Table of Loci for Traits in Grapevine Relevant for Breeding and Genetics:

Update: May 26, 2020

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												
Agrobacterium spec.	*Rcg1*	15	7.1	UDV015	Kunbarát	x	Sárfehér	272	Kunbarát	*V. amurensis*	Kuczmog et al. (2012)	crown gall
			9.3	9M3-3								
Colletotrichum gloeosporioides (Glomerella cingulata)	*CgR1*	14	4.1	np19345	Cabernet Sauvignon	x	Shuang Hong	91	Shuang Hong	*V. amurensis*	Fu et al. (2019)	ripe rot
Daktulosphaira vitifoliae	*Rdv1*	13		GF13_1	GF.V3125	x	Börner	188	Börner	*V. cinerea*	Zhang et al. (2009)	
			21.9	GF13_9								
				GF13-1	GF.V3125	x	Börner	188	Börner	*V. cinerea*	Hausmann et al. (2011)	
			21.5	GF13-7								
Daktulosphaira vitifoliae	*Rdv2*	14	4.9	S14_4921219	V. cinerea C2-50	x	Riesling	90	V. cinerea C2-50	*V. cinerea*	Smith et al. (2018)	root resistance
Daktulosphaira vitifoliae	*Rdv3*	14	5.0	S14_5049399	MN1264	x	MN1246	125	MN1264		Clark et al. (2018)	foliar resistance
Daktulosphaira vitifoliae	*Rdv4*	4			MN1264	x	MN1246	125	MN1264		Clark et al. (2018)	foliar resistance
Daktulosphaira vitifoliae	*Rdv5*	5			MN1264	x	MN1246	125			Clark et al. (2018)	root resistance
Daktulosphaira vitifoliae	*Rdv6*	7			VRH8771	x	Cabernet Sauvignon	135	VRH8771	*M. rotundifolia*	Rubio et al. (2020)	root resistance
Daktulosphaira vitifoliae	*Rdv7*	3	5.5	3_5494608	VRH8771	x	Cabernet Sauvignon	135	VRH8771	*M. rotundifolia*	Rubio et al. (2020)	root resistance
Daktulosphaira vitifoliae	*Rdv8*	10			VRH8771	x	Cabernet Sauvignon	135	VRH8771	*M. rotundifolia*	Rubio et al. (2020)	root resistance
Diaporthe ampelina (Phomopsis viticola)	*Rda1*	15	19.6	S15_19560016	Chardonnay	x	V. cinerea B9	148	*V. cinerea* B9	*V. cinerea*	Barba et al. (2018)	Cane, cluster
				S15_19591538	Horizon	x	V. cinerea B9	162	*V. cinerea* B9	*V. cinerea*		Cane, cluster
			19.3	S15_19300044	Horizon	x	Illinois 547-1	366	Illinois 547-1	*V. cinerea*		Cane
Diaporthe ampelina (Phomopsis viticola)	*Rda2*	7	1.2	VVMD7	Horizon	x	*V. cinerea* B9	162	Horizon		Barba et al. (2018)	Cane, cluster
			1.8	VrZAG62								
			3.1	VVIb22								
			3.1	S7_3127568								
			1.9	S7_1912889	Horizon	x	Illinois 547-1	366	Horizon			Cane
Erysiphe necator	*Ren1*	13		UDV020	Nimrang	x	Kishmish vatkana	310	Kishmish vatkana	*V. vinifera*	Hoffmann et al. (2008)	
			18.4	VMC9h4-2								
			18.4	VMCNg4e10.1								
Erysiphe necator	*Ren2*	14	26.9	CS25	Horizon	x	Illinois 547-1	58	Illinois 547-1		Dalbo et al. (2001)	
Erysiphe necator	*Ren3*	15	7.1	UDV015b	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)	
Erysiphe necator	*Ren4*	18	26.9	VMC7f2	C166-043	x	F8909-08	42	C166-043	*V. romanetii*	Riaz et al. (2012)	
			26.9	SNPs	C87-41	x	B70-57	57	C87-41	*V. romanetii*	Mahanil et al. (2012)	
Erysiphe necator	*Ren5*	14	4.8	VMC9c1	Regale	x	Regale	191	Regale	*M. rotundifolia*	Blanc et al. (2012)	
Erysiphe necator	*Ren6*	9	8.6	PN9-057	F2-35	x	V. piasezkii (DVIT2027)	277	V. piasezkii (DVIT2027)	*V. piasezkii*	Pap et al. (2016)	
			9.1	PN9-068								
Erysiphe necator	*Ren7*	19	0.2	VVIp17.1	F2-35	x	V. piasezkii (DVIT2027)	277	V. piasezkii (DVIT2027)	*V. piasezkii*	Pap et al. (2016)	
			0.9	VMC9a2.1								
Erysiphe necator	*Ren8*	18	13.2	UDV117	GF.GA-47-42	x	Villard blanc	151			Zyprian et al. (2016)	
				SPS_P_SNP632GF								
Erysiphe necator	*Ren9*	15	1.4	CenGen6	Regent	x	Lemberger	153	Regent		Zendler et al. (2017)	
Erysiphe necator	*Ren10*	2	17.9	S2_17854965	MN1264	x	MN1214	147	Seyval blanc		Teh et al. (2017)	
		2		Haploblock validation	MN1264	x	MN1246	125				

Trait	*Symbol*	Chomosome	Position on chr [Mb]	Associated marker	Parent 1		Parent 2	Population size	Genotype of origin	Original species of trait	Reference	Comment
Erysiphe (*Uncinula*) *necator*	*Run1*	12	13.1	VMC4f3.1	VRH3082-1-42	x	Cabernet Sauvignon	161	VRH3082-1-42	*M. rotundifolia*	Barker et al. (2005)	Powdery mildew resistance originating from Muscaninia named as *Run*
			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				
					BC1:M. rotundifolia	x	Syrah	139				
Erysiphe (*Uncinula*) *necator*	*Run2.1*	18	26.9	VMC7f2	JB81-107-11	x	Chenin Blanc	97	Magnolia	M. rotundifolia	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
Erysiphe (*Uncinula*) *necator*	*Run2.2*	18	26.9	VMC7f2	e2-9	x	Malaga Rosada	255	Trayshed	*M. rotundifolia*	Riaz et al. (2011)	
Erysiphe necator	*Sen1*	9	13.6 - 18.0	S8_19258484	*V. rupestris* B38	x	Chardonnay	85	Chardonnay	*V. vinifera*	Barba et al. (2014)	
Guignardia bidwellii	*Rgb1*	14	26.7	GF14-42	GF.V3125	x	Börner	202	Börner		Rex et al. (2014)	
Guignardia bidwellii	*Rgb2*	16	15.3	VChr16c	GF.V312	x	Börner	202	Börner		Rex et al. (2014)	
Meloidogyne javanica (root knot nematode)	*MjR1*	18	31.2 34.0	S18_31160355 S18_33954011	C2-50	x	Riesling	90	C2-50	*V. cinerea*	Smith et al. (2018)	
Pierce's disease (*Xylella fastidiosa*)	*Pdr1*	14	25.3	VMCNg3h8	*V. rupestris*	x	*V. arizonica*	181		*V. arizonica*	Riaz et al. (2006)	
			26.6	VVIn64							Riaz et al. (2008)	
			26.1	UDV095								
Plasmopara viticola	*Rpv1*	12	10.3	VVIb32	Syrah	x	28-8-78		28-8-78	*M. rotundifolia*	Merdinoglu et al. (2003)	
Plasmopara viticola	*Rpv2*	18			Cabernet Sauvignon	x	8624	129	8624	*M. rotundifolia*	Wiedemann-Merdinoglu et al. (2006)	
Plasmopara viticola	*Rpv3*	18		UDV112	Regent	x	Lemberger	153	Regent		Welter et al. (2007)	
			24.9	UDV305	Chardonnay	x	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	x	RedGlobe	206	Regent		van Heerden et al. (2014)	
	Rpv3.1 (=*Rpv3*$^{299-279}$)		24.9 26.1	UDV305 UDV737					Seibel 4614	*V. rupestris*	Di Gaspero et al. (2012)	Pedigree analysis
			25.9 26.9	GF18-06 GF18-08	GF.GA-47-42	x	Villard blanc	151	Villard blanc	*V. rupestris*	Zyprian et al. (2016)	
	Rpv3.2 (=*Rpv3*$^{null-297}$)		24.9 26.1	UDV305 UDV737					Munson (Jaeger 70)	*V. rupestris* or *V. lincecumii*	Di Gaspero et al. (2012)	Pedigree analysis
			25.9 26.9	GF18-06 GF18-08	GF.GA-47-42	x	Villard blanc	151	GF.GA-47-42	*V. rupestris* or *V. lincecumii*	Zyprian et al. (2016)	
	Rpv3.3 (=*Rpv3*$^{null-271}$)		24.9 26.1	UDV305 UDV737					Noah	*V. labrusca* or *V. riparia*	Di Gaspero et al. (2012)	
			23.4 26.1	VVIN16 UDV737	Merzling	x	Teroldego	136	Merzling		Vezzulli et al. (2019)	
	Rpv3$^{321-312}$		24.9 26.1	UDV305 UDV737					Noah	*V. labrusca* or *V. riparia*	Di Gaspero et al. (2012)	Pedigree analysis
	Rpv3$^{361-299}$		24.9 26.1	UDV305 UDV737					*V. rupestris* Ganzin	*V. rupestris*		
	Rpv3$^{299-314}$		24.9 26.1	UDV305 UDV737					*V. rupestris* Ganzin	*V. rupestris*		
	Rpv3$^{null-287}$		24.9 26.1	UDV305 UDV737					Bayard (Couderc 28-112)	*V. rupestris* or *V. labrusca*		
Plasmopara viticola	*Rpv4*	4	4.7	VMC7h3	Regent	x	Lemberger	153	Regent		Welter et al. (2007)	
			5.2	VMCNg2e1								
Plasmopara viticola	*Rpv5*	9	4.0	VVIo52b	Cabernet Sauvignon	x	Gloire de Montpellier	138	Gloire de Montpellier	*V. riparia*	Marguerit et al. (2009)	
Plasmopara viticola	*Rpv6*	12	20.4	VMC8g9	Cabernet Sauvignon	x	Gloire de Montpellier	138	Gloire de Montpellier	*V. riparia*	Marguerit et al. (2009)	
Plasmopara viticola	*Rpv7*	7	11.4	UDV097	Chardonnay	x	Bianca	116	Bianca		Bellin et al. (2009)	
Plasmopara viticola	*Rpv8*	14	6.6	Chr14V015	V. amurensis Ruprecht	x	V. amurensis Ruprecht	232	V. amurensis Ruprecht	*V.amurensis*	Blasi et al. (2011)	
Plasmopara viticola	*Rpv9*	7	16.6	CCoAOMT	Moscato Bianco	x	V. riparia W63	174	V. riparia W63	*V.riparia*	Moreira et al. (2011)	CCoAOMT is the candidate gene from which the marker IN0006 was derived

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Plasmopara viticola	*Rpv10*	9	3.7	GF09-46	GF.GA-52-42	x	Solaris	256	Solaris	*V. amurensis*	Schwander et al. (2012)	
Plasmopara viticola	*Rpv11*	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)	
Plasmopara viticola	*Rpv12*	14	8.0	UDV014	99-1-48	x	Pinot noir	180	99-1-48	*V. amurensis*	Venuti et al. (2013)	
			9.3	UDV304	Cabernet Sauvignan	x	20/3		20/3	*V. amurensis*		
				rgvvin180								
			10.1	UDV370								
Plasmopara viticola	*Rpv13*	12	10.0	VMC1g3.2	Moscato Bianco	x	V. riparia W63	174	V. riparia W63	*V.riparia*	Moreira et al. (2011)	
Plasmopara viticola	*Rpv14*	5	20.2	GF05-13	GF.V3125	x	Börner	202	Börner	*V. cinerea*	Ochssner et al. (2016)	
Plasmopara viticola	*Rpv15*	18			V. piasezkii (DVIT2027)	x	F2-35	94	V. piasezkii (DVIT2027)	*V. piasezkii*	Pap et al. (in preparation)	
Plasmopara viticola	*Rpv16*										Pap et al. (in preparation)	
Plasmopara viticola	*Rpv17*	8	11.7		V. rupestris B38	x	Horizon	163	Horizon		Divilov et al. (2018)	
Plasmopara viticola	*Rpv18*	11	15.4		V. rupestris B38	x	Horizon	163	Horizon		Divilov et al. (2018)	
Plasmopara viticola	*Rpv19*	14	29.5		V. rupestris B38	x	Horizon	163	V. rupestris B38	*V. rupestris*	Divilov et al. (2018)	
Plasmopara viticola	*Rpv20*	6	0.9		Horizon	x	V. cinerea B9	152	Horizon		Divilov et al. (2018)	
Plasmopara viticola	*Rpv21*	7	2.1		Horizon	x	V. cinerea B9	152	Horizon		Divilov et al. (2018)	
Plasmopara viticola	*Rpv22*										Jiang et al. (in preparation)	
Plasmopara viticola	*Rpv23*										Jiang et al. (in preparation)	
Plasmopara viticola	*Rpv24*										Jiang et al. (in preparation)	
Plasmopara viticola	*Rpv25*	15	3.0	Marker561375	Red Globe	x	Shuangyou	149	Shuangyou	*V. amurensis*	Lin et al. (2019)	
			3.9	Marker549779								
Plasmopara viticola	*Rpv26*	15	14.7	Marker525926	Red Globe	x	Shuangyou	149	Shuangyou	*V. amurensis*	Lin et al. (2019)	
			15.0	Marker526446								
Plasmopara viticola	*Rpv27*	18	24.6	VVCS1H077H16R1-	Norton	x	Cabernet Sauvignon	182	Norton	*V. aestivalis*	Sapkota et al. (2019)	
			26.0	UDV737								
Plasmopara viticola	*Rpv28*										Bhattarai et al (in preparation)	
Xiphinema index	*XiR1*	19	20.9	VMC5a10	*V. rupestris*	x	*V. arizonica*	185		*V. arizonica*	Xu et al. (2008)	
			20.9	1N2R3b							Hwang et al. (2010)	
				M4F3R								
Xiphinema index	*XiR2*	9		VVBX-A-06	VRH8771	x	Cabernet Sauvignon	135	VRH8771		Rubio et al. (2020)	
Xiphinema index	*XiR3*	10		SC8-03	VRH8771	x	Cabernet Sauvignon	135	VRH8771		Rubio et al. (2020)	
Xiphinema index	*XiR4*	18	29.1	UDV108	VRH8771	x	Cabernet Sauvignon	135	VRH8771		Rubio et al. (2020)	
Morphology												
Berry size (berry weight)	*Be size*	18	25.9	SCC8	MTP2223-27	x	MTP2121-30	139		*V. vinifera*	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	*Flb*	18	0.9	VMC2a3	Chardonnay	x	Ugni Blanc Mutant	71	Ugni Blanc	*V. vinifera*	Fernandez et al. (2006)	Mutant
GA insensitive dwarf mutant	*Vvgai1*	1	4.9						Pinot Meunier		Boss & Thomas (2002)	Mutant
Leaf hairs	*LH1*	5	0.9	Nifts5-50363	Muscat of Alexandria	x	Campbell Early	95	Muscat of Alexandria	*V. vinifera*	Kono et al. (2018)	reducing leaf hair density; confers DM susceptibility
Seed development inhibitor (Seedlessness)	*Sdl*	18	25.9	SCC8	MTP2223-27	x	MTP2121-30	139			Doligez et al. (2002)	
			23.2	VMC6f11	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	*Sex*	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	VVIb23	*V. rupestris*	x	*V. arizonica*	181			Riaz et al. (2006)	
			5.0	APT3	V3125	x	Börner	202			Fechter et al. (2012)	
			4.7	SNP4C_1	Moscato Bianco	x	V. riparia WR63	340			Battilana et al. (2013)	
			4.9	VVIb23	Muscat Ottonel	x	Malvasia aromatica di	91				
			4.9	VSVV007							Picq et al. (2014)	
			5.0	VSVV010								

Trait	*Symbol*	Chomosome	Position on chr [Mb]	Associated marker	Parent 1		Parent 2	Population size	Genotype of origin	Original species of trait	Reference	Comment
Phenology												
Berry skin color	*BeCo*	2	8.2	VMC5g7	MTP3140	x	MTP2223-27	139			Doligez et al. (2002)	
			17.5	VMC8c2								
			14.2	MybA1							Kobayashi et al. (2004)	
Véraison	*Ver*	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	*Ver1*	16	15.8	UDV052	GF.GA-47-42	x	Villard blanc	151	GF.GA-47-42		Zyprian et al. (2016)	
				SNP1092P11R								
Véraison	*Ver2*	18		SPS_P_SNP632GF	GF.GA-47-42	x	Villard blanc	151			Zyprian et al. (2016)	
Metabolites												
Anthocyanin 3-monoglucosides	*Ufgt*	16	2.3	UFGT	Regent	x	Lemberger	153			Fischer et al. (2004)	
Anthocyanin 3,5-diglucosides	*5-GT*	9	6.5		Regent	x	Lemberger	153	Regent		Hausmann et al. (2009)	
											Janvary et al. (2009)	
Isobutyl-methoxypyrazine (IBMP)	*VvOMT3*	3	2.2	VvOMT3	(Cabernet Sauvignon x Pinot Meunier)	x	self pollinated	64	Cabernet Sauvignon		Dunlevy et al. (2013)	
					Cabernet Sauvignon	x	Gloire de Montpellier	138	Cabernet Sauvignon		Guillaumie et al. (2013)	3 significant QTLs for IBMP content
Linalool content	*Lin*	10		cnd41	Italia	x	Big Perlon	163		*V. vinifera*	Battilana et al. (2009)	
			1.2	VVIh01	Moscato Bianco	x	V. riparia WR63	174				
			1.4	VrZAG67								
			1.3	VrZAG64	Muscat Ottonel	x	Muscat Ottonel	121		*V. vinifera*	Duchene et al. (2009)	
			1.1	VMC3d7	Gewürztraminer	x	Gewürztraminer	115		*V. vinifera*		
Monoterpene content	*Mtc*	5	3.8	DXS1	Italia	x	Big Perlon	163		*V. vinifera*	Battilana et al. (2009)	
					Moscato Bianco	x	V. riparia WR63	174				
					Muscat Ottonel	x	Muscat Ottonel	121		*V. vinifera*	Duchene et al. (2009)	
					Gewürztraminer	x	Gewürztraminer	115		*V. vinifera*		