



Viticulture, enology and marketing for cold-hardy grapes



Brianna, Frontenac, La Crescent, and Marquette Training Trial

West Madison Agricultural Research Station (WMARS)

Verona, WI

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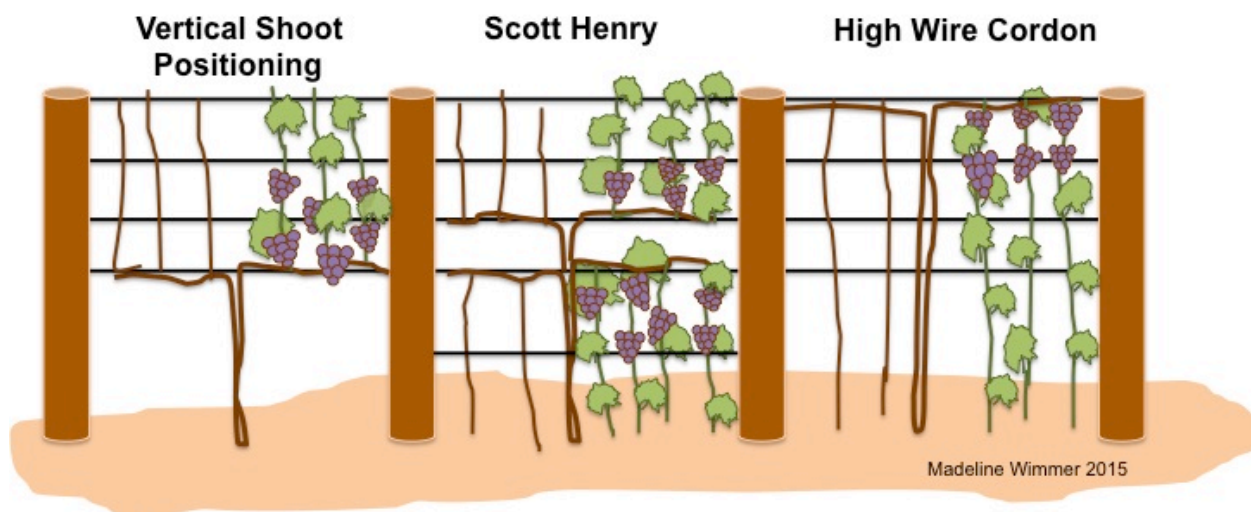
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Background and Rationale:

Cold hardy *Vitis riparia* hybrids can be particularly challenging to manage in the vineyard due to their vigorous growth habit. Choosing an adequate training system can help control growth, positively influence yield, and fruit quality, as well as labor cost. The following study looks at yield, fruit quality, and labor requirements for three training systems for 'Brianna' (**BR**), 'Frontenac' (**FR**), 'La Crescent' (**LT**), and 'Marquette' (**MQ**) cultivars.

Treatments: Grapevines were established at West Madison Agricultural Research Station (WMARS) during the 2012 growing season and cropped for the first time in 2015. Three training systems were established:

- 1) **High Wire Cordon (HC):** Cordons trained to 6 feet off the ground and shoots were positioned downwards.
- 2) **Vertical Shoot Positioning (VSP):** Cordons trained to 3.5- 4 feet off the ground, shoots trained upwards
- 3) **Scott Henry (SH):** Upper cordon trained to approximately 5 feet off the ground, shoots trained upwards and lower cordon trained to 3.5- 4 feet off the ground, shoots combed downwards.



Methods: During 2015, shoot number was adjusted to six shoots per linear foot of canopy at 5" shoot growth for all cultivars. Berry samples were collected once per week starting July 30th (pre-veraison) until harvest (**BR**:

9/6, LT: 9/14, MQ: 9/16, FR: 10/2) for fruit quality analysis (brix, titratable acidity, pH). At harvest, total yield, number of clusters, cluster weight, and berry weight data were collected.

Results 2015: In all cultivars SH training system had the highest yield (kg/vine) and the highest number of cluster per linear meter of cordon (Table 1). Cluster weight was also significantly higher in SH systems for Brianna and La Crescent, but was lowest for Marquette.

There were significant differences among treatments only for Brix at harvest (Table 2). Brianna presented higher Brix in HC and VSP systems compared with SH. La Crescent presented higher Brix in HC and VSP, but the latter was not significantly different from SH. Average berry weight (g) was lowest in SH for Brianna, and in VSP for La Crescent and Marquette. There were no differences in average berry weight among treatments for Frontenac.

Table 1. Yield components in training systems trial at WMARS, Verona, Wisconsin in 2015

Cultivar	Treatment	Yield (kg/Vine)	Number Clusters/Vine	Number Cluster/meter of cordon	Average Cluster Weight (g)	Average Berry Weight (g)
BRIANNA	HC	6.79 ab	47.07	26.3 b	145.12 a	3.18 a
	SH	9.89 a	70.15	44.8 a	142.04 a	2.95 b
	VSP	6.64 b	57.88	33.4 ab	109.12 b	3.06 ab
LA CRESCENT	HC	3.60 b	42.07 ab	25.8 a	84.34 b	1.57 a
	SH	6.44 a	59.10 a	38.1 a	112.34 a	1.62 a
	VSP	1.96 c	28.55 b	17.3 b	71.09 c	1.43 b
MARQUETTE	HC	6.12	52.19 b	31.9b	116.12 a	1.62 a
	SH	6.89	68.75 a	44.1 a	97.22 b	1.59 ab
	VSP	5.98	57.44 ab	33.7 ab	105.1 ab	1.51 b
FRONTENAC	HC	8.75 b	60.00 b	35.6 b	145.99 ns	1.37 ns
	SH	11.35 a	77.50 a	48.3 a	147.24	1.34
	VSP	8.36 b	57.81 b	33.9 b	144.02	1.4

Means followed by the same letter within column and variety are not significantly different at $\alpha=0.05$. Columns where no letters are present indicate no significant differences among treatments.

Table 2. Fruit composition at harvest in training systems trial at WMARS, Verona, Wisconsin in 2015

Cultivar	Treatment	°Brix (% Soluble Solids)	Titrateable Acidity (g/L)	pH
BRIANNA	HC	19.4 a	6.09	3.42
	SH	17.55 b	5.7	3.43
	VSP	19.07 a	4.31	3.46
LA CRESCENT	HC	20.95 a	12.2	3.08
	SH	19.57 ab	11.55	3.14
	VSP	18.5 b	12.87	3.04
MARQUETTE	HC	24.55	10.15	3.43
	SH	24.53	8.86	3.4
	VSP	24.29	9.94	3.47
FRONTENAC	HC	22.95	12.54	3.36
	SH	23.75	12.38	3.35
	VSP	23.3	11.8	3.38

Means followed by the same letter within column and variety are not significantly different at $\alpha=0.05$. Columns where no letters are present indicate no significant differences among treatments.

What the results mean:

- SH training system yielded higher for Brianna, Frontenac, and La Crescent, but not for Marquette. This is probably due to the lower weight of Marquette clusters in the SH training system.
- La Crescent had the lowest yield in the VSP system, due to a significantly lower number of clusters per vine and cluster weight. We observed that fruit set was particularly poor in this variety during 2015, which we attribute to weather conditions during bloom time.
- Higher yields in SH system in Frontenac did not affect cluster weight, berry size, nor did it negatively impacted fruit quality.
- The higher yield observed in Brianna and La Crescent in the SH system negatively impacted the accumulation of soluble sugar (Brix) in comparison to HC system.