tissues. The successive stages of abscission illustrated by SEM provide more precise knowledge of fruit growth, more specific timing of development from blossom at anthesis and subsequent growth of the young fruitlet.

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American Hybrid Grape Cultivars in Australia

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About ten years ago a planting of American hybrid grape cultivars was started at the Merbein field station of the CSIRO Division of Horticultural Research. Merbein is a semi-arid irrigation area of the Murray Valley in north-west Victoria, Australia. Mean maximum temperature during the hottest months is about 32°C and the relative humidity is low. Soils are highly alkaline and the soil type supporting the planting, Coomealla sandy loam (2), has a brown sandy loam above a light brown sandy clay subsoil containing moderate amounts of lime and rubble. Soils of this kind are widespread in the area.

Such conditions might not be expected to favor American hybrid grapes. The growth of the cultivars planted is shown in Table 1. Only three vines of each cultivar were planted and yield in American hybrids is, of course, very much influenced by cultural practices (5). Under the somewhat restrictive practices used at Merbein, Canada Muscat, Himrod and Romulus yielded at the rate of about 10-12 kg m^{-2}.

The cultivars in each group in Table 1 are listed in approximate order of vigor. Those listed as very weak barely survived and in six years did not develop far enough to produce any fruit. The poorer cultivars in the weak group produced very little fruit, and even on the better cultivars in this group the fruit suffered from excessive exposure to direct sunlight because of the sparse cover of foliage. Lime-induced chlorosis commonly occurred.

The use of a vigorous rootstock appeared to be a possible way of overcoming these problems. Dogridge (V. champini), which is noted for the

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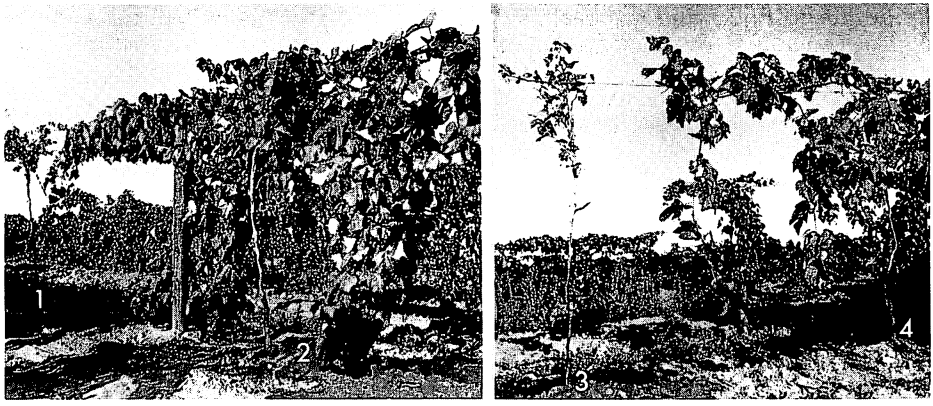

Fig. 1. Effect of grafting Dogridge rootstock on some American hybrid grape cultivars. Photographs taken April 1978.

1. **False Concord on own roots, planted Sept. 1969**
2. **Concord on Dogridge, planted Sept. 1975**
3. **Early Niabell on own roots, planted Sept. 1969**
4. **Early Niabell on Dogridge, planted Sept. 1975**

vigor it imparts to its scions in both California and Australia (1, 4) and which reduces chloride uptake (3), was used. Graftings were made with the cultivars Seneca, Fredonia, Campbell Early, Concord, Early Niabell, Veeport, Vinered, Iona and Delaware and planted in place of or in addition to the original vines. With all cultivars vigorous, healthy and fruitful vines were produced (Figure 1).

The extra growth on the rootstock increased the amount of fruit bearing wood available, from none at all to ample in the case of the cultivars which were very weak on their own roots, and to a worthwhile extent even in the case of Seneca. There was no suggestion of excessive vigor which might prove difficult to manage.

The main interest in the cultivars was their potential for unfermented

Table 1. Growth of some American hybrid grape cultivars on their own roots at Merbein.

Good	Fair	Weak	Very weak
Canada Muscat	New York Muscat	Fredonia	Ontario
Himrod	Elvira	Isabella	Iona
Dutchess	Catawba	Campbell Early	Delaware
Romulus	Alden	False Concord[1]	Diamond
Schuyler	Agawam	Concord	
Seneca		Early Niabell	
		Veeport	
		Elsinburgh	
		Vinered	

[1]Unidentified cultivar from the Foundation Vineyard, Davis, at first thought to be Concord.

grape juice. Following the early success of Canada Muscat a larger planting of this cultivar was made from which very promising unfermented juice and wine have been produced. Details of fruit composition are shown in Table 2.

Of the two seedless varieties, Himrod is the more vigorous, but its fruit abscises as soon as it is ripe. Romulus appears to be more fruitful and the attractive bunches mature and hold well.

Table 2. Composition of Canada Muscat grapes grown at Merbein.

Date of harvest	Total soluble solids °Brix	pH	Titratable acidity gl^{-1} as tartaric
Feb. 6, 1976	18.0	3.21	8.5
Feb. 7, 1977	16.2	3.52	5.7
Feb. 3, 1978	19.5	3.30	5.1

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Black Walnut Variety Trials—1950-1977

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In the spring of 1950 a grove of 59 black walnut trees, grafted on seedling stock, was established on The Pennsylvania State University Pomology Farm. In 1959 two trees of Cornell black walnuts were added to the grove. The tree numbers for each variety are given in Table 1.

The various varieties were obtained from many sources; however, most came from Tennessee Valley Authority nurseries. The exact source of each variety is not known as no record now exists. Through 1961 and 1956 the grove was supervised by the second and third authors, respectively.

The numbers of trees and first-fruiting are presented for each variety in Table 1. The Burton and Cornell trees never fruited. The Burton tree lived through the 18th leaf but was never a vigorous tree. The Cornell trees likewise were weak and developed a "witches broom" growth effect several years before their death. Growth of the other varieties was uneventful.

During the 18-year period, from 1955 to 1977, two crops were lost completely to spring frosts. Although no systematic yield records were maintained, Wiard probably has produced

Authorized as Paper Number 5623 in Journal Series of the Pennsylvania Agricultural Experiment Station.
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