

## 2018 UPDATES ON THE AGRONOMIC PERFORMANCES OF FUNGUS RESISTANT WINE GRAPES IN TRENTINO (ITALY)

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### Abstract:

**Context and purpose of the study** - On the market there are several wine grapes which are tolerant to the main fungal diseases. These varieties, commonly defined “resistant”, were developed in the grapevine breeding programs carried out mainly in Germany, France, Hungary and Italy. Some of these cultivars have been included in the national catalogues of wine grape varieties and have sometimes been allowed for specific kinds of wine. The VEVIR project, aimed at the enological evaluation of resistant vines, involves 33 cultivars achieved at the State Institute for Viticulture Freiburg in Germany, the Research Institute of Viticulture and Enology Pecs in Hungary and the Fondazione Edmund Mach S. Michele all'Adige (FEM) in Italy. The project's objectives are the identification of varieties suitable for cultivation in certain areas of the Trentino province, the outlining of the technical protocols for growing and winemaking and the assessment of economical sustainability. All the key players in Trentino's wine production chain are involved in the project: grapes and wine producers (Cavit S.c., Mezzacorona S.c.a., La Vis-Valle di Cembra s.c.a. and Ferrari F.lli Lunelli S.p.A), researchers (FEM) and nurserymen (AVIT consortium).

**Material and methods** - This work provides an update on to the cultivation performances of 8 white (Aromera, Bronner, Helios, Johanniter, Muscaris, Res29, Solaris and Souvigner Gris) and 8 red varieties (Baron, Cabernet Cantor, Cabernet Carbon, Cabernet Cortis, Cabino, Monarch, Prior and Regent) grown in experimental vineyards located in Rovereto (southern Trentino, 170 m asl), S. Michele all'Adige (northern Trentino, 200 m asl) and Telve (eastern Trentino, 400 m asl).

**Results** - The data collected between 2015 and 2018 showed a shorter production cycle that however, generally guaranteed a good level of ripeness of the grape. This, alongside verified tolerance to downy and powdery mildew, makes some of these varieties suitable for production in specific areas increasing environmental and economic sustainability and reducing the number of treatments and drift-related problems. Moreover, some varieties can be useful in mountain environments subjected to more severe weather conditions which are limiting for the traditional vinifera and to a higher risk of accidents (such as terraced and sloping vineyards). However, other factors still need to be further verified. Observations on the field have demonstrated that the choice to not apply any fungicide treatment has inevitable consequences on the fungal community of the vineyard, in some cases resulting in diseases such as black rot. Good agronomic practice requires two/three targeted treatments also on tolerant cultivars to limit the potential inoculum of downy mildew and to control emerging new pathologies.

**Keywords:** Grapevine, Phenology, Agronomic parameters, Resistance characteristics, Grape harvest analysis.

### 1. Introduction.



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### Materials and methods:

- 16 varieties (Freiburg Inst.)
- 3 experimental vineyards in Trentino:
  1. Rovereto (170 m asl);
  2. S. Michele all'Adige (200) ;
  3. Telve (400).
- Data: 1. phenology;

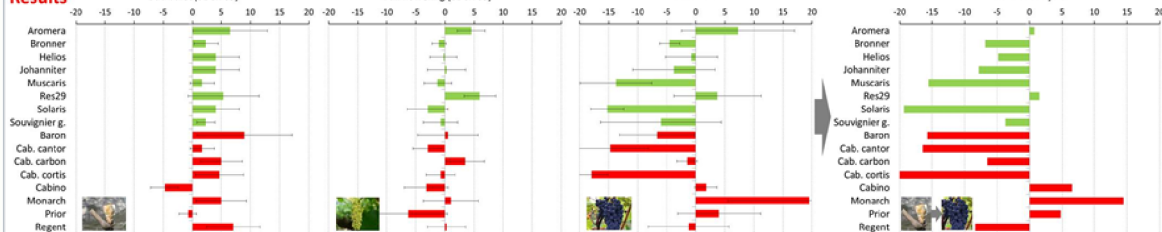
2. agronomic parameters;

3. grape analysis;

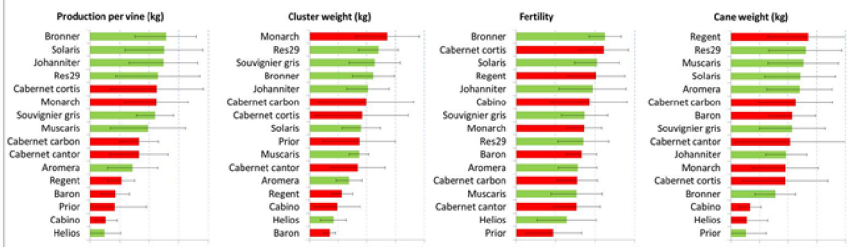
4. resistance characteristics.



### Results



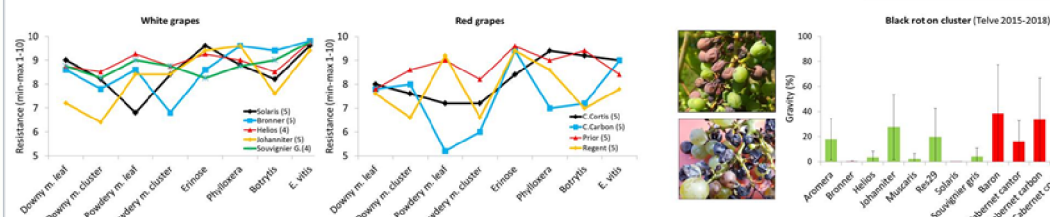
**1. Phenology** (Rovereto vineyard, 2015-2018) Each graph shows the days in advance (towards the left) and the delay (towards the right) of the appearance of 3 phenological stages (bud burst, full flowering and 18° Brix) of each variety compared to the stages recorded in the same vineyard for the reference variety Chardonnay (in green the white varieties, in red the red varieties). The graph on the right highlights a duration of the production cycle (from budding to maturation) which is shorter in the resistant varieties, both white (minus 7 days in average) and red (minus 6 days), compared to the Chardonnay. Only Cabano, Monarch and Prior have a longer cycle.



**2. Agronomic parameters:** the main production parameters (represented in each graph in descending order) were recorded between 2015 and 2018 in Rovereto vineyard (planted in 2013, "pergola semplice" training system). Bronner, Cabernet cortis, Solaris and Regent have shown a high fertility (more than 2 bunches per shoot in average).

**3. Grape analysis** of the last pre-harvest samples collected in Rovereto vineyard (mean ± st. dev. 2015-2018).

Variety	Brix	pH	Total acidity
Aronara	20,38 ± 2,39	3,29 ± 0,08	6,13 ± 1,10
Bronner	20,08 ± 3,19	3,19 ± 0,08	7,15 ± 1,53
Helios	20,89 ± 3,24	3,24 ± 0,11	5,98 ± 1,33
Johanniter	19,71 ± 1,26	3,35 ± 0,10	6,35 ± 0,26
Muscaris	23,69 ± 0,85	3,36 ± 0,15	6,23 ± 1,87
Res29	20,28 ± 2,72	3,18 ± 0,09	6,77 ± 1,49
Solaris	22,96 ± 1,74	3,22 ± 0,10	7,08 ± 1,62
Souvignier gris	21,38 ± 1,19	3,19 ± 0,12	7,53 ± 1,12
Cabano	21,59 ± 0,36	3,35 ± 0,14	6,13 ± 1,03
Bronner	22,61 ± 0,61	3,18 ± 0,13	6,48 ± 1,39
C.Cortis	21,66 ± 1,11	3,24 ± 0,06	6,93 ± 1,08
C.Cortis	21,78 ± 1,00	3,08 ± 0,17	7,18 ± 2,20
Cabano	20,88 ± 2,29	3,46 ± 0,13	6,43 ± 0,92
Monarch	17,70 ± 0,93	3,22 ± 0,07	6,79 ± 1,49
Prior	21,09 ± 0,64	3,34 ± 0,16	6,17 ± 0,92
Regent	20,65 ± 1,72	3,43 ± 0,11	5,85 ± 0,67



**4. Resistance characteristics:** the evaluations, represented in the two graphs on the left, were performed on a smaller number of varieties in S. Michele all'Adige vineyard between 2012 and 2015 (4) and 2016 (5). Only in the experimental vineyard of Telve (400 m asl, «guyot» training system) Black rot (*Guignardia bidwellii*) infections were observed both on the leaf and on the bunch. In 2015 the disease appeared only on two varieties (Aronara and Cabernet cortis), whereas in the following years most of the cultivars were affected (even seriously). Bronner and Solaris have shown, in 4 years of observations, a high tolerance to this fungus (graph on the right).

**Conclusions:** The data collected between 2015 and 2018 showed a shorter production cycle that however, generally guaranteed a good level of ripeness of the grape. This, alongside verified tolerance to downy and powdery mildew, makes some of these varieties suitable for production in specific areas increasing environmental and economic sustainability and reducing the number of treatments and drift-related problems. Moreover, some varieties can be useful in mountain environments subjected to more severe weather conditions which are limiting for the traditional vinifera and to a higher risk of accidents (such as terraced and sloping vineyards). However, other factors still need to be further verified. Observations on the field have demonstrated that the choice to not apply any fungicide treatment has inevitable consequences on the fungal community of the vineyard, in some cases resulting in diseases such as Black rot. Good agronomic practice requires two/three targeted treatments also on tolerant cultivars to limit the potential inoculum of downy mildew and to control emerging new pathologies.

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