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Effect of Pruning Severity on Growth Behavior of Spur and Bunch Morphology of Grapes (*Vitis vinifera* L.) Cv. Perlette

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ABSTRACT

Pruning severity with previous year bearing status was evaluated for growth behavior of spur and bunch morphology of Grape (*Vitis vinifera* L.) cultivar Perlette. Pruning severity and previous year bearing status had no effect on bud burst, panicle emergence and anthesis date. However maximum percentage of bud burst, fruitful buds and TSS were observed in spurs pruned to six nodes. Pruning of spurs at different nodes affected quality and weight per cane significantly.

Key Words: Grape; Pruning; Spur; Bunch-morphology

INTRODUCTION

Grapes (*Vitis vinifera* L.) are one of the most delicious, refreshing and nourishing fruit of the world. Grape vine has great response to pruning. Vine pruning improves the nutrient uptake and utilization while fruit pruning accompanied by thinning permits a balance of yield capacity and crop than does pruning alone. With less severe pruning and with crop control achieved by thinning, the quality of grapes is improved owing to the increase in the ratio of leaves to crop (Winkler, 1958; Kliever & Weaver, 1971). Pruning severities enhanced the length of fruit spur (2-5 buds), which significantly increased the yield. The optimum cluster and 100 berry weight, TSS enzyme activity and the lowest shot berries were obtained on spurs with 2-4 buds (Al-Daujaili, 1989).

The present study was conducted to evaluate reduction in the bunch compactness and improvement in productivity and quality of Perlette grapes at different pruning levels.

MATERIALS AND METHODS

In 15 years old vineyard of cv. Perlette trained on pergola, 18 vine were selected for experiment. Bearing and non-bearing canes of the previous year were tagged for the study. Pruning was done on 15th February, 1998 and 15th February, 1999.The experiment was laid out in Randomized Complete Block Design (RCBD) with three levels of time *viz*. 4th &14th March and 3rd April. Two bearing levels of non-bearing canes, and three levels of pruning viz. spurs pruned to 6, 8 and 10 nodes were replicated six times.

Physical characteristics. For bud bust, the canes were pruned to different number of nodes and tagged. Data were collected for bud bursting, panicle emergence, anthesis and fruit set percentage.

$$Fruit\ set\ \%age = \frac{Total\ Number\ of\ \ Fruit\ set}{Total\ Number\ of\ \ flowers} \times 100$$

Mean bunch weight was determined once at harvesting.

Acidity of fruit juice. Juice (5 mL) was taken and then diluted in 100 mL measuring flask by adding distilled water. It was titrated against N/10 NaOH using phenolphthalein as indicator (Hurtwitz, 1990). The results were expressed as percent citric acid by using the following formula:

$$Acidity\%age = \frac{N/10 NaOH used \times 0.0064}{Vol.of\ \ sample\ used} \times 100$$

Leaf NPK analysis. Leaf nitrogen was analyzed according to method described by Chapman and Parker (1961). For phosphorus (P) and potash (K) determination, wet digestion was done (Yoshida *et al*., 1976). Both P and K were then analyzed (Chapman & Parker, 1976).

RESULTS AND DISCUSSION

Pruning severity and previous year bearing status showed no effect on bud burst percentage, panicle emergence time, date of anthesis and acidity percentage whereas fruitfull buds, bunch weight and leaf N, P and K contents were significantly affected by the pruning levels (Table I). Although, there was non-significant effect of pruning severity on the bud burst yet non-bearing canes had more bud burst percentage than the previous year bearing canes pruned to same number of nodes and bud burst percentage was indirectly proportional to number of nodes. Previous year non-bearing canes obviously had more potential that is why performed better than bearing canes during previous year.

Table I. **Effect of pruning on growth behavior of spur and bunch morphology of grapes**

Treatments	Bud bursts %		Panicle emergence time		Anthesis time		Fruitful bud/ cane		Bunch weight (g)		Juice acidity (%))		Leaf N	Leaf P	Leaf K
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	(%)	(%)	(%)
Bearing canes spur pruned to 6 nodes	59.21	61.08	March	March	April	April	68.86 b	63.33 c	848 a	870.83 a	0.93	0.92	1.1 ab	0.27	1.91 a
Bearing canes spur pruned to 8 nodes	56.86	59.70	March	March	April	April	63.86 de	59.26 d	822.66 b	847.41 b	0.90	0.91	1.06 cd	0.22	1.78 cd
Bearing canes spur pruned to 10 nodes	52.77	55.77	March	March	April	April	63.31 e	55.53 e	748.3 d	786.62 c	0.90	0.91	1.00 e	0.17	1.77 d
Spurs of non bearing canes pruned to 6 nodes	62.91	63.12	March	March	April	April	69.90 a	71.66 a	839.66 ab	857.42 ab	0.92	0.91	1.16 a	0.30	1.93 a
Spurs of non bearing canes pruned to 8 nodes	57.63	60.19	March	March	April	April	66.66 c	66.33 b	788.0 c	840.46 b	0.91	0.91	1.08 c	0.26	1.79 c
Spurs of non bearing canes pruned to 10 nodes	59.99	55.00	March	March	April	April	69.03 d	62.03 c	743.3 d	773.31 c	0.91	0.91	1.05 d	0.29	1.78 cd

The pruning levels have non-significant effect on panicle emergence and anthesis date during both the years of study. The results are supported by the findings of Chadha *et al*. (1969), and Jauhari and Hand (1970), respectively.

Fruitful buds/cane were significantly effected by the pruning levels and statistically maximum fruitful buds were recovered on previous year non bearing canes with low number of buds while minimum fruitful buds were observed in previous year bearing cane pruned up to 10 nodes. The results are similar to the findings of Kumar and Chohan (1989). Pruning levels significantly affected the bunch weight in both the years (Table I). Higher bunch weight was recorded in year 1999 than 1998 that may be the result of environmental factors. Maximum bunch weight was observed in bearing canes pruned to six nodes in both years followed by non bearing canes pruned up to six nodes and the results were significantly different to each other. While, minimum bunch weight was noted in previous year non bearing canes pruned up to 10 nodes. Higher bunch weight in case of bearing spurs might be the result of efficient utilization of nutrients into fruiting (Naidenov *et al*., 1980). The table shows non-significant effect of all the treatments on the juice acidity percentage.

Maximum N percentage was noted in previous year non-bearing spurs, pruned to six nodes that were followed by bearing spurs pruned to six nodes. These were statistically non significant to each other. Statistically minimum leaf N content was recorded in previous year bearing spurs pruned to 10 nodes. Pruning severity did not affect the leaf P content, however, different pruning levels significantly affected the K content. Statistically maximum K contents (1.93%) were noted in previous year non-bearing spurs pruned to six nodes that was followed by previous year bearing spurs pruned to six nodes. Statistically least leaf K content was recorded in previous year bearing spurs pruned to eight nodes and previous year non-bearing spurs pruned to 10 nodes.

In conclusion, the performance of previous year non-bearing spurs remained better than the bearing ones and improved bunch properties were noted in spurs pruned to six nodes than rest of the treatments.

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