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STUDIES ON SEVERITY OF PRUNING IN GRAPES (*VITIS VINIFERA* L.) CV. PUSA NAVRANG - A TEINTURIER HYBRID*

V. Palanichamy, P.C. Jindal and Room Singh

Division of Fruits and Horticultural Technology,
Indian Agricultural Research Institute, New Delhi -110 012, India

ABSTRACT

Pusa Navrang - a teinturier grape hybrid - was pruned at three different levels *viz.*, 4, 6 and 8 buds per cane retaining uniformly 12 canes per vine on the 'head' system. Among the three pruning treatments, the highest yield (8.16 kg/vine) and the maximum number of bunches (36.2/vine) were obtained with pruning at 6 - bud level. The maximum bunch weight (234 g) along with its size (20.5 x 15.3 cm) was recorded at 4 - bud pruning. Similarly, the berry weight (1.5 g), TSS (17.8%) and juice percentage (74.5%) were the highest in the same treatment. Looking at the superior quality of grape berry at 4-bud level, specially juice percentage and TSS as this variety is recommended for juice and coloured wines, it is advocated that comparatively higher yield obtained in 6 - bud level can be forgone.

The hybridization work on grape was started at IARI, New Delhi during 1958 with the objective to develop, early maturing, and high yielding with good quality, varieties preferably resistant to diseases. Under this project, a unique grape hybrid - Pusa Navrang -(Madelein Angevine x Rubired) was released during 1996 (Jindal *et al.*, 1997). This teinturier hybrid having colour in berry skin and pulp is ideally suited for juice and coloured wine.

Among the various cultural operations in grape, pruning has the maximum influence on the ultimate yield and quality of a cultivar. The degree of berry quality depends on the precision of pruning operation. Severity of pruning influences the yield and quality of grape by exploiting the inherent capacity of the bud that is retained for the purpose. This inherent capacity of a bud is the summation of all processes, which is expressed through the various stages of its ontogeny. The pruning requirement of different varieties differs as per their growth behaviour. Therefore, separate standardization of pruning requirement is essential for all the grape cultivars for harnessing desired yield and quality. Therefore, it is essential to get scientific information on the pruning requirement of Pusa Navrang, which has been released for commercial cultivation during 1996.

The present investigations were carried out at the experimental vineyard of the Division of Fruits and Horticultural Technology, IARI, New Delhi during 1999-2000. Twenty one healthy vines of Pusa Navrang trained on 'head' system of training were selected for the present experiment. Nine-year - old vines were pruned on January 14, 2000. The pruning treatments included three levels of pruning i.e. 4-bud; 6-bud and 8-bud per cane and uniformly 12 canes per vine were retained. All the vines received recommended cultural practices. The treatments were replicated seven times with one vine as a unit. The data with respect to yield and quality parameters were collected and calculated as per factorial randomized block design. For juice percentage, fifty berries were taken randomly and the juice was extracted, weighed and the percentage was calculated. The TSS was measured with the help of a refractometer and the titrable acidity was determined by titrating five ml juice against 0.1 N NaOH, which has been expressed as tarteric acid. Tanin content was analysed according to

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the procedure quoted by Sadasivam and Manickam (1996).

The effect of severity of pruning on yield parameters like, bunch weight, number of bunches per vine, bunch length, bunch width and quality parameters like, TSS, titrable acidity, tanin content, juice content and seed number per berry are presented and discussed as under.

Yield parameters: The effect of pruning treatments on bunch characteristics showed significant variation in bunch weight (Table 1). It was the highest in 4-bud pruning (234 g) followed by 6-bud and 8-bud. Significant differences were recorded among three pruning treatments for bunch length, which was the maximum in 4-bud treatment (20.5 cm). Likewise, average bunch width ranged from 11.9 cm in 8-bud to 15.3 cm in 4-bud pruning. The maximum yield (8.16 kg/ vine) was obtained, when the vines were pruned at 6-bud level, which was significantly higher than the remaining two treatments i.e.4-bud and 8-bud pruning. The other two treatments, however, were at par. As far as the number of bunches per vine is concerned, 6-bud and 8-bud pruning gave almost similar results, which were much higher than the 4-bud pruning.

Furthermore, with an increase in severity of pruning there was an increase in bunch weight, which means that the severity of pruning is directly related to bunch weight. Increased bunch weight in 4-bud level of pruning might be due to increased availability of carbohydrates (due to lesser bunches per vine). Less availability of fruitful buds at intence pruning might have resulted in lower number of bunches. Chadha *et al.* (1974) also found increased bunch numbers with less severe pruning in Khandhari grapes. Similarly, Jauhari and Darshana Nand (1970) obtained the maximum bunch weight in 5-node pruning treatment and it was lower at lesser severity of pruning in Perlette. The similar kind of observation was also made in case of bunch length and its width.

Similarly, Jauhari and Darshana Nand (1970) recommended pruning of vines to 6 nodes in Perlette to obtain the highest yield. Swartout (1924) observed increased production with increasing bud number retained per cane upto a maximum point after which the production decreased. Similar was the case in the present study, where the maximum fruitful zone in Pusa Navrang was between 4 to 6 buds after which the yield declined.

Quality parameters: The average berry weight differed significantly with each other among all the three treatments (Table 2). It was the highest at 4-bud level of pruning (1.5 g). As the severity of pruning reduced, the berry weight decreased, which means they are inverserly proportionate to each other. However, no difference was recorded in the number of seeds per berry, which is generally not affected by the pruning treatments in grape. The highest TSS (17.8 %) was found in 4-bud pruning and the significantly lower total soluble solids (16.0 %) were recorded at 8-bud pruning treatment. The juice content increased with the decreasing intensity of pruning. The severity of pruning did not affect titrable acidity and the tannin content. The general quality parameters (berry weight, total soluble solids and juice content) were better in 4 - bud level of pruning as compared to 6-bud and 8-bud pruning. At the 8-bud level, the quality was reduced, which might be due to the reduced allocation of photosynthates formed from the fixed leaf area available to the individual bunches. Similar observations of improved berry quality with lower yield load have been recorded by several workers (Boichev, 1972; Ionev, 1986 and Mikhailov, 1988). Severity of pruning has been confirmed by bud dissection technique (Palanichamy, 2000). Therefore, the Pusa Navrang - a newly released hybrid - requires 4 - bud pruning for its

Table 1. Effect of pruning severity on yield parameters in cv. Pusa Navrang - a teinturier hybrid

Buds/cane	Bunch weight (g)	Bunch length (cm)	Bunch width (cm)	Number of bunches/vine	Yield/ vine (kg)
4 - buds	234	20.5	15.3	31.5	7.20
6 - buds	225	17.8	13.8	36.2	8.16
8 - buds	210	15.7	11.9	35.0	7.34
CD at 5%	0.60	1.03	0.49	2.69	0.19

Table 2. Effect of pruning severity on quality characters in Pusa Navrang - a teinturier hybrid

Severity of pruning	Average berry wt. (g)	Average seed number/berry	TSS (%)	Titratable acidity (%)	Juice content (%)	Tannin content (%)
4- bud	1.50	2.86	17.8	1.70	74.5	1.24
6- bud	1.42	2.90	17.3	1.71	71.7	1.13
8- bud	1.22	3.00	16.0	1.72	67.7	1.20
CD at 5%	0.06	0.19	0.66	0.03	1.60	0.14

commercial cultivation to get an optimum yield with the best quality berries. However, this hybrid does not pose the problem productivity because it is very heavy yielder.

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