

Characteristics of the Wine Grape Cultivar, 'DeChaunac', as Grown in Erie County, Pennsylvania^{1, 3}

C. W. HAESELER AND ROBERT B. BEELMAN²

Introduction

Commercial production of wine grapes commenced in the mid-1800's along the southern shore of Lake Erie. Principal wine cultivars at that time were 'Delaware' and 'Catawba', a situation which still exists today. Strong interest in other wine cultivars occurred as efforts to change the wine law in Pennsylvania were successful, and stronger interest in European-type wines became evident. These facts necessitated investigation as to whether or not cultivars other than 'Delaware' and 'Catawba' could be grown successfully along Pennsylvania's primary grape belt. Therefore, vines of the 'DeChaunac' cultivar were planted in 1967 to determine whether or not this cultivar could be grown commercially in this area.

Review of Literature

Although 'DeChaunac' (Seibel 9549) is a French-American hybrid, Galet (7) made only passing reference to this cultivar in his treatise on French wine varieties. Canadian researchers (4) have experimented with this cultivar since 1949 and have been quite successful with it. It also received favorable wine ratings in Ontario (12). Results from New York (6) have indicated 'DeChaunac' vines to be low to medium in vigor, but the musts consistently fermented into a very high quality wine. Research in Ohio (5) has shown that 'DeChaunac' was of questionable commercial value, due to

rather poor vigor and production. This cultivar, also, was injured by low winter temperatures and spring frosts in southern Ohio. Gallander and Stetson (8) indicated, however, that 'DeChaunac' must fermented into a high quality wine.

Methods and Materials

One-year rooted cuttings of 'DeChaunac' grapevines were planted at The Pennsylvania State University Research Laboratory located in North East, Pennsylvania in May 1967. Vines were set eight feet apart in rows spaced nine feet. Each plot consisted of three vines and was replicated three times. Formerly, the site was a tart cherry orchard in which the soil type was a Conotton gravelly loam. This soil is deep, well-drained, low in organic matter and of medium fertility. Soil pH is naturally low and the soil is high in available potassium. Normally, this type of soil is low in available magnesium, calcium and phosphorous. However, the levels of these elements were increased through application of fertilizer and dolomitic limestone (Table 1).

Initially, vines were trained to the Umbrella-Kniffin system and subsequently to the Six-Arm Kniffin system. Vines were balance-pruned in accordance with the 30 + 10 scale (10).

Weed control was affected by mechanical means for the first two years. From the third year onward herbicides were applied as recommended in the Pennsylvania Insect,

¹This research was made possible through funds provided by the Pennsylvania Department of Agriculture.

²Associate Professors, Pomology and Food Science, Department of Horticulture, The Pennsylvania State University, University Park, Pennsylvania 16802.

³Authorized for publication as Paper No. 4896 in the Journal Series of The Pennsylvania Agricultural Experiment Station. Authorized for publication July 16, 1975.

Table 1. Fertilizer program for the wine grape cultivar 'DeChaunac' over seven growing seasons in Erie County, Pa.

Year	Amounts of lime and fertilizer applied per hectare			
	Dolomitic limestone (M.T.)	10-10-10 (M.T.)	Ammonium nitrate (kg)	Magnesium oxide (kg)
1967	2.0	1.14		
1968			227	
1969			340	227
1970	2.0			
1971			227	
1972			227	
1973			340	

Disease and Weed Control spray schedule (1), as were insecticides and fungicides. Soil management consisted, principally, of trashy cultivation. A cover crop of rye grass was sown each year in late July or early August.

Crop control, by means of cluster thinning, was exercised annually and consisted of removing all fruit during the first two years the vines were in the vineyard. Two to three clusters were left per shoot in 1970 and 1971. Thereafter, only two clusters were allowed to remain per shoot. Clusters were removed approximately one week prior to peak bloom.

Results and Discussion

Yields varied from a high of 23.59 M.T./ha in 1971 to a low of 14.52 M.T./ha in 1972 (Table 2). The low yield in 1972 was attributed principally to low temperatures (17.2°C) and unusually heavy rain during bloom which resulted in poor fruit set. High yields, resulting in poor vigor in 1971 and 1972, were due to insufficient knowledge of the bearing potential of this cultivar and to unusually heavy fruit set during the 1971 season. Average yield for the four-year experimental period was 18.98 M.T./ha. These data for yield supported those reported in Canada (4), but were generally higher than re-

ported in Ohio (5). In the latter situation 'DeChaunac' vines were severely retarded as a result of low winter temperatures and spring frosts. Retardation of development by cold injury was not experienced in Pennsylvania.

Number of clusters per vine varied over the four-year experimental period, but not to the extent expected from the variation manifested in the data for yield (Table 2). The number of clusters, prior to thinning, ranged from two to five per shoot. Low numbers of clusters noted in 1973 were due to the cluster thinning technique employed in an effort to obtain better quality fruit. Since cluster thinning was utilized regularly in the last two years, but not consistently so in the initial fruiting years, it appears that this practice was a principal factor associated with lower yields in 1972 and 1973.

Cluster weights were rather consistent, except for 1972, when fruit set was poor (Table 2). Clusters ranged in size from small to medium, as expressed by weight. They were long, conical, and rather loose, particularly at the apex.

Berry weights ranged from a high of 1.96 gms to a low of 1.41 gms (Table 2). Thus, berries of this cultivar were small. Berry shape was

Table 2. Vine and must characteristics of the wine grape cultivar 'DeChaunac' (Seibel 9549) over four growing seasons in Erie County, Pa.

Year	Yield (M.T./ha.)	No. of clusters per vine	Cluster weight (gms)	Berry weight (gms)	Vine vigor (kg/vine)	Yield per node (gms)	Soluble solids (per cent)	Total acidity (gms/100 gms)
1970	22.45	142	100.8	1.81	1.77	336.55	19.7	0.98
1971	23.59	153	102.2	1.66	1.14	433.50	16.0	1.04
1972	14.52	133	71.2	1.41	1.04	275.58	18.2	1.19
1973	15.37	108	94.9	1.96	1.36	206.30	19.8	1.06
Mean	18.98	134	92.2	1.71	1.33	312.98	18.4	1.07

round and berries were black in color. Fruit was covered with a heavy bloom which caused it to appear blue-black rather than black in color.

Vine vigor ranged from medium to high as weights of one-year wood removed ranged from 1.04 to 1.77 kg per vine (Table 2). These data were similar to those reported by Bradt (4) for non-thinned 'DeChaunac' vines growing in a Vineland fine sandy loam. Vines of this same cultivar grown in Trafalgar clay were not as vigorous as those reported here, regardless of the cluster thinning technique utilized. Vigor was greater than reported in New York (6) and Ohio (5).

Yield of fruit retained per node for this cultivar ranged from 206.3 to 433.5 gms. The mean value for the four-year duration was 312.98 gms (Table 2). These data, except for 1972, paralleled those for yield. Effects of cluster thinning were evident in the last two years, as yield per node was lower in those years.

Soluble solids content of the must averaged 18.2 percent for the four fruiting seasons. Variability was not as great as some other characteristics, as soluble solids percentage ranged from a low of 16.0 to 19.8 percent (Table 2). Although these values were considered low for fermenting into red wines, they were within workable limits and slightly higher than

those reported in New York and Ohio (6, 8).

Total acidity of the juice, expressed as tartaric acid, averaged 1.07 gms per 100 gms of must (Table 2). Values were higher than ideal, but were within usable limits and were similar to those obtained in southern Ohio (8).

Nutritional status of vines for ten essential mineral elements for three growing seasons are presented in Table 3.⁴ Levels of these elements were similar to those reported for Concord grape vines in Pennsylvania (11), except for nitrogen. Nitrogen levels for 'DeChaunac' were much higher than for 'Concords' which probably was due to the difference in sampling technique. Principal difference between sampling 'DeChaunac' and 'Concord' grape vines for analysis was that only petioles are utilized for 'Concord' vines whereas entire leaves were used for analysis of the 'DeChaunac' plants. Entire leaves were used for 'DeChaunac' vines because petioles are much smaller than those of 'Concord'. If only petioles were used, a much larger sample would have been required from 'DeChaunac' vines than from 'Concord' to obtain a large enough dry sample for analysis. Thus, these data establish a base for standard values for ten essential mineral elements for this cultivar in Pennsylvania.

⁴Soil analysis data are available upon request.

Table 3. Mean values for 10 essential mineral elements in the most recently fully expanded leaves of bearing grape vines of the 'DeChaunac' cultivar (1970-1973).

Year	Percent of dry weight				Ppm of dry weight					
	N	P	K	Ca	Mg	Mn	Fe	Cu	B	Zn
1970	3.21	.25	1.56	1.43	.24	147	146	11	32	29
1971	3.35	.25	1.53	1.65	.23	153	207	11	30	18
1972	3.24	.23	1.56	1.35	.28	161	172	11	24	27
1973	3.07	.26	1.42	1.52	.27	173	210	11	36	33
Mean	3.21	.25	1.52	1.49	.26	158	184	11	30	27

Magnesium levels for 'DeChaunac' vines were slightly lower than reported for 'Concord' grape vines (11). Magnesium deficiency was observed several times since 1967, particularly during wet, cold conditions, as leaves were attaining a fully expanded condition.

Other observations included winter injury symptoms, disease occurrence, commencement of various growth stages and harvest dates. Bud swell normally occurred between late April to the first few days in May. Peak bloom occurred around June 25th, which is slightly later than 'Concord'. Generally, first color was observed about the middle of July, quite early in the season. Harvest normally ranged from Sept. 25 to Oct. 16, approximately 100 to 110 days after peak bloom.

Although exposure to low winter temperatures (-5°F or lower) was more frequent than normally expected (9), cold injury symptoms have not been apparent to date. Some shoot tip die-back was noted every year, but was never particularly harmful.

Leaf lesions of dead arm (*Phomopsis viticola*, Pine) were noted in 1972, but shoot infection was not detected in that year. Also, vines have not shown dead arm symptoms since that time. Other diseases have not been

particularly bothersome. Insect control has not been anymore difficult than with 'Concord' vines.

Basic growth pattern was droopy, but canes were rather short and not particularly large in diameter. In the first few years plants suckered profusely. Consequently, more time and effort were expended for sucker removal from this cultivar than normally required for 'Catawba' or 'Delaware' vines. Tendrils were rather small and weak. At full berry maturity, pedicels tended to desiccate, shrivel and become brittle. Thus, this variety may be well-adapted to mechanical harvesting.

Beelman (2) and Beelman and McArdle (3) reported that wine fermented from the musts of 'DeChaunac' were excellent, particularly for blending purposes.

Conclusions

The wine grape cultivar, 'DeChaunac' has grown and produced well, provided acceptable quality must along with good quality red wine over four bearing seasons. It has been relatively free of insect, disease and low temperature injury problems during this time and is a cultivar that has definite commercial potential in Erie County, Pennsylvania.

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Scion Selection for Green Wood Grafting in Apple

D. F. DAYTON¹

The results obtained from grafting presumably non-dormant *Pyrus* budwood were recently described by Thompson (2). "Green Wood Grafting" is suggested as a term for this technique since it more accurately describes the dormancy condition of the scion wood.

In this test, vigorously growing terminal shoots of 'Starking Delicious', 30-32 cm in length, were collected on 2 July, 1975. The leaf blades and all but 5-6 mm of the petioles were immediately removed. Approximately 5 cm of the softest green tissue at the distal ends of the scions was also excised. Scions thus prepared were held in poly wrapping at c.a. 5°C until the following day.

A total of 12 seedling apple plants in their second leaf were available. These had previously been selected for uniformity in size and were growing vigorously in the nursery, having been started in the greenhouse in late April and transplanted approximately 30 days later. The tops of these seedlings were excised on 3 July, 12-13 cm above the soil line. The remaining stubs, on which the bark was slipping well, were each grafted to a single scion piece using the bark grafting technique (1, p. 390). This technique was considered most practical due to the relatively small diameter and soft condition of the scion material. The grafts were tied with rubber tapes and all cut surfaces were coated with a water-asphalt grafting compound.

¹Department of Horticulture, University of Illinois, Urbana, Illinois 61801.