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Short communication

Effect of bunch load on berry growth in Tas-A-Ganesh grafted on different rootstocks

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Grape (*Vitis vinifera*) is cultivated in an area of about 60,000 ha in India with annual production of 1.2 million tonnes (Anon., 1). It is considered as one of the major important fruit crop grown in the country with high export potential. It is being grown mainly in Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu. Besides, it is also grown on a limited area in North India. Among the different white seedless grapes grown in different parts of country, Thompson Seedless is most popular among the growers. The fruit complying the requirements of the importing country is only being sold in the market. Retention of more crop load on the vine reduces the quality of final produce harvested in terms of size, appearance, colour, etc. Maintenance of optimum crop load is a key step in getting good quality bunches either for local market or exporting the grapes in the international market. Vegetative characters like total shoot length and number of leaves available on the shoot plays a major important role, as the leaves are the major source of carbohydrate for the berries to a large extent. The crop load retention can vary from variety to variety, from rootstock to rootstock and also the spacing adopted. As per Williams (10), the production practices used to maximize grape quality parameters or yield can have a significant effect on the source: sink relationship of grapevine. Considering this, an experiment was undertaken with the objective to study the effect of crop load on quality of Tas-A-Ganesh grapes grown on its own roots and grafted on two rootstocks, namely Dogridge and 110 R.

The experiment was carried out at the experimental farm of National Research Centre for Grapes, Pune. Three-year old vines of Tas-A-Ganesh on its own root and grafted on Dogridge and 110 R rootstocks were selected for the study. After back pruning, the vines were maintained by following all the recommended cultural practices and the shoots were pruned during October at 6-7 nodes for fruiting. Four different treatments were (i) 30 bunches/vine, (ii) 35 bunches/ vine, (iii) 40 bunches/vine and (iv) more than 40 bunches/vine. The other factor was different rootstocks.

After the fruit set, excess bunches were thinned out manually and only required number of bunches were retained. The growth regulator *viz*., GA_3 @10 ppm was sprayed at pre- bloom stage of the flower inflorescence and after the fruit set, bunches were dipped in GA_3 @ 40 ppm and 6-BA @ 10 ppm concentration. The total shoot length and number of leaves were measured at 75 days after October pruning. The yield and quality parameters *viz*., yield per vine, average bunch weight, berry diameter, berry length and TSS (°Brix) were recorded at harvest. The data was statistically analyzed as per Panse and Sukhatme (6).

Among the growth characters studied, significant differences were recorded for shoot length for bunch load, however, different rootstocks did not affect the shoot growth (Table 1). With the increase in bunch load, there was reduction in the shoot growth. The increase in shoot length was up to 40 bunches per vine and in cases where more than 40 bunches were retained there was reduction in shoot length. During the development of a bunch, the bunch acts as a sink while the shoot acts as a source. Hence, the growing shoot plays an important role in bunch development. The reduction in shoot growth might be due to the transportation of food material from source, the growing tip to the developing bunch resulted into the reduced shoot growth and also the leaves/ shoot. During bunch development stage, the fruit cluster main sink is, while the main shoot and lateral constitute relatively weak sink (Sepulveda *et al*., 8).

Bunch size is very important parameter for table grape quality and this was measured as bunch weight. Average bunch weight significantly differed among the different crop load as well as rootstocks. Highest bunch weight of 413.20 g was recorded when 40 bunches were retained on the vines of Tas-A-Ganesh grafted on Dogridge rootstock, whereas it was minimum in own rooted Tas-A-Ganesh (Table 1). Earlier. Coban and Kara (2) also reported the increase in bunch weight at 45 and 75-bud vine stock but reduction in average bunch weight at increase in bud vine stock. A negative correlation was determined between berry diameter and different crop load. An imbalance in the crop to canopy ratio is easily gets created when the bud loads are too high (Schalkwyk *et al*., 9). The berry diameter increased up to 40-bunch load but with the increase in bunch load, the berry diameter reduced in all the rootstocks (Table 2). The same trend was also observed for berry length. Nick Dokoozlian *et al*. (5) also reported greatest berry fresh weight as well as berry diameter

Table 1. The effect of number of bunches on growth of Tas-A-Ganesh on two rootstocks.

Rootstock	Number of leaves				Average bunch weight (g)				50-berry weight (g)			
	30	35	40	>40	30	35	40	>40	30	35	40	>40
Dog ridge	625.4	775..S	746.6	764.8	343.38	380.18	413.20	329.00	170.20	185.90	202.10	158.30
110 R	600.8	740.4	563.8	530,4	338.40	359.00	365,24	275.00	170.20	1 74.00	196.10	109.0
Own root	590.4	588.8	611.0	568.60	253.28	278.00	296.50	278.40	122,00	139.00	142.00	95.80
	Factor A	Factor B	Interaction of A × B			Factor A	Factor B	Interaction of A × B		Factor A	Factor B	Interaction of A × B
CD at 5%	37.08	42.82	74.17			18.35	21.18	2.32		7,47	8.63	14.95

Table 2. The effect of number of bunches on yield parameters of Tas-A-Ganesh on two rootstocks.

Rootstock	Berry diameter (mm)				Berry length (cm)				TSS (°Brix)			
	30	35	40	>40	30	35	40	>40	30	35	40	>40
Dog ridge	16.76	18.00	16.14	15.70	2.07	2.37	2.20	2.18	22.16	23.08	22.28	22.24
110R	15.24	15.26	16.46	15.72	1.98	2.18	2.19	2.00	22.84	22.20	21.84	21.88
Own root	15,58	15.86	16,36	14.90	2,15	2.16	1.96	1.97	22.08	21.36	22,66	21.48
	Factor A	Factor B	Interaction of A × B			Factor A	Factor B	Interaction of A × B		Factor	Factor B	Interaction of A × B
CD at 5%	0.51	0.59	1.02			0.10	0.11	NS		NS	NS	NS

when crop load ranged between 20 and 30 cluster per vine in Red Globe variety.

A negative correlation wherein the data between total soluble solids content (TSS) and different crop load levels and the total soluble solids content was decreased with the increase in bunch load. Among the bunch load treatments, highest TSS content was found in 35 and 40 bunch, however, own rooted Tas-A-Ganesh had maximum TSS (Table 2). These results are in conformity with the results of Howell *et al*. (3) and Reynolds *et al*. (7). Bunch thinning provides a way of setting conditions, which ensures an adequate supply of sugar to the berry so that sugar accumulation and secondary metabolite production are appropriate (Hand *et al*. (4).

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