Supplementary Material

***Vitis vinifera* genotyping toolbox to highlight diversity and germplasm identification**

**Stylianos Tympakianakis1,†,** **Emmanouil Trantas1,2,†,\*, Evangelia V. Avramidou3,** **Filippos Ververidis1,2\***

1Laboratory of Biological and Biotechnological Applications, Department of Agriculture, School of Agricultural Sciences, Hellenic Mediterranean University, Heraklion, Greece

2Institute of Agri-Food and Life Sciences, Research Center of the Hellenic Mediterranean University, Heraklion, Greece

3Institute of Mediterranean Forest Ecosystems, Hellenic Agricultural Organisation “DIMITRA”, Athens, Greece

**\* Correspondence:**Emmanouil A. Trantas, mtrantas@hmu.gr

Filippos Ververidis, ververidis@hmu.gr

† These authors contributed equally to this work and share first authorship

# Supplementary Table 1. Up to date collection of SSR markers used for Vitis genetic analyses. Nine microsatellite markers that are proposed by the OIV for the identification of vine (OIV-VITI\_609 2019) have been marked. Column 3 present the Genbank genomic locus in *Vitis vinifera* (1, PN40024) and *V. riparia* (2, cv Riparia Gloire de Montpellier isolate 1030). *V. vinifera* or *V. riparia* chromosome refers to the chromosome where the SSR locus is located. PCR product size refers to the size of amplicon on the *V. vinifera* or *V. riparia* DNA estimated with the NCBI Primer-Blast tool (Ye, et al. 2012). F, forward primer sequence; R, reverse primer sequence; G, genomic, N/A, not available.

| **SSR marker (OIV code)** | **SSR locus primer pair** | **GenBank record** | **SSR locus coordinates** | ***Vitis vinifera*** **Chromosome #** | ***V. riparia* Chromosome** | **SSR Repeat motif** | **Allele Size (bp) in *Vitis* sp.** | **Number of Alleles** **(No)** | **Observed Heterozygosity****[HO]** | **Expected Heterozygosity****[HE]** | **Probability of identity****[Pi]** | **References** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **VVS2 (801)** | F: CAGCCCGTAAATGTATCCATCR: AAATTCAAAATTCTAATTCAACTGG | 1: NC\_012017.32: NC\_048441.1 | 1: F3909894-3909914R3910030-39100062: F15841543-15841523R 15841399-15841423 | **11** | **11** | (GA)22 | **123–161** | **10-13** | **0,723** | **0,815** | **0.093** | (Thomas and Scott 1993, Hvarleva, et al. 2004, Merkouropoulos, et al. 2015, Guo, et al. 2016, Stavrakaki, et al. 2020) |
| **VVMD5 (802)** | F: CTAGAGCTACGCCAATCCAAR: TATACCAAAAATCATATTCCTAAA | 1: NC\_012022.32: NC\_048446.1 | 1: F 20785556-20785575R 20785782-207857592: F 22785066-22785085R 22785330-22785307 | **16** | **16** | (CT)3, AT(CT)11, ATAG(AT)3 | **226-246** | **8** | **0,745** | **0,845** | **0.075** | (Bowers, et al. 1996, Schuck, et al. 2009, Carimi, et al. 2010, Karatas, et al. 2014, Merkouropoulos, et al. 2015, Guo, et al. 2016) |
| **VVMD7 (803)** | F: AGAGTTGCGGAGAACAGGATR: CGAACCTTCACACGCTTGAT | 1: NC\_012013.32: NC\_048447.1 | 1: F 1178552-1178571R 1178797-11787782: F 17261888-17261869R 17261625-17261644 | **7** | **17** | (CT)14.5 | **233-263** | **14** | **0,806** | **0,819** | **0.069** | (Bowers, et al. 1996, Schuck, et al. 2009, Merkouropoulos, et al. 2015, Guo, et al. 2016) |
| **VVMD27 (804)** | F: GTACCAGATCTGAATACATCCGTAAGTR: ACGGGTATAGAGCAAACGGTGT | 1: NC\_012011.32: NC\_048435.1 | 1: F 4472201-4472175R 4472022-44720432: F 4125679-4125653R 4125474-4125495 | **5** | **5** | (CT)n | **173-194** | **11** | **0,840** | **0,812** | **0.072** | (Bowers, et al. 1999, Schuck, et al. 2009, Merkouropoulos, et al. 2015, Guo, et al. 2016, Marques da Silva, Figueiredo et al. 2020) |
| **VrZAG62 (805)** | F: GGTGAAATGGGCACCGAACACACGCR: CCATGTCTCTCCTCAGCTTCTCAGC | 1:NC\_012013.32:NC\_048437.1 | N/A | **7** | **7** | (GA)19 | **180-207** | **8-10** | **0.8514** | **0,839** | **0.124** | (Sefc, et al. 1999, Hvarleva, et al. 2004, Galbács, et al. 2009, Carimi, et al. 2010, Karatas, et al. 2014, Merkouropoulos, et al. 2015, Guo, et al. 2016, Rustioni, et al. 2016) |
| **VrZAG79 (806)** | F: AGATTGTGGAGGAGGGAACAAACCGR: TGCCCCCATTTTCAAACTCCCTTCC | 1: NC\_012011.32: NC\_048435.1 | 1: F5692717-5692693R 5692460-56924842: F 5338631-5338607R 5338374-5338398 | **5** | **5** | (GA)19 | **240-264** | **10** | **0.7027** | **0,818** | **0.065** | (Sefc, et al. 1999, Hvarleva, et al. 2004, Halasz, et al. 2005, Galbács, et al. 2009, Carimi, et al. 2010, Merkouropoulos, et al. 2015, Guo, et al. 2016, Rustioni, et al. 2016) |
| **VVMD32 (807)** | F: TATGATTTTTTAGGGGGGTGAGGR: GGAAAGATGGGATGACTCGC | 1: NC\_012010.32: NC\_048434.1 | 1: F 18035848-18035826R 18035578-180355972: F 18639366-18639344R 18639131-18639150 | **4** | **4** | (CT)n | **239-273** | **15** | **0,734** | **0,818** | **0.073** | (Bowers, et al. 1999, Schuck, et al. 2009, Laucou, et al. 2011, Merkouropoulos, et al. 2015, Guo, et al. 2016, Marques da Silva, et al. 2020) |
| **VVMD25 (808)** | F: TTCCGTTAAAGCAAAAGAAAAAGGR: TTGGATTTGAAATTTATTGAGGGG | 1: NC\_012017.32: NC\_048441.1 | 1: F 2971933-2971910R 2971693-29717162: F 16798603-16798626R 16798843-16798820 | **11** | **11** | (CT)n | **241-259** | **10** | **0,883** | **0,784** | **0.107** | (Galbács, et al. 2009, Schuck, et al. 2009, Laucou, et al. 2011, Merkouropoulos, et al. 2015, Guo, et al. 2016, Marques da Silva, et al. 2020) |
| **VVMD28 (809)** | F: ACAATTCAATGAAAAGAGAGAGAGAGAR: TCATCAATTTCGTATCTCTATTTGCTG | 1: NC\_012009.32: NC\_048433.1 | 1: F 11617504-11617531R 11617740-116177142: F 11553155-11553128R 11552939-11552965 | **3** | **3** | (CT)n | **218-278** | **15** | **0,860** | **0,869** | **0.044** | (Galbács, et al. 2009, Schuck, et al. 2009, Laucou, et al. 2011, Merkouropoulos, et al. 2015, Guo, et al. 2016, Marques da Silva, et al. 2020) |
| **ccSSR-14 a** | F: GGGTATAATGGTAGATGCCC R: GCCGTAGTAAATAGGAGAGAAA | 1:NC\_007957.12:NC\_039680.1 | 1: F 89061- 89080R 89262- 892412: F 89088- 89107R 89290- 89269 | **N/A** | **N/A** | (T)14 | **201-204** | **N/A** | **N/A** | **N/A** | **N/A** | (Sefc, et al. 2009) |
| **Scu04vv** | F: TGTCCTCTTTCCCTCTCCCAACR: CAGTCTGTCATCTGACCATGTAGCC | 1:NC\_012007.32:NC\_048431.1 | 1: F 4261254-4261275R 4261428-42614042: F 4354617-4354638R 4354789-4354765 | **1** | **1** | (CT)8 | **167-177** | **3** | **0.896** | **0.574** | **0.459** | (Scott, et al. 2000, Ekhvaia, et al. 2014) |
| **Scu05vv** | F: CAAGCAGTTATTGAAGCTGCAAGGR: TCATCCATCACACAGGAAACAGTG | 2:NC\_048442.1 | 2: F 15237440-15237417R 15237277-15237301 | **N/A** | **12** | (AT)13 | **134-214** | **15** | **0.30** | **0.67** | **N/A** | (Scott, et al. 2000, Drábek, et al. 2016, Italian\_Vitis\_Database 2022) |
| **Scu06vv** | F: CCCTAGTCTCTCTACCTATCCATGR: CCTAATGCCAGGAAGGTTGC | 1:NC\_012023.32:NC\_048447.1 | 1: F 3158905-3158882R 3158735-31587542: F 17721673-17721696R 17721876-17721857 | **17** | **17** | (AT)8 | **131-211** | **2** | **0.250** | **N/A** | **0.212** | (Scott, et al. 2000, Jahnke, et al. 2011, Italian\_Vitis\_Database 2022) |
| **Scu07vv** | F: CCGAAGAGGAATATGGGTTTGAGR: CCTAACTTGAAACGAAAGGACTGC | 1:NC\_012021.32:NC\_048445.1 | 1: F 16971038-16971016R 16970836-169708592: F 3760003-3760025R 3760208-3760185 | **15** | **15** | (ACC)5 | **163-243** | **4** | **N/A** | **N/A** | **N/A** | (Scott, et al. 2000, Wang, et al. 2015, Italian\_Vitis\_Database 2022) |
| **Scu08vv** | F: CGAGACCCAGCATCGTTTCAAGR: GCAAAATCCCCGTACAAGTC | 1:NC\_012017.32:NC\_048441.1 | 1: F 2579555-2579534R 2579373-25793922: F 17193768-17193789R 17193944-17193925 | **11** | **11** | (GGT)5 | **185-197** | **4** | **0.182** | **0.197** | **0.685** | (Scott, et al. 2000, Halasz, et al. 2005, Galbács, et al. 2009) |
| **Scu09vv** | F: AAGCAGCAGTTATTGGCGR: CAGATACTGAGGGTTTAAGCTC | 1: NC\_012020.32: NC\_048444.1 | 1: F 24477739-24477722R 24474623-244746442: F 5860287-5860304R 5863386-5863365 | **14** | **14** | (GGT)5 | **82-162** | **N/A** | **N/A** | **N/A** | **N/A** | (Scott, et al. 2000, Italian\_Vitis\_Database 2022) |
| **Scu10vv** | F: TACCCCCACAACCCTTTTR: TTCTCCGCCACCTCCTTTTCAC | 1:NC\_012024.32:NC\_048448.1 | 1: F 4520661- 4520678R 4520877- 45208562: F 4606282- 4606299R 4606489- 4606468 | **18** | **18** | (CAA)6 | **202-217** | **6** | **0.182** | **0.722** | **0.124** | (Scott, et al. 2000, Halasz, et al. 2005, Galbács, et al. 2009) |
| **Scu11vv** | F: AATTGATAGTGCCACGTTCTCGCCR: AACGCCGACAAGAATCCCAAGG | 1:NC\_012025.32:NC\_048449.1 | 1: F 6614205- 7003606R 7003391- 70034122: F 6614205- 6614182R 6613961- 6613982 | **19** | **19** | (CTT)8 | **213-293** | **25** | **0.874** | **N/A** | **0.630** | (Scott, et al. 2000), |
| **Scu14vv** | F: CTGCACTTGAATACGAGCAGGTCR: TGTTATATGATCCTCCCCCTCCTC | 1:NC\_012022.32:NC\_048446.1 | N/A | **16** | **16** | (GAA)6 | **168-188** | **4** | **N/A** | **N/A** | **N/A** | (Scott, et al. 2000, Dauob, et al. 2018) |
| **Scu15vv** | F: GCCTATGTGCCAGACCAAAAACR: TTGGAAGTAGCCAGCCCAACCTTC | 1:NC\_012020.32: NC\_048444.1 | N/A | **14** | **14** | (GAA)6 | **155-235** | **N/A** | **N/A** | **N/A** | **N/A** | (Scott, et al. 2000, Italian\_Vitis\_Database 2022) |
| **Scu16vv** | F: CAAAGACAAAGAAGCCACCGACR: ACCCTCTAAAGCACACACAGGAAC | 1:NC\_012024.32:NC\_048448.1 | N/A | **18** | **18** | (GAA)5 | **130-210** | **N/A** | **N/A** | **N/A** | **N/A** | (Scott, et al. 2000, Italian\_Vitis\_Database 2022) |
| **UCH11** | F: ATGCCCGAGAAGAGTCGAGAAR: CTGCCGTTTGGGTAAGATGCT | 1:NC\_012011.32: NC\_048435.1 | N/A | **5** | **5** | (GA)15 | **220–262** | **21** | **0.7977** | **0.7968** | **0.191** | (Lefort and Roubelakis-Aggelakis 2000, Lefort, et al. 2002, Hvarleva, et al. 2004) |
| **UCH12** | F: TTTTCATTGAAAAGAAGGAR: TGTGCTTTGTGCTAGATAA | 1:NC\_012020.32:NC\_048444.1 | N/A | **14** | **14** | (CT)17(CA)13 | **135–234** | **21** | **0.9315** | **0.9047** | **N/A** | (Lefort, et al. 2002) |
| **UCH19** | F: GATTTGAAAGTCGAAAGCCAGGR: TGCAAAGACTGTGAGATGAGGG | 1:NC\_012007.32:NC\_048431.1 | N/A | **1** | **1** | (CT)23 | **174–212** | **12** | **0.8630** | **0.8646** | **N/A** | (Lefort, et al. 2002) |
| **UCH2** | F: AGCTCGGCTAGCTGCAAAATCR: ACCCTTCCCTCTTCAAAACCC | 1:NC\_012025.32:NC\_048449.1 | N/A | **19** | **19** | (AG)15 | **146–200** | **19** | **0.7638** | **0.9023** | **N/A** | (Lefort, et al. 2002), |
| **UCH29** | F: AAACATGATCTGATGCAGGTGAR: CAACCTGTTGATGAAAGGGAAA | 1:NC\_012007.32:[NC\_048431.1](https://www.ncbi.nlm.nih.gov/nucleotide/1847502376?from=21451094&to=21451382&report=gbwithparts) | N/A | **1** | **1** | (CT)18 | **207–315** | **26** | **0.7932** | **0.8458** | **0.116** | (Lefort, et al. 2002, Hvarleva, et al. 2004) |
| **UCH35** | F: AAATGTGCAAGTTGAAGAGGGAR: AGACCGTTCAAACAAGCAAATG | N/A | N/A | **N/A** | **N/A** | (CT)17 | **133–181** | **15** | **0.7313** | **0.8567** | **N/A** | (Lefort, et al. 2002) |
| **UCH40** | F: GCAGTTGATGCAAAACAACAGTR: CACATCATTCATTGATGAGGCT | 1:NC\_012019.32:NC\_048443.1 | N/A | **13** | **13** | Imperfect run of(GCA)n(ACA)m | **237–312** | **17** | **0.8636** | **0.8846** | **N/A** | (Lefort, et al. 2002) |
| **VChr10a** | F: AAATGTTTAGTAGCCTCATTTTGTTTR: TTTGTTCGGAACTACTCTTCTTCA | 1:NC\_012016.32:NC\_048440.1 | N/A | **10** | **10** | ACT | **98-137** | **8** | **0.271** | **0.647** | **0.618** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr10b** | F: CCATGTCCAACCGAAACAACR: CAGAAATCTCGTGTCGCTCA | 1:NC\_012016.32:NC\_048440.1 | N/A | **10** | **10** | AAC | **116-136** | **5** | **0.813** | **0.703** | **0.635** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr11a** | F: GGGATAAGGTGAAAGCCTCAR: ATGCTTGGTATCTGGCAACC | 1:NC\_012017.32:NC\_048441.1 | N/A | **11** | **11** | AAAG | **178-207** | **6** | **0.542** | **0.558** | **0.506** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr11b** | F: TGAGTTGAGCTATTGGCTTTGAR: AGCAACTCTGTCCATCCATGT | 1:NC\_012017.3 | N/A | **11** | **N/A** | AGAT | **151-163** | **5** | **0.690** | **0.770** | **0.720** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr12a** | F: GCTTTAAATGTTAGATTAGGGCACTCR: TCCATGTTGTTTGCTCTTTCC | 1:NC\_012018.32:NC\_048442.1 | N/A | **12** | **12** | AATT | **126-146** | **7** | **0.542** | **0.695** | **0.640** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr12b** | F: AAACACAAGGTTGCATTGGAR: GGCTTTCTTGTGGACTTAAATGA | 1:NC\_012018.31:NC\_012014.32:NC\_048438.1 | N/A | **12, 8** | **8** | AATT | **161-169** | **2** | **0.250** | **0.449** | **0.346** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr13a** | F: TGGCAGAGCAAATGAATCAAR: TTGGATGGATTGGAATGACC | 1:NC\_012019.32:NC\_048443.1 | N/A | **13** | **13** | AAAAG | **135-165** | **7** | **0.625** | **0.698** | **0.652** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr13b** | F: TAAGCATTCTGGGCTTTTCCR: TCGTCTATATGCGACCTTGG | 1:NW\_003724181.12:NC\_048443.1 | N/A | **13** | **13** | AAAT | **145-170** | **8** | **0.500** | **0.643** | **0.613** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr13c** | F: AGACCCAAGGGCAAGGTACTR: AACACCGTTAGGCATACTCCA | 1:NC\_012019.32:NC\_048443.1 | N/A | **13** | **13** | AAT | **114-135** | **5** | **0.750** | **0.744** | **0.689** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr13d** | F: AATCTGACGCCATGAGGAAGR: TCGTCTATATGCGACCTTGG | N/A | N/A | **N/A** | **N/A** | AATC | **174-191** | **4** | **0.250** | **0.248** | **0.234** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr14a** | F: AACCTGGGATGCTGAGAATGR: TGCATGCATATGGATCTTGT | 1:NC\_012020.32:NC\_048444.12:NC\_048447.1 | N/A | **14** | **14, 17** | AATC | **128-189** | **3** | **0.500** | **0.541** | **0.444** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr14b** | F: CAATTGAACACTTACACTCACAATCAR: TGTGACTAAAGGTTATTAGCAGGA | 1:NC\_012020.32:NC\_048444.1 | N/A | **14** | **14** | ATC | **176-243** | **15** | **0.234** | **0.811** | **0.786** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr15a** | F: CAATCCCAACAGTTCCATGAR: CGTTTTCTCCTTCGGACAAG | 1:NC\_012021.3 | N/A | **15** | **N/A** | ATCC | **127-165** | **8** | **0.717** | **0.728** | **0.677** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr15b** | F: GGGTCCAATTCCTTTTGGTTR: CGAAAGACTCAATTGCCACA | 1:NC\_012021.32:NC\_048445.1 | N/A | **15** | **15** | AAT | **90-151** | **10** | **0.292** | **0.830** | **0.799** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr16a** | F: TTCATGTGTGACACCCCTTTR: AATGTCCATGCTTCAAAATACC | 1:NC\_012022.3 | N/A | **16** | **N/A** | AAAT | **100-167** | **8** | **0.604** | **0.632** | **0.602** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr16b** | F: ATAAGGCGCTGACTTTGTGAR: CCAGGAGATCAACCACCATT | 1:NC\_012022.3 | N/A | **16** | **N/A** | AATT | **165-193** | **7** | **0.500** | **0.558** | **0.526** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr16c** | F: TTTCAATATTCCAAATGTGACCTR: CATTTCTTTGCTCTTCCTGCT | 1:NC\_012022.32:NC\_048446.1 | N/A | **16** | **16** | AATT | **151-161** | **4** | **0.638** | **0.582** | **0.516** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr17a** | F: AGGAAGAGGATTGATCACCAR: GTGCCAACCCTTGCACTATT | 1:NC\_012023.3 | N/A | **17** | **N/A** | AACC | **170-184** | **3** | **0.178** | **0.463** | **0.372** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr17b** | F: CCAAAGCCGACAACTTCTTCR: CCGCCATAAACCCTAAACCT | 1:NC\_012023.3 | N/A | **17** | **N/A** | ACTC | **154-162** | **3** | **0.021** | **0.142** | **0.134** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr17c** | F: CCATGTTCCATCCCACTTCTR: CGTACGTACAAAATCTTGGGATAC | 1:NC\_012023.3 | N/A | **17** | **N/A** | AAT | **94-120** | **8** | **0.333** | **0.548** | **0.519** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr18a** | F: TTCCCACCCGGTAAATATGAR: CATCCAAACATCACGCTGAG | 1:NC\_012024.32:NC\_048448.1 | N/A | **18** | **18** | AAGG | **151-191** | **8** | **0.542** | **0.705** | **0.659** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr18b** | F: ATACGCAAATGATCACAGCAR: CATTTTCTCCATGGCCTCAT | 1:NC\_012024.32:NC\_048448.1 | N/A | **18** | **18** | AGGC | **137-154** | **5** | **0.521** | **0.730** | **0.672** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr18c** | F: TGAAGCCCATTACAACCAAAR: TGCAAATTAAAGCCAAGTGTG | 1:NC\_012024.3 | N/A | **18** | **N/A** | AATC | **125-134** | **4** | **0.208** | **0.196** | **0.187** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr18d** | F: TAGGTACGGTCCCAATGACCR: TCGATCGATCATCTTCATCTCT | 1:NW\_003724189.1 | N/A | **18** | **N/A** | AAACT | **195-205** | **3** | **0.364** | **0.411** | **0.370** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr19a** | F: TTTGTTAGGTGTTGTTACCCGTTAR: ATCTTCTGGCCATGTGGTTC | 1:NC\_012025.3 | N/A | **19** | **N/A** | AAG | **121-150** | **10** | **0.792** | **0.784** | **0.748** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr19b** | F: TGGATTCACCATTGTCCTCAR: CGAGGATACCAACAAGAATGAA | 1:NC\_012025.32:NC\_048449.1 | N/A | **19** | **19** | AGAT | **157-171** | **5** | **0.500** | **0.711** | **0.652** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr1a** | F: TTCATACCTTGCAGGGAGCTAR: TGATTTCCATTCCCAAATTCA | 1:NC\_012007.3 | N/A | **1** | **N/A** | ATCC | **175-244** | **9** | **0.458** | **0.545** | **0.525** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr1b** | F: AGATGGGTGGCATTAGCAAGR: TTATTTCCCTCCCTCGCTGT | 1:NC\_012007.32:NC\_048431.1 | N/A | **1** | **1** | ATCC | **90-111** | **6** | **0.771** | **0.689** | **0.635** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr1c** | F: CTGGCCTTATGCACAAAGTGR: GATGAACACATCAATCAAATACCC | 1:NC\_012007.32:NC\_048431.1 | N/A | **1** | **1** | AGCC | **87-100** | **3** | **0.521** | **0.476** | **0.369** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr2a** | F: GGTCCGCTTTTGAGAAGAAAR: CATGTGAACGCGCTAAACAC | 1:NC\_012008.32:NC\_048432.1 | N/A | **2** | **2** | AGGC | **137-155** | **3** | **0.542** | **0.405** | **0.328** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr2b** | F: CCTCCTGCGAACAAGTCTGTR: GTTGCTGGATTTGTGGAAGG | 1:NC\_012008.32:NC\_048432.1 | N/A | **2** | **2** | AGCT | **112-128** | **6** | **0.563** | **0.508** | **0.467** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr2c** | F: CTCAAAGCCCTCCAATTCAAR: GGGCTCATGTGTCTGGAGTT | 1:NC\_012008.32:NC\_048432.1 | N/A | **2** | **2** | AGCC | **147-158** | **5** | **0.521** | **0.490** | **0.443** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr3a** | F: CAATCATATGAGCAAGGCATGTR: GCTTCCTGAAATTTGTGTCCA | 1:NC\_012009.32:NC\_048433.1 | N/A | **3** | **3** | AAT | **175-249** | **14** | **0.688** | **0.836** | **0.810** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr4a** | F: CAACTGGGATCCAAGACCTCR: CAGCTTCACAGGTAACCACA | 1:NC\_012010.32:NC\_048434.1 | N/A | **4** | **4** | AAAG | **173-203** | **7** | **0.563** | **0.644** | **0.585** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr5a** | F: ACTTGGCGAGTATTTGTTCTAAAR: CCGCTTTGTGAAGGTATCCA | 1:NC\_012011.32:NC\_048435.1 | N/A | **5** | **5** | AGATG | **183-259** | **11** | **0.750** | **0.772** | **0.745** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr5b** | F: CTTCTCGGTCATGGTCATTGR:CTCCTTCCACCTCTGGTTCA | 1:NC\_012011.32:NC\_048435.1 | N/A | **5** | **5** | AAAG | **179-219** | **10** | **0.750** | **0.792** | **0.754** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr5c** | F: CCCATCAGTTTGCCTATGAAR: TTTGATCTTGTTATTGTGCTGTTAC | 1:NC\_012011.32:NC\_048435.1 | N/A | **5** | **5** | ACAT | **83-123** | **7** | **0.729** | **0.747** | **0.704** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr6a** | F: AATGTTGAGCTTTGGGCTTGR: CCAATTCTTCCATACCTCAAAA | 1:NC\_012012.3 | N/A | **6** | **N/A** | AATC | **173-180** | **4** | **0.532** | **0.572** | **0.502** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr7a** | F: TCCGTGTCACAAAGAACATGAR: ATTAGGGCACTGCCTCTTCC | 1:NC\_012013.3 | N/A | **7** | **N/A** | AAAAG | **126-140** | **3** | **0.417** | **0.506** | **0.386** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr7b** | F: AAAGGGCCTAAACTCTTAATAACTTGR: TGCTTTATAGACACTAACCCACAAA | 1:NW\_003724159.12:NC\_048437.1 | N/A | **7** | **7** | ACAT | **172-195** | **6** | **0.688** | **0.703** | **0.651** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr7c** | F: CACTTCTCTGCCACCCATTTR: GGTTGGAAATTCTAGGGCATT | 1:NC\_012013.3 | N/A | **7** | **N/A** | ATGC | **101-108** | **3** | **0.688** | **0.620** | **0.532** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr8a** | F: ACCCACTGCCACTCTCTCATR: AAATCTCCGGGATCCTTTTG | 1:NC\_012014.32:NC\_048438.1 | N/A | **8** | **8** | AAT | **172-206** | **12** | **0.596** | **0.835** | **0.805** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr8b** | F: TGTGTGATGTTTTGTCGATGGR: TGAACCAAGTTCTAATTTACATTTCC | 1:NC\_012014.3 | N/A | **8** | **N/A** | AAG | **58-156** | **16** | **0.646** | **0.889** | **0.870** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr9a** | F: GCGACAGCATCACTTCAATCR: GAATTGCCAAGGACAAGGAG | 1:NC\_012015.32:NC\_048439.1 | N/A | **9** | **9** | AAG | **87-117** | **8** | **0.787** | **0.809** | **0.776** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VChr9b** | F: AGCGTCATGACAGGTATCAGAAR: AAAGAATTAATCATTACCATTTCACG | 1:NC\_012015.3 | N/A | **9** | **N/A** | AAT | **102-160** | **10** | **0.313** | **0.865** | **0.840** | (Cipriani, et al. 2008, Italian\_Vitis\_Database 2022) |
| **VMC1b11** | F: CTTTGAAAATTCCTTCCGGGTTR: TATTCAAAGCCACCCGTTCTCT | N/A | N/A | **N/A** | **N/A** | (AG)17 | **167-196** | **8** | **0.947** | **0.809** | **0.771** | (Cipriani, et al. 2008, Laucou, et al. 2011, Dos Anjos 2013; Karatas, et al. 2014, Zarouri 2016, Nebish, et al. 2017) |
| **VMC1C10** | F: ATATTCACAGCTGTTCCAAGTCCCAR: GAGAGTGGCGGAAGGCTTGTTGACC | N/A | N/A | **N/A** | **N/A** | (TGC)6 | **129-185** | **16** | **0.841** | **0.863** | **0.033** | (Jahnke, et al. 2011, Dos Anjos 2013; Zarouri 2016) |
| **VMC1E8** | F: CAGCGAGCTCTTGATTTATTGTR: GATCATAGCTTCAACGGCTTTT | N/A | N/A | **N/A** | **N/A** | (GA)21 | **206-231** | **10** | **0.773** | **0.805** | **0.063** | (Dos Anjos 2013; Guo, et al. 2016, Zarouri 2016) |
| **VMC1F10** | F: CATACAAGGAATTTACCCCCAR: ACCTCTTGTGCTGTCTAACCA | N/A | N/A | **N/A** | **N/A** | (AG)18 | **190-208** | **10** | **0.643** | **0.816** | **0.056** | (Dos Anjos 2013; Zarouri 2016) |
| **VMC2H4** | F: AGTACCAGGTGTGCCTATAAGAATCR: GTTGATTGGATGTTCCAGAGAGGAT | N/A | N/A | **N/A** | **N/A** | N/A | **118-237** | **15** | **0.816** | **0.86** | **0.033** | (Dos Anjos 2013; Zarouri 2016) |
| **VMC3B12** | F: ATAAGGCAGGTTGATTACAGGAR: CATCACAGGTTGATTCGACACT | N/A | N/A | **N/A** | **N/A** | (AG)24 | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | (Dos Anjos 2013; Guo, et al. 2016) |
| **VMC3C9** | F: ATAAAATGGAATTAAGGGGGGAR: CAAACGCTAGATACCATGGAGA | N/A | N/A | **N/A** | **N/A** | N/A | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | (Gaspero, et al. 2000, Guo, et al. 2016) |
| **VMC3D12** | F: TGTCACTGTGGACATAGGGAGR: ATCACCAAAGGGAAGCAAAAG | 1: NC\_012019.32: NC\_048443.1 | 1:F 083896- 8083876R 8083693- 80837132:F 20214024- 20214044R 20214226- 20214206 | **13** | **13** | (TC)21 | **197-251** | **23** | **0.841** | **0.871** | **0.856** | (Dos Anjos 2013; Zarouri 2016) |
| **VMC4A1** | 5′ATGCGACCTTAATAAATTGGGAA5′AAGCTAGGCTTGTATGAGGGAGA | N/A | N/A | **N/A** | **N/A** | (AG)20 | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | (Gaspero, et al. 2000) |
| **VMC4A5** | 5′ATTTTCCACAGGCAAACCACAT5′TGTGGTTGTTGTAGCCTATCGG | 2:NC\_048439.1 | N/A | **N/A** | **9** | (AGAC)5N31(AG)14 | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | (Gaspero, et al. 2000) |
| **VMC4C6** | 5′CTCCATCCCTATCTCATCAG5′CTCTAACACCCAATCTCACA | 1:NC\_012011.3 | N/A | **5** | **N/A** | (GCT)11 | **153-177** | **7** | **0.696** | **0.676** | **0.153** | (Gaspero, et al. 2000, Zarouri 2016) |
| **VMC4D2** | 5′TGCAGATACCACATACCCACCT5′AACAGCAAACATCCCAACTCAG | 1:NC\_012007.32:NC\_048431.1 | N/A | **1** | **1** | (AG)16 | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | (Gaspero, et al. 2000) |
| **VMC4D4** | 5′GTCTTGTAATGGAACCAACTGC5′AGATTGACCTGGACCTGAAACT | 1:NC\_012010.32:NC\_048434.1 | N/A | **4** | **4** | (GCT)9 | **152-176** | **7** | **0.594** | **0.558** | **0.238** | (Gaspero, et al. 2000, Zarouri 2016) |
| **VMC4f3** | F: AAAGCACTATGGTGGGTGTAAAR: TAACCAATACATGCATCAAGGA | 1:NC\_012018.32:NC\_048442.1 | N/A | **12** | **12** | (AG)20AA(AG)9 | **165–208** | **12** | **0.868** | **0.874** | **0.848** | (Gaspero, et al. 2000, Laucou, et al. 2011, Nebish, et al. 2017) |
| **VMC4G6** | 5′CCTTGAAGAGATGAGTTTGCTA5′TATTTAACTTTGTGCCTCTGCT | 1:NC\_012012.32:NC\_048436.1 | N/A | **6** | **6** | (AG)17 | **119-139** | **11** | **0.657** | **0.794** | **0.07** | (Gaspero, et al. 2000, Zarouri 2016) |
| **VMC4H5** | 5′GATTTGTGACACTTGTGTAGCG5′CAAGTGGAAAGCAATCTAGGAA | N/A | N/A | **N/A** | **N/A** | (AG)5TG(AG)33 | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | (Gaspero, et al. 2000) |
| **VMC4H6** | 5′GTATAGAACCACGCATCCAACA5′CCCTTAGTTTCCTCGTGCTTTT | 1:NC\_012015.32:NC\_048439.1 | N/A | **9** | **9** | (AG)23 | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | (Gaspero, et al. 2000) |
| **VMC5E9** | F: ATCCAGAGCCATAACAGATTCAR: TCACAGCTTTCTCATTACCCTT | 1: NC\_012025.32: NC\_048449.1 | 1:F 4183347- 4183326R 4183125- 41831462:F 4486656- 4486677R 4486860- 4486839 | **19** | **19** | (AG)22(CAC)6 | **282-314** | **19** | **0.816** | **0.894** | **0.076** | (Jahnke, et al. 2011; Dos Anjos 2013) |
| **VMC5G8** | F: GCACATGCACATCTTGTTTCACTCTR: GAGACTTTTGGAAGCAATGATGGCA | N/A | N/A | **N/A** | **N/A** | (CTG)7(AG)11 | **281-319** | **11** | **0.739** | **0.778** | **0.085** | (Jahnke, et al. 2011, Dos Anjos 2013; Zarouri 2016) |
| **VMC6B11** | F: TGATTATGGCAATAATCACACCR: TTGCTTACCCATCAAAAAGAAA | 1:NC\_012008.32:NC\_048432.1 | N/A | **2** | **2** | (TC)20 | **83-116** | **N/A** | **N/A** | **N/A** | **N/A** | (Arroyo-García and Martínez-Zapater 2004) |
| **VMC6C10** | F: TTCCTGCGAATTCTAACCCCTTR: CCACTTCCATTCCCTCTCCTGT | 1:NC\_012020.32:NC\_048444.1 | N/A | **14** | **14** | (GA)17 | **105-143** | **N/A** | **N/A** | **N/A** | **N/A** | (Arroyo-García and Martínez-Zapater 2004) |
| **VMC6C7** | F: ACATATATCCGAAAGTGTGGGGCR: CTTAAAGCTTGAAGCTTTTGGTGC | N/A | N/A | **N/A** | **N/A** | (GA)10 | **114-161** | **N/A** | **N/A** | **N/A** | **N/A** | (Arroyo-García and Martínez-Zapater 2004) |
| **VMC6D12** | F: CTCTCTTTTCCGAAATTGGGGTR: ATTTTCCCTGGAAACAAAGTGG | 1:NC\_012015.32:NC\_048439.1 | 1: F 3792236- 3792257R 3792401- 37923802: F 4056320- 4056341R 4056487- 4056466 | **9** | **9** | (TC)18 | **131-181** | **13** | **0.826** | **0.827** | **0.046** | (Arroyo-García and Martínez-Zapater 2004, Zarouri 2016) |
| **VMC6E10** | F: CTAGGTGTGCCAAGAGATCAGAR: CATTTGTGGGTAGTTGTGAGGA | 1:NC\_012011.32:NC\_048435.1 | 1: F 14299510- 14299531R 14299606- 142995852: F 14323591- 14323612R 14323699- 14323678 | **5** | **5** | (GA)13 | **90-122** | **N/A** | **N/A** | **N/A** | **N/A** | (Arroyo-García and Martínez-Zapater 2004) |
| **VMC6G10** | F: CATCATTCATCCAAATTATGTAGR: TTTAGTAGGTTAGGGATACCAGT | 1: NC\_012010.3 | 1: F 23105311- 23105333R 23105488-23105466 | **4** | **N/A** | (GA)14 | **121-195** | **12** | **0.614** | **0.618** | **0.582** | (Arroyo-García and Martínez-Zapater 2004, Zarouri 2016) |
| **VMC6G8** | F: GAGTGTCAGTCTCAAAATAAGGAR: CCCCTCATCTCTTCTCTATCTAA | N/A | N/A | **N/A** | **N/A** | (GA)15 | **88-109** | **N/A** | **N/A** | **N/A** | **N/A** | (Arroyo-García and Martínez-Zapater 2004) |
| **VMC7G3** | F: ATATTACTAGTGCTGTCCTGCTCCAR: TGAAAGTTGAAAGAGAGGAAGCAAA | N/A | N/A | **19** | **N/A** | (TC)16 | **115-161** | **17** | **0.585** | **0.587** | **0.186** | (Jahnke, et al. 2011, Zarouri 2016) |
| **VMC7h3** | F: TCAGATATTGAAGAACACCACAR: ACTAGAAAATGCACAATCTCCC | 1: NC\_012010.32: NC\_048434.1 | 1: F 4719044- 4719065R 4719178- 47191572: F 4968212- 4968233R 4968352- 4968331 | **4** | **4** | (TC)16 | **119-175** | **21** | **0.749** | **0.783** | **0.075** | (Dos Anjos 2013; Jing, et al. 2013, Zarouri 2016) |
| **VMC8F10** | F: TATGAAAGATGAATGGCTGCTCR: AAGGGTGCTTGAAGGTTTATGT | 1: NC\_012009.3 | 1: F 3324131- 3324152R 3324340- 3324319 | **3** | **N/A** | (TC)19 | **199-237** | **14** | **0.787** | **0.808** | **0.06** | (Dos Anjos 2013; Guo, et al. 2016, Zarouri 2016) |
| **VMC9a2.1** | F: AGCTCGGCTAGCTGCAAAATCR: ACCCTTCCCTCTTCAAAACCC | 1: NC\_012025.32: NC\_048449.1 | 1:F 854676- 854656R 854511- 8545312:F 765199- 765179R 765048- 765068 | **19** | **19** | (AG)15 | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | (Dos Anjos 2013; Jing, et al. 2013) |
| **VMCNG1E1** | F: TGTGTTACGCCATTGCTTGCATTTTR: AACTGCCCTACAAGAGGGGAAAAGC | N/A | N/A | **14** | **N/A** | N/A | **91-129** | **16** | **0.807** | **0.842** | **0.043** | (Jahnke, et al. 2011, Zarouri 2016) |
| **VMCNG2B7.2** | F: TTTTGGAGTGAATAGAGACCCCTR: CAGAATTTGGCTCCATATTTGAA | N/A | N/A | **14** | **N/A** | (GA)13 | **134-156** | **N/A** | **N/A** | **N/A** | **N/A** | (Arroyo-García and Martínez-Zapater 2004) |
| **VMCNG2E8** | F: CAGAGACAAAGGAAACGAGGCTR: TGCCTACCTAGTGCCATTCAAA | N/A | N/A | **13** | **N/A** | (GA)29 | **190-208** | **N/A** | **N/A** | **N/A** | **N/A** | (Arroyo-García and Martínez-Zapater 2004) |
| **VMCNG2G7** | F: CAACAGAATTCAAATGAAATGGAR: CAAACAGCATAAATACACAAGGA | 1:NC\_012007.3 | 1:F 6993233- 6993255R 6993332- 6993310 | **1** | **N/A** | (TC)18(TC)7 | **102-150** | **13** | **0.826** | **0.802** | **0.058** | (Arroyo-García and Martínez-Zapater 2004, Zarouri 2016) |
| **VMCNG2H7** | F: ACGTTAAATAGAACATGGTCCCR: CAACCTCTTTTTTTGAGGTAGC | 1:NC\_012018.32:NC\_048442.1 | 1: F 15917119 -15917140R 15917287 - 159172662: F 7448476- 7448455R 7448305- 7448326 | **12** | **12** | (GA)16 | **150-178** | **N/A** | **N/A** | **N/A** | **N/A** | (Arroyo-García and Martínez-Zapater 2004) |
| **VrZAG12** | F: CTGCAAATAAATATTAAAAAATTCGR: AAATCCTCGGTCTCTAGCCAAAAGG | N/A | Ν/Α | **15** | **Ν/Α** | (GA)24 | **140–172** | **N/A** | **>0.26** | **0.77** | **N/A** | (Sefc, Regner et al. 1999) |
| **VrZAG14** | F: ATCAAAGGCCTCCTTTATTGCCATCR: TAGTACCAACTACCAACAACCAAAG | 1:NW\_003724191.1 | 1: F 897819- 897843R 897956- 897932 | **18** | **Ν/Α** | (A)12(GA)16 | **137–162** | **N/A** | **>0.21** | **0.52** | **N/A** | (Sefc, et al. 1999) |
| **VrZAG15** | F: GGATTTTGGCTGTAGTTTTGTGAAGR: ATCTCAAGCTGGGCTGTATTACAAT | 1:NC\_012023.32:NC\_048447.1 | 1: F 6457122- 6457098R 6456959- 64569822: F 13126445- 13126469R 13126626- 13126603 | **17** | **17** | (GA)19 | **163–193** | **11** | **0.46** | **0.44** | **0.36** | (Sefc, et al. 1999, Zarouri 2016) |
| **VrZag21** | F: TCATTCACTCACTGCATTCATCGGCR: GGGGCTACTCCAAAGTCAGTTCTTG | 1:NC\_012010.32:NC\_048434.1 | 1: F 13648595- 13648619R 13648800- 136487762: F 13667960- 13667984R 13668169- 13668145 | **4** | **4** | (GA)16 | **190–214** | **8** | **0.7162** | **0.7300** | **0.205** | (Sefc, et al. 1999, Hvarleva, et al. 2004, Jahnke, et al. 2011) |
| **VrZag25** | F: CTCCACTTCACATCACATGGCATGCR: CGGCCAACATTTACTCATCTCTCCC | N/A | Ν/Α | **Ν/Α** | **Ν/Α** | (GA)11C(AG)3GG(AG)3 | **225–245** | **N/A** | **N/A** | **N/A** | **0.24** | (Sefc, et al. 1999, Jahnke, et al. 2011) |
| **VrZAG29** | F: ATAACCAGGACAAGTTATTCAAGCCR: ACCCAATTGACCATCTTTTATGCTG | 1:NC\_012007.32:NC\_048431.1 | 1: F 5286106- 5286130R 5286217- 52861932: F 5403151- 5403175R 5403282- 5403258 | **1** | **1** | (GA)19 | **105-119** | **5** | **0.338** | **0.359** | **0.439** | (Sefc, et al. 1999, Zarouri 2016) |
| **VrZAG47** | F: GGTCTGAATACATCCGTAAGTATATR: ACGGTGTGCTCTCATTGTCATTGAC | 1: NC\_012011.32: NC\_048435.1 | 1: F 4472195-4472171R 4472037-44720612: F 4125673-4125649R 4125489-4125513 | **5** | **5** | (GA)15(AA)(GA)5 | **155-174** | **8** | **0.8243** | **0.8023** | **0.122** | (Sefc, et al. 1999, Hvarleva, et al. 2004, Galbács, et al. 2009) |
| **VrZAG64** | F: TATGAAAGAAACCCAACYCGGCACGR: TGCAATGTGGTCAGCCTTTGATGGG | N/A | N/A | **10** | **N/A** | (TC)27 | **112-197** | **10** | **0.8919** | **0.8074** | **0.111** | (Hvarleva, et al. 2004, Veres, et al. 2004, Halasz, et al. 2005, Dos Anjos 2013) |
| **VrZag67** | F: ACCTGGCCCGACTCCTCTTGTATGCR: TCCTGCCGGCGATAACCAAGCTATG | 1:NC\_012016.32:NC\_048440.1 | 1: F 1447885-1447861R 1447733-14477572: F 17288150-17288174R 17288306-17288282 | **10** | **10** | (GA)18(TA)10 | **126–159** | **17** | **0,796** | **0,829** | **0.09** | (Sefc, et al. 1999, Merkouropoulos, et al. 2015) |
| **VrZAG7** | F: GTGGTAGTGGGTGTGAACGGAGTGGR: AACAGCATGACATCCACCTCAACGG | 2:NC\_048440.1 | 2: F 498496-498472R 498301-498325 | **N/A** | **10** | (AG)4T(AG)21 | **106–158** |  | **0.39** | **0.37** | **0.48** | (Sefc, et al. 1999) |
| **VrZAG83** | F: GGCGGAGGCGGTAGATGAGAGGGCGR: ACGCAACGGCTAGTAAATACAACGG | 2:NC\_048434.1 | 2: F 20847826-20847802R 20847643-20847667 | **N/A** | **4** | (GA)5C(AG)2T(GA)3GG(GA)2T(AG)7 | **191-214** | **6** | **0.6081** | **0.7047** | **0.253** | (Sefc, et al. 1999, Hvarleva, et al. 2004, Galbács, et al. 2009, Bibi, et al. 2020) |
| **VVIb01** | F: TGACCCTCGACCTTAAAATCTTR: TGGTGAGTGCAATGATAGTAGA | 1: NC\_012008.32: NC\_048432.1 | 1: F2349171-2349192R2349460-23494392: F 17441702-17441681R17441405-17441426 | **2** | **2** | (CT)12 | **250-300** | **4**  | **0.80** | **0.70** | **0.575** | (Laucou, et al. 2011, Nebish, et al. 2017) |
| **VVIb09**  | F: ATGTTTTGATTCCTTAGGTGACR: CCTAAGAGCCATTCAAGATTAA | 1:NC\_012023.32:NC\_048447.1 | 1: F 9295347-9295368R 9295626-92956052: F 10473528-10473507R 10473259-10473280 | **17** | **17** | (GT)10/(TC)11 | **250-300** | **5**  | **0.80** | **0.78** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb10** | F: CAAATCCTGAAAATGGCCTCATR: GAGCCCTTAAAACACTTTGACT | 1: NC\_012018.32: NC\_048442.1 | 1: F 18063282-18063261R 18063207-18063228F 18063282-18063261R 18062999-180630202: F 5852597-5852618R 5852668-5852647 | **12** | **12** | (GA)12 | **50-100** | **3**  | **0.40** | **0.34** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb18** | F: TTTTGTTTGCGAGGTTGGGATTR: AATCAATCAACCACGCATGCTT | 1: NC\_012012.32: NC\_048436. | 1: F 6330751-6330730R 6330570-63305912: F 16606767-16606788R 16606948-16606927 | **6** | **6** | (GGT-GT)3-GG-(GT)5-CT-(GT)3 | **150-200** | **1** | **0.00** | **0.00** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb19** | F: TGGATGTTCCTAAACCTTAAGTR: GCATAAGGGCATTTTGGTAAAT | 1: NC\_012017.3 | 1: F 5848909-5848930R 5849300-5849279 | **11** | **N/A** | (CT)6-CG-(CT)4 | **350-400** | **2** | **0.00** | **0.18** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb22** | F: CCCTCCAATCTACATCCATGAA R: CAGTGTGTTTCTTGATGGTCCA | 1: NC\_012013.32: NC\_048437.1 | 1: F 3139481-3139502R 3139640-31396192: F 27274422-27274401R 27274277-27274298 | **7** | **7** | (CT)8-CA-(6CA-TA)3  | **150-200** | **3** | **0.60** | **0.46** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb23** | F: GGTCACGTAGATATTGAAGTTGR: TTTGTATTTTGGGCATTTGCAG | 1: NC\_012008.32: NC\_048432.1 | 1: F 4864625-4864604R 4864334-48643552: F 14679430-14679451R 14679740-14679719 | **2** | **2** | (GA)12 | **300-305** | **4** | **0.60** | **0.72** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb31** | F: GGTTGGTACCAATGAAATCAATR: ACGTTCTCACAGTATTTCTCAA | 1: NC\_012024.32: NC\_048448.1 | 1: F 2913110-2913089R 2912731-29127522: F 2940815-2940794R 2940451-2940472 | **18** | **18** | (GA)3/(GA)4-AA-(GA)9-(GGA)5  | **350-400** | **3** | **0.40** | **0.46** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb32** | F: GTAACCATCTCTAACCATTTCAR: TGAGAACACTTCACAGAGATTT | 1: NC\_012018.32: NC\_048442.1 | 1: F 10307595-10307616R 10307763-103077422: F 13864770-13864749R 13864618-13864639 | **12** | **12** | (TG)16-(TA)2 | **150-200** | **6** | **0.60** | **0.82** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb54** | F: GTCAAACATACATGCACCAACAR: ACCAATGAAACCTAAAAGAGGG | 1: NC\_012025.32: NC\_048449.1 | 1: F 20082012-20081991R 20081815-200818362: F 20472639-20472618R 20472437-20472458 | **19** | **19** | (CA)4/(CA)5 | **150-200** | **1** | **0.00** | **0.00** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb59** | F: ATCATTCTGATCCAGCTAATCCR: TTCCTGAGTTGCTTTCATTAGC | 1: NC\_012009.32:N/A | 1: F 8121467-8121446R 8121111-8121132 | **3** | **N/A** | (GA)30 | **350-400** | **4** | **0.60** | **0.64** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb63** | F: ACCACCAACATATATAGTCCAAR: GAGAGAAATGTGGAGGAGTAAA | 1: NC\_012021.32: NC\_048445.1 | 1: F 11597299-11597278R 11597153-115971742: F 9459483-9459504R 9459637-9459616 | **15** | **15** | (GA)13/(TA)2-(GA)4  | **150-200** | **4** | **0.80** | **0.66** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb66** | F: CCACTAGTGGTCAGAAAAGAAGR: TTGTATTGTGTGCCTCTTCTCA | 1: NC\_012014.32: NC\_048438.1 | 1: F 18270347-18270326R 18270246-182702672: F 18444409-18444388R 18444322-18444343 | **8** | **8** | (GA)13 | **50-100** | **8** | **1.00** | **0.86** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb68** | F: AATACATACATCCCATAAGGAGR: TTGTGATGCAATACTCGTTGAT | 1: NC\_012022.32: NC\_048446.1 | 1: F 15787960-15787939R 15787783-157878042: F 16377363-16377342R 16377190-16377211 | **16** | **16** | (GA)4/(GA)9 | **150-200** | **3** | **0.80** | **0.54** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb72** | F: TCAACTTAATTTCCTGATCCGAR: CCAATTGATGGAGTATACTCAT | 1: NC\_012011.32: NC\_048435.1 | 1: F 2848403-2848424R 2848585-28485642: F 2354282-2354303R 2354464-2354443 | **5** | **5** | (CA)3/(CA)6 | **150-200** | **2** | **0.20** | **0.18** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIb94** | F: AGAAATCACATGAGAAAGCTGTR: ATTCACTTCTCCAAACGCTTTT | 1: NC\_012007.32: NC\_048431.1 | 1: F 6835061-6835040R 6834767-68347882: F 6880258-6880237R 6879970-6879991 | **1** | **1** | (CT)12 | **300-350** | **4**  | **0.80** | **0.66** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIc05** | F: GCGATTAAGCAAGTTGAAGAACR: AATGATTGCAAATAGATAGGGC | 1: NC\_012017.32:N/A | 1: F 13520289-13520310R 13520468-13520447 | **11** | **N/A** | (CT)12 | **150-200** | **2**  | **0.00** | **0.32** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIc35** | F: GGAAAAATGATGAGGTAAAGCCR: GGCAGATATGGAGAAACAAATG | 1: NC\_012021.32: NC\_048445.1 | 1: F9660794-9660815R9661165-96611442: F11458399-11458378R11458039-11458060 | **15** | **15** | (TC)25 | **350-400** | **4**  | **0.40** | **0.56** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIc46** | F: TTGCAACATGGATTCCCTTTTTR: AAATGGATTTTTGTGGGGGAAT | 1: NC\_012014.32: NC\_048438.1 | 1: F 15047468-15047447R 15047378-150473992: F 15103858-15103837R 15103768-15103789 | **8** | **8** | (TCA)5 | **50-100** | **2**  | **0.20** | **0.18** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIc50** | F: TTGTTAGCCACAATTCAAGAGGR: TGTTATGGACAAGATGAAAGGC | 1: NC\_012012.32: NC\_048436.1 | 1: F 8450955-8450976R 8451033-84510122: F 14311014-14310993R 14310928-14310949 | **6** | **6** | (GA)12 | **50-100** | **4**  | **0.20** | **0.58** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIc51** | F: CTTTGAAGCACAAAATCGAGCTR: ACCAAAGGGAAGCAAAAGAAAA | 1: NC\_012019.32: NC\_048443.1 | 1: F 8083860-8083839R 8083696-80837172: F 20214060-20214081R 20214223-20214202 | **13** | **13** | (CTTCT)3-(CT)11 | **150-200** | **3** | **0.60** | **0.46** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIc72** | F: GTATTGTGTAAGCATTGTGTGGR: GGACAAGGAGTTAGATATGAAC | 1: NC\_012007.32: NC\_048431.1 | 1: F 3255985-3255964R 3255733-32557542: F 3261527-3261506R 3261273-3261294 | **1** | **1** | (AG)5-GGAA-(AG)3-GG-(AG)8 | **300-350** | **3** | **0.80** | **0.54** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIf52** | F: AGGGAATTGAAGAGAAACTGTTR: TCTGCCAAGCAAATGAAAGAAA | 1: NC\_012007.32: NC\_048431.1 | 1: F 22273039-22273060R 22273297-222732762: F 23238182-23238203R 23238432-23238411 | **1** | **1** | (AG)3-GAG-(GGA)2-(GA)2-(GG-3AG)3-(AG)3-(GGAA)2/(TG)4 | **300-350** | **5** | **0.80** | **0.83** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIh01** | F: GGGCTTTGCTGCGATATTTATTR: ACACAGAATACGCAACTTTGCA | 1: NC\_012016.32: NC\_048440.1 | 1: F 1181498-1181477R 1181256-11812772: F 21645480-21645501R 21645719-21645698 | **10** | **10** | (CT)20 | **300-350** | **5** | **0.80** | **0.76** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIh02** | F: AGAACACTTTGGTAAGAGGCAAR: TTCTATACGACGTAGCCCAAAA | 1: NC\_012009.31: NC\_012015.32: NC\_048439.1 | 1: F 9073477-9073456R 9073342-9073363F 703090-703069R 702969-7029902: F 710088-710067R 709965-709986 | **3, 9** | **9** | (TC)12 | **50-100** | **4** | **1.00** | **0.70** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIh54** | F: CCGCACTTGTGTTGAATTTCAGR: CAAACCGTTTTTACACCAGCAG | 1: NC\_012019.32: NC\_048443.1 | 1: F 3333487-3333508R 3333652-33336312: F 25894227-25894206R 25894062-25894083 | **13** | **13** | (GA)18 | **150-200** | **4** | **0.80** | **0.66** | **0.828** | (Merdinoglu, et al. 2005; Laucou, et al., 2011; Nebish, et al. 2017) |
| **VVIi51** | F: ATCCCAAGAGAACCAAGAAACTR: GCTGATCTCAGTGCATATGTTG | 1: NC\_012020.32: NC\_048444.1 | 1: F 28772163-28772184R 28772424-287724032: F 1550482-1550461R 1550235-1550256 | **14** | **14** | (GA)17 | **300-350** | **5** | **1.00** | **0.76** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIi52** | F: AGATTTAGAGACGAAAAAGGGTR: CTTGATCTTTAGTTGCAGTCTG | 1: NC\_012011.32: NC\_048435.1 | 1: F 4629717-4629696R 4629620-46296412: F 4247694-4247673R 4247605-4247626 | **5** | **5** | (GT)12 | **50-100** | **3** | **0.40** | **0.58** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm01** | F: GAAGAATTTTAGGAGTTGGTCAR: GAAGAGAAGCAAGAAGTGATAA | 1: NC\_012019.32: N/A | 1: F 6508124-6508145R 6508306-65082852: F N/AR N/A | **13** | **N/A** | (CA)3-GA-(CA)9 | **150-200** | **2** | **0.40** | **0.32** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm03** | F: ACTTTGCACTTCCCCTTAAAAAR: ATGGATATGCTGATAGTGATGT | 1: NC\_012025.32: NC\_048449.1 | 1: F 7078556-7078577R 7078930-70789092: F 7515415-7515436R 7515787-7515766 | **19** | **19** | (GA)12 | **350-400** | **4** | **0.40** | **0.58** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm04** | F: AAAAATCTGATATCAACCGGCTR: TATATTGATCACCACACTCGAT | 1: NC\_012017.32: NC\_048441.1 | 1: F 558439-558460R 558521-5585002: F 19307340-19307319R 19307250-19307271 | **11** | **11** | (GA)14 | **50-100** | **5** | **0.60** | **0.68** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm07** | F: TGGTGTCAACATTCCTTACAAGR: TTATTACATGGATAGGCACTCA | 1: NC\_012014.32: NC\_048438.1 | 1: F 10702981-10703002R 10703329-107033082: F 10787839-10787860R 10788195-10788174 | **8** | **8** | (TC)5-TA-(TC)14 | **350-400** | **3** | **0.80** | **0.64** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm10** | F: AGGTGAACTCTGTAAATATACGR: GCTCAAAGTTGAAGATTTATCC | 1: NC\_012024.32: NC\_048448.1 | 1: F 10439563-10439542R 10439196-104392172: F 10689192-10689171R 10688827-10688848 | **18** | **18** | (GT)8-(GA)8 | **350-400** | **4** | **0.80** | **0.58** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIM10** | F: AAAAGGTGAACTCTGTAAATATACGR: GGATAAATCTTCAACTTTGAGCAGC | 1: N/A2: N/A | 1: N/A2: N/A | **18** | **N/A** | (GT)8-(GA)8 | **350-400** | **4**  | **0.80** | **0.58** | **N/A** | (Merdinoglu, et al. 2005, Jahnke, et al. 2011) |
| **VVIm11** | F: AAAAGCCCATTAAGTGCCAATGR: CCTATGAACTTATTGGGCTCTT | 1: NC\_012018.32: NC\_048442.1 | 1: F8350835-8350856R8351130-83511092: F12338916-12338895R12338637-12338658 | **12** | **12** | (CT)8-(TC)8 | **300-350** | **4** | **0.80** | **0.74** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm25** | F: TGTTTTAACAGAAGCCTACACGR: GAGAGTGATGTGGGATTTGTTA | 1: NC\_012007.32: NC\_048431.1 | 1: F 12224157-12224178R 12224323-122243022: F 13237272-13237293R 13237440-13237419 | **1** | **1** | (CT)12 | **150-200** | **5** | **0.80** | **0.68** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm26** | F: CTCACCCTTGGTGTTGAAGTTGR: CGTCACTCACCTCCAAAGCTTC | 1:NW\_003724290.12: NC\_048437.1 | 1: F 21599-21620R 21765-217442: F 7574793-7574772R 7574627-7574648 | **N/A** | **7** | (AG)5/(AG)3  | **150-200** | **1** | **0.00** | **0.00** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm33** | F: CTGAACCTGAAACTGATGAAGTR: ATGAATGGACAGTGCAACTTTG | 1: NC\_012013.32: NC\_048448.1 | 1: F 5667762-5667783, R 5667881-56678602: F 38950751-38950730, R 38950475-38950496 | **18** | **18** | (GA)10-(CA)7-(CA)6 | **300-350** | **1** | **0.00** | **0.00** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm42a** | F: AATGGTGGTAAAGTCTTTGCTGR: TCTTCCAATAATACCAGCACTG | 1: NC\_012021.32: NC\_048445.1 | 1:F 15943609-15943630R 15943863-159438422:F 4747445-4747424R 4747173-4747194 | **15** | **15** | (ACC)13-(AAC)6/(AG)3 | **300-350** | **4** | **0.40** | **0.48** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm42b** | F: CCCTCAAGACCTTGAAAATTGTR: ACACAAATATGCATACACACGC | 1: NC\_012021.32: NC\_048445.1 | 1:F 15943274-15943295R 15943358-159433372:F 4747783-4747762R 4747699-4747720 | **15** | **15** | (GT)7 | **50-100** | **3** | **0.60** | **0.46** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm43** | F: GGTGTTGTTTTCTTGTGTTTGTR: AGGATACATGCTGAAGAATATG | 1: NC\_012012.32: NC\_048436.1 | 1:F 19003995-19003974R 19003918-190039392:F 2854868-2854889R 2854953-2854932 | **6** | **6** | (TC)17 | **50-100** | **5** | **0.80** | **0.76** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm58** | F: ACAATTAGTATCAAAGCCAACCR: TTGGGTTGATCAACACTTGTTT | 1: NC\_012012.32: NC\_048443.1 | 1:F 8025477- 8025498R 8025863 - 80258422:F 769723- 769702R 769360- 769381 | **6** | **13** | (AT)4/(AT)3-(GT)5-AC-(GT)6 | **350-400** | **1** | **0.00** | **0.00** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm63** | F: AAGCCTTCTACTTGTTTGATGAR: ATTTGTTCTCAAACAGGCACAT | 1: NC\_012019.32: NC\_048443.1 | 1:F 4808159-4808138R 4807861-48078822:F 24394214-24394235R 24394520-24394499 | **13** | **13** | (TC)4-TATC-(TG)3 | **300-350** | **2** | **0.20** | **0.18** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm72** | F: AATGTCTTACAGCACTATTTGGR: TGAAGATGATATACAGAGTAGC | 1: NC\_012024.32: NC\_048448.1 | 1:F 6009889-6009868R 6009558-60095792:F 6048058-6048037R 6047737-6047758 | **18** | **18** | (CAA)3-AT-(GA)18 | **350-400** | **1** | **0.00** | **0.00** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm79a** | F: ATTATGTTTGAAGACTTGTGCCR: GTGAGATCTCTAGAGAAGTTTG | 1: NC\_012024.32: NC\_048448.1 | 1: F 13555077-13555056R 13554857-135548782: 13759781-13759760R 13759561-13759582 | **18** | **18** | (TTTTC)2 | **150-200** | **1** | **0.00** | **0.00** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm79b** | F: AAACTTCTCTAGAGATCTCACCR: AGTGTGTTTGACTCCAGAAAAG | 1: N/A2: N/A | 1: N/A2: N/A | **N/A** | **N/A** | (TC)9-TT-(TC)10-(T)13-C-(T)6 | **300-350** | **5** | **0.20** | **0.74** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIm93** | F: CAACGTTTATTGTAAGAGCCTCR: GCTTAGCTTGCTAGAAACTTGA | 1: NC\_012024.32: NC\_048448.1 | 1: F 6962396-6962375R 6962288-69623092: F 6934454-6934433R 6934344-6934365 | **18** | **18** | (CCCT)4-CCC-(CCCT)2-(CT)3 | **150-200** | **4** | **0.40** | **0.56** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIn03** | F: ACTCAAATTTGTTCCCTACTCTR: TGAGAAAATCTGAACCAGACTA | 1: NC\_012022.32: NC\_048446.1 | 1: F 388101-388122R 388445-3884242: F 342239-342260R 342585-342564 | **16** | **16** | (AC)3-(TAA)2/(TG)3-GG-TT-(TG)2 | **350-400** | **1** | **0.00** | **0.00** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIn04** | F: GTGAAGGTGGTGTTTGTAGATTR: CCTAATTGGCTGAATGTGATCT | 1: NC\_012025.32: NC\_048449.1 | 1: F 6696956-6696977R 6697317-66972962: F 7087084-7087105R 7087444-7087423 | **19** | **19** | TT-(CT)5/(TA)2-(GA)2 | **350-400** | **4** | **0.60** | **0.64** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIn16** | F: ACCTCTATAAGATCCTAACCTGR: AAGGGAGTGTGACTGATATTTC | 1: NC\_012024.32: NC\_048448.1 | 1: F 23389846-23389825, R 23389686-233897072: F 29558337- 29558316, R 29558187-29558208 | **18** | **18** | (AC)3-G-(CA)6 | **150-200** | **3**  | **0.80** | **0.62** | **0.628** | (Merdinoglu, et al. 2005, Laucou, et al. 2011, Nebish, et al. 2017) |
| **VVIn31** | F: GTTGAATAGTGTCCATGTTGTGR: GGATAGAATCACATTTGTAGCG | 1: NC\_012012.3 | 1: F 17800616- 17800595,R 17800420- 17800441 | **6** | **N/A** | (AGAT)4-(3(AG)-AT)4-(AG)14-(AT)2 | **150-200** | **6** | **0.80** | **0.76** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIn33** | F: TGCCAAAGCAAGTATCAACATGR: ATTTTGATCCCACCTAACTCTG | 1: NC\_012011.32: NC\_048435.1 | 1: F 11299447-11299468R 11299723- 112997022: F 11510823-11510844R 11511081- 11511060 | **5** | **5** | (TC)4-CC-AC-(TC)10-AC-(TC)8-AC-GC-(AC)5-(TC)2 | **300-350** | **4** | **0.80** | **0.74** | **N/A** | (Merdinoglu, et al. 2005) |
| **VVIn73** | F: TACTTCACCTAACAATACAGCTR: AATACATAAGGTGAAGATGCCT | 1: NC\_012023.32: NC\_048447.1 | 1: F 5504674 - 5504653R 5504409 - 55044302: F 14035715- 14035736R 14035970- 14035949 | **17** | **17** | (AC)10 | **260–272** | **5** | **0.595** | **0.514** | **0.459** | (Merdinoglu, et al. 2005, Laucou, et al. 2011, Nebish, et al. 2017) |
| **VVIp31** | F: TATCCAAGAGACAAATTCCCACR: TTCTCTTGTTTCCTGCAAATGG | 1: NC\_012025.32: N/A | 1: F 6697524 - 6697545R 6697705 - 66976842: N/A | **19** | **N/A** | (GA)20 | **173–196** | **11** | **0.895** | **0.847** | **0.818** | (Merdinoglu, et al. 2005, Laucou, et al. 2011, Nebish, et al. 2017) |
| **VVIp60** | F: GGGGAATAACTAAATTGAGGATR: GTATGAATGCGGATAGTTTGTG | 1: NC\_012007.32: NC\_048431.1 | 1: F 8803413-8803434R 8803728-88037072 F 9853301-9853322R: 9853622-9853601 | **1** | **1** | (TG)8-AG-(TG)10-(AG)12 | **306–332** | **9** | **0.789** | **0.755** | **0.710** | (Merdinoglu, et al. 2005, Laucou, et al. 2011, Nebish, et al. 2017) |
| **VVIQ52** | F: TAAAAGGATGGTAGATGACAGAR: ACAGGAAAGTGTTCAATGGTTA | 1: NC\_012015.32: NC\_048439.1 | 1: F 21558125-21558104R 21558043-215580642: F 22143424-22143403R 22143332-22143353 | **9** | **9** | (AC)2-TC)11 | **82-93** | **5** | **0.686** | **0.667** | **0.173** | (Merdinoglu, et al. 2005, Zarouri 2016) |
| **VVIV37** | F: TTTTCTCCCTACTCTTAACTTC R: GGTAGACCTTGAAATGAAGTAA | 1: NC\_012016.32: NC\_048440.1 | 1:F 11032502-11032481R 11032334-110323552:F 8762741-8762762R 8762899-8762878 | **10** | **10** | (TC)16-(TG)3 | **150-200** | **4**  | **0.80** | **0.64** | **0.760** | (Merdinoglu, et al. 2005, Nebish, et al. 2017) |
| **VVIV67** | F: TATAACTTCTCATAGGGTTTCC R: TTGGAGTCCATCAAATTCATCT | 1: NC\_012021.32: NC\_048445.1 | 1: F 10897758-10897737R 10897392-108974132: F 17911479-17911500R 17911867-17911846 | **15** | **15** | (CA)3-AT-(CA)2-(GA)4-TT-(GA)2/(AG)15 | **350-400** | **5**  | **1.00** | **0.74** | **0.777** | (Merdinoglu, et al. 2005, Nebish, et al. 2017) |
| **VVMD15** | F: CTGCAGTGCACTCAAAGTTGGR: TGAAACACCAAGGGAAACCTC | 1: N/A2: N/A | 1: N/A2: N/A | **N/A** | **N/A** | (GA)19 | **192–216** | **12** | **0.95** | **0.86** | **0.845** | (Sefc, et al. 1999, Jing, et al. 2013, Žulj , Maletić et al. 2020) |
| **VVMD19** | F: TGAAATATCATCAATGCTCTCTCTCCR: GGTTGATATTGCTTCCTTTTCCC | 1:NW\_003724213.12: NC\_048440.1 | 1:F 194851-194876R195046 -1950242:F 21094485-21094460R: 21094290-21094312 | **N/A** | **10** | N/A | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | (Jing, et al. 2013) |
| **VVMD21** | F: GGTTGTCTATGGAGTTGATGTTGCR: GCTTCAGTAAAAAGGGATTGCG | 1: NC\_012012.32: NC\_048436.1 | 1:F 13758808-13758831R 13759052-137590322: F 7531145-7531122R 7530928-7530948 | **6** | **6** | (A)13(A)21(T)18(C)9(T)22(AT)6 | **230-267** | **7** | **0.678** | **0.707** | **0.219** | (Galbács, et al. 2009, Dos Anjos 2013) |
| **VVMD24** | F: GTGGATGATGGAGTAGTCACGCR: GATTTTAGGTTCATGTTGGTGAAGG | 1:NC\_012020.32:NC\_048444.1 | 1: F 24252077-24252056R 24251864-242518882:F 6056744-6056765R 6056947-6056923 | **14** | **14** | (CT)11(T)10(A)10 | **206–219** | **7** | **0.868** | **0.809** | **0.770** | (Laucou, et al. 2011, Dos Anjos 2013, Nebish, et al. 2017) |
| **VVMD36** | F: GAAAATTAATAGGGGGACACGGGR: GCAACTGTAAAGGTAAGACACAGTCC | 1:NC\_012009.32:NC\_048433.1 | 1: F 7904163-7904185R 7904412-79043872: F 7525800-7525822R 7526047-7526022 | **3** | **3** | N/A | **244-296** | **17** | **0.817** | **0.838** | **0.082** | (Halasz, et al. 2005, Galbács, et al. 2009) |
| **VVMD6** | F: ATCTCTAACCCTAAAACCATR: CTGTGCTAAGACGAAGAAGA | 1:NC\_012013.32:NC\_048437.1 | 1: F 4186801-4186820R 4187000-41869812: F 26216152-26216133R 26215948-26215967 | **7** | **7** | (CT)C(CT)TTAG(CT)TAAT-(CT)6C(CT)2C(CT)2 | **194-214** | **5** | **N/A** | **N/A** | **N/A** | (Bowers, et al. 1996) |
| **VVMD8** | F: TAACAAACAAGAAGAGGAATR: AGCACATCCACAACATAATG | 1:NC\_012017.32:NC\_048441.1 | 1: F 19674992-19675011R 19675145-196751262: F 159556-159537R 159376-159395 | **11** | **11** | (TC)12.5(TA)8 | **131-215** | **23** | **0.754** | **0.798** | **0.066** | (Bowers, et al. 1996, Zarouri 2016) |
| **VVS1** | F: ACAATTGGAAACCGCGTGGAGR: CTTCTCAATGATATCTAAAACCATG | 1: NC\_012019.32: NC\_048443.1 | 1:F 6563366 - 6563346R 6563177 - 65632012:F 22468337-22468357R 22468519 - 22468495 | **13** | **13** | (AG)15 | **160-205** | **5** | **N/A** | **N/A** | **N/A** | (Thomas and Scott 1993, Lefort and Roubelakis-Aggelakis 2000, Dos Anjos 2013; Dauob, et al. 2018) |
| **VvUCH29** | F: AAACATGATCTGATGCAGGTGAR: CAACCTGTTGATGAAAGGGAAA | 1: AF143277 | N/A | **N/A** | **N/A** | (CT)18 | **207-315** | **26** | **0.793** | **0.845** | **N/A** | (Lefort, et al. 2002) |

**Reference list**

Arroyo-García, R. and J. Martínez-Zapater (2004). “Development and characterization of new microsatellite markers for grape.” Vitis **43** (4): 175–178

Bibi, A. C., E. D. Gonias and A. G. Doulis (2020). “Genetic diversity and structure analysis assessed by SSR Markers in a large collection of *Vitis c*ultivars from the island of Crete, Greece.” Biochemical Genetics: **58**, 294–321.

Bowers, J. E., G. S. Dangl and C. P. Meredith (1999). “Development and Characterization of Additional Microsatellite DNA Markers for Grape.” American Journal of Enology and Viticulture **50**(3): 243.

Bowers, J. E., G. S. Dangl, R. Vignani and C. P. Meredith (1996). “Isolation and characterization of new polymorphic simple sequence repeat loci in grape (*Vitis vinifera* L.).” Genome **39**(4): 628-633.

Carimi, F., F. Mercati, L. Abbate and F. Sunseri (2010). “Microsatellite analyses for evaluation of genetic diversity among Sicilian grapevine cultivars.” Genetic Resources and Crop Evolution **57**(5): 703-719.

Cipriani, G., M. T. Marrazzo, G. Di Gaspero, A. Pfeiffer, M. Morgante and R. Testolin (2008). “A set of microsatellite markers with long core repeat optimized for grape (*Vitis spp*) genotyping.” BMC Plant Biology **8**(1): 127.

Dauob, R., G. Makhoul and H. Mahfoud (2018). “Genetic Diversity among Grapevine (*Vitis Vinifera* L) Cultivars of Tartous Province (Syria) using Microsatellite Markers.” International Journal of Agriculture & Environmental Science **5**: 54-58.

Dos Anjos, L. M. (2013). Genetic diversity of Plasmopara viticola and genetic mapping of downy mildew resistance QTLs in grapevine (*Vitis* Spp.), PhD Thesis, Universidade de Brasília, Brasil.

Drábek, J., M. Smolíková, R. Kalendar, F. A. L. Pinto, P. Pavloušek, K. Klepárník and I. Frébort (2016). “Design and validation of an STR hexaplex assay for DNA profiling of grapevine cultivars.” Electrophoresis **37**(23-24): 3059-3067.

Ekhvaia, J., M. Gurushidze, F. R. Blattner and M. Akhalkatsi (2014). “Genetic diversity of *Vitis* *vinifera* in Georgia: relationships between local cultivars and wild grapevine, V vinifera L subsp *sylvestris*.” Genetic Resources and Crop Evolution **61**(8): 1507-1521.

Galbács, Z., S. Molnár, G. Halász, P. Kozma, S. Hoffmann, L. Kovacs, A. Veres, Z. Galli, A. Szőke, L. Heszky and E. Kiss (2009). “Identification of grapevine cultivars using microsatellite-based DNA barcodes.” Vitis **48**.

Gaspero, G., E. Peterlunger, R. Testolin, K. Edwards and G. Cipriani (2000). “Conservation of microsatellite loci within the genus *Vitis*.” Theoretical and Applied Genetics **101**: 301-308.

Guo, D.-L., Y.-H. Yu, F.-F. Xi, Y.-Y. Shi and G.-H. Zhang (2016). “Histological and molecular characterization of grape early ripening bud mutant.” International Journal of Genomics **2016**.

Halasz, G., A. Veres, P. Kozma, E. Kiss, Balogh, Z. Galli, A. Szoke, S. Hoffmann and L. Heszky (2005). “Microsatellite fingerprinting of grapevine (*Vitis vinifera* L) varieties of the Carpathian Basin.” Vitis **44**(4): 173-180.

Hvarleva, T., K. Rusanov, F. Lefort, I. Tsvetkov, A. Atanassov and I. Atanassov (2004). “Genotyping of Bulgarian *Vitis vinifera* L. cultivars by microsatellite analysis.” Vitis **43**(1): 27-34.

Italian\_Vitis\_Database (2022). <https://vitisdb.it/descriptors/microsatellites>.

Jahnke, G., J. Májer, A. Lakatos, J. G. Molnár, E. Deák, É. Stefanovits-Bányai and P. Varga (2009). “Isoenzyme and microsatellite analysis of *Vitis vinifera* L. varieties from the Hungarian grape germplasm.” Scientia Horticulturae **120**(2): 213-221.

Jing, Z. B., X. P. Wang and J. M. Cheng (2013). “Analysis of genetic diversity among Chinese wild *Vitis* species revealed with SSR and SRAP markers.” Genet Mol Res **12**(2): 1962-1973.

Karatas, D. D., H. Karatas, V. Laucou, G. Sarikamis, L. Riahi, R. Bacilieri and P. This (2014). “Genetic diversity of wild and cultivated grapevine accessions from southeast Turkey.” Hereditas **151**(4-5): 73-80.

Laucou, V., T. Lacombe, F. Dechesne, J.-P. R. Siret, M. Bruno, T. Dessup, P. Ortigosa, P. Parra, C. Roux, S. Santoni, D. Vare`s, J.-P. Pe´ros, J.-M. Boursiquot and P. This (2011). “High throughput analysis of grape genetic diversity as a tool for germplasm collection management.” Theoretical and Applied Genetics (122): 1233-1245.

Lefort, F., C. J. Kyvelos, M. Zervou, K. J. Edwards and K. A. Roubelakis-Angelakis (2002). “Characterization of new microsatellite loci from *Vitis vinifera* and their conservation in some *Vitis* species and hybrids.” Molecular Ecology Notes **2**(1): 20-21.

Lefort, F. and K. Roubelakis-Aggelakis (2000). “The Greek *Vitis* Database: a multimedia web-backed geneticdatabase for germplasm management of *Vitis* resources in Greece.” Journal of Wine Research **11**(3):233–242. <http://greekvitisdbbiologyuocgr/>.

Marques da Silva, J., A. Figueiredo, J. Cunha, J. E. Eiras-Dias, S. Silva, L. Vanneschi and P. Mariano (2020). “Using rapid chlorophyll fluorescence transients to classify *Vitis* genotypes.” Plants **9**(2): 174.

Merdinoglu, D., G. Butterlin, L. Bevilacqua, V. Chiquet, A.-F. Adam-Blondon and S. Decroocq (2005). “Development and characterization of a large set of microsatellite markers in grapevine (*Vitis vinifera* L) suitable for multiplex PCR.” Molecular Breeding **15**(4): 349-366.

Merkouropoulos, G., S. Michailidou, A. Alifragkis, E. Zioziou, S. Koundouras, A. Argiriou and N. Nicolaou (2015). “A combined approach involving ampelographic description, berry oenological traits and molecular analysis to study native grapevine varieties of Greece.” Vitis **54**: 99-103.

Nebish, A., I. Ochssner, E. Maul, R. Töpfer, L. Hausmann, A. Hovhannisyan, H. Devejyan, G. Melyan and R. Aroutiounian (2017). “Genetic identification and characterization of Armenian grapevine cultivars.” BIO Web Conf **9**: 01020.

Rustioni, L., G. De Lorenzis, M. Harta and O. Failla (2016). “Pink berry grape (*Vitis vinifera* L) characterization: Reflectance spectroscopy, HPLC and molecular markers.” Plant Physiology and Biochemistry **98**: 138-145.

Schuck, M. R., F. M. Moreira, M. P. Guerra, J. A. Voltolini, M. S. Grando and A. L. d. Silva (2009). “Molecular characterization of grapevine from Santa Catarina, Brazil, using microsatellite markers.” Pesquisa Agropecuária Brasileira **44**: 487-495.

Scott, K. D., P. Eggler, G. Seaton, M. Rossetto, E. M. Ablett, L. S. Lee and R. J. Henry (2000). “Analysis of SSRs derived from grape ESTs.” Theoretical and Applied Genetics **100**(5): 723-726.

Sefc, K., I. Pejić, E. Maletić, M. Thomas and F. Lefort (2009). Microsatellite markers for grapevine: tools for cultivar identification & pedigree reconstruction. Grapevine molecular physiology & biotechnology, Springer**:** 565-596.

Sefc, K. M., F. Regner, E. Turetschek, J. Glössl and H. Steinkellner (1999). “Identification of microsatellite sequences in *Vitis riparia* and their applicability for genotyping of different *Vitis* species.” Genome **42**(3): 367-373.

Stavrakaki, M., D. Bouza and K. Biniari (2020). “Differentiation of Greek grapevine cultivars (*Vitis vinifera* L.) based on the combination of ampelographic description and microsatellite markers.” Genetic Resources and Crop Evolution **67**(1): 21-40.

Thomas, M. R. and N. S. Scott (1993). “Microsatellite repeats in grapevine reveal DNA polymorphisms when analysed as sequence-tagged sites (STSs).” Theoretical and Applied Genetics **86**(8): 985-990.

Veres, A., A. Balogh, E. Kiss, A. Szőke, L. Heszky, P. Kozma, M. Kocsis and Z. Galli (2004). "Characterization of grapevine cultivars autochthonous in the Carpathian basin with microsatellites." Acta Horticulturae: 467-470.

Wang, L., J. Zhang, L. Liu, L. Zhang, L. Wei and D. Hu (2015). "Genetic diversity of grape germplasm as revealed by microsatellite (SSR) markers." African Journal of Biotechnology **14** (12): 990-998.

Ye, J., G. Coulouris, I. Zaretskaya, I. Cutcutache, S. Rozen and T. L. Madden (2012). "Primer-BLAST: a tool to design target-specific primers for polymerase chain reaction." BMC Bioinformatics **13**(1): 1-11.

Zarouri, B. (2016). Association study of phenology, yield and quality related traits in table grapes using SSR and SNP markers. Doctoral, Universidad Politecnica de Madrid

Žulj Mihaljević, M., E. Maletić, D. Preiner, G. Zdunić, M. Bubola, E. Zyprian and I. Pejić (2020). "Genetic diversity, population structure, and parentage analysis of Croatian grapevine germplasm." Genes **11**(7): 737.