

Traits and alleles relevant for breeding and genetics:

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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Symbol	Trait/Allele	Associated marker	Chromosome	Position on chr [Mb]	Parent 1	Parent 2	Population size	Genotype of origin	Original species trait/allele derived from?	Reference	Comment	
<i>Be size</i>	berry size (berry weight)	SCC8	18	25.9	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.	
		VMC7f2		26.9	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)
<i>Mtc</i>	monoterpene content	DXS1	5	3.8	Italia	x Big Perlon	163		<i>V. vinifera</i>	Battilana et al. (2009)		
					Moscato Bianco	x <i>V. riparia</i>	174					
					Muscat Ottonel	x Muscat Ottonel	121		<i>V. vinifera</i>	Duchene et al. (2009)		
					Gewürztraminer	x Gewürztraminer	115		<i>V. vinifera</i>			
<i>Lin</i>	Linalool content	cnd41	10		Italia	x Big Perlon	163		<i>V. vinifera</i>	Battilana et al. (2009)		
		VrZAG67/VVIH01			Moscato Bianco	x <i>V. riparia</i>	174					
		VrZAG64			Muscat Ottonel	x Muscat Ottonel	121		<i>V. vinifera</i>	Duchene et al. (2009)		
		VMC3d7			10.8	Gewürztraminer	x Gewürztraminer	115		<i>V. vinifera</i>		
<i>Fib</i>	Fleshless berry	VMC2A3	18	0.9	Chardonnay	x Ugni Blanc Mutant	71	Ugni Blanc	<i>V. vinifera</i>	Fernandez et al. (2006)	Mutant	
<i>MybA</i>	berry skin colour		2	14.2					<i>V. vinifera</i>			
<i>Pdr1</i>	Pierce's disease	VMCNg3h8	14	25.3	<i>V. rupestris</i>	x <i>V. arizonica</i>	181		<i>V. arizonica</i>	Riaz et al. (2006)		
		VVIn64		26.6							Riaz et al. (2008)	
		UDV-095		26.1								
<i>Rdv1</i>	<i>Daktulosphaira vitifoliae</i>	Gf13_9	13	21.9	Gf.V3125	x Börner	188	Börner	<i>V. cinerea</i>	Zhang et al. (2009)		
		VMC8e6		22.5								
<i>Rpv1</i>	<i>Plasmopara viticola</i>	VVib32	12	10.3	Syrah	x 28-8-78		28-8-78	<i>M. rotundifolia</i>	Merdinoglu et al. (2003)		
<i>Rpv2</i>	<i>Plasmopara viticola</i>		18		Cabernet Sauvignon	x 8624	129	8624	<i>M. rotundifolia</i>	Wiedemann-Merdinoglu et al. (2006)		
<i>Rpv3</i>	<i>Plasmopara viticola</i>	UDV-112	18		Regent	x Lemberger	153	Regent		Welter et al. (2007)	Regent and Bianca descend from Seibel 4614 (=Rpv3 ²⁹⁹⁻²⁷⁹ = Rpv3-1)	
		UDV-305		24.9	Chardonnay	x Bianca	116	Bianca		Bellin et al. (2009)		
<i>Rpv3</i> ²⁹⁹⁻²⁷⁹		VMC7f2		26.9	Regent	x RedGlobe	206	Regent		van Heerden et al. (2014)		
		UDV305		24.9				'Seibel 4614'	<i>V. rupestris</i>	Di Gaspero et al. (2012)	Pedigree analysis	
<i>Rpv3</i> ^{null-297}		UDV737		26.1								
		GF18-06		GF18-08	25.9	GF.GA-47-42	x Villard blanc	151	Villard blanc	<i>V. rupestris</i>	Zyprian et al. (2016)	
<i>Rpv3-1</i> (=Rpv3 ²⁹⁹⁻²⁷⁹)		UDV305		24.9				'Munson' (Jaeger 70)	<i>V. rupestris</i> or <i>V. lincedumii</i>	Di Gaspero et al. (2012)	Pedigree analysis	
		UDV737		26.1								
<i>Rpv3-2</i> (=Rpv3 ^{null-297})		GF18-06	GF18-08	25.9	GF.GA-47-42	x Villard blanc	151	GF.GA-47-42	<i>V. rupestris</i> or <i>V. lincedumii</i>	Zyprian et al. (2016)		
		UDV305		24.9					'Noah'	<i>V. labrusca</i> or <i>V. riparia</i>	Di Gaspero et al. (2012)	Pedigree analysis
<i>Rpv3</i> ³²¹⁻³¹²		UDV737		26.1								
		UDV305		24.9					'Noah'	<i>V. labrusca</i> or <i>V. riparia</i>		
<i>Rpv3</i> ^{null-271}		UDV737		26.1					<i>V. rupestris</i> Ganzin	<i>V. rupestris</i>		
		UDV305		24.9						<i>V. rupestris</i> Ganzin	<i>V. rupestris</i>	
<i>Rpv3</i> ³⁶¹⁻²⁹⁹		UDV737		26.1								
		UDV305		24.9								
<i>Rpv3</i> ²⁹⁹⁻³¹⁴		UDV737		26.1								
		UDV305		24.9						'Bayard' (Couderc 28-112)	<i>V. rupestris</i> or <i>V. labrusca</i>	
<i>Rpv3</i> ^{null-287}		UDV737		26.1								
		UDV305		24.9								
<i>Rpv4</i>	<i>Plasmopara viticola</i>	VMC7h3	4	4.7	Regent	x Lemberger	153	Regent		Welter et al. (2007)		
		VMCNg2e1		5.2								
<i>Rpv5</i>	<i>Plasmopara viticola</i>	VVIo52b	9	4.0	Cabernet Sauvignon	x Gloire de Montpellier	138	Gloire de Montpellier	<i>V. riparia</i>	Marguerit et al. (2009)		

Symbol	Trait/Allele	Associated marker	Chromosome	Position on chr [Mb]	Parent 1	Parent 2	Population size	Genotype of origin	Original species trait/allele derived from?	Reference	Comment	
Rpv6	<i>Plasmopara viticola</i>	VMC8G9	12	20.4	Cabernet Sauvignon	x Gloire de Montpellier	138		<i>V. riparia</i>	Marguerit et al. (2009)		
Rpv7	<i>Plasmopara viticola</i>	UDV-097	7	11.4	Chardonnay	x Bianca	116	Bianca		Bellin et al. (2009)		
Rpv8	<i>Plasmopara viticola</i>	Chr14V015	14	6.6	<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)		
Rpv9	<i>Plasmopara viticola</i>	CCoAOMT	7	16.6	Moscato Bianco	x <i>V. riparia</i>	174	Wr63	<i>V. riparia</i>	Moreira et al. (2011)	CCoAOMT is the candidate gene from which the marker IN0006 was derived	
Rpv10	<i>Plasmopara viticola</i>	GF09-46	9	3.7	Gf.Ga-52-42	x Solaris	256	Solaris	<i>V. amurensis</i>	Schwander et al. (2012)		
Rpv11	<i>Plasmopara viticola</i>	VVMD27	5	4.5	Regent	x Lemberger	153	Regent		Fischer et al. (2004)		
		CS1E104J11F			Chardonnay	x Bianca	116	Chardonnay		Bellin et al. (2009)		
		VCHR05C			Gf.Ga-52-42	x Solaris	256	Solaris		Schwander et al. (2011)		
Rpv12	<i>Plasmopara viticola</i>	UDV-014	14	8.0	99-1-48	x Pinot noir	180	99-1-48	<i>V. amurensis</i>	Venuti et al. (2013)		
		UDV-304			Cabernet Sauvignon	x 20/3		20/3	<i>V. amurensis</i>			
		rgvvin180										
		UDV-370										
Rpv13	<i>Plasmopara viticola</i>	VMC1G3.2	12	10.0	Moscato Bianco	x <i>V. riparia</i>	174	Wr63	<i>V. riparia</i>	Moreira et al. (2011)		
Rpv14	<i>Plasmopara viticola</i>	GF05-13	5	20.2	Gf.V3125	x Börner	202	Börner	<i>V. cinerea</i>	Ochssner et al. (2016)		
Rpv15	<i>Plasmopara viticola</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)		
Rcg1	<i>Agrobacterium spec.</i>	UDV-015	15	7.1	Kunbarát	x Sárfehér	272	Kunbarát	<i>V. amurensis</i>	Kuczmog et al. (2012)		
		9M3-3		9.3								
Rgb1	<i>Guignardia bidwellii</i>	Gf14-42	14	26.7	V3125	x Börner	202	Börner		Rex et al. (2014)		
Rgb2	<i>Guignardia bidwellii</i>	VChr16c	16	15.3	V3125	x Börner	202	Börner		Rex et al. (2014)		
Ren1	<i>Erysiphe necator</i>	UDV-020	13	18.4	Nimrang	x Kishmish vatkana	310	Kishmish vatkana	<i>V. vinifera</i>	Hoffmann et al. (2008)		
		VMC9h4-2										
		VMCNg4e10.1										
Ren2	<i>Erysiphe necator</i>	CS25	14	26.9	Horizon	x Illinois 547-1	58	Illinois 547-1		Dalbo et al. (2001)		
Ren3	<i>Erysiphe necator</i>	UDV-015b	15	7.1	Regent	x Lemberger	153	Regent		Welter et al. (2007)		
		VViv67										
		ScORA7-760			Regent	x Lemberger		152	Regent		Akkurt et al. 2007	
		VChr15CenGen02			Regent	x RedGlobe		206	Regent		van Heerden et al. (2014)	
		GF15-28 / VViv67			GF.GA-47-42	x Villard blanc		151			Zyprian et al. (2016)	
Ren4	<i>Erysiphe necator</i>	VMC7f2	18	26.9	C166-043	x F8909-08	42	C166-043	<i>V. romanetii</i>	Riaz et al. (2012)		
		SNPs		26.9	C87-41	x B70-57		57	C87-41		<i>V. romanetii</i>	Mahanil et al. (2012)
Ren5	<i>Erysiphe necator</i>		14	4.8					<i>M. rotundifolia</i>	Blanc et al. (2012)		
Ren6	<i>Erysiphe necator</i>	PN9-057	9	8.6	F2-35	x <i>V. piasezkii</i> (DVIT2027)	277	<i>V. piasezkii</i> (DVIT2027)	<i>V. piasezkii</i>	Pap et al. (2016)		
		PN9-068		9.1								
Ren7	<i>Erysiphe necator</i>	VVIp17.1	19	0.2	F2-35	x <i>V. piasezkii</i> (DVIT2027)	277	<i>V. piasezkii</i> (DVIT2027)	<i>V. piasezkii</i>	Pap et al. (2016)		
		VMC9a2.1		0.9								
Ren8	<i>Erysiphe necator</i>		18		GF.GA-47-42	x Villard blanc	151			Zyprian et al. (2016)		
Ren9	<i>Erysiphe necator</i>									Zendler et al. (in preparation)		
Ren10	<i>Erysiphe necator</i>	S2_17854965	2	79.0	MN1264	x MN1214	147	Seyval blanc		Teh et al. (in review)	Contact: J.J. Luby and M.D. Clark, U of Minnesota, USA	
		Haploblock validation			2	MN1264		x MN1246	125			
Run1	<i>Erysiphe (Uncinula) necator</i>	VMC4f3.1	12	13.1	VRH3082-1-42	x Cabernet Sauvignon	161	VRH3082-1-42	<i>M. rotundifolia</i>	Barker et al. (2005)	powdery mildew resistance originating from <i>Muscaninia</i> should be named as <i>Run...</i>	
	VMC8g9	20.4										
Run2.1	<i>Erysiphe (Uncinula) necator</i>	VMC7f2	18	26.9	JB81-107-11	x Chenin Blanc	97	Magnolia	<i>M. rotundifolia</i>	Riaz et al. (2011)	resistant tissue: Cane Rachis Rachis Fruit Leaf, Cane, Rachis, Fruit	
		VMCNg1e3		20.9								
		VVin16		23.4	JB81-107-11	x Tokay		47				
		VMC7f2		26.9								
		VMC7f2		26.9	A90-71	x Flame Seedless		80				
Run2.2	<i>Erysiphe (Uncinula) necator</i>	VMC7f2	18	26.9	e2-9	x Malaga Rosada	255	Trayshed	<i>M. rotundifolia</i>	Riaz et al. (2011)		
Sdl	seed development inhibitor	SCC8	18	25.9	MTP2223-27	x MTP2121-30	139			Doligez et al. (2002)		
	seedlessness	VMC6f11		23.2	Dominga	x Autumn Seedless		118	Autumn Seedless			Cabezas et al. (2006)
		VMC7f2		26.9				118				
					Italia	x Big Perlon		163	Big Perlon			Costantini et al. (2008)

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<i>Sen1</i>	<i>Erysiphe necator</i>	S8_19258484	9	13.6 - 18.0	<i>V. rupestris</i> B38	x Chardonnay	85	Chardonnay	<i>V. vinifera</i>	Barba et al. (2014)	
<i>Sex</i>	sex	VVMD34	2	3.7	Horizon	x Illinois 547-1	58			Dalbó et al. (2000)	
		VVS3		4.2	Ramsey	x Riparia Gloire	188			Lowe and Walker (2006)	
		VVib23		4.9	<i>V. rupestris</i>	x <i>V. arizonica</i>	181			Riaz et al. (2006)	
		APT3		5.0	V3125	x Börner	202			Fechter et al. (2012)	
		SNP4C_1		4.7	Moscato Bianco	x Vr	340			Battilana et al. (2013)	
		Vvib23		4.9	Muscat Ottonel	x <i>Malvasia aromatica di Candia</i>	91				
<i>Ufgt</i>		UFGT	16	2.3	Regent	x Lemberger	153			Fischer et al. (2004)	
<i>Ver</i>	véraison	VMC1E11	16	13.7	Regent	x Lemberger	153	Regent		Fischer et al. (2004)	For véraison (begin of ripening) several QTLs are published. This list here is still incomplete.
					Italia	x Big Perlon	163			Costantini et al. (2008)	
<i>Ver1</i>	véraison	UDV52	16	15.8	GF.GA-47-42	x Villard blanc	151	GF.GA-47-42		Zyprian et al. (2016)	
		SNP1092P11R									
<i>Ver2</i>	véraison	SPS_P_SNP632GF	18		GF.GA-47-42	x Villard blanc	151			Zyprian et al. (2016)	
<i>Vvgai1</i>	GA insensitive dwarf mutant		1	4.9				Pinot Meunier		Boss & Thomas (2002)	
<i>VvOMT3</i>	Isobutyl-methoxypyrazine (IBMP)	VvOMT3	3	2.2	(Cabernet Sauvignon x Pinot Meunier)	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
<i>Xir1</i>	Xiphinema index	VMC5a10	19	20.9	<i>V. rupestris</i>	x <i>V. arizonica</i>	185		<i>V. arizonica</i>	Xu et al. (2008)	
		IN2R3b		20.9						Hwang et al. (2010)	
		M4F3R									
<i>5-gt</i>	anthocyanin 3,5-diglucosides	Gf09_01	9	6.5	Regent	x Lemberger	153	Regent		Hausmann et al. (2009)	