

Additional file 15: Table S11 - Published functional candidate genes potentially involved in seed and/or berry development not colocalized with QTLs detected in the present study. Gene numbers were obtained from the automatic annotation provided with the Genoscope 12X whole genome sequence release of PN40024 (<http://www.genoscope.cns.fr/externe/GenomeBrowser/Vitis/>; [1]).

Grapevine 12X gene ID	Gene name	LG	position in 12X	putative homologous gene and/or function	Reference
GSVIVT01012249001	<i>VvSEP4</i>	1	194107 .. 206538	<i>MIKC</i> gene expressed in flowers and fruit	[92]
GSVIVT01012231001	-	1	381267 .. 382921	Cytochrome P450 78A-like protein in <i>Solanum lycopersicum</i> (tomato), harboring the causal SNP of a berry weight QTL	[56]
GSVIVT01012110001	<i>VvBS2</i>	1	1353272 .. 1355920	<i>MIKC</i> gene expressed in flowers and fruit	[92]
GSVIVT01011926001	-	1	2954243..2955469	ZmCNR2, involved in tissue growth activity in maize	[59]
GSVIVG01020033001	<i>VvHB13</i>	1	11304894 .. 11307266	<i>Homeo Box 13 (Arabidopsis)</i> , homeotic protein	[89]
GSVIVT01020031001	<i>VvSUC12</i>	1	11312668 .. 11322931	Proton-sucrose symporter (cDNA cloned in <i>V. vinifera</i> and upregulated in berries at <i>véraison</i>)	[93]
GSVIVG01010521001	<i>VvMADS4</i>	1	21368898 .. 21386389	<i>Agamous like 9 - Sepallata 3 (Arabidopsis)</i> MADS-box flower and berry development	[89, 90]
GSVIVT01010521001	<i>VvSEP3=MADS4</i>	1	21368898 .. 21386389	<i>MIKC</i> gene expressed in fruits with increasing expression from flowers to fruits	[90]
GSVIVT01004930001	<i>VvCEB1</i>	1	21582290 .. 21584461	Berry-specific basic helix-loop-helix transcription factor affecting cell size	[94]
GSVIVT01001124001	<i>VvXET2</i>	1	22826373 .. 22828816	Xyloglucan endotransglycosylase (cell-wall modifying enzyme expressed during berry development)	[78]
GSVIVT01001124001	<i>XTH</i>	1	22826373 .. 22828816	Xyloglucan:xyloglucosyl transferase involved in ethylene-induced berry expansion	[11]
GSVIVT01019523001	<i>CEL</i>	2	1331283 .. 1335833	Cellulase similar to endo-beta-(1,4)-glucanase with expression linked to berry development	[76]
GSVIVT01019653001	-	2	2231724..2233589	Cytochrome P450, family 78, subfamily A, polypeptide 9 (<i>Arabidopsis</i>), controlling fruit size	[95]

GSVIVG01019761001	VvJMJ ¹	2	3074405 .. 3119122	<i>F2K11.14</i> , transcription factor jumonji, associated with berry weight and length	[45, 89]
GSVIVT01023919001	<i>EXPL</i>	3	2486948 .. 2488738	Expansin <i>EXPL2</i> with expression linked to berry development	[76]
GSVIVG01023852001	VvHMGR3	3	2970316 .. 2972915	<i>HMG1</i> (Arabidopsis), HMGcoA reductase involved in cell elongation and isoprenoid synthesis	[96]
GSVIVG01031753001	VvFw2.2.2	3	4060722 .. 4066802	<i>Fw2.2</i> (tomato), negative regulator of cell division in fruit	[58]
GSVIVG01031754001	VvFw2.2.1	3	4067224 .. 4070468	<i>Fw2.2</i> (tomato), negative regulator of cell division in fruit	[58]
GSVIVG01031755001	VvFw2.2.3	3	4070578 .. 4072718	<i>Fw2.2</i> (tomato), negative regulator of cell division in fruit	[58]
GSVIVG01031941001	VvBURP1	3	5579524 .. 5580226	<i>Unknown seed protein like 1</i> (Arabidopsis), seed development	[89]
GSVIVG01031943001	VvSVP2	3	5581839 .. 5591761	-	[89]
GSVIVT01034945001	VvGA2ox4	5	343990 .. 346779	GA2-oxidase expressed in berry	[97]
GSVIVT01027774001	<i>Grip 3 = Grip 4</i>	5	7580440 .. 7581363	Proline-rich cell wall protein	[98]
GSVIVT01027789001	<i>Grip 15</i>	5	7787811 .. 7788943	Proline-rich cell wall protein	[98]
GSVIVT01027790001	<i>Grip 13</i>	5	7792153 .. 7793327	Proline-rich cell wall protein	[98]
GSVIVT01029048001	VvPL1	5	11376715 .. 11380856	Pectate lyase (cell-wall modifying enzyme expressed during berry development)	[78]
GSVIVT01031593001	VvXET1	5	18634353 .. 18636084	Xyloglucan endotransglycosylase (cell-wall modifying enzyme expressed during berry development)	[78]
GSVIVG01037533001	VvYABBY2	6	11951270 .. 11958015	<i>Fasciated</i> (tomato), controls carpel number	[89]
GSVIVT01031486001	<i>XET</i>	6	18028143 .. 18029883	Xyloglucan:xyloglucosyl transferase with expression linked to berry development	[76]

GSVIVT01031464001	-	6	18257605 .. 18258772	Major intrinsic family protein involved in ethylene-induced berry expansion	[11]
GSVIVG01031404001	Vv <i>HD2C</i>	6	19041783 .. 19047544	<i>HD2C</i> , histone deacetylase 2C	[89]
GSVIVT01028281001 ?	-	7	5457683 .. 5458417 ?	Integrase (EST expressed only after GA treatment)	[99]
GSVIVG01033891001	Vv <i>SPY</i>	8	16964462 .. 16984299	<i>SPINDLY</i> (Arabidopsis), repressor of GA and positive regulation of cytokinin signalling	[100]
GSVIVG01033743001	Vv <i>RPL24</i>	8	18192061 .. 18195774	<i>Ribosomal protein like 24</i> (Arabidopsis), auxin signaling and gynoecium development	[101]
GSVIVT01033540001	<i>BG</i>	8	19873175 .. 19874681	Glycosyl hydrolase family protein, similar to beta-(1,3)-glucanase, with expression linked to berry development	[76]
GSVIVT01033303001	Vv <i>PGI</i>	8	21672956 .. 21675817	polygalacturonase (cell-wall modifying enzyme expressed during berry development), involved in ethylene-induced berry expansion	[11, 78]
GSVIVT01033253001	Vv <i>AGL15.2</i>	8	22162819 .. 22165051	<i>MIKC</i> gene expressed in flowers and fruit	[92]
GSVIVT01017211001	Vv <i>GA3ox4</i>	9	5453528 .. 5458751	GA3beta-hydrolase gene expressed in berry	[97]
GSVIVT01017353001	-	9	7092507 .. 7134534	<i>CHY1</i> (EST expressed only after GA treatment)	[99]
GSVIVT01021303001	Vv <i>AG2</i>	10	3730147 .. 3738385	<i>MIKC</i> gene expressed in flowers and fruit	[92]
GSVIVT01021445001	<i>SIRK</i>	10	5451220 .. 5456608	K + channel protein (EST expressed only after GA treatment)	[99]
GSVIVT01021468001	Vv <i>GA2ox2</i>	10	5846741 .. 5848388	GA2-oxidase expressed in berry	[97]
GSVIVT01000802001	Vv <i>AG1=MADS1</i>	12	279315 .. 292144	<i>MIKC</i> gene expressed in flowers and fruit (Agamous Arabidopsis, MADS box fruit development)	[102]
GSVIVT01023135001	Vv <i>PME1</i>	12	22226001 .. 22228636	Pectin methylesterase (cell-wall modifying enzyme expressed during berry development)	[76, 78]
GSVIVT01032681001	Vlexp-2= Vlexp-3	13	1578645 .. 1580497	Expansin (cDNA cloned in <i>V. vinifera</i> with expression related to ripening)	[103]

GSVIVT01001437001	VvAGL15.1	13	20980100 .. 20988849	MIKC gene expressed in flowers and fruit	[92]
GSVIVG01036549001	VvMADS6	14	23320331 .. 23341234	<i>Apetala 1</i> (Arabidopsis), MADS box flower development	L. Torregrosa (pers. com.)
GSVIVT01036551001	VvSEPI=MADS2	14	23363222 .. 23379548	MIKC gene expressed in flowers and fruit	[90]
GSVIVT01032383001	-	14	26847692 .. 26853716	Pseudouridine synthase/transporter (EST expressed only after GA treatment)	[99]
GSVIVT01011354001	-	14	28912919 .. 28915800	Serine carboxypeptidase-like 44 (EST expressed only after GA treatment)	[99]
GSVIVT01018185001	-	15	13453328..13458913	PavCNR12, Prunus avium cell number regulator 12 (CNR12) gene, most likely underlying a fruit size QTL in sweet cherry	[55]
GSVIVT01027577001	VvAGL6=MADS3	15	15406740 .. 15424492	MIKC gene expressed in flowers and fruit (Agl6 and Agl13 Arabidopsis, MADS box seed development)	[90]
GSVIVT01027404001	-	15	17005434..17007131	Cytochrome P450, family 78, subfamily A, polypeptide 9 (Arabidopsis), controlling fruit size	[95]
GSVIVT01026942001	AQ3=PIP1;2	15	19199215 .. 19206926	Plasma membrane intrinsic protein 1A (PIPIA); aquaporin <i>PIPI.1</i> with expression linked to berry development	[76]
GSVIVT01024235001	AQUA	16	102222 .. 103573	Aquaporin TIP3-2 (Arabidopsis), major intrinsic family protein, involved in ethylene-induced berry expansion	[11]
GSVIVT01018665001	-	16	11481264..11488666	PavCNR12, Prunus avium cell number regulator 12 (CNR12) gene, most likely underlying a fruit size QTL in sweet cherry	[55]
GSVIVT01018599001	<i>Grip 28</i>	16	12503456 .. 12517626	Ripening-related protein, cell wall	[98]
GSVIVT01018453001	VvGA20ox1	16	14861395 .. 14863190	GA20-oxidase expressed in berry	[97]
GSVIVT01007582001	PL	17	11674724 .. 11676881	Pectate lyase family protein with expression linked to berry development	[76]
GSVIVT01012906001	<i>S27a</i>	17	13268008 .. 13273528	Ubiquitin extension protein	[104]

GSVIVT01029411001	<i>EX = Vlexp-1</i>	17	16771613 .. 16773967	Expansin with expression related to ripening, involved in ethylene-induced berry expansion	[11, 103]
GSVIVT01013458001	-	18	307575 .. 308424	Uncharacterized, significantly associated with berry size	[44]
GSVIVG01013435001	<i>VvHMGR1</i>	18	494023 .. 498427	<i>HMG1</i> (Arabidopsis), HMGcoA reductase involved in cell elongation and isoprenoid synthesis, associated with berry length	[45, 96]
GSVIVT01013402001	-	18	686115 .. 690591	Endoribonuclease/protein kinase Ire1p-like (Arabidopsis), significantly associated with berry size	[44]
GSVIVT01013367001	-	18	927341 .. 932130	Catalase, significantly associated with berry size	[44]
GSVIVT01013363001	-	18	949015 .. 961356	Ribosome biogenesis, significantly associated with berry size	[44]
GSVIVT01008762001	<i>EXPI</i>	18	1778795 .. 1780353	Expansin <i>EXPI1</i> with expression linked to berry development	[76]
GSVIVT01008762001	<i>AQI</i>	18	1778795 .. 1780353	Major intrinsic family protein MIP with expression linked to berry development	[76]
GSVIVG01008806001	<i>VvMADS9</i>	18	2291789 .. 2294142	<i>Pistilata</i> (Arabidopsis), MADS box flower development	[89]
GSVIVT01009024001	<i>VvHT2</i>	18	4363667 .. 4369067	Hexose transporter (cDNA cloned in <i>V. vinifera</i> with increased expression around <i>véraison</i>)	[105]
GSVIVG01009171001	<i>VvAGL22.2</i>	18	5694493 .. 5711399	<i>Agamous like 22</i> (Arabidopsis), MADS box flower development	L. Torregrosa (pers. com.)
GSVIVT01009219001	<i>VvAGL17.1</i>	18	6350901 .. 6376307	<i>Agamous like 17</i> (Arabidopsis), MADS box	[92]
GSVIVT01009254001	<i>VvSUC11</i>	18	6693573 .. 6703325	Proton-sucrose symporter (cDNA cloned in <i>V. vinifera</i> and upregulated in berries at <i>véraison</i>)	[93]
-	<i>VvKO</i>	18	9625800 .. 9625486 (blast)	Ent-Kaurene oxidase expressed in berry	[97]
GSVIVT01005051001	<i>VvCBPI</i>	Un	17696019 .. 17698346	Calcium-binding protein involved in embryo	[106]

				development	
- (AJ237987)	<i>Grip 68</i>	Un	94441 .. 154135	Ripening-related protein, cell wall	[98]
GSVIVT01007333001	<i>CS</i>	Un	31413744 .. 31415587	Cellulose synthase family protein involved in ethylene-induced berry expansion	[11]

¹ Not a berry or seed QTL because sex QTL