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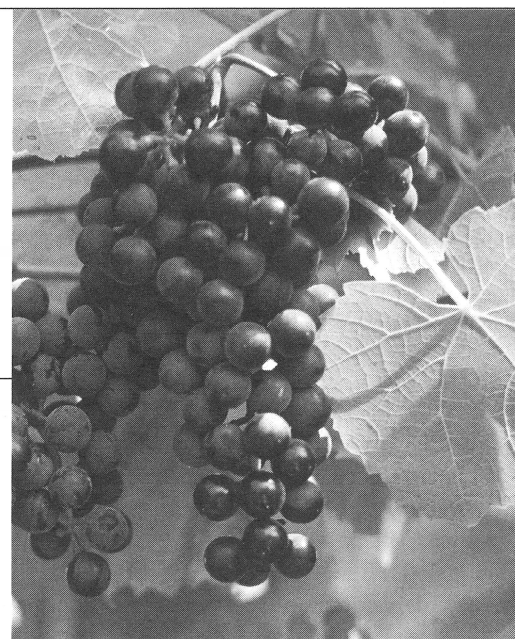
New York State Agricultural Experiment Station, Geneva, a Division of the New York State College of Agriculture and Life Sciences, A Statutory College of the State University, at Cornell University

'Abundance' Grape

B.I. Reisch¹, R.S. Luce¹, T. Henick-Kling², and R.M. Pool¹

¹Department of Horticultural Sciences

²Department of Food Science and Technology
New York State Agricultural Experiment Station
Cornell University
Geneva, New York 14456 USA



'Abundance' is an early / mid-season red wine grape for use primarily in red wine blends. It is distinguished from other red wine grapes grown in cool climates by its high degree of winter hardiness, adaptation to mechanized production systems, and ability to survive in older plantings where other red wine grapes are lost due to tomato and tobacco ringspot virus infections. 'Abundance' is a highly productive, easy to manage cultivar, and is the sixth wine grape to be developed by the New York State Agricultural Experiment Station of Cornell University.

ORIGIN

'Abundance' resulted from the cross, 'Buffalo' x 'Baco noir', made in 1947. Fruit were first observed in 1953 and vines were propagated that year for further tests under the number NY 34791. In later testing, it was re-named GR 7 (Geneva Red 7) for ease of identification. Initially, the seedling vine was described as vigorous and productive. More detailed records began when vines were propagated and planted to additional sites in 1955 and 1964. It was distributed in the 1970's via the New York Fruit Testing Association for trials with cooperators.

DESCRIPTION

Own-rooted vines grown in phylloxera (*Daktulosphaira vitifoliae* Fitch.) infested soils are productive and vigorous. Commercial plantings of other red wine grape hybrids, such as 'Baco noir', 'De Chaunac', and 'Chelois', have limited longevity due to the ringspot virus complex. Over the course of 10 to 20 years, such vineyards suffer severe vine losses and fruit production declines. Adjacent plantings of 'Abundance' are long-lived and appear to be resistant to either the viruses or their vectors.

'Abundance' was tested in a replicated trial of 27 red wine grapes at Dresden, NY, in cooperation with the Taylor Wine Co. Harvest data were collected between 1979 and 1983. In this trial, 'Abundance' proved to be vigorous and very productive in comparison with other red wine varieties (Table 1). Annual cane pruning weights exceeded 2.0 lbs. per vine, and fruit yield averaged 6.7 tons/acre, comparing favorably with 'De Chaunac' and significantly better than 'Chambourcin'. The average weight per cluster was 0.26 lbs. (Table 1).

In a two-vine planting at Geneva observed from 1996 to 2002, vines of 'Abundance' produced 30 lbs. fruit/vine, with 0.31 lbs./cluster and a mean berry weight of 1.56 g. By comparison, 'Concord' in 2001 and 2002 averaged 12.1 lbs. fruit/vine, with 0.21 lbs./cluster and mean berry weight of 3.34 g. The annual cane pruning weight per vine was 4.9 lbs/vine (range 2.5 to 7.2) for 'Abundance'. Commercial experience has shown that 'Abundance' is well adapted to mechanized production systems. Hedge and minimal pruned 'Abundance' vines have sustained productivity and achieved satisfactory fruit maturity over several years.

'Abundance' vines are rated as very winter hardy at Geneva. Trunk damage has not been observed and primary bud cold hardiness is excellent. Following extensive winter cold damage (1980/81) at Geneva, vines of 'Abundance' had 17 per cent shootless nodes, comparing favorably with 'De Chaunac' (22%), 'Marechal Foch' (19%), and 'Concord' (5.9%) and better than 'Baco noir' (61%) and 'Chambourcin' (93%). Between the winters of 1996/97 and 2001/02, mid-winter primary bud cold hardiness was measured by differential thermal analysis (Pool et al. 1990). The predicted temperature of 50% primary bud kill (LTE₅₀) for 'Abundance' was -17.1 F (range -14.6 to -20.4 F). During this same period, the LTE₅₀ for 'Concord' was similar; mean of

Table 1. Annual growth and viticultural performance of wine grapes grown at Dresden, New York, 1979-1983 (3 replications of 5 vines each).

Cultivar	Cane pruning weight (lbs/vine)	Mean cluster weight (lbs.)	Fruit yield Tons/acre
Abundance	2.8 bc	0.26 bc	6.7 ab
Chambourcin	1.2 d	0.46 a	3.3 b
Chancellor	1.8 d	0.40 ab	4.6 ab
Concord	2.2 cd	0.22 c	4.5 ab
De Chaunac	3.6 ab	0.33 abc	7.0 a

Mean separation within columns by Duncan's multiple range test, $p \leq 0.05$.

Table 2. Wine and juice analyses for 'Abundance' and additional red wine varieties, 1997 to 2001.

Variety	Yeast / Treatment*	Date of Harvest	JUICE ANALYSES					WINE ANALYSES (after ML, before TA adjustments)			
			Brix	pH	TA g/L	Tartrate g/L	Malate g/L	pH	TA g/L	Tartrate g/L	Malate g/L
Abundance	EC1118/HP	18-Sep-01	20.8	3.38	12.7	5.50	3.50	3.64	10.9	2.58	5.19
Chambourcin	EC1118/FS	9-Oct-01	22.2	3.32	10.4	8.90	2.40	3.12	11.4	5.28	1.95
Lemberger	Syrah/FS/ML	17-Oct-01	23.4	3.43	7.5	6.10	2.30	3.54	6.2	3.88	<0.1
Abundance	EC1118/HP	27-Sep-00	22.0	3.28	17.5	4.77	6.88	3.36	13.6	2.90	6.60
Chambourcin	Juice Only	23-Oct-00	18.0	3.01	13.7	6.37	6.09	***	***	***	***
Dornfelder	AMH/FS/ML	28-Sep-00	18.0	3.02	7.4	4.23	2.62	3.33	7.1	1.79	0.02
Lemberger	Syrah/ML	31-Oct-00	20.8	3.03	8.7	7.28	3.27	3.67	5.6	2.13	0.21
Abundance	EC1118/HP	9-Sep-99	19.6	3.11	10.4	***	***	3.58	8.8	2.25	4.20
Chambourcin	AMH/FS/ML-EQ54	11-Oct-99	20.0	3.03	11.8	***	***	3.78	6.4	1.55	<0.10
Dornfelder	AMH/FS/ML-M	13-Sep-99	20.5	3.17	6.0	***	***	3.27	6.8	2.18	<0.01
Lemberger	AMH/FS/ML-EQ54	6-Oct-99	23.0	3.09	7.9	***	***	3.57	5.5	1.75	<0.05
Abundance	EC1118/HP	16-Sep-98	21.4	3.20	10.5	3.17	3.03	3.61	8.4	1.51	4.99
Chambourcin	FS/AMH/ML	12-Oct-98	20.0	2.99	10.5	5.11	3.98	3.93	5.6	1.91	0.44
Dornfelder	AMH/ML	16-Sep-98	18.0	3.03	6.3	3.79	1.73	3.44	6.0	1.99	0.16
Abundance	EC1118/HP	24-Sep-97	19.2	3.42	11.5	5.74	3.33	3.35	10.1	2.33	2.32
Chambourcin	AMH/FS	9-Oct-97	20.2	3.08	13.2	6.26	5.65	3.24	9.2	2.22	0.54
Dornfelder	AMH/FS	25-Sep-97	18.8	3.04	8.6	4.98	3.40	3.42	7.7	2.98	0.32
Lemberger	AMH/FS	15-Oct-97	22.3	3.12	8.9	***	***	3.39	7.3	4.48	0.25

*Abbreviations used: HP = hot pressed at 65 C, 20 minutes; FS = fermented on the skins; ML = malo-lactic fermentation; EQ54 and M = strains of ML bacteria

-17.4 F (range -16.4 to -20.2 F). Data are less complete for other red wine cultivars, but include 'Frontenac', a hardy cultivar from Minnesota, (mean -18.2 F for 1999/2000 and 2000/01); and 'De Chaunac' (LTE₅₀ = -15.3 F in 1996/97). Values for LTE₅₀ can fluctuate depending on local conditions in different regions.

Budbreak is early, yet buds have limited resistance to spring frost damage. Compared to 'Concord', budbreak is one or two days earlier. Between 1996 and 2001, 50% bloom occurred 3 to 6 days before 'Concord'.

'Abundance' ripens usually between mid-September and early October at Geneva. Depending upon maturity and cropping level, 'Abundance' makes medium to dark red wines. In warm years wines may have cherry or red berry aromas with some labrusca notes. In cool years, wines tend to have some vegetative or herbaceous aromas. Color intensity of 'Abundance' wines is almost as good as for 'Baco noir', and better than other hybrid grapes like 'De Chaunac', 'Rougeon', 'Cascade' and 'Rosette'. The wines usually have better tannin structure than wines made from 'Baco noir' or 'De Chaunac'.

'Abundance' wines often have both high acidity and a moderately high pH (Table 2). The acidity is lower in comparison to 'Baco noir', 'De Chaunac' and 'Rougeon', but higher than the acidity among red vinifera varieties like 'Dornfelder' and 'Lemberger'. Use of malo-lactic fermentation combined with limited bicarbonate acidity adjustment may be desirable. Alternatively, the wine acid balance can be adjusted by blending and/or sugar adjustment. Sugar accumulation is very satisfactory, ranging from a low of 19.2 to a high of 22 Brix in a warm year. Successful commercial 'Abundance' wines have been made as light (not heavily extracted) wines. Use of hot pressing (via heating of crushed fruit to 65 C for 20 minutes), short skin contact time, or some carbonic maceration may be appropriate. 'Abundance' appears to be most suited to the production of standard quality table wine when combined with highly productive hybrid or vinifera wine varieties. Commercial wine makers have found 'Abundance' wines to be a valuable blending component in both hot and cool years.

Diseases can be readily controlled with 'Abundance'. It is considered to be moderately susceptible to powdery mildew, downy mildew and *Botrytis* bunch rot. Under typical disease control programs, these diseases are not usually a problem. Dead arm disease (*Eutypa lata*) has been observed occasionally as well, but does not present viticultural limitations.

'Abundance' is recommended for all wine growing regions of New York. Winter hardiness is not a limiting factor, but care must be exercised in areas subject to spring frost damage.

AVAILABILITY

Vines of 'Abundance' may be obtained via licensed commercial nurseries; contact B.I. Reisch <bir1@nysaes.cornell.edu> for a list of sources. Commercial nurseries should contact Cornell Research Foundation, 20 Thornwood Drive, Suite 105, Ithaca, New York 14850 (phone: 607-257-1081; fax: 607-257-1015; email <des33@cornell.edu>) for a license to propagate and distribute 'Abundance'. Virus-tested cuttings may be obtained from Foundation Plant Materials Service, University of California, One Shields Avenue, Davis, California 95616-8600 (phone: 530-752-3590; fax: 530-752-2132; email <fpms@ucdavis.edu>).

LITERATURE CITED

Pool, R.M., B.I. Reisch and M.J. Welser. 1990. Use of differential thermal analysis to quantify bud cold hardiness of grape selections and clones. *Vitis* (special issue) Proc. 5th Int. Symp. Grape Breeding 318-329.

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