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Evaluation of new grape selections with introgressed resistance genes

Asia Khafizova[3], Eugenio Sartori[3], Michele Morgante[1,2], Raffaele Testolin[1,2], Enrico Peterlunger[1], Simone D. Castellarin[1], Serena Foria[1], Gabriele di Gaspero[2], Guido Cipriani[1]
[1]Dipartimento di Scienze Agroalimentari, Ambientali e Animali – University of Udine
[2]Istituto di genomica applicata
[3]Vivai Cooperativi Rauscedo
Email: guido.cipriani@uniud.it

INTRODUCTION

Since 1998 at University of Udine started a breeding program with the purpose of introgressing resistance genes into elite wine cultivars. The first ten varieties were released in collaboration with the Institute of Applied Genomics and introduced into the market by Vivai Cooperativi Rauscedo, one of the leading grape nurseries. Here we present the results of a second generation of cultivars, in particular varieties producing Pinot-like wine styles.

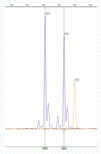
METHODS

- Crosses made in 2005 and 2007
- Berry sensory and wine sensory attributes selection on single seedling
- Evaluation plots with 40 graftings per selection
- Phenological (bud break) and agronomical characteristics (yeld/plant, vigor, field resistance, cluster weight) determined in two years
- Must parameters (brix, acidity) determined in two years
- Enological traits (alchool (%), pH, total acidity, tartaric and malic acid content and non-reducing extracts measured on wines produced in 2016 and 2017

RESULTS

Pinot Progenies	Downy mildew genotyping	Powdery mildew genotyping	Field resistance to downy mildew	Filed resistance to powdery mildew
Vc_109-033 W	Rpv 1, Rpv 12	Run 1, Ren 3	+++	+++
Vc_109-052 W	Rpv 12	Ren 3	++	+
Vc_156-1017 W	Rpv 1, Rpv 12	Run 1	+++	+++
Vc_156-869 W	Rpv 12	none	+++	-
Vc_156-680 B	Rpv 1, Rpv 12	Run 1	+++	+++
Vc_156-537 B	Rpv 1, Rpv 12	Run 1	++	+++
Vc_156-312 B	Rpv 12	none	+++	-

The progenies were evaluated for powdery and downy mildew resistances using MAS and field test for two years


Productivity traits and must characteristics

Selection	Harvest	Bunch weight (g)	Production per plant (kg)	Production per ha (t)	°Brix	Total acidity (g/l)	pH
Vc109_033	13/09/2016	112	2.4	8.6	21.2	5.9	3.35
	21/08/2017	185	5.1	18.2	20.2	6.0	3.43
Vc109_052	27/09/2016	218	3.6	12.9	20.7	6.7	3.5
	30/08/2017	240	3.7	13.0	21.2	5.6	3.6
Vc156_1017	2/09/2016	220	3.4	12.1	22.0	5.5	3.6
	21/08/2017	212	4.0	14.3	21.4	5.4	3.7
Vc156_869	27/09/2016	243	3.4	12.1	21.2	5.6	3.5
	30/08/2017	236	3.4	12.1	21.4	5.9	3.5
Vc156_680	5/10/2016	232	2.7	9.6	25.0	7.8	3.8
	7/09/2017	215	2.6	9.2	22.6	7.4	3.6
Vc156_537	5/10/2016	311	3.3	11.8	21.9	5.6	3.4
	11/09/2017	186	4.1	14.7	23.0	6.0	3.8
Vc156_312	11/10/2016	216	3.9	13.9	23.0	7.0	3.7
	11/09/2017	290	5.6	20.0	20.0	6.1	3.8

Wine traits

Selection	Year	Total acidity (g/l)	pH	Tartaric acid (g/l)	Malic acid (g/l)	Sugar free extract (g/l)	Alcohol, %
Vc109_033	2016	5.2	3.2	2.6	1.5	17.6	12.9
	2017	6.2	3.1	4.8	1.8	21.4	12.7
Vc109_052	2016	5.0	3.6	1.7	2.2	19.5	12.5
	2017	5.3	3.2	3.6	1.9	21.9	12.9
Vc156_1017	2016	5.1	3.5	1.9	1.8	20.8	13.4
	2017	6.2	3.1	4.5	1.7	21.5	13.0
Vc156_869	2016	5.4	3.2	2.1	1.8	18.1	12.9
	2017	5.6	3.4	2.2	2.0	20.9	13.0
Vc156_680	2016	5.5	3.7	1.8	0.3	26.1	15.2
	2017	5.3	3.8	2.1	0.1	28.0	13.4
Vc156_537	2016	5.2	3.7	1.7	0.1	24.5	13.4
	2017	5.3	3.8	2.0	0.1	25.6	14.0
Vc156_312	2016	5.2	4.0	1.7	0.1	31.6	14.1
	2017	5.3	3.9	1.9	0.1	28.7	14.0

109-033
SK-00-1/7 x Pinot blanc

- Vigour: medium-low
- Productivity: high
- Bud burst and ripening: medium-early
- High resistance to powdery and downy mildew
- Similar to Pinot blanc, compact bunch, easy berry detachment
- Wine: notable freshness, persistence, resembles the Pinot blanc wine

109-052
SK-00-1/7 x Pinot blanc

- Vigour: high
- Productivity : medium
- Bud burst and ripening: medium-early
- High resistance to powdery and downy mildew
- Leaves similar to Pinot blanc, compact bunch, upright shoots
- Wine: high tipicity, good structure, notable floral aromas, the wine resembles Chardonnay

156-1017
Pinot noir x 99-1-48

- Vigour: high
- Productivity: high
- Bud burst: medium-early
- Ripening: early
- High resistance to powdery and downy mildew
- Leaves similar to Croatina variety
- Wine: fruity and spicy aromas, complex and persistent, good structure

156-869
Pinot noir x 99-1-48

- Vigour: high
- Productivity: high
- Bud burst and ripening: medium-early
- High resistance to downy mildew
- Cluster medium-loose
- Wine: citrus and rose on the nose, resembles Pinot blanc, muscat-like aftertaste, good structure

156-680
Pinot nero x 99-1-48

- Vigour: high
- Productivity : medium
- Bud burst: medium-early
- Ripening: medium
- High resistance to powdery and downy mildew
- Wine: similar to Pinot noir type from Northern Italy, good structure and tipicity, lower coloration

156-537
Pinot noir x 99-1-48

- Vigour: medium-low
- Productivity: high
- Bud burst: medium-early
- Ripening: medium
- High resistance to powdery and downy mildew
- Cluster medium-loose
- Wine: excellent aromatic profile, tipical Pinot noir from Burgundy, good color

156-312
Pinot noir x 99-1-48

- Vigour: high
- Productivity: high
- Bud burst: medium-early
- Ripening: medium
- High resistance to downy mildew
- Slightly sensitive to *Botrytis*
- Cluster is compact and similar to Pinot
- Wine: aromas of black cherries and strawberry, very good structure and potential to long refinement period

Conclusions

Seven grape selections have been evaluated for their agronomic traits, enological characteristics and field resistance to downy and powdery mildew. Five selections with multiple resistance genes will be further tested in different pedo-climatic area