

## Supplementary data

**TABLE S1.** Preparation chart for MS/2 Medium for embryo rescue.

Stock Solution	Final Concentration.	Volume
		1000 mL
10x MS macros	1/2x	50 mL
1000x MS micros	1x	1000 $\mu$ L
250x Vitamins	1x	4000 $\mu$ L
200x FeEDTA	1x	5000 $\mu$ L
250x AA mix	1x	4000 $\mu$ L
Sucrose	1.50%	15.0 g
Volume		1000 mL
pH	5.8	5.8
Agar	0.7%	3.5 g (500 mL)
Charcoal	1.25g (500 mL)	
	Autoclave	
250 mg/mL Tim.	1000 $\mu$ g/mL	2000 $\mu$ g/mL

**TABLE S2.** Rooting medium preparation chart.

Stock Solution	Final Concentration	Volume
		1000 mL
10x SM micros	1x	100 $\mu$ L
1000x MS micros	1x	1000 $\mu$ L
1000x B5 vit.	1x	1000 $\mu$ L
200x FeEDTA	1x	5000 $\mu$ L
1000 $\mu$ M NAA	0.5 $\mu$ M	500 $\mu$ L
Sucrose	1.50 %	15.0 g
Volume		1000 mL
pH	5.7	5.7
Agar	1.00%	5.0g (500ml)
	Autoclave	
250mg/mL Tim.	1000 $\mu$ g/mL	2000 $\mu$ g/mL

**SUPPLEMENTARY DATA**

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**TABLE S3.** Grape Soil Mix Chart.

Composted Pine Bark	2 Buckets
River Sand	1 Bucket
Fe SO <sub>4</sub>	30 g
pH Amendment	60 g
Longlife Osmocote	140 g

**TABLE S4.** PCR preparation chart used for MAS in the project.

PCR Cycle	PCR Mix	R.E. Mix
95°C - 1 min.	3 $\mu$ L - 5X Buffer-Red	7 $\mu$ L - PCR Prod.
95°C - 20 sec. (34x)	0.5 $\mu$ L - F. Primer	2 $\mu$ L - 10x Buffer
Ann. Temp. - 20 sec	0.5 $\mu$ L - R. Primer	0.5 $\mu$ L Enzyme
72°C - 30 sec. (34x)	1 $\mu$ L - DNA Prod.	10.5 $\mu$ L Ster. Water
	0.25 $\mu$ L - Taq Polym.	
	9.75 $\mu$ L - Ster. Water	
	15 $\mu$ L - Total Volume	20 $\mu$ L - Total Volume

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**TABLE S5.** Plant types, planting dates and glasshouse transfers of Bogazkere F1 progeny.

Cross No.	Plant Type	Planting Date
2.1	-	-
2.2	-	-
3.1	-	-
3.2	Tall	25.05.20
3.3	Tall	01.06.20
3.5	Tall	01.06.21
3.6	-	-
3.7	Tall	01.06.20
6.1	Tall	01.06.20
6.2	-	-
5.1	Tall	15.05.20
5.2	Micro	25.05.20
5.4	Micro	27.07.20
5.5	-	-
5.6	Tall	25.05.20
5.7	Tall	01.06.20
5.8	Tall	25.05.20
5.9	Tall	15.05.20
5.10	-	-
5.11	Tall	01.06.20
5.13	Micro	01.06.20
5.14	Tall	27.07.20
5.15	Tall	15.05.20
5.16	Tall	25.05.20
5.17	Tall	25.05.20
5.18	-	-
5.19	-	-
5.20	Micro	15.05.20
5.21	Tall	01.06.20
5.22	Micro	25.05.20
5.23	Tall	01.06.20
5.24	Micro	27.8.20
5.25	-	-
5.26	-	-
5.27	Micro	15.05.20
5.28	Tall	27.8.20
<b>Total</b>	<b>14 Tall /11Micro</b>	

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**TABLE S6.** PCR results of 36 Bogazkere F1 progeny for *Ren4/Rpvrom* and *Run1/Rpv1* resistance markers.

Cross Number	<i>Ren4/Rpvrom</i>	<i>Run1/Rpv1</i>
2.1	+	-
2.2	+	-
3.1	+	+
3.2	+	+
3.3	+	+
3.5	-	-
3.6	-	+
3.7	-	-
6.1	-	-
6.2	-	+
5.1	-	-
5.2	+	+
5.4	+	-
5.5	-	-
5.6	-	+
5.7	+	-
5.8	-	-
5.9	+	+
5.10	+	+
5.11	+	-
5.13	-	-
5.14	+	-
5.15	+	-
5.16	-	-
5.17	+	-
5.18	-	-
5.19	+	-
5.20	-	+
5.21	-	-
5.22	+	-
5.23	+	-
5.24	-	-
5.25	+	+
5.26	+	-
5.27	+	+
5.28	+	+
Total	21 +	13+
36	15 -	23-

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**TABLE S7.** PCR results of 36 Boğazkere F1 progeny for *VVMT137* flower sex marker.

Cross No.	Flower Sex
2.1	Female
2.2	Herm.
3.1	Female
3.2	Herm.
3.3	Herm.
3.5	Herm.
3.6	Female
3.7	Herm.
6.1	Female
6.2	Herm.
5.1	Female
5.2	Female
5.4	Herm.
5.5	Female
5.6	Herm.
5.7	Herm.
5.8	Female
5.9	Herm.
5.10	Herm.
5.11	Herm.
5.13	Herm.
5.14	Female
5.15	Female
5.16	Herm.
5.17	Female
5.18	Female
5.19	Female
5.20	Herm.
5.21	Herm.
5.22	Herm.
5.23	Female
5.24	Female
5.25	Herm.
5.26	Herm.
5.27	Female
5.28	Herm.
Total	16 Female
36	20 Herm.

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**TABLE S8.** Distribution of 25 Bogazkere F1 progeny that are transferred to glasshouse based on their plant type and presence/absence of resistance genes.

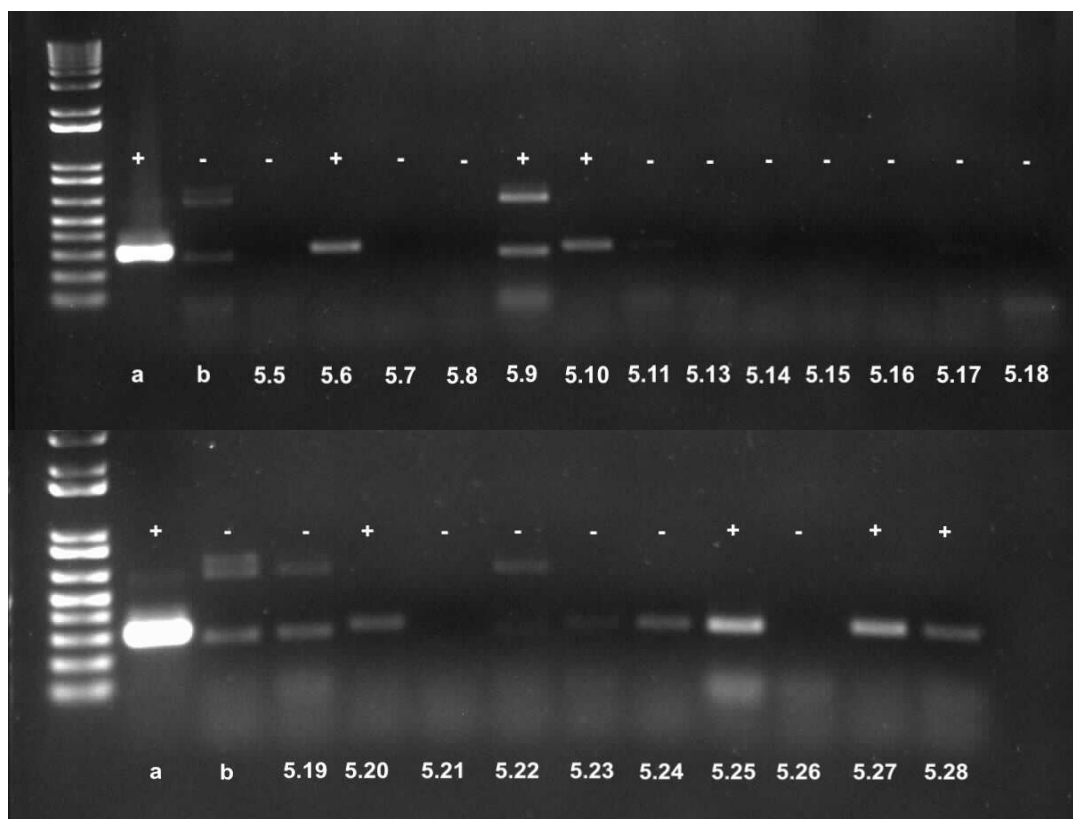
Plant Type	Herm.	Fem.	Total
<i>Ren4/Rpvrom</i>	4	4	8
<i>Run1/Rpv1</i>	2	0	2
Both +	4	2	6
Both -	5	4	9
Total	15	10	25

**TABLE S9.** Procurement List of Equipment and Chemicals.

Consumables	Company
3M tape	3M Micropore™ Tape
50ml falcon tubes	Griener Bio-one
Activated charcoal	Merck
Agar	Bacto™ Agar BD Sciences
Agarose	Invitrogen, Life Technologies
Chloroform	Merck Emsure™
Cotton wool	Swisspers
Ethanol	Merck
Filter paper	Whatman™ Grade 1.85mm GE Health Sciences
Foil	Alfresca Cater's Aluminium Foil
Gibberellic Acid	Sigma Aldrich
Hydrogen peroxide 30% w/w	Chem Supply
Isopropanol	2-propanol Bio-strategy Australia
Mercaptoethanol	Sigma Aldrich
Miltons	Anti-bacterial Solution 2.1 w/w sodium hypochlorite
Oligos (primers)	IDT
Parafilm	Parafilm M
PCR reagents	MyTaq Red DNA polymerase Meridian Biosciences
Petri dishes	Griener Bio-one 20mm x 10mm
Reagents for SM etc	Sigma Aldrich
Restriction enzymes	New England Biolab
Soil mixture	SARDI
Sucrose	Chem Supply
Timentin	GoldBio
Tween 20	Tween® 20 Sigma Aldrich
Centrifuge	Hitachi Himac CT 15E
Electrophoresis tank set up	OWL
Incubator 37	Ratek
Nanodrop	NanaDrop
Orbital shaker	Ratek
PCR machine	Biorad S1000™ Thermal cycler
pH meter	CyberScan 510
Power pack for tank	Biorad Power Pac 300
Vortex	Vortex Genie 2

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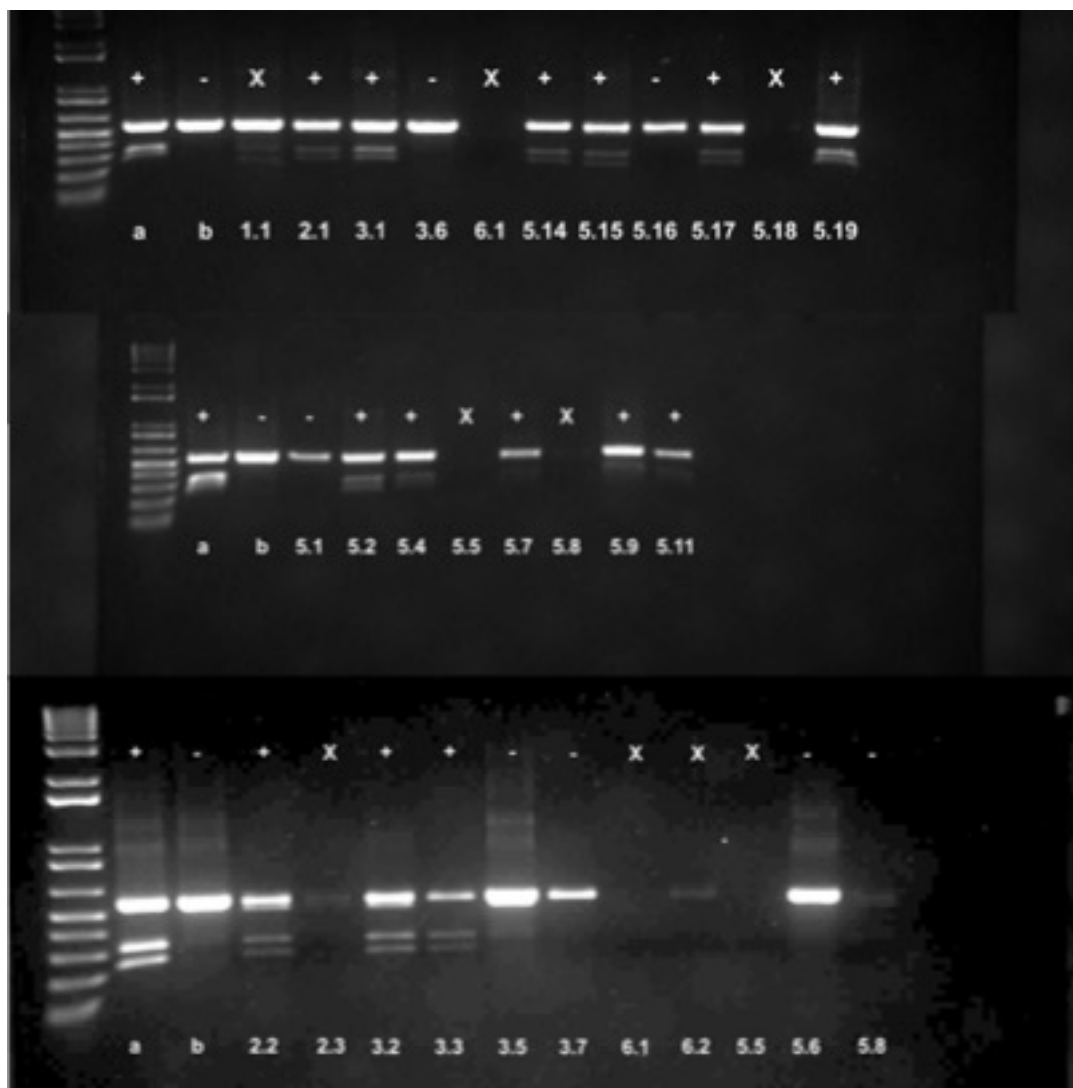


**FIGURE S1.** PCR results image of *Run1/Rpv1* resistance marker of 36 Bogazkere F1 progeny (a indicates positive control for *Run1/Rpv1*. b indicates negative control for *Run1/Rpv1*).



SUPPLEMENTARY DATA

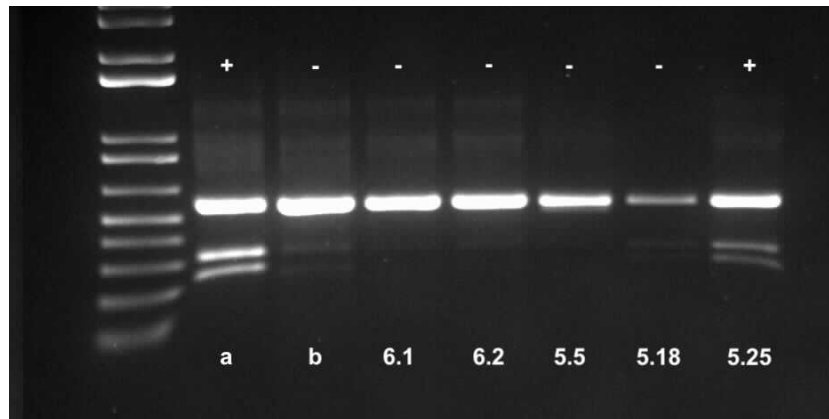
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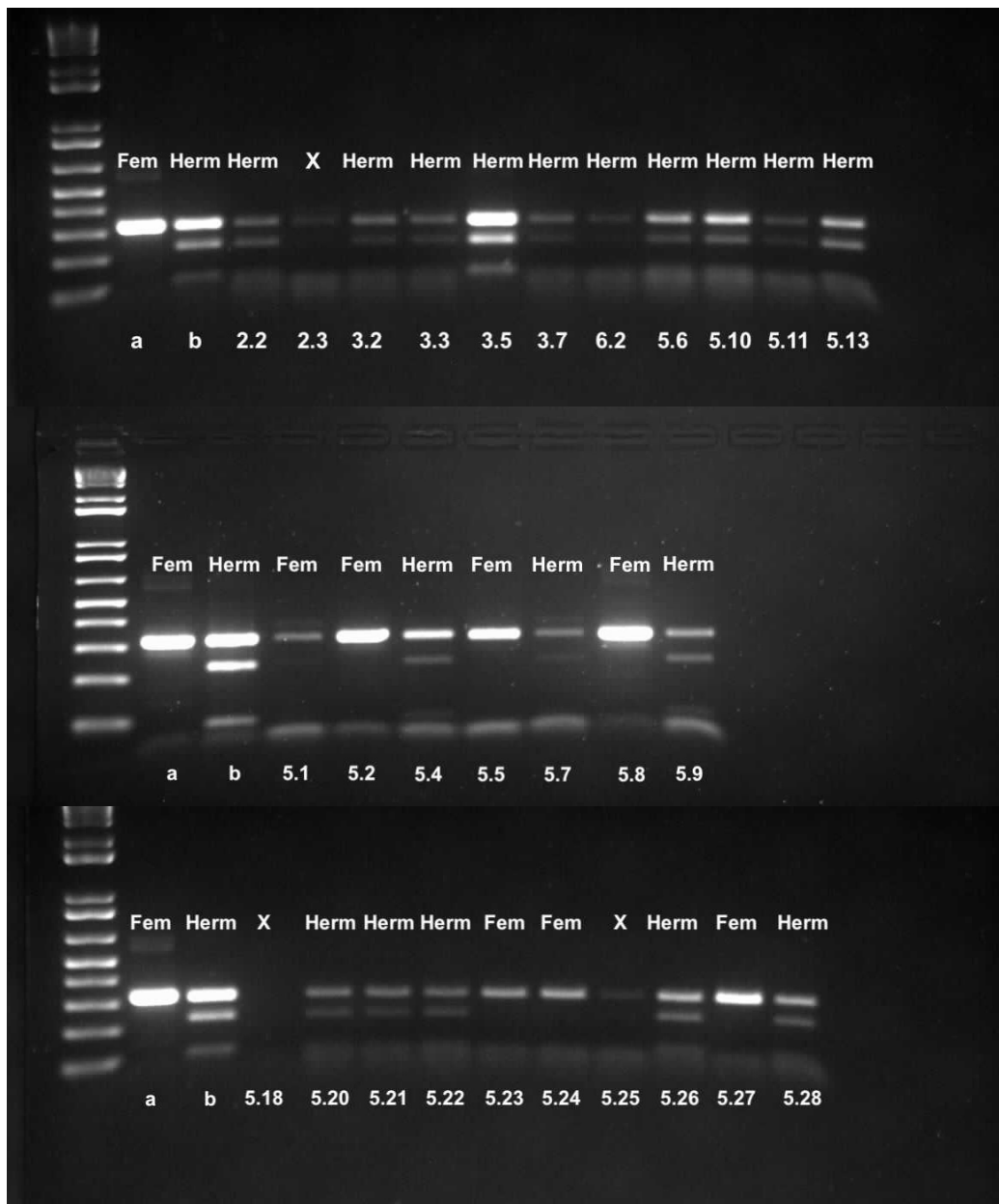
**FIGURE S2.** PCR results of *Ren4/Rpvrom* resistance marker of 36 Boğazkere F1 progeny (a indicates positive control for *Ren4/Rpvrom*. b indicates negative control for *Ren4/Rpvrom*. X indicates n.d. 2.3 excluded later).

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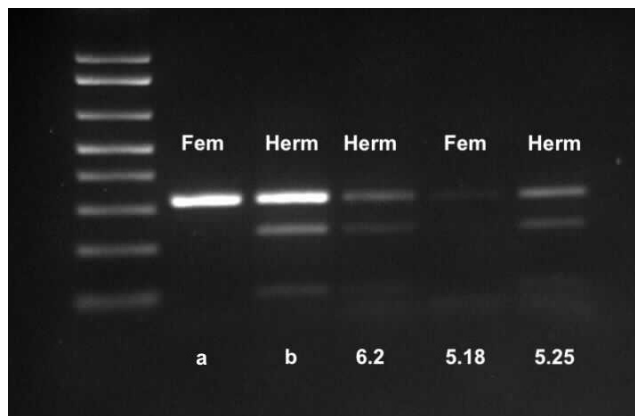
**FIGURE S3.** PCR results of *Ren4/Rpvrom* resistance marker of 5 out of 36 Bogazkere F1 progeny to complete n.d. PCR results with new DNA extractions (a indicates positive control for *Ren4/Rpvrom*. b indicates negative control for *Ren4/Rpvrom*).



**FIGURE S4.** PCR results of *VVMT137* flower sex marker of 36 Bogazkere F1 progeny (a indicates female control for flower sex, b indicates hermaphrodite for flower sex, X indicates n.d. 1.1 excluded later).

SUPPLEMENTARY DATA

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**FIGURE S5.** PCR results of *VVMT137* flower sex marker of 5 out of 36 Bogazkere F1 progeny to complete n.d. PCR results with new DNA extractions (a indicates female control for flower sex, b indicates hermaphrodite for flower sex).

## ABBREVIATIONS

BAC: Bacterial Artificial Chromosome

bp: Base Pair

BSA: Bulk Segregant Analysis

CAPS: Cleaved Amplified Polymorphic Sequences

cm: Centimetre

CTAB: Cetyl Trimethylammonium Bromide

DNA: Deoxyribonucleic Acid

*E. necator* / *U. necator*: *Erysiphe necator* / *Uncinula necator*

ETI: Effector-Triggered Immunity

FeEDTA: Ferric Ethylenediamine tetraacetic acid

FeSO<sub>4</sub>: Iron (II) Sulfate

F. primer: Forward Primer

GA3: Gibberellic Acid Potassium Salt

H<sub>2</sub>O<sub>2</sub>: Hydrogen Peroxide

HR: Hypersensitive Response

IPGRI: International Plant Genetic Resources Institute

L: Litre

MAS: Marker-Assisted Selection

m: Metre

ml: Millilitre

mm: Millimetre

mM: Millimolar

MS/2: Murishage & Skoog Medium

*M. rotundifolia*: *Muscadinia rotundifolia*

NAA: 1-Naphthaleneacetic acid

NBS-LRR: Nucleotide Binding Site - Leucine-Rich Repeat

n.d.: Not Determined

NLR: NOD-like Receptor

PCR: Polymerase Chain Reaction

*P. viticola*: *Plasmopora viticola*

QTL: Quantitative Trait Loci

QTLRgD: Partial Resistance to Downy Mildew

QTLRgP: Partial Resistance to Powdery Mildew

*Ren3*: Resistance to *Erysiphe necator* 3

*Ren4*: Resistance to *Erysiphe necator* 4

RH: Relative Humidity

R.M: Rooting Media

R gene: Resistance Gene

*Rpv1*: Resistance to *Plasmopora viticola* 1

R. Primer: Reverse Primer

*Run1*: Resistance to *Uncinula necator* 1

SCAR: Sequence Characterized Amplified Region

SSR: Simple Sequence Repeats

TIR-NB-LRR: Toll/Interleukin 1 Receptor - Nucleotide Binding - Leucine-Rich Repeat

UV: Ultra-violet

*V. vinifera*: *Vitis vinifera*

*V. piasekii*: *Vitis piasekii*

*V. rotundifolia*: *Vitis rotundifolia*

µl: Microlitre

µm: Micrometre