Evaluation of cane and spur pruning effect on Traminette crop yield and fruit composition

(Final report)

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Public Abstract: Traminette, a white-berried, French-American hybrid winegrape cultivar, is widely planted throughout the eastern US. Despite its popularity, relatively few formal field research studies have been conducted on Traminette. Traminette is known for bearing a relatively light crop but producing ample vegetative growth. There is thus a need to evaluate methods to improve Traminette crop yield in Southeastern US vineyards through novel practices. A pruning trial was conducted in a commercial vineyard in Hendersonville, NC. Spur pruning density was set by dormant pruning to 20 buds per vine (10, two-bud spurs). Canes were trained bilaterally (two canes per vine) and were pruned to one of the following methods: 1) two, 10-bud canes (20 total buds per vine); 2) two, eight-bud canes (16 total buds per vine); or, 3) two, five-bud canes (10 total buds per vine). Results indicated that pruning treatment had no effect on shoot number, cluster number, or crop yield per bud. Pruning further did not affect primary chemistry (sugar, pH, or titratable acidity) of the fruit juice collected at harvest. These results suggest that spur and cane pruning similarly impact Traminette productivity, regardless of bud number retained per cane or vine.

Introduction: Traminette is a white-berried, French-American hybrid winegrape cultivar produced from a cross between J.S. Seyve 23.416 (*Vitis* spp.) and Gewürztraminer (*Vitis vinifera*). Traminette has been widely planted throughout the Eastern US over the last two decades. However, despite its popularity, relatively few formal field research studies have been conducted on this cultivar (Bordelon et al. 2008; O'Daniel et al. 2012). It is notorious for bearing a relatively light crop but producing large amounts of vegetative growth. That industry anecdote is supported by the Virginia Commercial Grape Report, which reported an average yield of 3.1 tons per acre in Traminette vineyards compared to 4.7 and 4.1 tons per acre in the other hybrid cultivars Vidal blanc and Chambourcin, respectively (Wood et al. 2017). There is thus a need to evaluate methods to improve Traminette crop yield in Southeastern US vineyards through more novel methods besides what was reported by previous studies on bud density (O'Daniel et al. 2012) and trellis division (Bordelon et al. 2008). Two common training/pruning methods are cordon training/spur pruning (henceforth called "spur pruning") and head training/cane pruning

(henceforth called “cane pruning”). Spur pruning is by far the most widely implemented pruning method in Southeastern US vineyards. Growers are hesitant to cane prune due to the fear (without proof) that removal of a large mass of dormant grapevine wood will substantially reduce crop yield. That “fear” should be alleviated by several recent studies that have shown cane pruning to be a viable option across several cultivars and regions (Hatch 2015; Lockwood et al. 2016; Skinkis and Gregory 2017; White et al. 2018). Those studies have confirmed that crop yield and fruit quality are unaffected by pruning method in Cabernet Sauvignon, Pinot noir, and Petit Manseng (Hatch 2015; Skinkis and Gregory 2017; White et al. 2018) but improved by cane relative to spur pruning in Sauvignon blanc (Lockwood et al. 2016). If Traminette is similar to cultivars like Sauvignon blanc, which has lower fruitfulness in basal- relative to apically positioned buds, then cane pruning could improve Traminette crop yield relative to spur pruning. Several veteran Southeastern US vineyard managers and Traminette growers have expressed high interest in learning more about cane pruning effects in modest-yielding Traminette vineyards (Eric Case and Matt Chobanian, personal communication, 2018). The relevance of the evaluation of pruning method in Traminette is not limited to growers of this cultivar. Instead, it is part of a larger effort to refine generally unquestioned, widely adopted, viticulture management practices (e.g., pruning) that could have great long-term impact if it stimulates assessment across the broad range of cultivars and growing conditions throughout the Southeastern US.

Materials and Methods: This project evaluated spur pruning and cane pruning to different cane lengths in a commercial Traminette vineyard (Burntshirt Vineyards’ Sugarloaf Vineyard site in Hendersonville, NC). In 2019, vines were trained to low fruiting wires and vertical shoot positioning was aided by catch wires. Vine spacing was 6 feet and row spacing was 10 feet. Spur pruning (Spur) density was set by dormant pruning to 20 buds per vine (10, two-bud spurs). Canes were trained bilaterally (two canes per vine) and were pruned to 100%, 75%, and 50% of the buds retained in the Spur treatment; thus, cane pruning treatments were one of the following: 1) two, 10-bud canes (20 total buds per vine); 2) two, eight-bud canes (8 BC; 16 total buds per vine); or, 3) two, five-bud canes (5 BC; 10 total buds per vine), respectively. Adventitious, noncount shoots arising from any vine tissue other than one-year old buds were thinned. Since unequal bud numbers were retained per vine, select data are expressed on per bud basis where logical. Due to the coronavirus pandemic, treatments were not carried out and data was not collected in 2020. The completion of this project was postponed to 2021.

Results and Discussion:

Shoot number. There were no significant differences in the number of shoots that emerged from retained buds (Table 1). This suggests that regardless of the number of buds left on the vine, shoot counts will remain the same.

Table 1. Number of shoots per bud retained in Traminette grapevines after they were spur pruned (Spur) or cane pruned 10-, 8-, or 5-bud canes (10 BC, 8 BC, and 5 BC, respectively) in 2019 and 2021.

	Year	
Pruning treatment	**2019**	**2021**
10 BC	0.90	0.53
8 BC	0.91	0.56
5 BC	0.97	0.88
Spur	1.01	0.89
Significance	ns	ns

Crop yield components. Treatments did not affect crop yield per retained bud (Table 2). Logically, cluster number per vine was highest in Spur (32), followed by 10 BC (30), and 8 BC (24) (data not shown) but there was no difference in the cluster number per retained bud (Table 2). There were no differences in cluster weight, berry number per cluster, or individual berry weight.

Table 2. Yield components and berry traits in Traminette grapevines after they were spur pruned (Spur) or cane pruned 10-, 8-, or 5-bud canes (10 BC, 8 BC, and 5 BC, respectively) in 2019 and 2021.

Year	**Pruning treatment**	**Crop yield (lbs. per bud retained)**	**Cluster number (per bud retained)**	**Cluster weight (g)**	**Berry #/ cluster**	**Berry weight (g)**
2019	10 BC	0.40	1.49	122.8	60	2.0
	8 BC	0.45	1.52	131.6	65	2.0
	5 BC	0.45	1.72	129.1	62	2.1
	Spur	0.45	1.58	131.9	62	2.1
	Significance	ns	ns	ns	ns	ns
2021	10 BC	0.29	1.27	104.9	66	1.6
	8 BC	0.31	1.25	114.3	71	1.6
	5 BC	0.33	1.43	100.7	60	1.7
	Spur	0.33	1.49	103.7	61	1.7
	Significance	ns	ns	ns	ns	ns

Primary fruit composition. Treatments had no effect on soluble solids, titratable acidity, or pH (Table 3).

Table 3. Primary chemistry of fruits harvested from Traminette grapevines after they were spur pruned (Spur) or cane pruned 10-, 8-, or 5-bud canes (10 BC, 8 BC, and 5 BC, respectively) in 2019 and 2021.

Year	Pruning treatment	Soluble solid content (°Brix)	Titratable Acidity (TA)	pH
2019	10 BC	22.6	5.7	3.2
	8 BC	22.9	5.8	3.2
	5 BC	22.6	5.7	3.3
	Spur	22.4	5.8	3.2
	Significance	ns	ns	ns
2021	10 BC	20.2	6.6	3.1
	8 BC	20.0	6.7	3.2
	5 BC	20.0	7.4	3.1
	Spur	19.7	6.8	3.4
	Significance	ns	ns	ns

Our results suggest that Traminette shoot production and crop yield per bud were not affected by pruning choice or by the number of buds retained per cane. These results refute two industry anecdotes: (1) that cane pruning reduces crop yield relative to spur pruning, and (2) that shorter canes result in greater consistency in shoot production and greater crop yield relative to longer canes. Pruning to different bud numbers per cane was an attempt to evaluate the latter industry anecdote, by retaining cane lengths that would emulate a between-vine spacing less than six feet. Thus, closer vine spacing may not affect Traminette productivity in cane pruning situations. Our crop yield data was presented on a “per bud” basis. While in both years crops pruned to 10 BC and 8 BC had numerically fewer shoots per bud than 5 BC and spur pruned vines, differences were statistically insignificant. Furthermore, there were no significant differences in crop yield between the pruning treatments. The 33% decrease in average crop yields between years can be attributed to late frost damage in 2021. In conclusion, it is recommended that growers either spur prune their vines or cane prune with 10 buds per cane (10 BC). Both methods offer 20 count buds per vine and considering that pruning has shown that it has no effect on crop yield or chemistry, it would be unnecessary and inefficient to use 5 BC or 8 BC, producing fewer berries per vine.

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