

Table of Loci for Traits in Grapevine Relevant for Breeding and Genetics:**Update: February 16, 2024**

Associated markers, their chromosomal localisation, and the donor genotype/species are given. Chromosomal position of a trait/allele is given in megabases according to the 12 x genome sequence of PN40024 (<http://www.genoscope.cns.fr/vitis>).

The symbols were discussed and assigned at the International Conference on Grapevine Breeding and Genetics at Geneva, August 1 - 5, 2010. Follow up information on naming of loci will be provided on VIVC to avoid homonyms.

For updating information please contact: reinhard.toepfer@julius-kuehn.de or ludger.hausmann@julius-kuehn.de.

Trait	Symbol	Chr	Position on chr [Mb]	Associated / flanking marker	Parent 1	Parent 2	Population size	Genotype of origin	Original species of trait	Reference	Comment			
Resistance														
<i>Agrobacterium spec.</i> [crown gall]	<i>Rcg1</i>	15	7.1	UDV015	Kunbarát	Sárfehér	272	Kunbarát	<i>V. amurensis</i>	Kuczmog et al. (2012)	crown gall			
			9.3	9M3-3										
<i>Botrytis cinerea</i> [bunch rot; gray mold]		2	5.0	VMC6F1	Norton	Cabernet Sauvignon	182	Norton	<i>V. aestivalis</i>	Sapkota et al. (2019)				
			5.0	VMC3B10										
<i>Botrytis cinerea</i> [leaf; gray mold]		2			RG	VS	177			Su et al. (2023)	leaf no marker data given			
			7											
			2									ZSX	VT	176
			7											
<i>Colletotrichum gloeosporioides</i> (<i>Glomerella cingulata</i>) [ripe rot]	<i>CgR1</i>	14	4.1	np19345	Cabernet Sauvignon	Shuang Hong	91	Shuang Hong	<i>V. amurensis</i>	Fu et al. (2019)	ripe rot			
<i>Conithyrium diplodiella</i> [white rot]	<i>Rcd1</i>	14	3.5	chr14_3541187	Zhuosexiang	Victoria	177	Zhuosexiang		Su et al. (2021)	white rot			
			6.6	chr14_6602952										
<i>Daktulosphaira vitifoliae</i> [phylloxera]	<i>Rdv1</i>	13		GF13-1	GF.V3125	Börner	188	Börner	<i>V. cinerea</i>	Zhang et al. (2009)				
			21.9	GF13-9										
				GF13-1	GF.V3125	Börner	188	Börner	<i>V. cinerea</i>	Hausmann et al. (2011)				
			21.5	GF13-7										
<i>Daktulosphaira vitifoliae</i>	<i>Rdv2</i>	14	4.9	S14_4921219	<i>V. cinerea</i> C2-50	Riesling	90	<i>V. cinerea</i> C2-50	<i>V. cinerea</i>	Smith et al. (2018)	root resistance			
<i>Daktulosphaira vitifoliae</i>	<i>Rdv3</i>	14	5.0	S14_5049399	MN1264	MN1264	125	MN1264		Clark et al. (2018)	foliar resistance			
			4.8	14_4805213			1023	Seyval Blanc	Yin et al. (2022)	MN1264 = (MN1069 x Seyval Blanc)				
<i>Daktulosphaira vitifoliae</i>	<i>Rdv4</i>	4			MN1264	MN1264	125	MN1264		Clark et al. (2018)	foliar resistance			
<i>Daktulosphaira vitifoliae</i>	<i>Rdv5</i>	5			MN1264	MN1264	125			Clark et al. (2018)	root resistance			
<i>Daktulosphaira vitifoliae</i>	<i>Rdv6</i>	7			VRH8771	Cabernet Sauvignon	135	VRH8771	<i>M. rotundifolia</i>	Rubio et al. (2020)	root resistance			
<i>Daktulosphaira vitifoliae</i>	<i>Rdv7</i>	3	5.5	3_5494608	VRH8771	Cabernet Sauvignon	135	VRH8771	<i>M. rotundifolia</i>	Rubio et al. (2020)	root resistance			
<i>Daktulosphaira vitifoliae</i>	<i>Rdv8</i>	10			VRH8771	Cabernet Sauvignon	135	VRH8771	<i>M. rotundifolia</i>	Rubio et al. (2020)	root resistance			
<i>Diaporthe ampelina</i> (<i>Phomopsis viticola</i>)	<i>Rda1</i>	15	19.6	S15_19560016	Chardonnay	<i>V. cinerea</i> B9	148	<i>V. cinerea</i> B9	<i>V. cinerea</i>	Barba et al. (2018)	cane, cluster			
				S15_19591538	Horizon	<i>V. cinerea</i> B9	162	<i>V. cinerea</i> B9	<i>V. cinerea</i>		cane, cluster			
			19.3	S15_19300044	Horizon	Illinois 547-1	366	Illinois 547-1	<i>V. cinerea</i>		cane			
<i>Diaporthe ampelina</i> (<i>Phomopsis viticola</i>)	<i>Rda2</i>	7	1.2	VVMD7	Horizon	<i>V. cinerea</i> B9	162	Horizon		Barba et al. (2018)	cane, cluster			
			1.8	VtZAG62										
			3.1	VVtb22										
			3.1	S7_3127568										
			1.9	S7_1912889								Horizon	Illinois 547-1	366
<i>Elsinoë ampelina</i>	<i>Rea1</i>									Modesto et al. (in preparation)				
<i>Erysiphe necator</i>	<i>Ren1</i>	13		UDV020	Nimrang	Kishmish vatkana	310	Kishmish vatkana	<i>V. vinifera</i>	Hoffmann et al. (2008)				
			18.4	VMC9h4-2										
			18.4	VMCNg4e10.1										
<i>Erysiphe necator</i>	<i>Ren1.2</i>	13	17.9	SNP_13_17909186	Shavtsitska	Glera	184	Shavtsitska	<i>V. vinifera</i>	Possamai et al. (2021)				
			18.2	SNP_13_18213673										
<i>Erysiphe necator</i>	<i>Ren2</i>	14	26.9	CS25	Horizon	Illinois 547-1	58	Illinois 547-1		Dalbo et al. (2001)				
<i>Erysiphe necator</i>	<i>Ren3</i>	15	7.1	UDV015b	Regent	Lemberger	153	Regent		Welter et al. (2007)				
			10.9	VViv67										
				ScORA7-760	Regent	Lemberger	152	Regent		Akkurt et al. (2007)				
			4.9	VChr15CenGen02	Regent	RedGlobe	206	Regent		van Heerden et al. (2014)				
			10.9	GF15-28 / VViv67	GF.GA-47-42	Villard blanc	151			Zyprian et al. (2016)				
	9.3	GF15-42	Regent	Lemberger	132	Regent			Zendler et al. (2017)					

Trait	Symbol	Chr	Position on chr [Mb]	Associated / flanking marker	Parent 1	Parent 2	Population size	Genotype of origin	Original species of trait	Reference	Comment	
<i>Erysiphe necator</i>	Ren4	18	26.9	VMC7f2	C166-043	F8909-08	42	C166-043	<i>V. romanetii</i>	Riaz et al. (2012)		
			26.9	SNPs	C87-41	B70-57	57	C87-41	<i>V. romanetii</i>	Mahanil et al. (2012)		
<i>Erysiphe necator</i>	Ren5	14	4.8	VMC9c1	Regale	Regale	191	Regale	<i>M. rotundifolia</i>	Blanc et al. (2012)		
<i>Erysiphe necator</i>	Ren6	9	8.6	PN9-057	F2-35	V. piasezkii (DVIT2027)	277	V. piasezkii (DVIT2027)	<i>V. piasezkii</i>	Pap et al. (2016)		
			9.1	PN9-068								
<i>Erysiphe necator</i>	Ren7	19	0.2	VVIp17.1	F2-35	V. piasezkii (DVIT2027)	277	V. piasezkii (DVIT2027)	<i>V. piasezkii</i>	Pap et al. (2016)		
			0.9	VMC9a2.1								
<i>Erysiphe necator</i>	Ren8	18	13.2	UDV117	GF.GA-47-42	Villard blanc	151			Zyprian et al. (2016)		
				SPS_P_SNP632GF								
<i>Erysiphe necator</i>	Ren9	15	1.4	CenGen6	Regent	Lemberger	153	Regent		Zendler et al. (2017)		
<i>Erysiphe necator</i>	Ren10	2	17.9	S2_17854965	MN1264	MN1214	147	Seyval blanc		Teh et al. (2017)		
					Haploblock validation	MN1264	MN1246	125				
<i>Erysiphe necator</i>	Ren11	15	13.7	rh_chr15_13698923	B37-28	C56-11	244	Tamiami	<i>V. aestivalis</i>	Karn et al. (2021)	B37-28 (Tamiami x <i>V. vinifera</i>)	
			15.3	rh_vhr15_15294725	Tamiami	M13	300					
<i>Erysiphe necator</i>	Ren12	13	22.8	I3_22768514	<i>V. amurensis</i>	Valley Pearl	248	<i>V. amurensis</i>	<i>V. amurensis</i>	Sapkota et al. (2023)		
			27.0	I3_26962710								
<i>Erysiphe necator</i>	Ren13									Cadle-Davidson et al. (in preparation)		
<i>Erysiphe necator</i>	Ren14									De Lorenzis et al. (in preparation)		
<i>Erysiphe necator</i>	Ren15									De Lorenzis et al. (in preparation)		
<i>Erysiphe necator</i>	Ren16									Hwang et al. (in preparation)		
<i>Erysiphe (Uncinula) necator</i>	Run1	12	13.1	VMC4f3.1	VRH3082-1-42	Cabernet Sauvignon	161	VRH3082-1-42	<i>M. rotundifolia</i>	Barker et al. (2005)	powdery mildew resistance originating from <i>Muscadinia</i> was named <i>Run</i>	
			20.4	VMC8g9								
			16.4	49MRP1.P2	VRH3082-1-42	Cabernet Sauvignon	2575					
			16.8	CB53.54	VRH3176-21-11	Cabernet Sauvignon	722					
				VRH3161-6-4	Cabernet Sauvignon	110						
				BC1:M_rotundifolia	Syrah	139						
<i>Erysiphe (Uncinula) necator</i>	Run2.1	18	26.9	VMC7f2	JB81-107-11	Chenin Blanc	97	Magnolia	<i>M. rotundifolia</i>	Riaz et al. (2011)	resistant tissue: Cane	
			20.9	VMCNg1e3							rachis	
			23.4	VVIn16	JB81-107-11	Tokay	47				rachis	
			26.9	VMC7f2							fruit	
			26.9	VMC7f2	A90-71	Flame Seedless	80				leaf, cane, rachis, fruit	
<i>Erysiphe (Uncinula) necator</i>	Run2.2	18	26.9	VMC7f2	e2-9	Malaga Rosada	255	Trayshed	<i>M. rotundifolia</i>	Riaz et al. (2011)		
<i>Erysiphe necator</i>	Sen1	9	13.6 - 18.0	S8_19258484	<i>V. rupestris</i> B38	Chardonnay	85	Chardonnay	<i>V. vinifera</i>	Barba et al. (2014)		
Grapevine fanleaf virus (GFV)	rgflv1	1	0.6	VMC4f8	(Riesling x	self-pollinated	87	Riesling	<i>V. vinifera</i>	Djennane et al. (2021)		
			1.5	Chr1_1535	Gewurztraminer)							
<i>Guignardia bidwellii</i>	Rgb1	14	26.7	GF14-42	GF.V3125	Börner	202	Börner		Rex et al. (2014)		
<i>Guignardia bidwellii</i>	Rgb2	16	15.3	VChr16c	GF.V312	Börner	202	Börner		Rex et al. (2014)		
<i>Meloidogyne javanica</i> (root knot nematode)	MjR1	18	31.2	S18_31160355	C2-50	Riesling	90	C2-50	<i>V. cinerea</i>	Smith et al. (2018)		
			34.0	S18_33954011								
Pierce's disease (<i>Xylella fastidiosa</i>)	Pdr1	14	25.3	VMCNg3b8	<i>V. rupestris</i>	<i>V. arizonica</i>	181		<i>V. arizonica</i>	Riaz et al. (2006)		
			26.6	VVIn64							Riaz et al. (2008)	
			26.1	UDV095								
<i>Plasmopara viticola</i>	Rpv1	12	10.3	VVlb32	Syrah	28-8-78		28-8-78	<i>M. rotundifolia</i>	Merdinoglu et al. (2003)		
<i>Plasmopara viticola</i>	Rpv2	18			Cabernet Sauvignon	8624		8624	<i>M. rotundifolia</i>	Wiedemann-Merdinoglu et al. (2006)		
<i>Plasmopara viticola</i>	Rpv3	18		UDV112	Regent	Lemberger	153	Regent		Welter et al. (2007)		
			24.9	UDV305	Chardonnay	Bianca	116	Bianca		Bellin et al. (2009)	Regent and Bianca descend from Seibel 4614 (=Rpv3 ²⁹⁹⁻²⁷⁹ = Rpv3-1)	
			26.9	VMC7f2								
			26.9	VMC7f2	Regent	RedGlobe	206	Regent		van Heerden et al. (2014)		
	Rpv3.1 (=Rpv3 ²⁹⁹⁻²⁷⁹)	24.9	UDV305				Seibel 4614	<i>V. rupestris</i>	Di Gaspero et al. (2012)	pedigree analysis		
		26.1	UDV737									
	25.9	GF18-06	GF18-	GF.GA-47-42	Villard blanc	151	Villard blanc	<i>V. rupestris</i>	Zyprian et al. (2016)			
	26.9	08										

Trait	Symbol	Chr	Position on chr [Mb]	Associated / flanking marker	Parent 1	Parent 2	Population size	Genotype of origin	Original species of trait	Reference	Comment	
	<i>Rpv3.2</i> (= <i>Rpv3</i> ^{mult-207})		24.9	UDV305				Munson (Jaeger 70)	<i>V. rupestris</i> or <i>V. linccumii</i>	Di Gaspero et al. (2012)	pedigree analysis	
			26.1	UDV737								
	25.9		GF18-06	GF18-08	GF.GA-47-42	Villard blanc	151	GF.GA-47-42	<i>V. rupestris</i> or <i>V. linccumii</i>	Zyprian et al. (2016)		
	26.9											
	<i>Rpv3.3</i> (= <i>Rpv3</i> ^{mult-271})		24.9	UDV305					Noah	<i>V. labrusca</i> or <i>V. riparia</i>	Di Gaspero et al. (2012)	
			26.1	UDV737								
	<i>Rpv3</i> ³²¹⁻³¹²		23.4	VVIN16		Merzling	Teroldego	136	Merzling		Vezzulli et al. (2019)	
26.1		UDV737										
<i>Rpv3</i> ³⁶¹⁻²⁹⁹	24.9	UDV305					Noah	<i>V. labrusca</i> or <i>V. riparia</i>	Di Gaspero et al. (2012)	pedigree analysis		
	26.1	UDV737					<i>V. rupestris</i> Ganzin	<i>V. rupestris</i>				
<i>Rpv3</i> ²⁹⁹⁻³¹⁴	24.9	UDV305						<i>V. rupestris</i> Ganzin	<i>V. rupestris</i>			
	26.1	UDV737										
<i>Rpv3</i> ^{mult-287}	24.9	UDV305					Bayard (Couderc 28-112)	<i>V. rupestris</i> or <i>V. labrusca</i>				
	26.1	UDV737										
<i>Plasmopara viticola</i>	<i>Rpv4</i>	4	4.7	VMC7h3	Regent	Lemberger	153	Regent		Welter et al. (2007)		
			5.2	VMCNg2e1								
<i>Plasmopara viticola</i>	<i>Rpv5</i>	9	4.0	VVIo52b	Cabernet Sauvignon	Gloire de Montpellier	138	Gloire de Montpellier	<i>V. riparia</i>	Marguerit et al. (2009)		
<i>Plasmopara viticola</i>	<i>Rpv6</i>	12	20.4	VMC8g9	Cabernet Sauvignon	Gloire de Montpellier	138	Gloire de Montpellier	<i>V. riparia</i>	Marguerit et al. (2009)		
<i>Plasmopara viticola</i>	<i>Rpv7</i>	7	11.4	UDV097	Chardonnay	Bianca	116	Bianca		Bellin et al. (2009)		
<i>Plasmopara viticola</i>	<i>Rpv8</i>	14	6.6	Chr14V015	<i>V. amurensis</i> Ruprecht	<i>V. amurensis</i> Ruprecht	232	<i>V. amurensis</i> Ruprecht	<i>V. amurensis</i>	Blasi et al. (2011)		
<i>Plasmopara viticola</i>	<i>Rpv9</i>	7	16.6	CCoAOMT	Moscato Bianco	<i>V. riparia</i> W63	174	<i>V. riparia</i> W63	<i>V. riparia</i>	Moreira et al. (2011)	CCoAOMT is the candidate gene from which the marker IN0006 was derived	
<i>Plasmopara viticola</i>	<i>Rpv10</i>	9	3.7	GF09-46	GF.GA-52-42	Solaris	256	Solaris	<i>V. amurensis</i>	Schwander et al. (2012)		
<i>Plasmopara viticola</i>	<i>Rpv11</i>	5	4.5	VVMD27	Regent	Lemberger	153	Regent		Fischer et al. (2004)		
					CS1E104J11F	Chardonnay	Bianca	116	Chardonnay		Bellin et al. (2009)	
			4.1	VCHR05C	GF.GA-52-42	Solaris	256	Solaris		Schwander et al. (2012)		
<i>Plasmopara viticola</i>	<i>Rpv12</i>	14	8.0	UDV014	99-1-48	Pinot noir	180	99-1-48	<i>V. amurensis</i>	Venuti et al. (2013)		
			9.3	UDV304	Cabernet Sauvignan	20/3		<i>V. amurensis</i>				
				rgvvin180								
			10.1	UDV370								
<i>Plasmopara viticola</i>	<i>Rpv13</i>	12	10.0	VMC1g3.2	Moscato Bianco	<i>V. riparia</i> W63	174	<i>V. riparia</i> W63	<i>V. riparia</i>	Moreira et al. (2011)		
<i>Plasmopara viticola</i>	<i>Rpv14</i>	5	20.2	GF05-13	GF.V3125	Börner	202	Börner	<i>V. cinerea</i>	Ochssner et al. (2016)		
<i>Plasmopara viticola</i>	<i>Rpv15</i>	18			<i>V. piasezkii</i> (DVIT2027)	F2-35	94	<i>V. piasezkii</i> (DVIT2027)	<i>V. piasezkii</i>	Pap et al. (in preparation)		
<i>Plasmopara viticola</i>	<i>Rpv16</i>									Pap et al. (in preparation)		
<i>Plasmopara viticola</i>	<i>Rpv17</i>	8	11.7		<i>V. rupestris</i> B38	Horizon	163	Horizon		Divilov et al. (2018)		
<i>Plasmopara viticola</i>	<i>Rpv18</i>	11	15.4		<i>V. rupestris</i> B38	Horizon	163	Horizon		Divilov et al. (2018)		
<i>Plasmopara viticola</i>	<i>Rpv19</i>	14	29.5		<i>V. rupestris</i> B38	Horizon	163	<i>V. rupestris</i> B38	<i>V. rupestris</i>	Divilov et al. (2018)		
<i>Plasmopara viticola</i>	<i>Rpv20</i>	6	0.9		Horizon	<i>V. cinerea</i> B9	152	Horizon		Divilov et al. (2018)		
<i>Plasmopara viticola</i>	<i>Rpv21</i>	7	2.1		Horizon	<i>V. cinerea</i> B9	152	Horizon		Divilov et al. (2018)		
<i>Plasmopara viticola</i>	<i>Rpv22</i>	2	2.1		Cabernet Sauvignan	Shuanghong	91	Shuanghong	<i>V. amurensis</i>	Fu et al. (2020)		
			3.5									
<i>Plasmopara viticola</i>	<i>Rpv23</i>	15	9.9		Cabernet Sauvignan	Shuanghong	91	Shuanghong	<i>V. amurensis</i>	Fu et al. (2020)		
			13.9									
<i>Plasmopara viticola</i>	<i>Rpv24</i>	18			Cabernet Sauvignan	Shuanghong	91	Shuanghong	<i>V. amurensis</i>	Fu et al. (2020)		
<i>Plasmopara viticola</i>	<i>Rpv25</i>	15	3.0	Marker561375	Red Globe	Shuangyou	149	Shuangyou	<i>V. amurensis</i>	Lin et al. (2019)		
			3.9	Marker549779								
<i>Plasmopara viticola</i>	<i>Rpv26</i>	15	14.7	Marker525926	Red Globe	Shuangyou	149	Shuangyou	<i>V. amurensis</i>	Lin et al. (2019)		
			15.0	Marker526446								

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<i>Plasmopara viticola</i>	Rpv27	18	24.6	VVCS1H077H16R1-1	Norton	Cabernet Sauvignon	182	Norton	<i>V. aestivalis</i>	Sapkota et al. (2019)		
			26.0	UDV737								
<i>Plasmopara viticola</i>	Rpv28.1	10	1.3	S10_1285522	V. rupestris B38	V. riparia HP-1	136	V. rupestris B38	<i>V. rupestris</i>	Bhattarai et al. (2021)	physical position based on 12X.v2	
	Rpv28.2		3.0	S10_3024940								85
<i>Plasmopara viticola</i>	Rpv29	14	21.6	chr14_21613512_C_T	Mgaloblishvili	Mgaloblishvili	132	Mgaloblishvili	<i>V. vinifera</i>	Sargolzaei et al. (2020)	84 OPs of Mgaloblishvili, 48 genotypes of Georgian germplasm collection	
<i>Plasmopara viticola</i>	Rpv30	3	16.2	cn_C_T_chr3_16229046	Mgaloblishvili	Mgaloblishvili	132	Mgaloblishvili	<i>V. vinifera</i>	Sargolzaei et al. (2020)	84 OPs of Mgaloblishvili, 48 genotypes of Georgian germplasm collection	
<i>Plasmopara viticola</i>	Rpv31	16	21.3	li_T_C_chr16_21398409	Mgaloblishvili	Mgaloblishvili	132	Mgaloblishvili	<i>V. vinifera</i>	Sargolzaei et al. (2020)	84 OPs of Mgaloblishvili, 48 genotypes of Georgian germplasm collection	
<i>Plasmopara viticola</i>	Rpv32									Malagol et al. (in preparation)		
<i>Plasmopara viticola</i>	Rpv33	9	0.9	rh_chr9_893002	<i>Vitis x doaniana</i>	Chardonnay	220	<i>V. acerifolia</i>	<i>V. acerifolia</i>	Zou et al. (2023)	<i>Vitis x doaniana</i> (= <i>V. mustangensis</i> x <i>V. acerifolia</i>)	
			1.3	rh_chr9_1305204								
<i>Plasmopara viticola</i>	Rpv34									Cadle-Davidson et al. (in preparation)		
<i>Plasmopara viticola</i>	Rpv35									Cadle-Davidson et al. (in preparation)		
<i>Plasmopara viticola</i>	Rpv36									De Lorenzis et al. (in preparation)		
<i>Plasmopara viticola</i>	Rpv37									De Lorenzis et al. (in preparation)		
<i>Xiphinema index</i>	XiR1	19	20.9	VMC5a10	<i>V. rupestris</i>	<i>V. arizonica</i>	185	<i>V. arizonica</i>	<i>V. arizonica</i>	Xu et al. (2008)		
			20.9	IN2R3b								Hwang et al. (2010)
				M4F3R								
<i>Xiphinema index</i>	XiR2	9		VVBX-A-06	VRH8771	Cabernet Sauvignon	135	VRH8771		Rubio et al. (2020)		
<i>Xiphinema index</i>	XiR3	10		SC8-03	VRH8771	Cabernet Sauvignon	135	VRH8771		Rubio et al. (2020)		
<i>Xiphinema index</i>	XiR4	18	29.1	UDV108	VRH8771	Cabernet Sauvignon	135	VRH8771		Rubio et al. (2020)		
Morphology												
Berry size (berry weight)	Be size	18	25.9	SCC8	MTP2223-27	MTP2121-30	139		<i>V. vinifera</i>	Doligez et al. (2002)	Only one major QTL for berry size is indicated. There are several other QTLs described in the literature.	
			26.9	VMC7f2	Dominga	Autumn Seedless	118			Cabezas et al. (2006)		
					Ruby Seedless	Thompson Seedless	144			Mejia et al. (2007); Mejia et al. (2011)		
					Italia	Big Perlon	163			Costantini et al. (2008)		
Fleshless berry	Ffb	18	0.9	VMC2a3	Chardonnay	Ugni Blanc Mutant	71	Ugni Blanc	<i>V. vinifera</i>	Fernandez et al. (2006)	Mutant	
GA insensitive dwarf mutant	Vvgail	1	4.9						Pinot Meunier	Boss & Thomas (2002)	periclinal chimera mutant	
Leaf hairs	LH1	5	0.9	Nifts5-50363	Muscat of Alexandria	Campbell Early	95	Muscat of Alexandria	<i>V. vinifera</i>	Kono et al. (2018)	reducing leaf hair density; confers DM susceptibility	
Leaf variegation	Lvar1	14	26.1	14_26071477	MN1220	MN1326	119			Olson et al. (2022)	locus validated with 2 other populations and with GWAS	
			28.7	14_28696427								
Leaf variegation	Lvar2	11	16.3	11_16272242	MN1256	MN1327	57			Olson et al. (2022)		
			18.4	11_18433707								
Seed development inhibitor (Seedlessness)	SdI	18	25.9	SCC8	MTP2223-27	MTP2121-30	139			Doligez et al. (2002)		
			23.2	VMC6f11	Dominga	Autumn Seedless	118	Autumn Seedless		Cabezas et al. (2006)		
			26.9	VMC7f2			118					
			26.9	VMC7f2	Italia	Big Perlon	163	Big Perlon		Costantini et al. (2008)		
			26.9	p3_VvAGL11	Ruby Seedless	Sultanina	139			Mejia et al. (2011)		
Sex	Sex	2	3.7	VVMD34	Horizon	Illinois 547-1	58			Dalbó et al. (2000)		
			4.2	VVS3	Ramsey	Riparia Gloire	188			Lowe and Walker (2006)		
			4.9	VVb23	<i>V. rupestris</i>	<i>V. arizonica</i>	181			Riaz et al. (2006)		
			5.0	APT3Indel	V3125	Börner	202			Fechter et al. (2012)		
			4.7	SNP4C_1	Moscato Bianco	<i>V. riparia</i> WR63	340			Battilana et al. (2013)		
			4.9	VVb23	Muscat Ottonel	Malvasia aromatica di	91					
			4.9	VSVV007						Picq et al. (2014)		
			5.0	VSVV010								

Trait	Symbol	Chr	Position on chr [Mb]	Associated / flanking marker	Parent 1	Parent 2	Population size	Genotype of origin	Original species of trait	Reference	Comment			
Phenology														
Berry skin color	<i>BeCo</i>	2	8.2	VMC5g7	MTP3140	MTP2223-27	139			Doligez et al. (2002)				
			17.5	VMC8c2										
			14.2	MybA1										
Véraison	<i>Ver</i>	16	13.7	VMC1e11	Regent	Lemberger	153	Regent		Fischer et al. (2004)	For véraison (begin of ripening) several QTLs are published. This data here is incomplete.			
					Italia	Big Perlon	163		Costantini et al. (2008)					
Véraison	<i>Ver1</i>	16	15.8	UDV052	GF.GA-47-42	Villard blanc	151	GF.GA-47-42		Zyprian et al. (2016)				
Véraison	<i>Ver2</i>	18		SPS_P_SNP632GF	GF.GA-47-42	Villard blanc	151			Zyprian et al. (2016)				
Growth cessation [photoperiod-induced]		13	8.1	VMC3D12	(V. riparia x Seyval)	self-pollinated	113			Garris et al. (2009)	greenhouse			
			27.0	VVIp10										
			9.1	VMC6G1							95			field
			19.1	VVIp36c										
Metabolites														
Anthocyanin 3-monoglucosides	<i>Ufgt</i>	16	2.3	UFGT	Regent	Lemberger	153			Fischer et al. (2004)				
Anthocyanin 3,5-diglucosides	<i>5-GT</i>	9	6.5		Regent	Lemberger	153	Regent		Hausmann et al. (2009) Janvary et al. (2009) Yang et al. (2014)				
Monoterpene content	<i>Mtc</i>	5	3.8	DXS1	Italia	Big Perlon	163		<i>V. vinifera</i>	Battilana et al. (2009)				
					Moscato Bianco	V. riparia WR63	174							
					Muscat Ottonel	Muscat Ottonel	121		<i>V. vinifera</i>	Duchene et al. (2009)				
					Gewuerztraminer	Gewuerztraminer	115							
Muscat flavor		1	6.1	VVIq57	MTP2687-85 (Olivette noire x Ribol)	Muscat of Hamburg	174	Muscat of Hamburg	<i>V. vinifera</i>	Doligez et al. (2006)				
			5	VVMD27										
			5.7	VzZAG79										
			7	VMC1A12										
Geraniol content		5	4.5	VVMD27	MTP2687-85 (Olivette noire x Ribol)	Muscat of Hamburg	174	Muscat of Hamburg	<i>V. vinifera</i>	Doligez et al. (2006)				
			5.7	VzZAG79										
			13	VMC8E6										
			16	VVMD37										
Linalool content	<i>Lin</i>	2	4.8	VVIb23	MTP2687-85 (Olivette noire x Ribol)	Muscat of Hamburg	174	MTP2687-85 (Olivette noire x Muscat of Hamburg)	<i>V. vinifera</i>	Doligez et al. (2006)				
			7.0	VMC2C10.1										
			5	VVMD27										
			5.7	VzZAG79										
Linalool content	<i>Lin</i>	10		end41	Italia	Big Perlon	163		<i>V. vinifera</i>	Battilana et al. (2009)				
			1.2	VVIh01	Moscato Bianco	V. riparia WR63	174							
			1.4	VzZAG67										
Linalool content	<i>Lin</i>	10	1.3	VzZAG64	Muscat Ottonel	Muscat Ottonel	121		<i>V. vinifera</i>	Duchene et al. (2009)				
			1.1	VMC3d7	Gewuerztraminer	Gewuerztraminer	115		<i>V. vinifera</i>					
Nerol content		5	4.5	VVMD27	MTP2687-85 (Olivette noire x Ribol)	Muscat of Hamburg	174	Muscat of Hamburg	<i>V. vinifera</i>	Doligez et al. (2006)				
			5.7	VzZAG79										
			12	TT251F02										
			13	VMC8E6										
			16	VVMD37										
Isobutyl-methoxy pyrazine (IBMP)	<i>VvOMT3</i>	3	2.2	VvOMT3	(Cabernet Sauvignon x Pinot Meunier)	self pollinated	64	Cabernet Sauvignon		Dunlevy et al. (2013)	3 significant QTLs for IBMP content			
					Cabernet Sauvignon	Gloire de Montpellier	138	Cabernet Sauvignon		Guillaumie et al. (2013)				
Malic acid concentration	<i>MA</i>	6	8.0		16-9-2	self pollinated	63			Yang et al. (2016)	16-9-2 = F1 of V. riparia x Seyval			

Trait	Symbol	Chr	Position on chr [Mb]	Associated / flanking marker	Parent 1	Parent 2	Population size	Genotype of origin	Original species of trait	Reference	Comment
Iron deficiency [lime-induced chlorosis]		13	8.2	VMC3D12	Cabernet Sauvignon	Gloire de Montpellier	138	Gloire de Montpellier	<i>V. riparia</i>	Bert et al. (2013)	Only the major QTL is indicated. There are many other QTLs described.
			24.7	VMC2C7							
Mg [Mg content; chlorosis]		11	3.9	VVS2	Welschriesling	Sirius	92	Sirius		Mandl et al. (2006)	
			9.0	VMC6G1							
Yeast assimilable nitrogen	YAN	7	18.8		16-9-2	self-pollinated	63			Yang et al. (2016)	16-9-2 = F1 of <i>V. riparia</i> x Seyval