

## Results from new fungus-tolerant grapevine varieties for Organic Viticulture

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### Abstract

**Two red and three white new fungus-tolerant grape varieties were tested within a period of five years. REGENT, RONDO, JOHANNITER and Gf 48-12 show a better wine quality than PINOT NOIR or SILVANER and can be recommended for Organic Viticulture as well as for the conventional viticulture to reduce copper and fungicide applications.**

Keywords: fungus-tolerant grape varieties, environment protection

### Introduction

The breeding of fungus-tolerant grape varieties began in France after the introduction of *Phylloxera vastatrix* at the end of the last century. The first hybrids had a low wine quality and were not supported because the grafting method showed better results to combat the Phylloxera and delivered further wines of higher quality with the traditional varieties. In the last 50 years new varieties were combined and the tested grape varieties showed acceptable results in fungus tolerance and wine quality.

### Material and methods

Five new selected varieties were tested in comparison to traditional varieties growing on a shell lime soil in Franconia, Germany. The trial was a split plot design with 3 replicates. The fungus-tolerant varieties were not treated with fungicides. Yield, sugar content, acid and the amount of fungus damage were investigated. The varieties were separately treated and fermented in 100 l steel barrels. The bottled wines were tested 2-3 times every year in Double-Blind-Tastings by 12-16 expert tasters. The new varieties were also tested in open tastings in the last two years by a panel of 248 winegrowers. All

Table 1. New red fungus-tolerant varieties for Organic Viticulture (abc:  $P < 0.05$ )

criteria/Varieties	Regent	Rondo	Pinot noir
years	1995-99	1995-99	1995-99
yield kg/a	74.7 a	80.8 a	72.9 a
sugar content (°Oechsle)	93 a	88.6 b	85 b
acid (must)	7.2 c	10.7 b	13.7 a
quality number (DLG 1-5)	2.44 a	2.48 a	2.13 b
open wine tasting (n=248)	2.55 a	2.27 b	1.98 c
dominant flavor	Blackberry	Elder-berry	Cherry
dominant flavor	Elder-berry	Woodberries	Strawberry
bud break (mean)	01. May	25. Apr	29. Apr
days until flowering	46	46	50
days from flowering to harvest	124 a	111 b	121 a
Downy mildew – leaf (1-9)	1	1	1
Downey mildew - grape (1-9)	1	1	1
Powdery mildew – leaf (1-9)	1	2.2	2.6
Powdery mildew – grape (1-9)	1	3	1.4
Red fire disease – leaf (1-9)	4	2.5	1.5
Botrytis infection in %	16	7	10

\*)1-9 infection index ( 1=very low infection; 9=very strong infection)

presented varieties in this study were pre-selected from the bulk of tested varieties and showed good results and therefore can be recommended for Organic Viticulture. All presented varieties have a very

good winter hardiness and do not suffer from serious viticultural problems.

## Results and discussion

Table 1 shows the results of the two new promising fungus-tolerant red varieties REGENT and RONDO in comparison to Pinot Noir in the mean of five years.

Both had a higher sugar accumulation than Pinot Noir and a lower content of acid. REGENT needs profound soils because of a lower vigor and needs more vigorous rootstocks. The expert panels and the winegrowers in the open tastings rated the wine quality of both fungus-tolerant varieties significantly higher than of Pinot Noir. RONDO is a very early variety with early bud break, early flowering and earlier harvest maturity compared to REGENT and Pinot Noir. Only its powdery mildew resistance is lower than that of REGENT. The new fungus-tolerant varieties REGENT and RONDO shows higher sugar accumulation and creates deep coloured wines with high density. Best results are reached with barrique seasoning. Based on a higher acid value RONDO delivers a long-lasting wine with good ageing potential. Meanwhile REGENT is classified within five German wine regions.

Table 2. New white fungus-tolerant varieties for Organic Viticulture (abc:  $P < 0.05$ )

<b>criteria/varieties</b>	<b>Johanniter</b>	<b>Bronner</b>	<b>Gf 48-12</b>	<b>Silvaner</b>
<b>years</b>	<b>1995-1999</b>	<b>1995-1999</b>	<b>1995-1999</b>	<b>1995-1999</b>
<b>yield kg/a</b>	<b>111.7 a</b>	<b>105.9 a</b>	<b>94.7 a</b>	<b>91.5 a</b>
<b>sugar content (°Oechsle)</b>	<b>86.0 a</b>	<b>85.6 a</b>	<b>83.4 ab</b>	<b>80.8 b</b>
<b>acid (must)</b>	<b>9.1 c</b>	<b>10.1 bc</b>	<b>11.1 b</b>	<b>9.5 c</b>
<b>quality number (DLG 1-5)</b>	<b>2.21 a</b>	<b>2.11 a</b>	<b>2.21 a</b>	<b>1.99 a</b>
<b>open wine tasting (n=248)</b>	<b>2.31 a</b>	<b>1.79 b</b>	<b>2.22 a</b>	<b>1.87 b</b>
<b>dominant flavor</b>	<b>Citrus</b>	<b>Green appel</b>	<b>Black currant</b>	<b>Citrus, Pear</b>
<b>dominant flavor</b>	<b>Apple</b>	<b>Citrus</b>	<b>Maracuja</b>	<b>Green appel</b>
<b>bud break (mean)</b>	<b>28. Apr</b>	<b>29. Apr</b>	<b>28. Apr</b>	<b>28. Apr</b>
<b>days until flowering</b>	<b>50</b>	<b>45</b>	<b>53</b>	<b>52</b>
<b>days from flowering to harvest</b>	<b>121</b>	<b>131</b>	<b>126</b>	<b>122</b>
<b>Downy mildew – leaf (1-9*)</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>Downey mildew - grape (1-9)</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>
<b>Powdery mildew – leaf (1-9)</b>	<b>1</b>	<b>1</b>	<b>2.6</b>	<b>1.8</b>
<b>Powdery mildew – grape (1-9)</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3.4</b>
<b>Red fire disease – leaf (1-9)</b>	<b>3</b>	<b>4</b>	<b>3.5</b>	<b>1.5</b>
<b>Botrytis infection in %</b>	<b>9</b>	<b>3</b>	<b>12</b>	<b>14.4</b>

\*)1-9 infection index ( 1=very low infection; 9=very strong infection)

In Table 2 three new fungus-tolerant white wine varieties of German breeders from the same field experiment are listed in comparison to the standard franconian variety Silvaner. JOHANNITER obtained a significantly higher yield, increased sugar content and a higher quality ranking than Silvaner. These result were confirmed by the winegrowers tastings. JOHANNITER has the same vegetation period than Silvaner, shows a high downy mildew resistance and was infected only insignificantly by powdery mildew in some years. The wine is crispy, aromatic and well balanced in acid and shows a higher acceptance than Silvaner. BRONNER, another new fungus-tolerant variety, achieved medium results in wine quality and does not reach the expression like JOHANNITER. The new fungus-tolerant variety MERZLING was not tested in this experimental trial but showed significant lower quality rankings than Silvaner or Müller-Thurgau within three experiments at three different sites and therefore can not be recommended in contrast to JOHANNITER. The new fungus-tolerant variety Gf 48-12 showed higher acid values but remarkable quality results. In winetastings, Gf 48-12 reached excellent high ratings by both the experts and winegrowers. This aromatic variety is not fully resistant against fungus, but reached the results without spraying. Sometimes powdery mildew is a little problem but in Organic Viticulture with less importance due to the possibilities of sulfur application. The intense aroma of Gf 48-12 is closely related to the traditional varieties

BACCHUS and SCHEUREBE and is characterized by Maracuja and black currant flavor. A moderate content of residual sugar (half-sweet) seems to be recommended concerning the higher amount of acid.

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