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The Munson Grapes — A Rich Germplasm Legacy[1]

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Abstract

An historical review is presented of the contributions of T.V. Munson to viticulture and the improvement of cultivated grapes. Munson developed more than 300 grape cultivars with the principal goal of combining the pest resistance and climatic adaptability of various native American grape species with the superior fruit quality of commercial cultivars. Several Munson cultivars achieved commercial importance in the early 1900's and a few are still grown today, most notably the rootstock 'Dog Ridge.' Munson's legacy is the genetic diversity within his cultivars; a valuable genetic resource for grape breeders.

Thomas Volney Munson (1843-1913), pioneer in American viticulture, made important contributions in three areas: classification, breeding, and cultural practices. His belief in the importance of genetic diversity to commercial viticulture fueled nearly four decades of work, which included the development of over 300 grape cultivars. Munson centered his research at his Denison, Texas vineyards. His viticultural pursuits, however, led him through 40 states to collect specimens of both wild *Vitis* species and cultivated varieties. He distinguished himself as a botanical authority in 1885, when he presented a preliminary reorganization and expansion of *Vitis* classification to the American Horticultural Society. By 1890, the United States Department of Agriculture published a completed version: "Classification and Generic Synopsis of the Wild Grapes of North America" (16). In 1909, Munson published a classic viticulture text, *Foundations of American Grape Culture*, a treatment of classification, cultivar descriptions, and cultural practices (18).

Beyond these efforts, Munson also joined in the search for solutions to the phylloxera devastation of French vineyards. He suggested the adoption of

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several American species, including *Vitis champini* Planch., *V. rupestris* Scheele, *V. berlandieri* Planch., and *V. cordifolia* Michx., for use as phylloxera-resistant rootstocks (18). The calcareous soils of northern Texas were similar enough to those of France's Champagne region so that compatible, resistant rootstocks could be successfully grafted to major *V. vinifera* L. cultivars. In appreciation of his assistance, the French government awarded him the Legion of Honor's "Chevalier du Merite Agricole" in 1888 (5).

Munson's breeding work was undertaken primarily to combine the disease resistance and climatic adaptability of various native American grape species with the superior fruit quality of commercial cultivars, derived mostly from *V. labrusca* L. and *V. vinifera*. He promoted the use of region-specific breeding, particularly where the economically critical *V. vinifera* cultivars suffered from endemic disease and pest infestations. Munson's interspecific hybrids were developed especially for the southwest. He collected and studied native species for their disease and pest resistance, drought tolerance, soil-specific performance, and fruit qualities, and subsequently performed numerous interspecific crosses and selections of the best progeny.

Although Munson developed and named over 300 grape cultivars, many were used primarily for breeding and relatively few have achieved commercial importance. In 1940, 'Carman' was the most widely grown grape in northern Texas (10). This hybrid between a *V. lincecumii* Buckley selection and the *V. labrusca* X *V. vinifera* hybrid 'Triumph' was favored by Texas growers for its vigor, cold hardiness, and shipability. 'Carman' and 'Extra' (another *V. lincecumii* X 'Triumph' hybrid) were grown as fresh market grapes in Florida for many years (19). As many as 5,000 acres of these and other Munson cultivars were planted in central Florida during the 1920's. The prominence of Munson cultivars in Florida eventually waned because of declining vigor and production, later found to be caused by Pierce's disease.

The most enduring cultivar is the rootstock 'Dog Ridge.' It has been the most important rootstock in Florida (12), and only now is being replaced by a recently developed rootstock, 'Tampa' (14). 'Dog Ridge,' a *V. champini* selection, has succeeded in California (21), Florida (12), Texas (9) and other southern states (1, 7) be-

Table 1. The species makeup of T. V. Munson's important cultivars.

	Species[1]								
	Ae.	Bo.	Ca.	Ch.	La.	Li.	Ri.	Ru.	Vi.
America						X		X	
Amethyst		X			X				X
Bailey					X	X			X
Beacon					X	X			
Bell		X			X		X		X
Brilliant		X			X				X
Captivator		X			X				X
Carman					X	X			X
Champanel				X	X				
Cloeta					X	X		X	X
Dog Ridge				X					
Ellen Scott		X			X	X			X
Elvicand			X		X		X		
Extra					X	X			X
Fern Munson					X	X			X
Gold Coin	X				X				
Headlight		X			X				X
Hidalgo		X			X				X
Jaeger		X				X			
Lomanto		X		X	X				X
Manito		X			X	X		X	X
Marguerite		X				X			
President					X				X
Ramsey				X					
Red Eagle					X				X
Rommel					X		X		X
R. W. Munson					X	X			X
Wapanuka		X			X		X		X
Wine King	X				X	X		X	

[1]Key to species: Ae. = *V. aestivalis*, Bo. = *V. bourquiniana*, Ca. = *V. candicans*, Ch. = *V. champini*, La. = *V. labrusca*, Li. = *V. lincecumii*, Ri. = *V. riparia*, Ru. = *V. rupestris*, Vi. = *V. vinifera*.

cause it is resistant to Pierce's disease, Texas root rot, and root-knot nematode. It is adapted to both light sandy soils (21) and calcareous soils (17) and is tolerant to drought and salinity (3, 17). 'Ramsey' rootstock (syn. 'Salt Creek,' *V. champini*) is another enduring Munson cultivar with multiple pest resistance and tolerance to drought and salinity (3, 8, 17).

The disease resistance of Munson's cultivars, together with their climatic adaptability, make them most useful today as germplasm for breeding programs. Many cultivars have high levels of resistance to major diseases; 'America' and 'Wine King' are highly resistant to both black rot and downy mildew (2). The multiple pest resistance of 'Dog Ridge' and 'Ramsey' has already been mentioned. Resistance to anthracnose also has been reported for 'Dog Ridge' and 'Champanel' (13).

The large number of *Vitis* species represented and recombined in the Munson cultivars provides tremendous genetic diversity. The species background of some of Munson's most important cultivars is shown in Table 1. Munson's method of crossing superior selections of native species with high quality commercial cultivars of *V. labrusca* and/or *V. vinifera* heritage resulted in hybrids with desirable characters from both parents, but frequently inadequate fruit quality for a commercial cultivar. Often, Munson crossed these first generation hybrids to another cultivar, selecting progeny having improved fruit quality and retaining pest resistance and adaptability. Many of his cultivars, therefore, are ready-to-use sources of resistance or adaptation, without the sacrifice in fruit quality experienced with first generation hybrids.

Munson's emphasis on introgressing pest resistance and local adaptation from native species into commercial cultivars has been emulated by modern grape breeders. The Florida breeding program, for example, has utilized its own selections of two native subspecies of *V. aestivalis* Michx., *V. smalliana* Bailey and *V. simpsoni* Munson, to incorporate resistance to Pierce's disease in table grapes, wine grapes, and rootstocks (11, 14).

Munson cultivars have been utilized in several modern breeding programs. 'Harmony' ('Dog Ridge' X 'Couderc 1613), a rootstock released in 1966, incorporates the nematode and disease resistance of 'Dog Ridge,' but has better adaptability to California soils, lower vigor, and is easier to propagate (20). The Florida program used 'Extra' in crosses with *V. shuttleworthi* House in rootstock improvement efforts (15), and putative progeny of 'Extra' or 'Bailey' were important contributors of Pierce's disease resistance (19). Munson's 'Lomanto' was used as a grandparent in the Ontario breeding program to produce 'Vincent,' a wine grape with heavy pigmentation inherited from 'Lomanto' (4).

Greater use of the rich germplasm developed by Munson may have been inhibited in the past by the lack of an organized collection. In the early 1970's, however, Dr. Roy Renfro and others began to search for and collect Munson cultivars from private vineyards (6). Today, 65 of his cultivars are growing in the T. V. Munson Memorial Vineyard at the Grayson County College in Denison, Texas.

Although the grapes of T. V. Munson for the most part are gone from commercial production, their availability as a valuable genetic resource is a living legacy of Munson's grape improvement efforts.

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Quality and Mineral Content in 'Swiss Bartlett' Pears Grown on Clonal Old Home x Farmingdale, Clonal Quince and Seedling Rootstocks

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Abstract

Fruit weight, firmness, percent soluble solids, titratable acidity, and flesh Ca, Mg, K, P and N content of 'Swiss Bartlett' pears were different among several clonal Old Home x Farmingdale (OH x F), clonal Quince and seedling rootstocks. No rootstock was found to be superior but fruit calcium in pears grown on OH x F 230 rootstock was significantly higher than in fruit grown on all the other rootstocks. Fruit calcium and nitrogen contents were higher in the fruit from trees at age 5 to 6 yrs than in fruit from the same trees at age 11-13 yrs. Fruit Mg, K and P showed no trend with tree age.

Introduction

Recent reports by Denby and Meheriuk (2) and Kappel and Quamme (5) have identified several clonal Old Home x Farmingdale (OH x F) rootstocks for commercial use in pear plantings in British Columbia and Ontario, respectively. Two OH x F selections, 69 and 87, were more precocious and had higher yields than most of the other rootstocks in these studies but no effects on fruit quality

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