguing and can be explained by two different hypotheses. First, it is possible that many Sicilian wild populations suffer from introgression of *sativa* germplasm. This scenario is plausible, considering many different factors, such as the relatively small extension of the island, its millennial history of exploitation, the ancient reduction of its original forest cover, the importance of viticulture in the local economy with extensive fields, and the diffusion of recent diseases threatening the natural populations (Pacifico et al., 2016). We especially found strong evidence for this situation in population P8. Alternatively, it is possible that the current wild Sicilian populations are phylogenetically related to a *sylvestris* group that has not been identified yet, or is even extinct, and that contributed to the early domestication of grapevine. In that case, the residual current Sicilian wild populations maintain a close link to the cultivated germplasm or even directly contributed to the development of some local *sativa* varieties. For its genetic homogeneity, separation from the other *sylvestris* populations and its relation to the cultivated Sicilian and Italian pool, P4 represents an intriguing candidate.

In agreement with this hypothesis, our analyses indicated a few Sicilian cultivated varieties as closely related to the Sicilian wild germplasm, namely Austina bianca, Bracaù, Giugnatica, Lorisi, Mantonico, and Tintorè. Unfortunately, we could retrieve very little historical information for these varieties. Austina bianca is a white grape variety cultivated in the province of Palermo, it was traditionally used for table and wine production. Bracaù, also known as Grecaù, is not mentioned in ancient literature. It is a black berry vine grown in the province of Catania, traditionally used for wine production (Carimi et al., 2010). Giugnatica is a red table grape grown in the Aeolian archipelago. It is considered an early grape that ripens in June. The first citation of Lorisi dates back to the beginning of the nineteenth century. Geremia (1836) mentioned Lorisi, also known as Visparu (Geremia, 1839) in a review of wine varieties found in the vineyards of Etna valley, province of Catania. It was used to make good quality sweet white wines and for the production of raisins. In the second half of the nineteenth century, Caruso (1869) mentions two forms of Lorisi (white and black berry) grown in the area of Cefalù, province of Palermo. Mantonico, existing as white and black berry versions, has been described in Sicily under different names: Muntonicu, Montonico nero femminino, Mantonicu niuru fimmineddu, Montonico nero and Mantonicu niuru for the black berry version, and Montonico bianco, Mantonicu vrancu, Mantonicu masculu for the white berry version. The first citations of this vine dates back to the early 1500s (Venuti, 1516), and later on it was also mentioned by Cupani (1696), Sestini (1812) and Minà Palumbo (1891). In the Aeolian archipelago, where our accession was collected, the red grape form is considered a traditional local variety and is used to produce sweet wines (Gristina et al., 2017). The Tintorè grape, of unknown origin, was found in the province of Agrigento and used to darken the wine. There is no historical information on this grape variety in Sicily. Our results show that Sicilian wild populations are related to the cultivated Sicilian and Italian germplasm, suggesting events of introgression and/or domestication of local varieties. It is thus intriguing to speculate that these ancient Sicilian varieties may derive from local *sylvestris* germplasm.

CONCLUSIONS

The comparison of the genetic structure of Sicilian *sylvestris* populations with the cultivated local germplasm and the grapevine accessions across Western Europe and Central Asia confirms the genetic separation between the Western and Eastern *sylvestris* pools, and their connections with the cultivated germplasm. The Sicilian wild populations appeared closely related to the local cultivated germplasm, probably due to gene flow between the two pools, for either hybridization or early events of introgression of the *sylvestris* germplasm into *sativa* accessions. Considering the archeological evidences that point to Sicily among the oldest centers in grapevine cultivation (Copper Age, early 4th–3rd millennium BCE), it is plausible that the genetic affinity among current Sicilian *sylvestris* and *sativa* germplasms derives from early domestication events occurred in this region. The data set and the results presented here, in a region of primary interest for understanding domestication, migration, and expansion of grape around the Mediterranean basin, may contribute to facilitate future investigations to further unravel the phylogenetic history and population dynamics of grapevine.

DATA AVAILABILITY STATEMENT

All datasets for this study are included in the article/**Supplementary Files**.

AUTHOR CONTRIBUTIONS

RM and FC conceived and supervised the project. RM, AG, LA, AM, GG and FC contributed to collect plant materials. RM, DC and FB performed the genetic characterization of the plant material. RM, AG and IF analysed the data. RM, AG, IF, and FC analysed and interpreted data. RM, AG, DP and FC wrote the first draft. All authors made a substantial, direct and intellectual contribution to this work. All of the author approve the final version of the manuscript.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpls.2019.01506/full#supplementary-material

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Supplementary Figure S1. NJ phylogenetic tree of cultivated and wild Sicilian accessions.

Supplementary Table S1. List of 301 *V. vinifera* subps. *sativa* and *sylvestris* grapevine samples analysed.

Accessions ID	Species	Population Code	Source District / Area (Population Code)	Name	Sex
3005	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♀
3006	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♀
3007	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♀
3009	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♀
3010	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♂
3011	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♂
3013	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♀
3015	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♂
3016	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♀
3017	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♀
3018	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♂
3019	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♂
3020	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♀
3021	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♀
3022	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		♀
3023	V. vinifera subps. sylvestris	P1	Castelbuono, Madonie Mts. PA (P1)		nd
3024	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♂
3025	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♂
3026	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♀
3027	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♂
3028	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♀
3029	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♂
3030	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♂
3031	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♀
3032	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♀
3033	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♀
3034	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♂
3035	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♀
3036	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♂
3037	V. vinifera subps. sylvestris	P2	Cava Grande Cassibile, Iblei Mts. SR (P2)		♀
3039	V. vinifera subps. sylvestris	P3	Cava Sturia, Iblei Mts. SR (P3)		♂
3040	V. vinifera subps. sylvestris	P3	Cava Sturia, Iblei Mts. SR (P3)		♂
3041	V. vinifera subps. sylvestris	P3	Cava Sturia, Iblei Mts. SR (P3)		♀
3042	V. vinifera subps. sylvestris	P3	Cava Sturia, Iblei Mts. SR (P3)		♀
3043	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3044	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3045	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3046	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3047	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3048	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3050	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3051	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3052	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3053	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3054	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3055	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3056	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3057	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3058	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3059	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3060	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3061	V. vinifera subps. sylvestris	P4	Riserva Boschi Favara e Granza, Torto Valley PA (P4)		♀
3062	V. vinifera subps. sylvestris	P5	Bosco della Ficuzza, Sicani Mts. PA (P5)		♀
3063	V. vinifera subps. sylvestris	P5	Bosco della Ficuzza, Sicani Mts. PA (P5)		♂
3064	V. vinifera subps. sylvestris	P5	Bosco della Ficuzza, Sicani Mts. PA (P5)		♂
3065	V. vinifera subps. sylvestris	P5	Bosco della Ficuzza, Sicani Mts. PA (P5)		♂
3066	V. vinifera subps. sylvestris	P5	Bosco della Ficuzza, Sicani Mts. PA (P5)		♂
3067	V. vinifera subps. sylvestris	P5	Bosco della Ficuzza, Sicani Mts. PA (P5)		♂
3068	V. vinifera subps. sylvestris	P5	Bosco della Ficuzza, Sicani Mts. PA (P5)		♂
3069	V. vinifera subps. sylvestris	P5	Bosco della Ficuzza, Sicani Mts. PA (P5)		♂
3070	V. vinifera subps. sylvestris	P5	Bosco della Ficuzza, Sicani Mts. PA (P5)		♂
3071	V. vinifera subps. sylvestris	P6	Stretta di Longi, Nebrodi Mts. ME (P6)		♀
3072	V. vinifera subps. sylvestris	P6	Stretta di Longi, Nebrodi Mts. ME (P6)		♀
3074	V. vinifera subps. sylvestris	P6	Stretta di Longi, Nebrodi Mts. ME (P6)		♂
3075	V. vinifera subps. sylvestris	P6	Stretta di Longi, Nebrodi Mts. ME (P6)		♂
3076	V. vinifera subps. sylvestris	P6	Stretta di Longi, Nebrodi Mts. ME (P6)		♂
3077	V. vinifera subps. sylvestris	P6	Stretta di Longi, Nebrodi Mts. ME (P6)		♀
3078	V. vinifera subps. sylvestris	P6	Stretta di Longi, Nebrodi Mts. ME (P6)		♀
3079	V. vinifera subps. sylvestris	P6	Stretta di Longi, Nebrodi Mts. ME (P6)		nd
3080	V. vinifera subps. sylvestris	P6	Stretta di Longi, Nebrodi Mts. ME (P6)		♀
3081	V. vinifera subps. sylvestris	P6	Stretta di Longi, Nebrodi Mts. ME (P6)		♀
3082	V. vinifera subps. sylvestris	P6	Stretta di Longi, Nebrodi Mts. ME (P6)		nd
3083	V. vinifera subps. sylvestris	P6	Stretta di Longi, Nebrodi Mts. ME (P6)		♀
3084	V. vinifera subps. sylvestris	P6	Stretta di Longi, Nebrodi Mts. ME (P6)		♀
3085	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♂
3086	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♂
3087	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♂
3088	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♂

Supplementary Table S1. List of 301 *V. vinifera* subps. *sativa* and *sylvestris* grapevine samples analysed.

Accessions ID	Species	Population Code	Source District / Area (Population Code)	Name	Sex
3089	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♂
3090	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♀
3091	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♀
3092	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♀
3093	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♀
3094	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♂
3095	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♂
3096	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♂
3097	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♀
3098	V. vinifera subps. sylvestris	P7	Fiume Manghisi, Iblei Mts. SR (P7)		♂
3099	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		♂
3100	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		♂
3101	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		nd
3102	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		nd
3104	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		♀
3105	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		♂
3106	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		♀
3107	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		♂
3108	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		♀
3109	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		♀
3110	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		♀
3111	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		♂
3112	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		♀
3113	V. vinifera subps. sylvestris	P8	Riserva Pantalica e Valle Anapo, Iblei Mts. SR (P8)		♀
3114	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♂
3115	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♂
3116	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♂
3117	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♀
3118	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♂
3119	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♀
3120	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♂
3121	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♂
3122	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♀
3123	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♀
3124	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♂
3125	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♂
3126	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		nd
3127	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♀
3128	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♂
3129	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♂
3130	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♀
3131	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♂
3133	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♂
3134	V. vinifera subps. sylvestris	P9	Fiume Sosio, Sicani Mts. AG (P9)		♀
3135	V. vinifera subps. sylvestris	P10	Riserva Zangara, Belice Valley TP (P10)		♂
3136	V. vinifera subps. sylvestris	P10	Riserva Zangara, Belice Valley TP (P10)		♂
3137	V. vinifera subps. sylvestris	P10	Riserva Zangara, Belice Valley TP (P10)		nd
3138	V. vinifera subps. sylvestris	P10	Riserva Zangara, Belice Valley TP (P10)		nd
3139	V. vinifera subps. sylvestris	P10	Riserva Zangara, Belice Valley TP (P10)		♀
3140	V. vinifera subps. sylvestris	P10	Riserva Zangara, Belice Valley TP (P10)		♀
3141	V. vinifera subps. sylvestris	P10	Riserva Zangara, Belice Valley TP (P10)		nd
3142	V. vinifera subps. sylvestris	P10	Riserva Zangara, Belice Valley TP (P10)		♂
3143	V. vinifera subps. sylvestris	P10	Riserva Zangara, Belice Valley TP (P10)		♀
3175	V. vinifera subps. sativa	SR	Syracuse (SR)	Albanello	♀♂
3176	V. vinifera subps. sativa	CT	Catania (CT)	Alzano	♀♂
3177	V. vinifera subps. sativa	PA	Palermo (PA)	Austina bianca	♀♂
3178	V. vinifera subps. sativa	PA	Palermo (PA)	Barbarossa	♀♂
3179	V. vinifera subps. sativa	CT	Catania (CT)	Bracaù (Grecaù)	♀♂
3180	V. vinifera subps. sativa	SR	Syracuse (SR)	Bruntisi nero	♀♂
3181	V. vinifera subps. sativa	CT	Catania (CT)	Calabrese	♀♂
3183	V. vinifera subps. sativa	ME	Messina (ME)	Carnuffino	♀♂
3184	V. vinifera subps. sativa	CT	Catania (CT)	Carricante A	♀♂
3185	V. vinifera subps. sativa	CT	Catania (CT)	Carricante C	♀♂
3186	V. vinifera subps. sativa	PA	Palermo (PA)	Catanese nero	♀♂
3187	V. vinifera subps. sativa	TP	Trapani (TP)	Catarratto D	♀♂
3188	V. vinifera subps. sativa	AG	Agrigento (AG)	Catarratto A	♀♂
3189	V. vinifera subps. sativa	TP	Trapani (TP)	Catarratto B	♀♂
3190	V. vinifera subps. sativa	PA	Palermo (PA)	Catarratto C	♀♂
3191	V. vinifera subps. sativa	PA	Palermo (PA)	Catarratto nero	♀♂
3192	V. vinifera subps. sativa	PA	Palermo (PA)	Catarratto Termini	♀♂
3193	V. vinifera subps. sativa	SR	Syracuse (SR)	Cessalà	♀♂
3194	V. vinifera subps. sativa	AG	Agrigento (AG)	Cirrinciò	♀♂
3195	V. vinifera subps. sativa	ME	Messina (ME)	Coda di volpe	♀♂
3196	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Corinto A	♀♂
3197	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Corinto B	♀♂
3198	V. vinifera subps. sativa	TP	Trapani (TP)	Damaschino A	♀♂
3199	V. vinifera subps. sativa	PA	Palermo (PA)	Diretta bianca	♀♂
3200	V. vinifera subps. sativa	PA	Palermo (PA)	Diretta bianca (Uva di Francia)	♀♂

Supplementary Table S1. List of 301 *V. vinifera* subps. *sativa* and *sylvestris* grapevine samples analysed.

Accessions ID	Species	Population Code	Source District / Area (Population Code)	Name	Sex
3201	V. vinifera subps. sativa	PA	Palermo (PA)	Diretta nera A	♀♂
3202	V. vinifera subps. sativa	CT	Catania (CT)	Dolcetta	♀♂
3203	V. vinifera subps. sativa	RG	Ragusa (RG)	Frappato C	♀♂
3204	V. vinifera subps. sativa	RG	Ragusa (RG)	Frappato 2	♀♂
3205	V. vinifera subps. sativa	RG	Ragusa (RG)	Frappato 3	♀♂
3206	V. vinifera subps. sativa	RG	Ragusa (RG)	Frappato A	♀♂
3207	V. vinifera subps. sativa	RG	Ragusa (RG)	Frappato B	♀♂
3208	V. vinifera subps. sativa	RG	Ragusa (RG)	Frappato F	♀♂
3210	V. vinifera subps. sativa	SR	Syracuse (SR)	Gamay	♀♂
3211	V. vinifera subps. sativa	AG	Agrigento (AG)	Grecanico A	♀♂
3212	V. vinifera subps. sativa	AG	Agrigento (AG)	Grecanico B	♀♂
3213	V. vinifera subps. sativa	TP	Trapani (TP)	Grecanico C	♀♂
3214	V. vinifera subps. sativa	CT	Catania (CT)	Grecaù (Bracaù)	♀♂
3215	V. vinifera subps. sativa	TP	Trapani (TP)	Grillo A	♀♂
3216	V. vinifera subps. sativa	TP	Trapani (TP)	Grillo C	♀♂
3217	V. vinifera subps. sativa	TP	Trapani (TP)	Grillo D	♀♂
3218	V. vinifera subps. sativa	PA	Palermo (PA)	Jala bianca	♀♂
3219	V. vinifera subps. sativa	ME	Messina (ME)	Inzolia A	♀♂
3220	V. vinifera subps. sativa	AG	Agrigento (AG)	Inzolia C	♀♂
3221	V. vinifera subps. sativa	PA	Palermo (PA)	Inzolia imperiale A	♀♂
3223	V. vinifera subps. sativa	CT	Catania (CT)	Inzuccarato	♀♂
3224	V. vinifera subps. sativa	SR	Syracuse (SR)	Inzuccarato di Noto	♀♂
3225	V. vinifera subps. sativa	AG	Agrigento (AG)	Lacrima di Maria A	♀♂
3226	V. vinifera subps. sativa	SR	Syracuse (SR)	Leanfurtisi	♀♂
3227	V. vinifera subps. sativa	PA	Palermo (PA)	Lorisi (Orisi)	♀♂
3228	V. vinifera subps. sativa	ME	Messina (ME)	Lucignola	♀♂
3229	V. vinifera subps. sativa	SR	Syracuse (SR)	Malvagia	♀♂
3230	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Malvasia di Lipari C	♀♂
3231	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Malvasia di Lipari A	♀♂
3232	V. vinifera subps. sativa	PA	Palermo (PA)	Marsala (Mareschino)	♀♂
3233	V. vinifera subps. sativa	AG	Agrigento (AG)	Marsigliana	♀♂
3234	V. vinifera subps. sativa	PA	Palermo (PA)	Minna di vacca B	♀♂
3235	V. vinifera subps. sativa	ME	Messina (ME)	Minnavacchina	♀♂
3236	V. vinifera subps. sativa	SR	Syracuse (SR)	Minnella bianca (Passulana)	♀♂
3237	V. vinifera subps. sativa	SR	Syracuse (SR)	Monteleone	♀♂
3238	V. vinifera subps. sativa	SR	Syracuse (SR)	Moscato di Noto B	♀♂
3239	V. vinifera subps. sativa	SR	Syracuse (SR)	Moscato bianco	♀♂
3240	V. vinifera subps. sativa	SR	Syracuse (SR)	Moscato di Noto C	♀♂
3241	V. vinifera subps. sativa	SR	Syracuse (SR)	Muscatedda	♀♂
3242	V. vinifera subps. sativa	SR	Syracuse (SR)	Muscatidduni	♀♂
3243	V. vinifera subps. sativa	CT	Catania (CT)	Nerello Mascalese B	♀♂
3244	V. vinifera subps. sativa	CT	Catania (CT)	Nerello Mascalese C	♀♂
3245	V. vinifera subps. sativa	CT	Catania (CT)	Nerello cappuccio A	♀♂
3246	V. vinifera subps. sativa	CT	Catania (CT)	Nerello Mascalese D	♀♂
3247	V. vinifera subps. sativa	CT	Catania (CT)	Nerello Mascalese E	♀♂
3248	V. vinifera subps. sativa	CT	Catania (CT)	Nerello Mascalese A	♀♂
3249	V. vinifera subps. sativa	TP	Trapani (TP)	Nero d'Avola A	♀♂
3250	V. vinifera subps. sativa	PA	Palermo (PA)	Nero grosso	♀♂
3251	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Nivureddu	♀♂
3252	V. vinifera subps. sativa	CT	Catania (CT)	Nivuro Bronte	♀♂
3253	V. vinifera subps. sativa	PA	Palermo (PA)	Nucera nera (Perricone)	♀♂
3254	V. vinifera subps. sativa	SR	Syracuse (SR)	Nzuccarato	♀♂
3255	V. vinifera subps. sativa	ME	Messina (ME)	Oriddru	♀♂
3258	V. vinifera subps. sativa	SR	Syracuse (SR)	Osso nivuro	♀♂
3259	V. vinifera subps. sativa	TP	Trapani (TP)	Perricone A	♀♂
3260	V. vinifera subps. sativa	PA	Palermo (PA)	Pizzutella	♀♂
3261	V. vinifera subps. sativa	SR	Syracuse (SR)	Precoce	♀♂
3262	V. vinifera subps. sativa	ME	Messina (ME)	Preventivo	♀♂
3263	V. vinifera subps. sativa	SR	Syracuse (SR)	Racignola bianca	♀♂
3265	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Racina di vento	♀♂
3266	V. vinifera subps. sativa	CT	Catania (CT)	Racinedda	♀♂
3267	V. vinifera subps. sativa	SR	Syracuse (SR)	Recunu (Bufania)	♀♂
3269	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Rucignola	♀♂
3270	V. vinifera subps. sativa	SR	Syracuse (SR)	Russetto	♀♂
3271	V. vinifera subps. sativa	SR	Syracuse (SR)	Sparo virdisi	♀♂
3272	V. vinifera subps. sativa	PA	Palermo (PA)	Sultanina	♀♂
3273	V. vinifera subps. sativa	PA	Palermo (PA)	Tallone nero	♀♂
3274	V. vinifera subps. sativa	AG	Agrigento (AG)	Tintorè (Ibisu)	♀♂
3275	V. vinifera subps. sativa	PA	Palermo (PA)	Triboti nera	♀♂
3276	V. vinifera subps. sativa	PA	Palermo (PA)	Tripolina bianca	♀♂
3277	V. vinifera subps. sativa	PA	Palermo (PA)	Uva francisi	♀♂
3278	V. vinifera subps. sativa	CT	Catania (CT)	Visparola	♀♂
3279	V. vinifera subps. sativa	ME	Messina (ME)	Vitraruolo	♀♂
3004	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Zibibbo A	♀♂
3280	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Zibibbo augustano	♀♂
3281	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Zibibbo B	♀♂
3282	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Zibibbo carricante	♀♂
3283	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Zibibbo grosso	♀♂

Supplementary Table S1. List of 301 *V. vinifera* subps. *sativa* and *sylvestris* grapevine samples analysed.

Accessions ID	Species	Population Code	Source District / Area (Population Code)	Name	Sex
3284	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Zibibbo nero	♀♂
3285	V. vinifera subps. sativa	TP	Trapani (TP)	Nero d'Avola B	♀♂
3286	V. vinifera subps. sativa	TP	Trapani (TP)	Nero d'Avola C	♀♂
3287	V. vinifera subps. sativa	TP	Trapani (TP)	Nero d'Avola D	♀♂
3292	V. vinifera subps. sativa	TP	Trapani (TP)	Nero d'Avola F	♀♂
3294	V. vinifera subps. sativa	TP	Trapani (TP)	Nero d'Avola G	♀♂
3299	V. vinifera subps. sativa	TP	Trapani (TP)	Nero d'Avola E	♀♂
3304	V. vinifera subps. sativa	CT	Catania (CT)	Alicante, Licante	♀♂
3307	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Inzolia imperiale B	♀♂
3308	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Cantaro	♀♂
3309	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Trummana	♀♂
3310	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Minutidda	♀♂
3311	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Malvasia B	♀♂
3312	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Livedda	♀♂
3313	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Mascarisi	♀♂
3314	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Racina i mustu B	♀♂
3315	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Nuciddara	♀♂
3316	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Moscato nero	♀♂
3317	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Diretta nera B	♀♂
3319	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Minnilottina	♀♂
3320	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Mantonico A	♀♂
3321	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Cornicchiola A	♀♂
3322	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Lacrime di Maria B	♀♂
3323	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Inzolia nera A	♀♂
3324	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Fiore d'arancio (Trunzu)	♀♂
3325	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Lugliatica (Luglienga)	♀♂
3326	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Lacrime di Maria C	♀♂
3327	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Greca	♀♂
3328	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Caleu	♀♂
3329	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Minna di vacca C	♀♂
3333	V. vinifera subps. sativa	PE	Pelagie Islands (PE)	Funcia chiatta	♀♂
3335	V. vinifera subps. sativa	PE	Pelagie Islands (PE)	Catarratto E	♀♂
3337	V. vinifera subps. sativa	US	Ustica island (US)	Inzolia nera B	♀♂
3338	V. vinifera subps. sativa	US	Ustica island (US)	Alivedda nera	♀♂
3339	V. vinifera subps. sativa	US	Ustica island (US)	Damaschino B	♀♂
3340	V. vinifera subps. sativa	US	Ustica island (US)	Albanella bianca	♀♂
3342	V. vinifera subps. sativa	US	Ustica island (US)	Menna vacca A	♀♂
3343	V. vinifera subps. sativa	US	Ustica island (US)	Zu Manuele	♀♂
3344	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Centoruotoli	♀♂
3345	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Cornicchiola B	♀♂
3348	V. vinifera subps. sativa	RG	Ragusa (RG)	Cutrera	♀♂
3349	V. vinifera subps. sativa	CT	Catania (CT)	Zu Matteo	♀♂
3350	V. vinifera subps. sativa	TP	Trapani (TP)	Catanese bianca	♀♂
3351	V. vinifera subps. sativa	TP	Trapani (TP)	Dunnuni	♀♂
3352	V. vinifera subps. sativa	TP	Trapani (TP)	Fumusa	♀♂
3354	V. vinifera subps. sativa	ME	Messina (ME)	Nocera	♀♂
3355	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Prunesta	♀♂
3361	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Inzolia Tunisina A	♀♂
3362	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Nero nostrale	♀♂
3363	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Zibibbo con i seni	♀♂
3364	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Garignano	♀♂
3365	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Zibibbo minna di vacca	♀♂
3366	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Zibibbo masculune	♀♂
3367	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Pionastro	♀♂
3368	V. vinifera subps. sativa	PT	Pantelleria island (PT)	Inzolia Tunisina B	♀♂
3288	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Racina i mustu A	♀♂
3289	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Cuda i vulpe	♀♂
3290	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Pirricone raspo rosso (3°Tipo)	♀♂
3291	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Malvasia A	♀♂
3293	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Nerello Mascarisi	♀♂
3296	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Cappuccio	♀♂
3297	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Perricone B	♀♂
3298	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Giugnatica	♀♂
3300	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Putrisa	♀♂
3302	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Mantonico B	♀♂
3305	V. vinifera subps. sativa	EO	Aeolian archipelago (EO)	Mantonico C	♀♂
3334	V. vinifera subps. sativa	PE	Pelagie Islands (PE)	Bertuccio	♀♂

nd: *Sex not determined.*

Supplementary Table S2. Wild grapevine populations analysed: habitat conditions and vegetation patterns.

Population name and Geographical districts	Population code	Habitat	Anthropic evidences	Vegetation patterns and dominant trees/shrubs
Castelbuono, Madonie Mts., Palermo	P1	Temporary river banks	Sporadic drafted, aged olive trees along the track to the sampling area	Riparian forest, canopy cover 100%, h = 5-8 m. *Salix pedicellata, Populusnigra, Laurusnobilis, Quercus ilex, Clematis cirrhosa, Hedera helix, Smilax aspera*
Cava Grande Cassibile, Iblei Mts. Syracuse	P2	Permanent river banks	Small cultivated patches inside the sampling area; Large abandoned and active cultivations in the surroundings	Riparian forest, canopy cover 60%, h = 6-8 m. *Quercus ilex, Fraxinusornus, Salix pedicellata, Ficuscarica, Platanusorientalis, Ailanthus altissima, Pistacialentiscus, Nerium oleander, Erica multiflora, Phlomisfruticosa, Clematis cirrhosa*
Cava Sturia, Iblei Mts. Syracuse	P3	Temporary river banks	Abandoned and active cultivations in the surroundings	Maquis, canopy cover 100%, h = 6-8 m. *Quercus ilex*, *Q. virgiliana, Ficuscarica, Olea europaea*var.*sylvestris, Fraxinusornus, Ailanthus altissima, Pistacialentiscus, P. terebinthus, Rhamnusalaternus, Phillyrealatifolia, Smilax aspera, Hedera helix*
Riserva Boschi Favara and Granza, Torto Valley Palermo	P4	Scree-type deposits	Sporadic small patches of abandoned fields along the track to the sampling area	Pioneer communities, canopy cover 40%, h = 2-4 m. *Ficuscarica, Rubus*sp., *Clematis cirrhosa, Quercusvirgiliana*(along the external border)
Bosco della Ficuzza, Sicani Mts. Palermo	P5	Temporary river banks	Sporadic small patches of abandoned fields and charcoal areas along the stream banks	Riparian forest, canopy cover 100%, h = 15-20 m. *Quercusvirgiliana, Acer campestris, Q. ilex, Fraxinusornus, F. oxyphylla, Q. suber, Salix pedicellata, Populusnigra, Ficuscarica, Crataegusmonogyna, Cytisustriflorus, Rubus, sp., Smilax aspera, Hedera helix, Clematis cirrhosa, Ruscusaculeatus*
Stretta di Longi, Nebrodi Mts. Messina	P6	Permanent river banks	Grazing-disturbance evidences	Riparian forest, canopy cover 100%, h = 8-10 m. *Salix pedicellata, Ficuscarica, Fraxinusangustifolia, Celtisaustralis, Clematis cirrhosa, Hedera helix, Rubus*sp.
Fiume Manghisi, Iblei Mts. Syracuse	P7	Permanent river banks	Abandoned and active cultivations in the surroundings	Riparian forest, canopy cover 80%, h = 8-12 m. *Salix pedicellata, Ficuscarica, Platanusorientalis, Quercus ilex, Clematis cirrhosa, Hedera helix*
Riserva Pantalica and Valle Anapo, Iblei Mts. Syracuse	P8	Permanent river banks	Small cultivated patches inside the sampling area; Large abandoned and active cultivations in the surroundings	Riparian forest, canopy cover 80%, h = 10-15 m. *Salix pedicellata, Populusnigra, Ficuscarica, Platanusorientalis, Quercus ilex, Fraxinusornus, Rhamnusalaternus, Nerium oleander, Clematis cirrhosa*
Fiume Sosio, Sicani Mts. Agrigento	P9	Permanent river banks	Sporadic small patches of abandoned fields along the track to the sampling area	Riparian forest, canopy cover 100%, h = 8-15 m. *Salix pedicellata, Quercus ilex, Q. virgiliana, Crataegusmonogyna, Prunusspinosa, Pistaciaterebinthus, Viburnum tinus, Rhamnusalaternus, Hedera helix*
Riserva Zangara, Belice Valley Trapani	P10	Permanent river banks	Large vineyard in the surroundings. Small abandoned olive patches inside the sampling area	Riparian forest, canopy cover 70%, h = 8-12 m. *Ulmuscanescens, Salix pedicellata, Populusnigra, Ficuscarica, Tamarix*sp.,*Nerium oleander, Myrtuscommunis, Hedera helix*

Supplementary Table S3. SSR marker and PCR multiplex conditions used. The set of six highly reproducible microsatellites suggested by the European group working within the grape GENRES projects is indicated in bold.

SSR marker	Forward primer	Reverse primer	Reference	Core repeat	Annealing T °C (max-min)	Dye	PCR multiplex
VVS2	CAG CCC GTA AAT GTA TCC ATC	AAATTCAAAATTCTAATTCAACTGG	Thomas and Scott (1993)	(GA)n	57-50	YAKYE	3
VVMD5	CTAGAGCTACGCCAATCCAA	TATACCAAAAATCATATTCCTAAA	Bowers et al. (1996)	(CT)nAT(CT)nATAG(AT)n	62-55	AT565	2
VVMD6	ATCTCTAACCCTAAAACCAT	CTGTGCTAAGACGAAGAAGA	Bowers et al. (1996)	(CT),C(CT),TTAG(CT)TAAT-(CT)C(CT)C(CT)	63-56	AT565	1
VVMD7	AGAGTTGCGGAGAACAGGAT	CGAACCTTCACACGCTTGAT	Bowers et al. (1996)	(CT)n	62-55	AT550	2
VVMD17	TGACTCGCCAAAATCTGACG	CACACATATCATCACCACACGG	Bowers et al. (1999)	(CT)n	57-50	AT565	3
VVMD21	GGTTGTCTATGGAGTTGATGTTGC	GCTTCAGTAAAAAGGGATTGCG	Bowers et al. (1999)	(CT)nGAGAAGG(A)n	62-55	YAKYE	4
VVMD24	GTGGATGATGGAGTAGTCACGC	GATTTTAGGTTCATGTTGGTGAAGG	Bowers et al. (1999)	(CT)n	61-54	YAKYE	6
VVMD25	TTCCGTTAAAGCAAAAGAAAAAGG	TTGGATTTGAAATTTATTGAGGGG	Bowers et al. (1999)	(CT)n	57-50	AT550	3
VVMD27	GTACCAGATCTGAATACATCCGTAAGT	ACGGGTATAGAGCAAACGGTGT	Bowers et al. (1999)	(CT)n	62-55	FAM	2
VVMD28	AACAATTCAATGAAAAGAGAGAGAGAGA	TCATCAATTTCGTATCTCTATTTGCTG	Bowers et al. (1999)	(CT)n	62-55	YAKYE	2
VVMD32	TATGATTTTTTAGGGGGGTGAGG	GGAAAGATGGGATGACTCGC	Bowers et al. (1999)	(CT)n	63-56	AT550	1
VrZAG62	GGTGAAATGGGCACCGAACACACGC	CCATGTCTCTCCTCAGCTTCTCAG	Sefc et al. 1999	(GA)n	63-56	YAKYE	1
VrZAG79	AGATTGTGGAGGAGGGAACAAACCG	TGCCCCCATTTTCAAACTCCCTTCC	Sefc et al. 1999	(GA)n	63-56	FAM	1
VMC1b11	CTTTGAAAATTCCTTCCGGGTT	TATTCAAAGCCACCCGTTCTCT	Zyprian and Töpfer (2005)	(GA)n	62-55	FAM	4
VMC4f3.1	AAAGCACTATGGTGGGTGTAAA	TAACCAATACATGCATCAAGGA	Di Gaspero et al. (2000)	(CT)nTT (CT)n	60-53	FAM	5
VVIb01	TGACCCTCGACCTTAAAATCTT	TGGTGAGTGCAATGATAGTAGA	Merdinoglu et al. (2005)	(CT)n	60-53	AT565	5
VVIh54	CCGCACTTGTGTTGAATTTCAG	CAAACCGTTTTTACACCAGCAG	Merdinoglu et al. (2005)	(GA)n	61-54	FAM	6
VVIn16	ACCTCTATAAGATCCTAACCTG	AAGGGAGTGTGACTGATATTTC	Merdinoglu et al. (2005)	(CA)nCG (CA)n	62-55	AT565	4
VVIn73	TACTTCACCTAACAATACAGCT	AATACATAAGGTGAAGATGCCT	Merdinoglu et al. (2005)	(CA)n	60-53	AT550	5
VVIp31	TATCCAAGAGACAAATTCCCAC	TTCTCTTGTTTCCTGCAAATGG	Merdinoglu et al. (2005)	(GA)n	61-54	AT550	6
VVIp60	GGGGAATAACTAAATTGAGGAT	GTATGAATGCGGATAGTTTGTG	Merdinoglu et al. (2005)	(TG)nA(GT)n(GA)n	57-50	FAM	3
VVIq52	TAAAAGGATGGTAGATGACAGA	ACAGGAAAGTGTTCAATGGTTA	Merdinoglu et al. (2005)	(CT)n	62-55	AT550	4
VVIv67	TATAACTTCTCATAGGGTTTCC	TTGGAGTCCATCAAATTCATCT	Merdinoglu et al. (2005)	(CA)nAT(CA)n(GA)nTT(GA)n(AG)n	61-54	AT565	6

SSR markers with the same PCR multiplex number were amplified in a single PCR mix, all primers being pooled in the PCR mix and analyzed in the same sequencer run

Supplementary Table S4. Genetic profiles of cultivated and wild Sicilian accessions.

Accession code	Population / Sample name	VVIp60		VVMD28		VVIb01		VVMD27		VVIv67		VVMD32		VVIn16		VVMD21		VVMD24		VVMD7		VMC1b11		VVIn73		VMIp31		VVIh54		VVIq52		VMC4f3_1		VVMD25		VrZag79		VrZag62		VVMD17		VVMD5		VVMD6		VVS2	
3005	P1	302	302	227	235	290	294	185	185	356	362	0	0	149	151	247	253	206	210	251	253	167	181	257	263	0	0	0	0	80	80	166	178	0	0	243	243	192	192	214	222	231	231	209	209	128	134
3006	P1	314	314	227	243	290	294	179	185	0	0	0	0	151	151	245	245	210	210	243	253	165	167	255	263	182	182	165	165	76	80	182	204	238	254	0	0	0	0	0	0	227	233	209	209	138	138
3007	P1	312	320	235	257	290	290	189	191	356	362	253	255	149	151	253	253	210	212	251	269	181	187	257	263	174	178	163	165	74	74	166	178	238	238	247	247	192	192	214	220	233	233	201	209	128	148
3009	P1	316	316	227	257	288	290	179	179	352	362	251	271	149	151	247	253	206	210	237	243	167	167	263	263	176	186	165	177	74	80	182	202	238	248	245	249	186	198	214	222	233	233	211	211	128	152
3010	P1	314	318	0	0	292	294	181	185	354	358	257	257	151	157	247	255	206	210	263	269	165	187	263	263	182	186	165	165	76	80	170	202	248	262	243	251	192	198	214	224	0	0	201	201	128	130
3011	P1	302	312	235	235	290	290	189	191	352	364	243	255	151	151	247	247	206	210	253	265	165	187	263	263	178	182	149	163	74	74	172	188	240	266	247	247	192	194	222	222	233	233	209	209	128	148
3013	P1	314	314	235	235	294	298	185	189	352	366	251	251	149	149	247	253	206	206	243	253	165	165	263	263	188	188	167	167	74	80	178	188	262	262	247	251	186	200	220	220	233	233	209	211	128	148
3015	P1	302	312	227	249	292	292	181	191	364	364	255	255	149	149	247	247	204	216	253	259	181	187	257	263	182	182	163	163	74	74	166	172	238	238	247	259	194	194	222	222	233	233	201	209	128	148
3016	P1	318	318	227	235	290	290	185	185	0	0	251	251	149	149	247	247	206	210	253	253	165	173	263	263	188	188	163	177	74	80	0	0	248	254	245	249	186	198	214	222	231	231	209	211	128	138
3017	P1	314	318	245	245	290	290	189	193	352	358	239	271	157	157	247	247	210	210	247	253	165	183	261	263	180	192	163	165	76	80	172	172	238	238	251	257	184	186	220	220	227	227	207	207	128	128
3018	P1	312	312	235	235	290	290	189	189	362	364	255	255	149	151	245	245	210	214	253	257	165	181	263	263	180	194	163	163	74	74	172	172	238	248	245	245	194	194	222	222	233	233	201	209	128	148
3019	P1	312	312	235	235	290	290	189	191	362	364	255	255	149	151	245	245	210	214	253	257	181	181	263	263	182	194	163	163	74	80	172	172	238	248	245	245	194	194	222	222	233	233	201	209	128	148
3020	P1	312	320	227	235	290	290	179	189	356	362	0	0	149	149	253	253	210	212	243	251	165	181	257	263	174	178	163	163	74	74	166	178	238	238	0	0	0	0	0	0	233	233	201	201	128	128
3021	P1	312	320	235	257	290	290	189	191	356	362	0	0	149	151	253	253	210	212	251	269	181	187	257	263	174	178	163	165	74	74	166	178	238	238	0	0	0	0	0	0	233	233	201	209	128	148
3022	P1	312	320	235	257	290	290	189	191	356	362	255	255	149	151	253	253	210	212	251	269	181	187	257	263	174	178	163	165	74	74	166	178	238	238	245	245	192	192	214	222	233	233	201	209	128	148
3023	P1	312	312	235	257	290	290	189	191	356	356	255	255	149	151	247	253	206	206	251	269	181	187	257	263	174	188	165	167	74	74	178	206	238	254	247	247	192	192	214	220	227	233	209	209	128	148
3024	P2	302	320	233	271	290	294	185	185	352	366	249	259	147	157	245	245	210	210	237	253	173	181	263	265	182	192	163	163	74	80	202	202	248	254	251	251	194	200	222	222	233	243	209	211	128	134
3025	P2	314	322	227	271	290	294	185	191	362	370	255	271	147	151	245	245	210	210	253	263	165	167	255	265	182	182	165	169	76	80	182	204	238	254	251	251	192	200	214	222	227	233	209	209	138	152
3026	P2	302	318	227	259	290	290	179	189	362	362	251	251	157	157	247	253	206	214	253	257	167	183	257	263	182	186	165	177	74	76	188	188	254	254	247	251	194	198	214	224	227	241	191	209	148	152
3027	P2	314	320	257	257	290	294	181	185	358	362	255	259	151	151	245	253	210	210	257	267	167	187	263	261	182	186	165	165	74	80	172	204	248	248	243	247	198	198	214	224	233	233	201	211	130	138
3028	P2	316	318	227	253	290	290	191	191	352	362	249	255	149	151	247	247	206	210	237	247	165	167	263	263	176	186	165	177	74	80	182	202	238	248	247	247	186	194	222	222	233	233	211	211	128	152
3029	P2	302	318	227	235	288	288	183	185	352	362	251	255	151	151	247	247	206	210	253	253	165	181	263	263	176	182	167	177	74	78	182	188	248	248	251	251	186	200	224	224	233	243	191	211	128	128
3030	P2	302	320	231	241	290	294	185	185	352	352	249	259	147	157	247	247	210	210	237	253	173	181	263	265	182	192	163	163	74	80	202	202	248	248	251	251	194	200	222	222	233	243	207	211	128	134
3031	P2	302	318	227	227	288	294	185	191	356	366	251	255	157	157	241	253	206	210	243	267	169	183	263	265	172	186	149	149	74	80	170	172	262	262	251	251	192	200	222	222	233	233	207	207	128	128
3032	P2	312	314	233	241	290	294	179	189	362	362	251	255	147	151	247	247	0	0	253	253	0	0	263	263	182	186	163	165	74	74	182	170	238	254	247	251	192	198	222	224	227	239	201	201	0	0
3033	P2	302	328	227	235	290	294	185	185	352	366	251	255	149	151	247	247	206	210	247	253	167	181	263	263	182	188	163	177	74	76	172	202	248	248	247	251	186	198	222	222	227	241	211	211	152	152
3034	P2	318	318	225	241	290	290	185	187	352	362	251	255	147	151	247	247	206	210	247	253	167	181	263	263	182	188	163	177	74	78	166	182	248	254	251	251	186	200	214	224	233	243	191	211	128	138
3035	P2	312	314	235	235	294	294	179	189	352	362	239	255	149	151	247	253	210	210	243	269	165	183	263	263	182	182	149	163	72	80	176	178	248	262	247	251	184	192	222	222	227	227	201	209	128	148
3036	P2	302	328	227	227	292	294	179	189	352	362	253	257	149	149	247	255	206	214	257	267	167	181	263	263	182	192	163	163	80	78	170	182	248	254	251	251	192	198	224	224	229	229	207	211	148	152
3037	P2	312	314	235	259	292	294	179	189	362	362	253	257	147	151	247	247	206	210	253	253	181	193	263	263	182	186	163	163	74	74	170	182	238	254	247	251	192	198	224	224	227	241	201	201	138	138
3039	P3	0	0	235	235	288	288	189	189	356	356	251	255	147	149	247	247	206	208	243	253	165	183	263	263	174	188	163	177	0	0	166	204	238	238	251	251	186	192	214	222	229	241	0	0	0	0
3040	P3	312	312	235	257	288	294	185	185	352	362	251	255	147	147	241	247	210	210	253	253	165	183	263	263	174	182	163	163	74	80	174	186	248	262	251	251	198	198	214	222	227	241	191	211	148	152
3041	P3	312	318	233	257	288	288	185	189	352	362	251	255	149	151	241	247	206	210	243	253	165	183	263	263	182	182	165	167	74	80	172	174	240	248	247	251	198	198	214	222	229	241	191	211	148	148
3042	P3	312	318	257	257	0	0	185	189	352	362	0	0	149	151	239	247	206	210	253	255	165	183	263	263	0	0	0	0	74	80	172	174	0	0	243	247	186	198	212	222	239	241	191	211	148	148
3043	P4	314	318	243	257	290	290	181	185	352	358	251	271	149	151	247	247	206	210	253	253	169	183	263	263	186	188	163	175	78	80	182	188	254	254	247	251	198	202	222	222	235	249	209	211	130	138
3044	P4	314	318	243	257	290	290	181	185	352	360	251	271	149	151	247	247	206	210	253	253	169	183	263	263	186	186	165	177	80	80	182	188	254	254	247	251	198	202	222	222	235	249	209	211	130	138
3045	P4	314	318	243	257	290	290	181	185	352	360	253	271	149	151	247	247	206	210	251	253	169	183	263	263	186	186	165	177	80	80	182	188	254	254	247	251	198	202	224	224	235	247	209	211	130	138
3046	P4	314	318	243	257	290	290	181	185	352	360	251	271	149	151	247	247	206	210	251	253	169	183	263	263	186	188	165	177	80	80	182	188	252	254	247	251	198	202	224	224	235	247	209	211	130	138
3047	P4	314	318	243	257	290	290	181	185	352	360	255	263	149	151	247	253	206	210	251	253	169	183	263	263	186	186	165	177	80	78	182	188	254	254	247	251	192	198	214	224	235	247	209	211	130	138
3048	P4	314	318	243	257	290	290	181	185	352	360	251	271	149	151	247	247	206	210	251	253	169	183	263	263	186	186	165	177	80	80	182	188	254	254	247	251	198	202	224	224	235	247	209	211	130	138
3050	P4	0	0	243	257	290	290	181	185	352	358	251	271	149	151	247	247	206	210	251	253	169	183	263	263	186	186	165	177	0	0	182	188	254	254	243	247	198	202	224	224	233	235	0	0	0	0
3051	P4	0	0	235	243	290	290	181	185	352	360	251	271	149	151	247	253	206	210	251	253	169	183	263	263	172	186	165	177	0	0	182	188	254	254	247	251	198	202	224	224	233	235	0	0	0	0
3052	P4	314	318	243	257	290	290	181	185	352	358	251	271	149	151	247	247	206	210	251	253	169	183	263	263	186	186	165	177	80	78	182	188	254	254	247	251	198	202	222	222	235	247	209	211	130	138
3053	P4	314	318	257	257	290	290	181	185	352	354	251	271	149	151	245	245	206	210	243	253	169	183	263	263	186	186	163	177	80	78	182	188	254	254	247	251	198	202	224	224	233	235	209	211	130	138
3054	P4	314	318	243	257	290	290	181	185	352	360	251	271	149	151	247	253	206	210	253	253	169	183	263	263	186	188	165	177	80	78	182	188	252	254	245	249	198	202	222	222	235	249	209	211	130	138
3055	P4	314	318	255	257	290	290	181	185	352	358	251	271	149	151	247	247	206	210	253	253	169	183	263	263	186	186	165	177	80	78	182	188	254	254	247	251	198	202	224	224	235	249	209	211	130	138
3056	P4	314	318	243	257	290	290	181	185	352	358	251	271	149	151	247	247	206	210	253	253	169	183	263	263	186	188	165	177	80	80	182	188	254	254	247	251	198	202	224	224	235	249	209	211	130	138
3057	P4	314	318	243	257	290	290	181	185	352	358	251	271	149	151	247	247	206	210	253	253	169	183	263	263	186	186	165	177	80	80	182	188	254	254	247	251	198	202	222	222	235	249	209	211	130	138
3060	P4	314	318	243	257	290	294	181	185	352	360	251	271	149	151	247	253	206	210	253	251	169	183	263	263	172	172	165	177	80	80	182	188	248	254	247	251	198	202	224	224	235	247	209	211	130	138
3061	P4	314	318	243	257	290	290	181	185	352	358	251	271	149	151	247	247	206	210	253	251	169	183	263	263	186	188	165	177	80	78	182	188	254	254	247	251	198	202	224	224	235	247	209	211	130	138
3062	P5	324	330	231	247	302	302	197	199	344	362	249	263	149	149	217	217	204	204	243	257	181	181	253	253	198	202	141	161	76	76	170	202	238	266	255	255	188	188	222	222	267	267	205	217	132	148
3063	P5	312	316	235	243	288	290	181	191	352	362	239	261	149	149	245	253	208	210	257	261	165	183	263	263	172	194	163	165	76	80	202	202	248	254	247	259	186	192	214	222	235	235	209	209	132	148
3064	P5	0	0	235	243	288	290	181	191	352	362	239	261	149	149	245	253	208	210	257	261	165	183	263	263	172	194	163	163	0	0	202	202	248	254	247	259	186	192	214	222	235	241	0	0	0	0
3065	P5	310	312	235	235	288	290	189	191	354	362	239	255	149	149	247	247	210	214	261	265	165	165	257	263	182	194	163	163	74	76	178	204	248	266	247	247	192	194	212	212	233	241	201	209	128	148
3066	P5	312	312	235	235	288	290	189	191	354	362	239	255	149	149	245	245	210	214	261	265	165	165	257	263	182	194	161	163	74	76	178	202	248	266	247	247	192	194	214	214	233	241	201	207	146	148
3067	P5	312	316	235	243	290	290	181	191	352	362	255	261	149	149	247	253	208	210	253	265	165	183	257	263	172	194	163	163	76	80	172	178	248	254	247	259	186	194	214	222	235	241	201	207	132	148
3068	P5	312	316	235	243	288	294	189	193	352	362	255	259	149	151	247	253	208	210	257	261	165	165	257	263	172	182	163	165	74	80	172	202	248	254	247	257	186	192	214	224	233	235	207	207	132	148
3069	P5	312	316	235	243	288	294	189	189	352	362	255	259	149	151	247	253	208	210	257	259	165	165	257	263	172	182	163	163	74	80	172	204	248	254	247	257	186	192	214	222	233	235	209	209	132	148
3070	P5	312	312	235	235	288	290	189	191	354	362	239	255	149	149	245	245	210	214	261	265	165	165	257	263	182	194	163	163	74	76	178	202	248	266	247	247	192	194	214	214	233	241	201	207	146	148
3071	P6	302	320	245	247	290	294	179	189	354	360	255	269	157	157	247	247	210	210	237	253	165	181	255	263	176	182	163	163	76	74	168	172	238	238	247	251	192	192	214	222	227	235	201	209	152	152
3072	P6	314	322	235	257	290	294	181	195	352	352	255	255	151	151	253	253	204	214	243	243	165	165	263	263	188	188	165	165	80	78	178	182	238	244	251	251	186	186	218	218	235	235	211	211	138	138
3074	P6	312	320	235	247	290	290	189	191	354	358	251	255	157	157	247	247	210	210	265	265	165	165	263	265	180	186	163	163	76	80	172	188	238	238	247	251	192	194	222	222	227	227	201	201	148	152
3075	P6	312	320	235	249	290	290	189	191	354	358	251	255	157	157	247	247	210	210	265	265	165	165	263	265	180	186	163	163	76	80	172	188	238	238	247	251	192	194	222	222	227	227	201	201	148	152
3077	P6	312	320	243	247	290	290	187	189	354	362	251	255	147	157	247	247	210	214	253	265	165	181	263	263	176	186	163	167	76	74	172	172	238	238	247	251	192	194	224	224	227	227	201	201	148	152
3078	P6	312	320	245	249	292	292	189	189	354	362	253	257	147	157	247	247	210	214	253	267	165	181	263	263	176	186	163	167	76	76	172	172	238	238	247	251	192	194	222	222	227	227	201	201	148	152
3079	P6	302	318	227	249	292	294	179	189	352	352	257	257	151	157	241	247	206	210	243	253	165	165	255	255	182	188	163	163	76	80	172	172	238	240	249	259	194	194	224	224	227	227	191	201	138	152
3080	P6	304	314	241	241	298	306	185	219	344	354	271	271	147	149	237	241	206	210	235	251	169	189	253	263	190	204	163	165	76	80	190	182	238	244	251	259	186	212	224	224	227	241	211	211	138	152
3081	P6	302	318	241	241	294	294	179	185	358	366	255	271	155	157	247	253	210	210	237	253	165	165	255	263	178	182	163	165	74	76	168	172	238	254	239	251	184	192	214	224	235	239	207	211	130	152
3082	P6	302	318	233	257	294	294	191	191	352	370	251	251	149	151	247	247	206	206	253	253	183	183	263	263	186	186	165	179	74	80	206	206	240	254	247	247	200	200	224	224	227	241	209	209	138	140
3083	P6	302	320	245	247	290	294	179	189	354	360	255	255	157	157	247	247	210	210	237	253	165	181	255	263	176	182	163	163	76	76	172	178	238	238	247	251	192	194	214	222	227	235	201	209	128	152
3084	P6	302	320	245	247	290	294	179	189	354	360	255	255	157	157	247	247	210	210	237	253	165	181	255	263	176	182	163	163	76	76	168	172	238	238	247	251	192	194	214	222	227	235	201	209	150	152
3085	P7	314	320	257	257	288	290	179	183	370	370	255	263	147	149	247	247	206	214	251	253	181	183	263	265	176	184	163	165	80	80	178	204	248	254	247	251	192	198	214	222	229	241	201	201	128	128
3086	P7	312	318	233	257	290	294	179	191	354	362	0	0	147	151	247	253	206	210	253	265	165	169	263	263	186	190	165	177	80	78	188	206	254	266	247	251	0	0	224	224	233	235	201	201	138	148
3087	P7	312	318	235	235	0	0	179	185	354	360	255	259	149	151	245	253	210	210	243	253	165	183	255	263	0	0	0	0	80	78	172	188	0	0	243	247	198	198	214	222	233	241	201	201	138	148
3088	P7	314	320	227	243	288	290	179	183	370	370	249	249	147	149	247	247	206	214	253	257	181	183	263	265	176	184	165	165	80	78	178	204	248	248	243	247	198	200	222	222	229	241	201	201	128	128
3089	P7	314	320	235	257	288	290	179	183	370	370	249	249	147	149	247	247	206	214	253	257	181	183	263	265	176	184	165	165	80	78	178	204	248	248	247	251	198	200	224	224	229	241	201	201	128	128
3090	P7	312	320	227	233	290	290	185	191	362	370	239	251	149	151	247	253	210	210	243	253	165	183	263	263	176	186	165	177	76	80	188	204	254	266	247	251	198	200	222	222	233	233	201	211	128	138
3091	P7	312	320	227	233	290	290	185	191	362	370	239	251	149	151	247	253	210	210	243	253	165	183	263	263	176	186	165	177	76	80	188	204	254	266	247	251	198	200	222	224	233	249	201	211	128	138
3092	P7	312	320	227	233	290	290	185	191	362	370	239	251	149	151	247	253	210	210	253	253	165	183	263	263	176	186	165	177	76	80	188	204	254	266	247	251	186	192	222	224	233	249	201	211	128	138
3093	P7	312	320	227	233	290	290	185	191	362	370	239	251	149	151	247	253	210	210	253	253	165	183	263	263	176	186	165	177	76	80	188	204	254	266	247	251	198	200	222	224	233	249	201	211	128	138
3094	P7	314	320	245	245	288	290	179	183	370	370	239	249	147	149	247	247	206	214	253	257	181	183	263	265	176	184	165	165	80	78	178	202	248	248	247	251	198	192	214	224	229	241	201	207	128	152

Supplementary Table S4. Genetic profiles of cultivated and wild Sicilian accessions.

Accession code	Population / Sample name	VVIp60		VVMD28		VVIb01		VVMD27		VVIv67		VVMD32		VVIn16		VVMD21		VVMD24		VVMD7		VMC1b11		VVIn73		VMIp31		VVIh54		VVIq52		VMC4f3_1		VVMD25		VrZag79		VrZag62		VVMD17		VVMD5		VVMD6		VVS2	
3095	P7	0	0	233	257	290	294	179	191	354	362	239	255	147	151	253	253	210	210	253	265	165	169	263	263	186	190	165	177	0	0	188	206	254	266	247	251	192	198	232	224	233	235	0	0	0	0
3096	P7	312	318	233	257	290	294	179	191	354	362	239	255	147	151	253	253	210	210	253	265	165	169	263	263	186	190	165	175	78	80	188	206	254	266	247	251	192	198	222	224	233	235	201	201	138	148
3097	P7	318	318	227	235	290	290	185	185	362	370	249	251	149	151	247	253	210	210	243	253	165	183	263	263	176	186	165	165	74	72	202	202	254	254	247	251	192	200	222	222	231	231	207	211	128	128
3098	P7	314	320	235	257	290	290	179	185	352	362	249	271	149	151	247	247	206	206	253	255	181	183	263	265	178	182	165	165	80	78	172	202	248	254	251	251	192	200	214	222	227	227	201	201	128	130
3099	P8	312	312	227	235	290	294	185	185	360	366	251	255	149	151	247	247	210	210	243	269	165	169	263	263	186	188	165	173	74	76	188	206	238	254	239	247	192	192	214	222	231	231	209	211	128	138
3100	P8	312	318	227	235	294	294	185	185	354	354	239	251	151	157	247	247	206	210	243	253	165	169	263	263	186	186	165	173	74	80	182	188	240	248	235	239	192	198	222	222	225	245	209	211	128	152
3101	P8	318	318	227	235	290	306	185	193	366	384	0	0	149	151	247	253	206	210	237	243	165	183	263	263	188	188	167	175	76	80	188	206	248	254	0	0	0	0	0	0	231	231	209	211	132	146
3102	P8	302	318	235	257	294	294	185	191	354	356	251	255	151	151	241	247	206	210	243	253	169	183	263	263	172	186	165	165	74	80	182	206	248	248	243	251	200	200	214	224	241	241	209	209	152	152
3104	P8	316	318	235	243	290	290	185	193	352	362	249	261	151	157	241	253	210	214	243	265	187	193	255	263	174	178	149	163	74	80	188	206	240	240	243	257	186	192	214	214	227	233	209	211	128	140
3105	P8	318	318	227	227	0	0	179	189	362	362	239	255	149	151	247	247	206	210	243	253	165	183	263	263	0	0	0	0	74	76	178	206	0	0	245	257	186	192	222	222	227	233	211	211	138	138
3106	P8	312	318	227	245	290	294	181	191	354	360	249	271	149	157	241	247	206	214	253	259	183	183	263	265	182	186	163	173	74	80	168	188	240	254	247	251	198	198	222	224	227	229	209	209	128	138
3107	P8	314	318	227	235	290	290	183	191	354	362	249	271	151	151	241	247	206	210	251	265	165	181	263	263	174	182	165	165	76	76	188	204	240	254	249	249	192	202	214	224	227	229	209	209	128	138
3108	P8	302	302	227	227	290	290	191	191	352	354	0	0	149	157	247	253	210	210	243	253	165	183	263	263	174	186	173	173	76	80	168	172	238	238	247	251	186	192	212	222	227	233	201	209	128	148
3110	P8	302	318	235	247	292	292	189	191	352	352	251	251	149	179	247	249	206	206	265	267	165	183	261	265	174	186	165	165	74	76	168	172	238	266	247	251	192	194	214	222	233	233	201	209	128	128
3111	P8	302	318	247	247	294	294	185	195	352	356	0	0	147	147	247	247	206	210	243	253	183	183	263	263	172	186	165	165	74	74	188	206	248	248	245	249	0	0	214	224	235	241	201	211	132	152
3112	P8	314	318	243	257	294	298	179	179	354	366	249	251	149	151	245	245	206	210	253	253	169	169	263	263	174	186	167	177	74	80	178	186	240	248	0	0	192	200	212	222	241	241	209	211	128	138
3113	P8	302	300	259	259	290	294	191	195	352	370	251	271	151	151	247	247	206	206	243	243	169	183	263	263	174	182	167	167	76	74	170	170	248	254	247	257	184	194	224	224	227	235	209	211	138	148
3114	P9	302	312	227	259	292	294	189	191	352	366	257	261	147	149	247	257	210	214	237	243	165	165	257	257	174	188	149	163	74	80	172	172	238	254	251	259	192	202	214	222	233	241	207	211	138	148
3115	P9	312	320	227	243	288	290	185	189	362	366	0	0	149	157	247	247	214	214	253	265	165	181	263	263	174	178	149	175	76	80	172	204	248	254	0	0	0	0	214	222	233	233	201	201	148	152
3116	P9	302	314	259	263	290	290	185	185	362	370	241	251	147	149	247	247	206	210	253	267	165	193	263	263	182	194	149	163	74	80	182	206	248	248	251	251	192	194	214	222	223	233	201	211	148	152
3117	P9	302	314	225	257	290	290	185	185	362	370	241	251	147	149	247	247	206	210	253	267	165	193	263	263	182	194	149	163	74	80	182	206	248	248	251	251	192	194	214	222	223	233	201	211	148	152
3118	P9	302	322	227	235	290	294	179	185	352	362	255	255	0	0	247	247	0	0	253	253	165	167	257	263	0	0	163	163	76	80	178	178	0	0	247	251	186	192	214	222	227	241	201	209	138	138
3119	P9	316	318	227	243	288	290	181	191	0	0	257	259	147	149	247	247	206	210	261	265	165	165	263	263	194	194	147	165	74	80	178	178	248	266	247	259	192	194	214	222	0	0	201	209	128	148
3120	P9	312	318	235	263	294	294	185	191	354	354	239	249	147	157	247	255	206	206	253	265	165	181	263	263	186	186	149	163	74	80	172	186	240	248	251	251	192	192	214	214	231	231	201	211	128	152
3121	P9	0	0	257	257	290	290	185	189	356	362	239	255	147	157	247	247	206	210	243	253	165	165	257	257	178	182	149	159	0	0	182	206	248	248	251	259	194	194	214	214	239	241	0	0	0	0
3122	P9	302	312	217	235	288	290	185	189	352	362	249	251	157	157	247	247	210	214	265	265	165	165	263	265	186	188	163	181	76	80	172	204	240	262	251	251	192	192	214	222	227	227	201	201	152	152
3123	P9	314	314	227	263	290	294	189	191	364	366	251	255	149	157	247	247	214	214	251	255	165	165	263	263	174	178	165	175	74	74	178	204	238	252	251	251	192	192	214	222	223	241	201	207	150	152
3124	P9	312	312	227	235	290	290	179	181	362	362	249	249	157	157	247	247	206	214	261	265	165	165	263	263	186	186	165	181	74	74	172	172	238	266	251	259	186	192	214	222	225	231	201	207	128	148
3125	P9	318	322	235	257	294	294	179	181	354	362	249	255	149	157	247	253	206	214	253	265	165	193	263	263	182	182	161	167	74	80	172	188	262	266	257	259	192	198	212	212	233	241	201	211	128	148
3126	P9	318	318	255	255	288	306	179	189	362	370	251	255	149	149	247	247	206	210	243	261	173	179	263	263	188	188	149	173	76	80	178	202	248	254	259	259	192	194	214	224	227	233	209	209	132	152
3127	P9	318	322	243	257	290	290	181	191	352	360	263	263	149	149	247	247	206	208	243	247	165	189	263	263	188	188	163	175	80	80	188	206	248	252	243	247	186	194	222	224	227	239	211	211	130	152
3128	P9	320	328	225	251	290	290	185	189	352	366	249	249	149	157	247	247	210	210	261	265	165	167	257	263	176	176	163	181	74	74	206	206	240	248	251	251	192	192	214	214	227	229	201	207	138	148
3129	P9	312	314	215	227	288	290	181	189	362	364	239	251	149	157	247	247	210	210	265	265	181	181	263	263	172	180	149	149	76	80	172	202	238	266	251	251	192	200	214	214	265	267	201	207	128	148
3130	P9	302	318	241	261	290	294	189	191	362	362	0	0	157	157	247	253	210	210	243	261	165	181	257	263	174	186	149	159	74	80	172	172	238	248	0	0	0	0	0	0	233	239	201	209	0	0
3131	P9	314	318	245	245	290	294	179	191	354	358	255	255	149	157	247	247	214	214	243	253	165	167	263	263	182	182	163	167	74	80	172	172	238	266	247	251	186	192	214	222	233	241	207	211	128	134
3133	P9	302	302	0	0	290	294	181	185	362	362	241	253	147	157	247	247	210	214	243	269	165	165	245	263	182	182	177	181	74	74	160	172	240	266	251	253	192	194	214	224	227	233	201	201	128	152
3134	P9	312	312	227	245	290	290	181	189	362	362	241	249	157	157	247	247	206	214	259	261	165	193	263	263	186	186	165	181	74	74	172	172	238	266	251	259	192	194	214	222	227	235	201	207	128	128
3135	P10	314	318	227	253	290	294	183	189	356	358	241	249	149	151	247	247	214	214	243	253	165	183	263	263	178	182	165	179	74	76	178	178	240	254	247	247	186	192	214	224	241	241	201	209	138	138
3136	P10	0	0	227	253	290	294	183	189	356	358	239	249	149	151	247	247	214	214	243	253	165	183	263	263	178	182	165	179	76	80	178	178	240	254	247	247	186	192	214	224	241	241	201	209	138	138
3137	P10	314	318	227	253	290	294	183	189	356	358	239	249	149	151	247	247	214	214	243	253	165	183	263	263	178	182	165	179	74	76	178	178	240	254	247	247	186	192	214	224	241	241	201	209	138	152
3138	P10	302	312	235	235	288	290	185	189	354	356	255	261	149	149	241	247	204	206	243	253	165	183	263	263	174	188	163	165	74	80	172	202	248	254	251	251	192	194	214	222	227	239	191	207	138	154
3139	P10	312	314	227	233	290	294	181	185	354	362	255	261	149	149	253	253	204	214	243	243	165	167	263	263	174	180	163	177	74	80	202	202	240	248	251	259	192	192	214	214	229	229	191	207	134	154
3141	P10	314	314	227	257	294	294	181	181	356	362	255	255	149	151	247	253	206	214	243	257	267	183	263	265	182	186	165	179	76	76	174	202	248	254	259	259	192	200	214	222	227	233	201	207	128	134
3142	P10	314	314	227	257	294	294	181	185	356	362	255	255	149	151	247	253	206	214	257	265	167	183	263	265	182	186	165	179	76	74	174	202	248	254	259	259	192	200	214	222	227	241	201	207	128	134
3175	Albanello	318	318	243	243	294	306	181	185	356	370	251	271	149	149	247	247	206	206	243	257	165	183	263	263	180	188	165	173	74	76	182	206	254	254	251	259	184	198	224	224	227	229	209	209	132	138
3176	Alzano	318	318	0	0	294	294	179	179	352	360	249	249	149	149	247	247	206	206	243	243	165	183	255	255	176	188	165	165	74	80	166	186	238	238	243	251	186	194	224	224	233	233	207	207	128	142
3177	Austina bianca	314	318	215	267	290	294	185	189	356	358	239	239	157	157	247	263	206	210	243	251	171	173	263	263	180	192	163	167	76	80	170	178	240	254	251	259	192	202	214	214	229	237	201	209	128	138
3178	Barbarossa	318	318	247	253	296	300	183	193	352	360	251	255	149	149	247	253	206	206	243	253	183	183	263	263	182	190	165	165	74	80	188	188	254	268	247	257	186	190	224	224	233	241	191	211	130	144
3179	Bracaù (Grecaù)	302	318	0	0	288	294	189	195	352	370	251	257	147	147	247	247	206	206	251	265	167	167	263	263	176	182	173	173	74	74	172	186	248	248	249	251	186	194	212	222	233	233	191	207	128	138
3180	Bruntisi nero	318	318	235	257	290	290	179	191	0	0	251	271	149	149	247	253	206	206	243	251	165	183	255	255	174	182	163	163	74	80	206	206	240	254	247	257	184	200	222	236	229	229	207	211	128	138
3181	Calabrese	314	314	235	243	300	300	181	195	354	366	251	251	147	147	247	253	206	206	243	243	169	183	263	263	174	188	167	167	80	80	186	186	240	254	251	251	184	200	222	222	225	239	209	211	138	148
3183	Carnuffino	318	318	227	235	290	298	179	191	352	354	251	255	149	149	241	247	206	210	243	253	165	169	263	263	174	186	165	177	80	80	172	172	240	254	243	251	192	200	222	222	229	241	207	209	128	138
3184	Carricante A	314	318	243	247	0	0	179	185	352	352	251	255	149	149	241	241	206	206	239	249	181	181	263	263	0	0	0	0	76	76	166	178	0	0	251	259	192	194	214	224	225	235	191	207	128	128
3185	Carricante C	314	318	243	247	290	290	179	185	352	352	251	251	149	149	241	241	206	206	243	253	181	181	263	263	186	186	163	163	74	74	166	178	238	240	251	259	184	196	212	222	227	237	191	207	128	128
3186	Catanese nero	314	326	233	247	290	306	183	185	352	354	257	271	149	149	241	247	206	206	243	251	165	183	263	263	186	190	165	177	76	80	188	188	238	244	247	249	186	196	224	224	241	241	207	211	128	152
3187	Catarratto D	318	318	227	235	0	0	179	179	354	370	249	251	149	149	241	247	206	206	243	253	165	183	263	265	0	0	0	0	74	80	172	186	0	0	251	251	186	198	224	224	227	227	207	207	128	138
3188	Catarratto A	318	322	227	235	290	298	179	179	354	370	251	271	149	149	241	247	206	206	243	253	165	183	263	263	174	188	163	167	74	74	172	186	254	254	251	251	186	198	224	224	227	233	207	207	128	138
3189	Catarratto B	318	318	227	235	290	298	179	195	352	370	249	249	149	149	241	247	206	206	243	253	165	183	263	263	174	188	163	167	74	80	172	206	254	254	251	251	198	200	222	222	227	233	207	207	128	142
3190	Catarratto C	318	318	233	235	290	298	179	179	354	370	249	251	147	151	241	247	206	206	243	251	169	183	263	265	174	188	163	167	74	80	172	186	254	254	251	251	198	200	222	222	227	227	191	207	128	138
3191	Catarratto nero	318	326	233	257	290	290	183	185	352	352	251	257	155	161	241	247	190	206	243	243	153	163	263	263	190	190	165	165	74	76	190	206	240	254	243	247	186	194	214	224	229	237	191	191	128	138
3192	Catarratto Termini	318	318	241	233	292	300	179	193	352	370	251	271	151	153	247	263	206	208	247	249	181	185	263	263	174	190	165	167	76	76	172	206	246	252	245	249	184	200	222	222	225	227	207	211	138	146
3193	Cessalà	314	326	0	0	290	290	179	195	354	366	271	271	153	153	253	263	206	206	251	257	165	169	263	263	174	184	159	165	74	80	164	202	248	254	251	257	194	202	220	222	0	0	191	211	130	148
3194	Cirrinciò	314	318	233	245	290	294	179	183	352	370	249	251	149	149	241	263	206	214	251	265	165	183	263	263	174	190	165	165	74	74	178	206	240	254	245	251	192	202	214	224	227	237	209	211	128	128
3195	Coda di volpe	322	328	235	235	290	294	179	193	356	370	249	257	147	151	247	247	206	206	243	253	169	183	255	265	174	188	167	167	72	74	186	202	240	254	251	251	198	198	224	224	227	233	201	209	128	138
3196	Corinto A	318	318	0	0	290	294	179	185	352	352	251	251	151	151	0	0	0	0	243	243	165	165	263	263	0	0	165	165	80	80	172	178	240	254	259	259	194	194	212	222	273	273	191	207	128	128
3197	Corinto B	312	314	229	235	288	290	179	189	328	352	251	251	147	149	237	247	204	214	241	243	177	183	263	269	174	180	165	165	76	76	182	206	254	256	247	247	184	196	220	222	227	229	209	209	134	138
3198	Damaschino A	314	318	0	0	0	0	179	195	352	352	249	255	149	151	247	253	0	0	243	243	181	183	263	263	0	0	0	0	80	80	166	166	0	0	251	257	184	186	222	236	227	239	207	207	138	138
3199	Diretta bianca	318	318	233	235	290	294	185	189	334	366	255	271	149	149	253	253	206	210	253	255	167	183	263	265	174	178	147	165	76	78	172	172	240	254	239	259	184	192	222	222	237	239	209	215	128	130
3200	Diretta bianca (Uva di Francia)	306	322	245	245	290	294	189	189	352	366	255	255	151	151	227	247	206	206	253	253	169	187	255	263	190	190	165	165	74	76	168	186	238	254	243	251	200	202	220	222	243	241	201	215	128	138
3201	Diretta nera A	318	318	235	255	0	0	181	189	334	358	239	271	147	151	227	247	204	208	243	249	165	183	253	263	0	0	0	0	76	80	166	178	0	0	251	257	188	202	222	222	225	225	207	207	128	140
3202	Dolcetta	318	318	0	0	290	290	179	195	352	370	251	257	151	151	241	247	206	206	243	243	187	193	255	263	174	182	167	167	74	80	172	206	240	254	243	247	186	194	212	222	225	227	191	207	128	138
3203	Frappato C	318	324	233	233	288	294	179	185	352	358	249	251	149	151	241	247	206	206	243	253	165	187	263	263	186	194	165	173	74	80	178	188	240	254	243	249	192	194	222	222	227	237	191	209	132	138
3204	Frappato 2	318	318	235	257	294	300	179	185	352	360	249	251	149	151	241	247	206	206	243	253	165	187	263	263	186	194	165	173	74	80	178	206	240	254	243	249	192	194	224	224	227	229	207	209	128	138
3205	Frappato 3	314	326	0	0	0	0	179	179	358	358	251	271	149	151	239	241	206	206	243	243	165	187	263	263	0	0	0	0	80	80	178	188	0	0	249	249	192	194	222	222	225	225	191	209	138	146
3206	Frappato A	316	318	227	233	288	294	179	185	352	358	249	249	149	151	241	247	206	206	243	243	165	187	263	263	186	194	165	173	52	64	178	188	240	254	243	249	192	194	222	222	227	227	201	211	130	136
3207	Frappato B	318	318	235	257	288	294	179	185	0	0	249	249	147	151	247	247	206	206	243	243	165	187	263	263	186	194	165	173	80	80	188	178	240	254	243	251	186	198	224	224	225	225	211	211	128	138
3208	Frappato F	318	318	233	257	288	294	179	185	352	358	251	257	149	151	241	247	206	206	243	243	165	187	263	263	186	194	165	173	80	80	178	188	240	254	245	249	186	200	224	224	227	227	211	211	128	138
3210	Gamay	302	318	241	245	288	290	193	193	358	370	249	257	149	157	247	247	204	208	247	251	165	187	255	265	174	174	167	167	74	80	166	186	240	240	251	257	184	186	212	220	227	241	207	207	128	140
3211	Grecanico A	322	328	233	245	290	294	179	193	356	370	249	257	147	149	247	247	206	206	253	257	169	183	255	265	174	188	165	167	74	80	186	202	240	254	251	251	186	198	224	224	225	231	201	207	128	138
3212	Grecanico B	322	328	235	247	0	0	179	193	356	370	249	249	147	149	247	247	206	206	243	253	169	183	255	265	0	0	0	0	74	80	186	202	0	0	251	251	186	198	224	224	227	233	201	209	128	138

Supplementary Table S4. Genetic profiles of cultivated and wild Sicilian accessions.

Accession code	Population / Sample name	VVIp60		VVMD28		VVIb01		VVMD27		VVIv67		VVMD32		VVIn16		VVMD21		VVMD24		VVMD7		VMC1b11		VVIn73		VMIp31		VVIh54		VVIq52		VMC4f3_1		VVMD25		VrZag79		VrZag62		VVMD17		VVMD5		VVMD6		VVS2	
3213	Grecanico C	322	328	235	247	290	294	179	193	356	370	249	257	149	149	247	247	206	206	253	257	169	183	255	263	174	188	167	167	72	72	186	202	240	254	249	249	186	198	224	224	227	233	201	209	128	138
3214	Grecaù (Bracaù)	314	318	227	233	290	294	179	181	360	360	251	255	149	149	247	253	206	208	247	251	165	169	263	263	180	186	163	163	74	80	172	188	236	246	249	253	186	202	222	222	227	227	207	211	128	138
3215	Grillo A	318	318	0	0	290	298	179	195	370	384	251	271	149	155	247	263	206	210	243	253	165	183	263	263	174	190	165	165	74	74	172	180	248	254	247	251	184	200	222	222	225	227	207	211	138	144
3216	Grillo C	318	318	233	239	290	298	179	193	370	384	251	271	149	151	247	263	206	210	247	249	165	183	263	263	174	190	165	167	76	76	172	180	248	254	245	249	184	200	222	222	225	227	207	211	138	144
3217	Grillo D	318	318	233	241	290	298	179	195	370	384	251	271	149	151	247	263	206	210	243	253	165	183	263	263	174	190	165	165	74	80	172	180	248	254	247	251	184	200	220	220	227	227	191	211	138	146
3218	Jala bianca	318	318	267	267	290	294	179	185	352	358	239	249	155	157	241	247	206	206	251	257	169	183	263	263	178	186	165	177	80	80	170	182	238	254	249	255	198	202	224	224	227	233	201	209	134	138
3219	Inzolia A	314	318	243	247	294	306	185	195	370	370	251	257	149	151	247	247	206	206	237	243	179	183	263	263	178	188	165	165	76	80	202	206	238	254	245	249	186	200	222	222	0	0	209	209	132	134
3220	Inzolia C	314	318	227	257	290	298	183	193	352	360	251	257	0	0	0	0	206	206	243	251	0	0	263	263	174	194	165	165	74	76	172	188	240	254	247	249	188	200	222	222	227	227	207	209	130	138
3221	Inzolia imperiale A	314	318	0	0	290	298	179	179	352	366	251	271	149	155	241	247	204	206	0	0	165	183	255	263	184	186	165	165	76	80	166	186	254	254	249	257	184	198	224	224	0	0	207	207	134	138
3223	Inzuccarato	318	326	227	227	0	0	179	193	328	384	257	271	149	149	253	253	206	208	0	0	165	183	263	263	0	0	0	0	74	76	172	188	0	0	241	251	188	188	224	224	225	225	207	207	140	148
3224	Inzuccarato di Noto	318	322	235	245	290	294	185	195	334	366	251	255	149	149	247	253	206	210	253	255	181	183	255	255	178	186	165	165	76	80	166	174	254	254	251	257	184	192	220	220	239	243	209	215	130	130
3225	Lacrima di Maria A	318	318	243	247	0	0	179	193	352	368	249	255	149	149	247	253	206	208	237	243	165	183	263	263	0	0	0	0	78	82	188	206	0	0	249	249	186	198	222	222	227	241	207	211	132	144
3226	Leanfurtisi	314	318	255	255	0	0	179	185	352	370	251	257	151	157	241	247	206	212	241	249	167	171	263	263	0	0	0	0	82	82	172	190	0	0	251	251	188	196	214	224	225	227	191	211	130	146
3227	Lorisi (Orisi)	318	324	235	257	0	0	181	195	362	362	251	257	151	151	241	249	212	212	243	235	165	171	263	263	0	0	165	173	74	76	170	186	238	238	243	251	186	196	214	222	235	243	201	209	132	138
3228	Lucignola	318	322	233	235	290	298	179	179	352	370	249	271	0	0	0	0	0	0	243	243	0	0	263	263	174	190	163	173	74	80	172	172	240	254	241	249	192	200	214	224	227	227	207	207	128	138
3229	Malvagia	318	326	255	255	292	300	179	179	352	352	249	251	151	157	247	253	206	206	241	249	165	169	263	263	174	188	165	165	82	82	172	188	254	254	243	251	188	200	224	224	225	225	191	207	138	146
3230	Malvasia di Lipari C	302	318	233	255	290	294	179	183	348	362	251	271	149	155	247	247	206	214	247	253	165	183	257	263	172	182	157	163	76	80	172	182	240	254	243	247	186	200	222	222	227	227	191	207	138	138
3231	Malvasia di Lipari A	318	326	241	255	290	294	183	183	348	362	251	271	149	155	247	247	206	214	247	253	165	183	257	263	172	182	157	163	76	80	172	182	240	254	243	247	186	200	222	222	227	227	191	207	128	138
3232	Marsala (Mareschino)	314	318	0	0	290	298	179	195	352	366	251	257	151	151	247	253	208	216	243	247	181	183	263	263	174	188	165	165	74	80	166	166	240	254	245	249	186	200	222	222	0	0	191	207	128	140
3233	Marsigliana	314	318	0	0	290	306	183	185	352	356	249	251	149	151	241	247	206	212	243	243	173	183	263	263	188	188	165	165	74	80	172	206	238	254	249	257	184	186	222	222	225	225	191	207	128	128
3234	Minna di vacca B	314	318	249	249	300	310	185	195	370	370	249	251	0	0	0	0	0	0	237	243	0	0	263	263	178	188	163	165	76	80	202	206	238	254	249	255	184	202	222	224	229	239	207	209	132	134
3235	Minnavacchina	318	324	233	255	294	308	191	193	352	370	251	255	149	151	247	247	204	206	241	249	167	183	263	263	182	188	165	175	76	76	206	206	246	252	245	249	186	200	222	224	239	249	209	209	136	138
3236	Minnella bianca (Passulana)	314	318	241	241	294	306	185	195	366	370	249	251	151	153	247	247	206	206	237	243	179	183	263	263	178	188	165	165	76	80	202	206	238	254	251	257	184	202	220	222	229	241	209	211	132	134
3237	Monteleone	302	314	245	245	288	294	189	195	352	370	251	257	149	151	247	247	206	206	251	267	169	181	263	263	176	182	179	173	76	80	172	186	240	248	249	251	192	194	212	224	233	239	191	207	128	138
3238	Moscato di Noto B	314	314	247	267	294	300	179	193	358	370	263	271	147	147	247	263	208	214	237	253	183	187	261	263	182	186	165	165	76	76	166	206	240	248	251	255	184	194	220	222	229	229	207	211	128	138
3239	Moscato bianco	318	324	235	257	290	294	179	193	358	358	263	263	147	147	261	263	206	206	243	253	183	187	261	263	182	188	165	165	74	76	166	206	238	254	255	255	194	194	220	222	241	241	201	209	132	138
3240	Moscato di Noto C	318	318	0	0	290	294	0	0	352	352	251	271	0	0	263	263	0	0	0	0	0	0	263	263	174	188	165	165	74	80	0	0	240	254	249	249	184	200	224	224	0	0	209	209	138	138
3241	Muscatedda	314	318	235	245	290	294	179	179	352	370	257	271	147	157	253	253	206	214	243	253	165	183	263	263	182	182	165	179	74	76	166	182	240	254	247	255	184	186	214	224	229	243	209	209	128	138
3242	Muscatidduni	302	318	257	257	290	294	189	195	352	370	249	251	153	153	247	247	206	206	241	243	169	183	263	263	174	182	167	173	76	76	170	172	248	254	247	257	184	194	224	224	227	235	209	211	138	146
3243	Nerello Mascalese B	314	318	227	241	290	298	179	179	352	352	251	255	149	151	241	247	206	212	243	253	165	169	263	263	172	182	163	163	74	80	172	178	240	240	251	259	194	200	212	222	225	225	191	209	128	138
3244	Nerello Mascalese C	314	318	0	0	290	298	179	179	352	354	251	255	0	0	0	0	0	0	243	253	0	0	263	263	188	194	163	165	80	80	172	178	240	240	251	259	194	200	214	222	225	225	191	209	128	138
3245	Nerello cappuccio A	314	322	247	257	290	294	181	185	352	352	249	251	0	0	0	0	0	0	243	243	0	0	263	263	174	176	165	165	74	76	0	0	240	254	251	259	184	186	222	222	227	229	191	207	128	138
3246	Nerello Mascalese D	314	318	225	241	290	298	179	179	352	354	251	255	151	151	241	247	206	212	243	253	167	171	263	263	188	194	163	163	80	80	172	178	240	240	251	259	194	200	214	222	227	237	191	209	128	138
3247	Nerello Mascalese E	314	318	225	241	290	298	179	179	352	354	251	255	151	153	241	247	206	212	243	253	165	183	263	263	186	188	163	163	74	80	172	178	240	240	251	259	194	200	212	222	227	237	191	209	128	138
3248	Nerello Mascalese A	314	318	241	241	290	298	179	179	352	354	251	255	149	149	241	247	206	206	243	253	165	183	263	263	188	194	163	163	76	82	172	178	240	240	249	257	194	200	212	222	227	239	191	209	128	138
3249	Nero d'Avola A	312	314	235	235	298	298	179	181	354	366	251	251	147	149	247	253	206	210	243	253	169	183	263	263	174	188	165	165	78	80	186	186	240	254	251	251	184	200	220	220	227	227	209	211	138	146
3250	Nero grosso	318	326	231	241	290	290	185	193	352	352	249	271	149	155	241	247	206	210	243	243	167	173	263	263	190	194	165	165	74	78	180	190	248	254	251	255	188	188	224	224	233	233	191	207	130	138
3251	Nivureddu	318	326	233	257	0	0	183	185	352	352	251	257	149	155	241	247	206	206	243	243	165	165	263	263	0	0	165	165	76	76	178	190	0	0	243	247	186	194	214	222	229	237	191	191	128	130
3252	Nivuro Bronte	314	318	0	0	288	290	195	193	358	358	239	239	151	157	241	241	208	208	243	247	187	193	255	263	174	182	167	167	74	80	166	186	240	240	257	257	186	186	212	236	225	225	207	211	138	138
3253	Nucera nera (Perricone)	318	328	233	257	292	292	183	185	352	352	251	257	149	155	241	247	206	206	243	243	165	165	263	263	190	190	165	165	74	76	178	190	240	254	243	247	186	194	212	222	229	237	191	191	128	130
3254	Nzuccarato	318	326	241	255	290	290	179	195	328	328	251	271	151	151	257	257	206	210	247	255	165	165	263	263	190	194	165	175	74	76	172	188	240	244	243	243	186	186	222	222	227	235	207	207	140	150
3255	Oriddru	318	322	0	0	294	298	0	0	354	384	257	259	149	149	241	247	206	206	0	0	169	183	263	263	174	178	165	167	72	76	186	202	246	252	241	245	202	202	224	228	0	0	207	211	128	138
3258	Osso nivuro	302	318	257	257	294	294	189	195	0	0	251	257	153	153	247	255	206	208	237	243	183	187	263	263	186	188	151	165	74	76	168	206	238	238	251	257	186	202	222	222	233	239	191	211	128	134
3259	Perricone A	318	326	233	257	290	290	179	185	352	352	249	257	151	155	241	247	206	206	243	243	165	167	263	263	190	190	165	165	76	80	172	178	240	254	243	247	186	194	214	224	227	229	191	191	128	128
3260	Pizzutella	312	314	257	257	290	294	183	185	352	356	257	271	151	151	253	253	206	206	243	253	183	183	263	263	172	182	165	177	74	76	166	188	248	254	243	251	184	186	222	222	227	233	209	209	128	130
3261	Precoce	314	318	233	245	290	306	189	193	352	360	239	271	0	0	0	0	0	0	247	253	0	0	263	263	180	192	163	165	76	82	172	186	238	238	251	257	184	186	222	224	225	237	209	209	128	128
3262	Preventivo	318	318	233	233	288	290	179	185	352	352	251	251	0	0	0	0	0	0	245	267	0	0	263	263	190	194	165	173	74	80	172	178	240	240	243	251	186	186	214	224	227	239	191	209	128	128
3263	Racignola bianca	318	324	235	257	294	306	179	193	352	352	251	255	151	153	247	247	206	206	243	253	167	183	263	263	184	188	175	179	76	76	172	206	248	254	247	249	188	200	222	224	227	233	209	209	136	138
3265	Racina di vento	314	322	235	257	296	300	181	193	352	352	255	271	149	149	253	253	202	212	243	253	165	187	263	263	188	188	165	165	74	80	178	178	240	246	249	249	188	202	220	224	235	241	209	209	136	138
3266	Racinedda	312	314	0	0	288	290	179	189	328	360	251	251	147	149	237	247	206	214	0	0	177	183	261	269	174	180	165	165	76	76	182	182	254	256	249	249	186	196	220	222	0	0	209	209	134	138
3267	Recunu (Bufania)	302	328	0	0	290	290	179	195	354	360	251	251	151	151	253	253	206	206	247	255	165	165	265	265	182	188	165	165	76	80	172	172	240	254	251	251	184	198	224	224	225	225	201	207	128	138
3269	Rucignola	302	318	0	0	294	294	185	191	352	370	249	251	149	151	247	247	206	206	249	249	165	183	263	263	186	188	165	179	74	80	188	206	240	254	241	245	194	200	224	224	227	227	209	209	138	140
3270	Russetto	318	322	233	233	288	294	179	179	356	358	0	0	149	149	247	247	206	214	243	251	165	187	263	263	186	186	163	163	74	80	178	188	240	254	0	0	0	0	0	0	0	0	191	209	138	140
3271	Sparo virdisi	316	322	257	257	294	294	179	189	352	360	249	251	149	149	247	247	206	210	243	243	169	183	255	263	176	188	165	165	74	74	166	186	238	238	243	251	186	194	224	238	233	241	191	209	128	140
3272	Sultanina	314	314	257	267	290	294	193	193	364	366	249	271	149	151	247	253	206	214	243	253	165	183	255	263	186	188	165	165	74	80	180	186	238	248	243	253	186	186	220	222	229	237	211	211	128	148
3273	Tallone nero	314	318	241	241	290	294	185	195	352	360	255	271	149	149	247	247	206	214	251	253	165	165	255	263	186	188	163	163	76	78	166	188	248	254	249	255	184	186	222	222	237	239	209	211	130	148
3274	Tintorè (Ibisu)	314	318	0	0	290	294	0	0	352	352	249	271	149	149	247	253	206	210	243	247	165	183	263	263	182	182	163	163	76	80	172	206	238	240	245	249	186	188	214	224	0	0	193	211	132	132
3275	Triboti nera	316	318	243	243	290	290	179	193	358	384	249	271	149	149	247	253	204	210	243	255	165	171	263	263	188	188	163	163	74	76	180	188	244	248	243	253	188	202	222	222	227	233	191	207	146	150
3276	Tripolina bianca	318	328	243	257	290	294	179	191	352	358	249	271	149	151	247	253	206	206	247	267	169	183	263	263	186	188	165	165	76	80	188	206	240	254	241	245	186	192	224	224	227	235	207	211	138	140
3277	Uva francisi	318	318	235	255	290	290	181	189	334	356	239	271	147	151	225	247	204	210	243	249	165	183	253	263	178	178	161	161	74	80	164	178	240	240	0	0	188	202	222	222	225	225	207	207	128	140
3278	Visparola	312	314	235	247	290	294	185	193	352	352	255	271	149	149	241	247	206	214	243	243	165	181	263	263	176	188	161	161	74	80	166	172	238	240	247	247	188	194	222	222	227	233	191	209	128	128
3279	Vitraruolo	302	318	0	0	294	294	0	0	356	358	251	251	151	157	241	247	206	210	0	0	183	183	263	263	186	186	161	165	76	80	170	172	248	254	243	243	200	200	224	224	0	0	201	209	128	138
3004	Zibibbo A	314	318	243	267	290	294	179	193	370	384	263	271	147	149	253	263	210	210	253	255	165	183	263	263	186	190	165	165	74	74	180	206	248	248	247	255	184	202	222	222	229	233	191	211	128	146
3280	Zibibbo augustano	314	318	241	265	290	294	179	193	370	384	251	263	147	149	255	263	210	210	0	0	165	183	263	263	186	190	165	165	74	74	180	206	248	248	243	251	184	200	222	222	227	231	191	211	128	154
3281	Zibibbo B	314	318	235	243	290	294	179	193	352	370	263	271	147	149	253	263	210	210	243	253	165	183	263	263	186	190	165	165	74	74	172	206	248	248	247	255	184	202	222	222	227	233	191	211	128	146
3282	Zibibbo carricante	314	318	243	267	290	294	179	193	352	352	263	271	147	149	253	263	210	210	253	251	165	183	263	263	186	190	165	165	74	74	172	206	248	248	247	255	184	202	222	222	229	233	191	211	128	146
3283	Zibibbo grosso	314	318	243	267	290	294	179	193	370	384	251	251	147	149	253	263	210	210	251	265	165	183	263	263	186	190	165	165	74	72	180	206	248	248	243	247	0	0	222	222	229	233	191	211	128	146
3284	Zibibbo nero	314	318	0	0	290	294	179	193	352	352	263	271	147	149	253	263	210	210	253	251	183	183	263	263	186	188	165	165	74	80	172	206	238	248	247	255	184	202	222	222	225	225	191	211	128	148
3285	Nero d'Avola B	314	314	0	0	290	294	179	181	352	352	251	251	147	149	247	253	206	210	243	253	183	183	263	263	186	188	163	163	80	78	172	178	0	0	251	251	184	200	222	222	0	0	209	209	138	148
3286	Nero d'Avola C	314	314	235	235	290	298	179	179	354	366	251	251	147	149	247	253	206	210	243	253	169	183	263	263	174	188	165	165	80	80	186	188	240	254	247	247	184	200	222	222	225	229	209	211	138	148
3287	Nero d'Avola D	314	318	243	243	294	306	181	185	356	370	251	271	149	151	247	247	206	206	243	257	169	179	263	263	180	188	165	173	74	76	182	206	254	254	251	259	184	198	224	224	227	229	209	209	132	138
3288	Racina i mustu A	318	318	235	243	290	298	179	185	352	354	251	255	149	151	239	239	206	212	243	253	165	169	263	263	174	188	165	165	80	80	172	172	240	254	241	247	192	200	222	222	237	241	211	213	128	138
3289	Cuda i vulpe	314	318	235	257	290	294	179	185	352	362	239	251	151	155	247	247	206	214	253	257	183	187	263	263	174	194	165	165	80	80	166	172	240	254	237	251	186	200	222	222	227	235	209	209	130	138
3290	Pirricone raspo rosso	318	324	241	241	294	294	185	185	352	366	251	271	149	149	247	247	206	210	249	255	165	173	255	263	186	186	163	163	74	76	166	206	238	254	239	251	186	202	222	222	225	237	191	211	128	130
3291	Malvasia A	318	328	233	253	290	294	179	183	348	362	251	271	149	155	247	247	206	214	243	249	165	185	257	263	172	182	157	163	76	80	172	182	240	254	241	245	186	200	224	224	225	225	191	209	138	142
3292	Nero d'Avola F	314	314	235	235	298	298	179	181	354	366	251	251	147	149	247	253	206	210	243	253	169	183	263	263	174	188	165	165	80	78	186	188	240	254	247	247	184	200	222	222	227	227	209	211	138	148
3293	Nerello Mascarisi	318	328	257	257	290	290	183	185	352	352	251	257	149	155	241	247	206	206	243	241	165	165	263	263	190	190	165	165	74	76	178	178	240	254	241	245	186	194	214	224	229	237	191	191	128	130
3294	Nero d'Avola G	314	314	235	235	298	298	179	181	354	366	251	251	147	149	247	253	206	210	243	253	169	183	263	263	174	188	165	165	80	78	186	188	240	254	251	251	184	200	222	222	227	241	209	211	138	148
3296	Cappuccio	314	318	227	233	290	294	189	189	0	0	257	257	147	149	253	263	210	210	251	265	165	183	263	263	0	0	165	165	74	74	180	206	238	254	249	251	192	194	214	224	0	0	191	211	128	146
3297	Perricone B	314	314	231	245	290	306	183	185	352	354	257	271	149	151	241	247	206	206	243	251	165	169	263	263	186	190	165	177	76	74	188	188	238	244	247	251	186	196	224	224	241	241	209	209	132	132

Supplementary Table S4. Genetic profiles of cultivated and wild Sicilian accessions.

Accession code	Population / Sample name	VVIp60		VVMD28		VVIb01		VVMD27		VVIv67		VVMD32		VVIn16		VVMD21		VVMD24		VVMD7		VMC1b11		VVIn73		VMIp31		VVIh54		VVIq52		VMC4f3_1		VVMD25		VrZag79		VrZag62		VVMD17		VVMD5		VVMD6		VVS2	
3298	Giugnatica	0	0	231	255	290	290	185	189	356	356	239	239	157	157	247	263	206	210	243	251	173	173	263	263	164	180	163	167	0	0	178	178	240	240	251	259	192	202	214	214	229	237	0	0	0	0
3299	Nero d'Avola E	314	314	235	241	298	298	179	181	354	366	249	251	147	149	247	253	206	210	243	253	169	183	263	263	174	188	165	165	78	80	186	188	240	254	247	247	184	200	222	222	227	227	209	211	138	148
3300	Putrisa	314	320	247	259	290	294	181	185	346	360	249	257	149	151	245	247	206	210	243	257	181	183	263	263	172	188	165	175	80	80	166	186	240	254	247	255	188	188	222	222	227	239	201	201	128	128
3302	Mantonico B	314	318	243	257	290	294	179	193	0	0	255	255	149	149	241	255	212	214	243	253	165	167	257	263	172	186	165	177	76	80	166	178	240	248	247	247	192	192	214	222	227	233	191	209	128	128
3304	Alicante, Licante	318	318	241	241	288	290	193	193	352	358	241	249	151	157	241	247	208	214	243	247	187	193	255	263	174	182	163	167	74	80	170	186	240	254	257	257	186	186	214	238	227	241	209	209	132	142
3305	Mantonico C	0	0	227	227	290	294	179	189	356	360	0	0	151	151	247	255	206	206	243	257	169	183	255	263	182	188	163	165	0	0	188	188	240	254	243	247	194	200	222	222	227	233	0	0	0	0
3307	Inzolia imperiale B	314	314	0	0	290	294	185	185	352	352	257	271	149	149	255	255	206	206	253	251	187	187	263	263	172	182	165	177	74	76	172	206	238	248	243	251	184	186	224	224	225	225	209	209	128	128
3308	Cantaro	314	316	241	255	290	294	179	179	352	384	249	271	149	151	241	253	206	206	235	249	169	187	263	263	190	190	165	175	74	76	182	188	238	244	245	245	186	200	220	224	233	245	209	211	128	138
3309	Trummana	316	318	0	0	290	294	179	179	356	358	249	251	149	149	247	253	204	210	243	241	165	171	263	263	186	188	165	165	74	74	178	188	240	254	245	249	186	200	224	224	225	225	191	191	148	134
3310	Minutidda	318	318	233	243	288	290	179	185	352	352	251	255	149	149	241	247	206	212	243	265	165	165	263	263	190	194	165	173	74	80	172	178	240	240	243	257	186	192	214	222	227	237	191	209	128	128
3311	Malvasia B	318	328	233	253	290	294	179	183	348	362	251	271	149	155	245	245	206	214	243	249	165	183	257	263	172	182	157	163	76	80	172	182	240	254	239	243	186	200	224	224	225	225	191	209	138	140
3312	Livedda	318	318	235	247	290	294	181	193	352	356	239	251	147	147	247	253	206	206	237	243	173	183	263	263	180	182	163	163	74	80	186	188	248	254	0	0	186	194	224	224	227	229	211	211	132	148
3313	Mascarisi	318	328	233	257	290	290	183	185	352	352	251	257	149	155	241	247	206	206	243	243	165	165	263	263	190	190	165	165	74	76	178	190	240	254	241	245	186	194	214	222	229	237	191	191	128	130
3314	Racina i mustu B	314	318	233	235	290	290	179	189	360	360	0	0	147	151	247	255	210	210	251	257	177	183	255	263	178	186	165	175	74	76	172	172	238	248	245	251	194	198	222	222	227	229	191	209	128	140
3315	Nuciddara	314	318	241	241	290	294	185	185	352	352	251	251	147	147	247	247	206	210	253	251	165	169	263	263	174	188	165	179	76	80	172	178	248	254	237	243	198	200	222	222	241	241	207	207	138	138
3316	Moscato nero	314	318	235	243	294	294	179	185	366	384	269	271	149	155	247	253	210	210	251	253	165	171	263	263	178	186	165	165	74	78	172	206	248	254	239	255	184	190	222	222	233	239	209	211	130	146
3317	Diretta nera B	318	318	235	243	290	298	179	193	352	358	251	251	149	151	247	253	206	210	243	253	165	183	263	263	174	188	165	165	76	80	188	206	240	254	251	251	184	200	222	222	227	233	209	211	132	138
3319	Minnilottina	314	318	243	247	0	0	185	193	368	370	251	251	149	151	247	253	206	206	237	243	179	183	263	263	0	0	0	0	76	80	206	206	238	238	251	251	184	200	222	222	229	239	211	213	132	134
3320	Mantonico A	318	322	243	243	294	294	185	185	352	366	251	271	149	149	247	247	206	210	253	259	165	173	255	263	186	186	163	165	74	76	166	206	238	254	239	251	184	202	220	220	227	239	191	211	128	130
3321	Cornicchiola A	312	314	243	257	290	290	179	181	342	352	257	261	147	151	247	263	206	210	251	253	165	183	263	263	180	194	159	165	80	84	166	202	238	248	251	251	194	202	222	224	237	249	191	211	140	146
3322	Lacrime i Maria B	316	318	241	241	290	290	179	195	358	384	0	0	149	149	247	255	204	210	239	249	165	171	263	263	188	190	163	163	74	76	180	188	244	248	0	0	0	0	0	0	223	229	191	209	146	150
3323	Inzolia nera A	312	314	231	245	290	306	169	183	352	354	0	0	149	151	241	247	206	206	241	249	165	169	263	263	186	190	165	177	76	80	188	190	238	244	243	247	186	196	224	224	239	239	209	211	128	152
3324	Fiore d'arancio (Trunzu)	314	328	235	243	290	294	179	185	352	352	271	271	151	151	253	263	206	206	237	243	165	169	263	263	174	184	165	175	74	80	188	206	248	254	251	257	194	202	222	222	227	233	191	211	128	148
3325	Lugliatica (Luglienga)	318	328	233	257	290	290	183	185	352	352	251	257	149	155	241	247	206	206	243	243	165	165	263	263	190	190	165	165	74	76	178	190	240	254	243	247	186	194	214	224	229	237	191	191	128	130
3326	Lacrime i Maria C	318	318	243	247	290	306	185	193	368	384	249	251	149	151	247	253	206	210	237	243	165	183	263	263	188	188	167	175	76	80	188	206	248	254	251	257	186	202	224	224	227	241	209	211	132	146
3327	Greca	314	318	247	257	290	306	185	185	356	366	251	257	149	149	247	253	206	206	237	243	183	183	263	263	188	200	165	175	74	80	202	206	248	254	247	253	188	202	222	224	239	239	209	211	132	138
3328	Caleu	314	322	257	257	290	294	183	193	352	356	261	271	149	151	247	253	206	206	237	247	183	183	263	263	182	188	165	165	76	80	186	188	238	248	247	257	186	202	224	224	239	241	209	211	128	148
3329	Minna di vacca C	318	318	0	0	290	294	179	185	352	358	239	251	149	149	253	253	204	206	243	247	165	183	263	263	188	190	163	163	76	80	188	202	248	254	0	0	186	194	224	224	233	239	207	211	132	146
3333	Funcia chiatta	314	318	241	241	290	290	179	193	358	366	249	271	149	151	251	253	210	214	243	241	165	183	263	263	174	190	165	167	74	80	166	188	248	254	251	257	184	186	222	222	227	227	209	209	138	146
3334	Bertuccio	314	322	0	0	290	294	181	185	0	0	249	251	149	151	247	251	206	212	243	243	173	183	263	263	176	188	165	165	74	76	178	178	240	254	251	259	184	186	220	220	225	225	207	207	138	140
3335	Catarratto E	0	0	227	235	290	294	179	179	352	368	251	251	149	149	247	253	206	210	243	253	165	183	263	263	174	178	165	165	0	0	0	0	240	254	243	247	194	198	222	222	227	227	0	0	0	0
3337	Inzolia nera B	314	320	243	257	290	294	185	193	356	368	239	261	0	0	0	0	0	0	243	257	167	183	263	263	188	188	165	175	76	80	166	186	238	248	247	247	192	198	222	222	233	233	203	211	128	128
3338	Alivedda nera	314	314	243	243	290	290	181	181	0	0	257	261	0	0	247	263	206	210	251	249	0	0	263	263	180	188	159	165	80	84	178	188	238	248	251	251	194	202	222	224	237	237	191	209	128	140
3339	Damaschino B	314	318	243	267	290	294	179	193	370	384	263	271	147	149	253	263	210	210	253	251	165	183	263	263	186	190	165	165	74	80	180	206	248	248	247	255	184	202	222	222	229	233	191	209	128	128
3340	Albanella bianca	318	318	227	227	290	294	179	189	352	356	251	271	151	151	247	253	206	206	243	257	169	183	255	263	186	188	165	177	74	80	186	188	238	248	247	251	194	200	222	222	233	233	211	211	132	148
3342	Menna vacca A	318	318	233	243	290	294	179	193	366	370	251	271	155	157	247	253	206	210	247	251	171	183	263	263	178	186	163	163	78	80	172	206	238	248	243	251	190	202	222	222	233	239	207	211	128	146
3343	Zu Manuele	0	0	0	0	290	294	179	191	352	360	255	261	157	157	247	255	206	210	243	253	181	183	263	263	188	190	163	163	80	78	188	206	240	248	247	249	184	202	224	224	225	225	209	209	0	0
3344	Centoruotoli	0	0	243	247	290	306	185	193	366	384	249	251	149	151	247	253	206	210	237	243	165	183	263	263	188	188	167	175	0	0	188	206	248	254	247	253	186	202	222	222	225	241	0	0	0	0
3345	Cornicchiola B	314	314	243	257	290	290	179	181	342	352	257	261	147	151	247	263	206	210	251	253	165	183	263	263	180	194	159	165	80	84	166	202	238	248	251	251	194	202	222	224	237	247	191	211	140	146
3348	Cutrera	324	322	233	233	290	290	187	193	352	352	251	271	149	149	247	253	206	210	243	251	165	169	255	263	182	190	165	165	74	74	172	188	238	238	251	257	190	198	222	222	229	229	209	211	128	138
3349	Zu Matteo	314	318	235	243	290	294	179	185	352	352	257	257	149	151	253	253	206	206	243	253	165	169	263	263	186	188	165	175	74	80	188	206	0	0	257	257	186	200	222	222	225	233	211	213	130	138
3350	Catanese bianca	314	328	231	245	290	298	179	183	354	370	249	255	151	155	241	247	206	206	247	249	165	187	263	263	188	188	165	165	74	76	172	190	238	254	245	257	188	192	224	224	225	241	211	211	128	148
3351	Dunnuni	314	318	0	0	290	294	179	185	370	384	0	0	147	149	253	263	206	210	243	253	165	183	263	263	178	188	165	165	74	80	180	206	248	254	0	0	186	186	222	222	0	0	207	209	128	138
3352	Fumusa	318	318	0	0	290	298	179	179	352	358	251	251	151	155	247	253	206	206	243	253	165	183	263	263	186	188	165	177	74	80	188	188	238	254	243	251	186	200	222	222	0	0	211	211	132	148
3354	Nocera	314	318	0	0	288	290	0	0	352	352	251	255	147	149	247	253	206	212	243	243	169	183	263	263	186	186	163	175	74	76	166	178	240	240	249	251	186	192	214	224	227	233	209	209	128	128
3355	Prunesta	314	318	227	233	290	294	179	179	360	360	0	0	149	149	247	253	206	210	247	247	165	169	263	263	182	190	165	165	74	80	172	188	240	248	251	255	186	202	222	222	225	225	207	211	128	144
3361	Inzolia Tunisina A	318	318	0	0	290	306	185	193	0	0	249	251	149	151	247	253	206	210	237	243	165	183	263	263	188	188	167	175	76	80	188	206	248	254	251	257	186	202	224	224	225	227	209	211	132	146
3362	Nero nostrale	318	328	227	233	290	294	183	183	352	352	251	257	0	0	241	247	206	206	243	243	165	165	263	263	176	188	165	165	74	76	178	188	238	238	243	247	186	194	224	224	229	229	191	191	128	130
3363	Zibibbo con i seni	314	318	241	265	290	294	179	193	370	384	263	271	147	149	253	263	210	210	249	251	165	183	263	263	186	190	165	165	74	72	180	206	248	248	245	251	184	202	222	222	227	231	191	211	128	146
3364	Garignano	0	0	247	257	290	294	181	185	356	370	249	251	149	151	247	251	206	206	243	243	165	183	263	263	174	182	165	165	0	0	178	186	238	254	249	255	184	186	222	222	225	227	0	0	0	0
3365	Zibibbo minna di vacca	314	318	227	247	290	294	179	179	352	352	263	263	149	149	263	263	210	210	253	251	165	165	263	263	174	188	163	165	74	74	178	188	238	254	247	255	184	202	222	222	0	0	191	191	128	146
3366	Zibibbo masculune	314	318	243	267	288	294	179	193	358	358	0	0	147	149	253	263	210	210	253	255	165	183	263	263	178	186	163	165	74	74	178	206	238	248	0	0	0	0	0	0	233	233	191	209	128	128
3367	Pionastro	318	318	247	247	290	294	183	193	352	360	251	255	149	151	247	253	206	206	243	253	183	183	263	265	182	190	165	165	74	80	188	206	254	266	247	257	190	202	224	224	233	239	191	211	130	144
3368	Inzolia Tunisina B	314	318	243	257	290	294	181	189	360	368	255	271	149	151	247	253	206	208	247	253	183	187	255	263	188	190	163	165	74	76	172	186	254	254	239	243	188	202	224	224	237	241	209	213	130	138