

Table of Loci for Traits in Grapevine Relevant for Breeding and Genetics:**Update: October 01, 2018**

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.

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Trait	Symbol	Chromosome	Position on chr [Mb]	Associated marker	Parent 1	Parent 2	Population size	Genotype of origin	Original species of trait	Reference	Comment		
Resistance													
<i>Agrobacterium spec.</i>	<i>Rcg1</i>	15	7.1	UDV-015	Kunbarát	x Sárfehér	272	Kunbarát	<i>V. amurensis</i>	Kuczog et al. (2012)			
			9.3	9M3-3									
<i>Daktulosphaira vitifoliae</i>	<i>Rdv1</i>	13	21.9	GF13_9	Gf.V3125	x Börner	188	Börner	<i>V. cinerea</i>	Zhang et al. (2009)			
			22.5	VMC8e6									
				GF13-1	Gf.V3125	x Börner	188	Börner	<i>V. cinerea</i>	Hausmann et al. (2011)			
			21.5	GF13-7									
<i>Diaporthe ampelina</i> (<i>Phomopsis viticola</i>)	<i>Rda1</i>	15	19.6	S15_19560016	Chardonnay	x <i>V. cinerea</i> B9	148	<i>V. cinerea</i> B9	<i>V. cinerea</i>	Barba et al. (2018)	Cane, cluster		
				S15_19591538	Horizon	x <i>V. cinerea</i> B9	162	<i>V. cinerea</i> B9	<i>V. cinerea</i>		Cane, cluster		
				S15_19300044	Horizon	x 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	x <i>V. cinerea</i> B9	162	Horizon		Barba et al. (2018)	Cane, cluster		
			1.8	VrZAG62									
			3.1	VVib22									
				S7_3127568									
				S7_1912889	Horizon	x Illinois 547-1	366	Horizon					Cane
<i>Erysiphe necator</i>	<i>Ren1</i>	13		UDV-020	Nimrang	x 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>Ren2</i>	14	26.9	CS25	Horizon	x Illinois 547-1	58	Illinois 547-1		Dalbo et al. (2001)			
<i>Erysiphe necator</i>	<i>Ren3</i>	15	7.1	UDV-015b	Regent	x Lemberger	153	Regent		Welter et al. (2007)			
			10.9	VViv67									
				ScORA7-760	Regent	x Lemberger	152	Regent		Akkurt et al. (2007)			
			4.9	VChr15CenGen02	Regent	x RedGlobe	206	Regent		van Heerden et al. (2014)			
			10.9	GF15-28 / VViv67	GF.GA-47-42	x Villard blanc	151			Zyprian et al. (2016)			
			9.3	GF15-42	Regent	x Lemberger	132	Regent		Zendler et al. (2017)			
<i>Erysiphe necator</i>	<i>Ren4</i>	18	26.9	VMC7f2	C166-043	x F8909-08	42	C166-043	<i>V. romanetii</i>	Riaz et al. (2012)			
			26.9	SNPs	C87-41	x B70-57	57	C87-41	<i>V. romanetii</i>	Mahanil et al. (2012)			
<i>Erysiphe necator</i>	<i>Ren5</i>	14	4.8	VMC9c1	Regale	x Regale	191	Regale	<i>M. rotundifolia</i>	Blanc et al. (2012)			
<i>Erysiphe necator</i>	<i>Ren6</i>	9	8.6	PN9-057	F2-35	x <i>V. piasezkii</i> (DVIT2027)	277	<i>V. piasezkii</i> (DVIT2027)	<i>V. piasezkii</i>	Pap et al. (2016)			
			9.1	PN9-068									
<i>Erysiphe necator</i>	<i>Ren7</i>	19	0.2	VVip17.1	F2-35	x <i>V. piasezkii</i> (DVIT2027)	277	<i>V. piasezkii</i> (DVIT2027)	<i>V. piasezkii</i>	Pap et al. (2016)			
			0.9	VMC9a2.1									
<i>Erysiphe necator</i>	<i>Ren8</i>	18			GF.GA-47-42	x Villard blanc	151			Zyprian et al. (2016)			
<i>Erysiphe necator</i>	<i>Ren9</i>	15	1.4	CenGen6	Regent	x Lemberger	153	Regent		Zendler et al. (2017)			
<i>Erysiphe necator</i>	<i>Ren10</i>	2	79.0	S2_17854965	MN1264	x MN1214	147	Seyval blanc		Teh et al. (2017)			
					Haploblock validation	MN1264	x MN1246	125					
<i>Erysiphe (Uncinula) necator</i>	<i>Run1</i>	12	13.1	VMC4f3.1	VRH3082-1-42	x Cabernet Sauvignon	161	VRH3082-1-42	<i>M. rotundifolia</i>	Barker et al. (2005)	Powdery mildew resistance originating from Muscaninia named as <i>Run</i>		
			20.4	VMC8g9									
			16.4	49MRP1.P2	VRH3082-1-42	x Cabernet Sauvignon	2575			Feechan et al. (2013)			
			16.8	CB53.54	VRH3176-21-11	x Cabernet Sauvignon	722						
				VRH3161-6-4	x Cabernet Sauvignon	110							
					x Syrah	139							
<i>Erysiphe (Uncinula) necator</i>	<i>Run2.1</i>	18	26.9	VMC7f2	JB81-107-11	x 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	x Tokay	47					Rachis	
			26.9	VMC7f2								Fruit	
			26.9	VMC7f2	A90-71	x Flame Seedless	80					Leaf, Cane, Rachis, Fruit	
<i>Erysiphe (Uncinula) necator</i>	<i>Run2.2</i>	18	26.9	VMC7f2	e2-9	x Malaga Rosada	255	Trayshed	<i>M. rotundifolia</i>	Riaz et al. (2011)			
<i>Erysiphe necator</i>	<i>Sen1</i>	9	13.6 - 18.0	SS_19258484	<i>V. rupestris</i> B38	x Chardonnay	85	Chardonnay	<i>V. vinifera</i>	Barba et al. (2014)			

Trait	Symbol	Chromosome	Position on chr [Mb]	Associated marker	Parent 1	Parent 2	Population size	Genotype of origin	Original species of trait	Reference	Comment	
<i>Guignardia bidwellii</i>	<i>Rgb1</i>	14	26.7	GF14-42	V3125	x Börner	202	Börner		Rex et al. (2014)		
<i>Guignardia bidwellii</i>	<i>Rgb2</i>	16	15.3	VChr16c	V3125	x Börner	202	Börner		Rex et al. (2014)		
Pierce's disease	<i>Pdr1</i>	14	25.3	VMCNg3h8	<i>V. rupestris</i>	x <i>V. arizonica</i>	181		<i>V. arizonica</i>	Riaz et al. (2006)		
			26.6	VVIn64							Riaz et al. (2008)	
			26.1	UDV-095								
<i>Plasmopara viticola</i>	<i>Rpv1</i>	12	10.3	VVib32	Syrah	x 28-8-78		28-8-78	<i>M. rotundifolia</i>	Merdinoglu et al. (2003)		
<i>Plasmopara viticola</i>	<i>Rpv2</i>	18			Cabernet Sauvignon	x 8624	129	8624	<i>M. rotundifolia</i>	Wiedemann-Merdinoglu et al. (2006)		
<i>Plasmopara viticola</i>	<i>Rpv3</i>	18		UDV-112	Regent	x Lemberger	153	Regent		Welter et al. (2007)	Regent and Bianca descend from Seibel 4614 (=Rpv3 ²⁹⁹⁻²⁷⁹ = Rpv3-1)	
			24.9	UDV-305	Chardonnay	x Bianca	116	Bianca		Bellin et al. (2009)		
			26.9	VMC7f2								
			26.9	VMC7f2	Regent	x RedGlobe	206	Regent		van Heerden et al. (2014)		
	<i>Rpv3-1</i> (=Rpv3 ²⁹⁹⁻²⁷⁹)	24.9	UDV-305						Seibel 4614	<i>V. rupestris</i>	Di Gaspero et al. (2012)	Pedigree analysis
		26.1	UDV-737									
	<i>Rpv3-2</i> (=Rpv3 ^{mult-297})	25.9	GF18-06	GF.GA-47-42	x Villard blanc	151	Villard blanc	Villard blanc	<i>V. rupestris</i>	Zyprian et al. (2016)		
		26.9	GF18-08									
	<i>Rpv3-3</i> (=Rpv3 ^{mult-271})	24.9	UDV-305						Munson (Jaeger 70)	<i>V. rupestris</i> or <i>V. lincecumii</i>	Di Gaspero et al. (2012)	Pedigree analysis
		26.1	UDV-737									
	<i>Rpv3-3</i> (=Rpv3 ^{mult-271})	25.9	GF18-06	GF.GA-47-42	x Villard blanc	151	GF.GA-47-42	GF.GA-47-42	<i>V. rupestris</i> or <i>V. lincecumii</i>	Zyprian et al. (2016)		
		26.9	GF18-08									
	<i>Rpv3-3</i> (=Rpv3 ^{mult-271})	24.9	UDV-305						Noah	<i>V. labrusca</i> or <i>V. riparia</i>	Di Gaspero et al. (2012)	
		26.1	UDV-737									
	<i>Rpv3</i> ³²¹⁻³¹²	24.9	UDV-305		Merzling	x Teroldego			S.V. 5-276		Vezzulli et al. (in preparation)	
26.1		UDV-737										
<i>Rpv3</i> ³⁶¹⁻²⁹⁹	24.9	UDV-305						Noah	<i>V. labrusca</i> or <i>V. riparia</i>	Di Gaspero et al. (2012)	Pedigree analysis	
	26.1	UDV-737						<i>V. rupestris</i> Ganzin	<i>V. rupestris</i>			
<i>Rpv3</i> ²⁹⁹⁻³¹⁴	24.9	UDV-305						<i>V. rupestris</i> Ganzin	<i>V. rupestris</i>			
	26.1	UDV-737										
<i>Rpv3</i> ^{mult-287}	24.9	UDV-305						Bayard (Couderc 28-112)	<i>V. rupestris</i> or <i>V. labrusca</i>			
	26.1	UDV-737										
<i>Plasmopara viticola</i>	<i>Rpv4</i>	4	4.7	VMC7h3	Regent	x Lemberger	153	Regent		Welter et al. (2007)		
			5.2	VMCNg2e1								
<i>Plasmopara viticola</i>	<i>Rpv5</i>	9	4.0	VVlo52b	Cabernet Sauvignon	x 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	x 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	UDV-097	Chardonnay	x Bianca	116	Bianca		Bellin et al. (2009)		
<i>Plasmopara viticola</i>	<i>Rpv8</i>	14	6.6	Chr14V015	<i>V. amurensis</i> Ruprecht	x <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	x <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	x Solaris	256	Solaris	<i>V. amurensis</i>	Schwander et al. (2012)		
<i>Plasmopara viticola</i>	<i>Rpv11</i>	5	4.5	VVMD27	Regent	x Lemberger	153	Regent		Fischer et al. (2004)		
				CS1E104J11F	Chardonnay	x Bianca	116	Chardonnay		Bellin et al. (2009)		
			4.1	VCHR05C	Gf.Ga-52-42	x Solaris	256	Solaris		Schwander et al. (2012)		
<i>Plasmopara viticola</i>	<i>Rpv12</i>	14	8.0	UDV-014	99-1-48	x Pinot noir	180	99-1-48	<i>V. amurensis</i>	Venuti et al. (2013)		
			9.3	UDV-304	Cabernet Sauvignan	x 20/3		20/3	<i>V. amurensis</i>			
				rgvvin180								
			10.1	UDV-370								
<i>Plasmopara viticola</i>	<i>Rpv13</i>	12	10.0	VMC1g3.2	Moscato Bianco	x <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	x Börner	202	Börner	<i>V. cinerea</i>	Ochssner et al. (2016)		
<i>Plasmopara viticola</i>	<i>Rpv15</i>	18			<i>V. piasezkii</i> (DVIT2027)	x 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	x Horizon	163	Horizon		Divilov et al. (2018)		

Trait	Symbol	Chromosome	Position on chr [Mb]	Associated marker	Parent 1	Parent 2	Population size	Genotype of origin	Original species of trait	Reference	Comment
<i>Plasmopara viticola</i>	<i>Rpv18</i>	11	15.4		<i>V. rupestris</i> B38	x Horizon	163	Horizon		Divilov et al. (2018)	
<i>Plasmopara viticola</i>	<i>Rpv19</i>	14	29.5		<i>V. rupestris</i> B38	x 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	x <i>V. cinerea</i> B9	152	Horizon		Divilov et al. (2018)	
<i>Plasmopara viticola</i>	<i>Rpv21</i>	7	2.1		Horizon	x <i>V. cinerea</i> B9	152	Horizon		Divilov et al. (2018)	
<i>Plasmopara viticola</i>	<i>Rpv22</i>									Jiang et al. (in preparation)	
<i>Plasmopara viticola</i>	<i>Rpv23</i>									Jiang et al. (in preparation)	
<i>Plasmopara viticola</i>	<i>Rpv24</i>									Jiang et al. (in preparation)	
<i>Plasmopara viticola</i>	<i>Rpv25</i>	15	3.0	Marker561375	Red Globe	x Shuangyou	149			Lin et al. (2019); online 2018	
			3.9	Marker549779							
<i>Plasmopara viticola</i>	<i>Rpv26</i>	15	14.7	Marker525926	Red Globe	x Shuangyou	149			Lin et al. (2019); online 2018	
			15.0	Marker526446							
<i>Plasmopara viticola</i>	<i>Rpv27</i>									Hwang et al. (in preparation)	
<i>Xiphinema index</i>	<i>XiR1</i>	19	20.9	VMC5a10	<i>V. rupestris</i>	x <i>V. arizonica</i>	185		<i>V. arizonica</i>	Xu et al. (2008)	
			20.9	1N2R3b						Hwang et al. (2010)	
				M4F3R							
Morphology											
Berry size (berry weight)	<i>Be size</i>	18	25.9	SCC8	MTP2223-27	x 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	x Autumn Seedless	118			Cabezas et al. (2006)	
					Ruby Seedless	x Thompson Seedless	144			Mejia et al. (2007)	
					Italia	x Big Perlon	163			Costantini et al. (2008)	
Fleshless berry	<i>Flb</i>	18	0.9	VMC2a3	Chardonnay	x Ugni Blanc Mutant	71	Ugni Blanc	<i>V. vinifera</i>	Fernandez et al. (2006)	Mutant
GA insensitive dwarf mutant	<i>Vvgai1</i>	1	4.9					Pinot Meunier		Boss & Thomas (2002)	
Seed development inhibitor (Seedlessness)	<i>Sdl</i>	18	25.9	SCC8	MTP2223-27	x MTP2121-30	139			Doligez et al. (2002)	
			23.2	VMC6f1	Dominga	x Autumn Seedless	118	Autumn Seedless		Cabezas et al. (2006)	
			26.9	VMC7f2			118				
			26.9	VMC7f2	Italia	x Big Perlon	163	Big Perlon		Costantini et al. (2008)	
Sex	<i>Sex</i>	2	3.7	VVMD34	Horizon	x Illinois 547-1	58			Dalbó et al. (2000)	
			4.2	VVS3	Ramsey	x Riparia Gloire	188			Lowe and Walker (2006)	
			4.9	VVlb23	<i>V. rupestris</i>	x <i>V. arizonica</i>	181			Riaz et al. (2006)	
			5.0	APT3	V3125	x Börner	202			Fechter et al. (2012)	
			4.7	SNP4C_1	Moscato Bianco	x <i>V. riparia</i> WR63	340			Battilana et al. (2013)	
			4.9	VSVV007	Muscat Ottonel	x <i>Malvasia aromatica</i> di	91				
			5.0	VSVV010						Picq et al. (2014)	
Phenology											
Berry skin color	<i>BeCo</i>	2	8.2	VMC5g7	MTP3140	x MTP2223-27	139		<i>V. vinifera</i>	Doligez et al. (2002)	
			17.5	VMC8c2							
			14.2	MybA1						Kobayashi et al. (2004)	
Véraison	<i>Ver</i>	16	13.7	VMC1e11	Regent	x Lemberger	153	Regent		Fischer et al. (2004)	For véraison (begin of ripening) several QTLs are published. This data here is incomplete.
					Italia	x Big Perlon	163			Costantini et al. (2008)	
Véraison	<i>Ver1</i>	16	15.8	UDV-052	GF.GA-47-42	x Villard blanc	151	GF.GA-47-42		Zyprian et al. (2016)	
				SNP1092P11R							
Véraison	<i>Ver2</i>	18		SPS_P_SNP632GF	GF.GA-47-42	x Villard blanc	151			Zyprian et al. (2016)	
Metabolites, aroma											
Anthocyanin 3,5-monoglucosides	<i>Ufgt</i>	16	2.3	UFGT	Regent	x Lemberger	153			Fischer et al. (2004)	
Anthocyanin 3,5-diglucosides	<i>5-GT</i>	9	6.5		Regent	x Lemberger	153	Regent		Hausmann et al. (2009)	
										Janvary et al. (2009)	
Isobutyl-methoxypyrazine (IBMP)	<i>VvOMT3</i>	3	2.2	VvOMT3	(Cabernet Sauvignon x Pinot Meunier)	x self pollinated	64	Cabernet Sauvignon		Dunlevy et al. (2013)	F2 population
					Cabernet Sauvignon	x Gloire de Montpellier	138	Cabernet Sauvignon		Guillaumie et al. (2013)	3 significant QTLs for IBMP content

Trait	Symbol	Chromosome	Position on chr [Mb]	Associated marker	Parent 1	Parent 2	Population size	Genotype of origin	Original species of trait	Reference	Comment
Linalool content	<i>Lin</i>	10		cn41	Italia	x Big Perlon	163		<i>V. vinifera</i>	Battilana et al. (2009)	
			1.2	VVlh01	Moscato Bianco	x V. riparia WR63	174				
			1.4	VrZAG67							
			1.3	VrZAG64	Muscat Ottonel	x Muscat Ottonel	121		<i>V. vinifera</i>	Duchene et al. (2009)	
			1.1	VMC3d7	Gewürztraminer	x Gewürztraminer	115		<i>V. vinifera</i>		
Monoterpene content	<i>Mtc</i>	5	3.8	DXS1	Italia	x Big Perlon	163		<i>V. vinifera</i>	Battilana et al. (2009)	
					Moscato Bianco	x V. riparia WR63	174				
					Muscat Ottonel	x Muscat Ottonel	121		<i>V. vinifera</i>	Duchene et al. (2009)	
					Gewürztraminer	x Gewürztraminer	115		<i>V. vinifera</i>		