Characteristics of the Wine Grape Cultivar Vidal 256 As Grown in Erie County, Pennsylvania[1]

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The cultivar Vidal 256 (V-256), a progeny from the cross 'St. Emilion' x 'Seibel 4986,' was highly productive, vigorous and fairly resistant to mildew in France (9). It also seemed to fruit well after being subjected to frost. Fruit tended to be acid and the wine was alcoholic and slightly scented. Einset *et al.* (8) classified 'V-256' as hardy, late maturing, but that musts contained acceptable sugar to ferment into sound wines possessing good aroma. Wines, however, tended to be young, slightly harsh, tart and somewhat thin in body. Cahoon and Gallander (6) reported 'V-256' as vigorous, moderately winter hardy with crown gall (*Agrobacterium tumefaciens,* Smith & Towne) in evidence. Incidences of other disease organisms were low. Musts ranged in soluble solids from 17.9% to 23.0% in some years. Under southern Ohio conditions total acidity values were low (0.82 g/100 g). Wines possessed fine aroma, were slightly tart, but were rated as good.

Methods and Materials

One-year rooted cuttings of 'Vidal 256' 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).

Table 1. Fertilizer program for the wine grape cultivar 'Vidal 256' for nine growing seasons.

	Amounts of lime and fertilizer applied per hectare			
Year	Dolomitic limestone (t)	10-10-10 (t)	Ammonium nitrate (kg)	MgO (kg)
1967	2.0	1.14		
1968			227	
1969			340	227
1970	2.0			
1971			227	
1972			227	
1973			340	
1974			340	227
1975			340	

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 (13).

Weed control was effected by mechanical means for the first two years. From the third year onward herbicides were applied as recommended in the Pennsylvania insect, disease and weed control spray schedule 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

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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.

Data collected consisted of yield of fruit per hectare, no. of clusters per vine, cluster wt, berry wt, % soluble solids and total acidity of the must, vine vigor and yield of fruit per retained node. Soluble solids was determined with an Abbe' refractometer after the musts were filtered. Total acidity was ascertained in accordance with the procedure described by Amerine (1). Sampling of fruit for berry weights, soluable solids, and total acidity determination was in accordance with that of Shaulis (12) except that 150 berries were taken per sample.

Analytical and sampling procedures for plant analysis were those described by Smith *et al.* (14) with the exception that an emission spectrograph was used for all elements except nitrogen. Also, entire leaves were analyzed rather than petioles alone.

Results 'V256'

Yields varied from a high of 28.7 metric tons per hectare (t-ha) in 1971 to a low of 1.4 t-ha in 1972 (Table 2). Low yield in 1972 was attributed to high production in 1971 coupled with poor fruit setting conditions of low temperatures (17.2°C) and unusually heavy rain during the bloom period. High yield experienced in 1971, resulting in poor vine vigor, was due to insufficient knowledge of the bearing potential of this cv which resulted in a high number of clusters per vine. Average yield for the six-year experimental period was 18.1 t-ha. These data for yield support observations reported by Galet (9).

Number of clusters per vine varied considerably from season to season (Table 2). This variation was consistently reflected in the yield pattern for those years as well, except for 1972 when fruit set was poor and berries were small. Number of clusters prior to thinning ranged from two to four clusters per shoot. Difference in yield reflected for 1970 and 1973 was a result of an excellent set of fruit in 1973 whereas fruit set was low in 1970 although berries were well-developed.

Cluster weights varied considerably from year to year reflecting the inconsistency noted in fruit set and berry development. Weights of clusters ranged from a high of 216.5 g in 1973 to a low of 11.06 g in 1972 exhibiting a 6-year mean of 157.9 g (Table 2).

Berry weights ranged from a high of 1.67 grams to a low of 1.45 gms (Table 1). Therefore, berries of this cv were small in size. Berry shape was round and berries were green-golden in color exhibiting prominent lenticels. When fully mature, fruit appeared somewhat translucent. Bloom was medium to heavy.

Vine vigor ranged from medium to high as weights of one-year wood re-

Table 2. Vine and must characteristics of the wine grape cultivar 'Vidal 256' over six growing seasons in Erie County, Pa. (1970-1975).

Year	Yield (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	11.6	56	137.0	1.60	1.7	174.2	20.3	1.11
1971	28.7	116	163.7	1.63	1.1	330.9	19.0	1.10
1972	10.4	62	110.6	1.27	1.2	157.0	20.3	1.35
1973	18.3	56	216.5	1.67	1.2	255.8	21.8	0.96
1974	22.6	96	155.6	1.45	1.4	315.4	16.7	1.49
1975	16.9	68	164.2	1.57	1.2	254.4	20.6	1.18
Mean	18.1	75	157.9	1.53	1.3	247.9	19.8	1.20

moved ranged from 1.1 kg/vine to a maximum of 1.7 kg/vine (Table 2). Canes were large in diameter and produced a number of laterals. These data supported observations reported elsewhere (6, 9) in that vines were quite vigorous.

Yield of fruit per retained node ranged from 157.0 gms in 1972 to 330.9 gms in 1971 (Table 2). The mean value for the six-year duration was 247.9 gms. Thesse data paralleled those for yield.

Soluble solids content of the must averaged 19.8% and, except for 1974, was fairly consistent (Table 2). Soluble solids in 1971 was 19.0% whereas in 1974 it was 16.7%. Yield was also high (22.6 t-ha) in 1974. In addition, the number of growing degree days in September and October were considerably lower in 1974 (369.9) than 1971 (828.0), the only year in which yield was greater than that obtained in 1974. Average soluble solids percentage for the 6-year duration corresponded to that reported from southern Ohio (6).

Total acidity of the juice, expressed as tartaric acid, averaged 1.20 gms/100 gms of must (Table 2). Values were higher than ideal and also higher than those reported from southern Ohio (6). Total acidity, however, was within workable limits.

Nutritional status of vines for ten essential mineral elements for six growing seasons is presented in Table 3. Levels of these elements were similar to those reported for 'DeChaunac' grape vines in Pennsylvania (10). As reported for 'DeChaunac' plants (10), nitrogen content in the leaves of 'Vidal 256' vines, expressed as percent dry weight, was the only element that manifested a significant difference from those reported by Smith *et al.* (14) for 'Concord' vines. The principal reason for this variation has been reported previously (10). Therefore, these data established a base for standard values for ten essential mineral elements for the cv Vidal 256 in Pennsylvania.

Foliage of 'Vidal 256' plants did not exhibit magnesium deficiency symptoms, as reported for the cv DeChaunac (10). However, erratic fruit set in some years, particularly in 1972, lends support to the hypothesis that boron content might be more desirable at a higher level than reflected in the data presented in Table 3, since this element has been shown to affect fruit set in some cvs in other grape districts of the United States (7).

Other observations included manifestation of low temperature injury, incidence of insect and disease problems, commencement and time of occurrence of various growth stages and time of harvest. Vines produced long heavy canes and exhibited a basic growth pattern that was upright-spreading. Sucker occurrence in the formative years was greater than for 'Concord,' but not nearly as profuse as observed with 'DeChaunac' vines (10). Tendrils of this cv were heavy and strong.

Bud swell was initiated from late April to early May, whereas bud break and shoot emergence were not evident until mid-to late May. Peak bloom occurred about June 28th, approximately 8-10 days later than 'Concord' and 5-6 days after 'DeChaunac' (10). Harvest normally ranged from October 16 to October 27, approximately 115 days after peak bloom. Fruit was very persistent.

Although vines were exposed to low winter temperature (−5°F or lower) several times, cold injury symptoms observed were relatively minor. Buds on vigorous canes were more susceptible to low temperature injury than those on laterals. Although some trunk injury has been noted in some vineyards in Erie County, this type of injury was not observed in the test plots during the 6-year experimental period. Shoot tip die-back was evident in every year, but was never

Table 3. Mean values for 10 essential mineral elements in the most recently fully expanded leaves of bearing grape vines of the 'Vidal 256' cultivar (1970-1975).

Year	Percent of dry weight				Ppm of dry weight					
	N	P	K	Ca	Mg	Mn	Fe	Cu	B	Zn
	3.11	0.25	1.46	1.40	0.26	129	83	11		
	2.94	0.24	1.82	1.61	0.37	163	106	9		
	3.29	0.24	1.36	1.21	0.28	121	117	11		
	2.99	0.26	1.32	1.45	0.33	128	73	10		
	3.41	0.28	1.47	1.48	0.29	162	119	14		
	3.61	0.23	1.14	1.72	0.35	142	147	11		
	3.23	0.25	1.43	1.48	0.31	141	108	11		

detrimental with respect to fruit production.

Vines have been relatively free of serious insect and disease problems. Powdery mildew [*Uncinular necator* (Schwein.) Burr.] was evident late in the season on fruit clusters which never matured, but was not transmitted to other parts of the vine. Fruit remained relatively free of any disease or disorder. Infestation by the aerial form of grape phylloxera [*Daktulosphaira vitifoliae* (Fitch)] was nil in the test plots; however, Jubb (11) reported that 'Vidal 256' was moderately susceptible to infestitation by aerial phylloxera in his observations in Erie County, Pa. Basically, control of insects and diseases was adequate when recommendations for the cv Concord were strictly followed. Fruit loss as a result of bird depredation was minimal.

Beelman (2, 3) and Beelman and McArdle (4, 5) reported that wines fermented from the musts of 'Vidal 256' were consistently rated as the best of those white wine cvs evaluated for manifesting a "vinifera-like" character.

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