

Effect of different rootstocks on ripening behaviour of grape cv. Arka Kanchan

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INTRODUCTION

The vital role of clonal rootstocks in controlling vigour, uniformity, precocity, yield, fruit quality, resistance/tolerance to pest and diseases, and suitability under varying soils and agro-climatic situations have been well explored in several fruit crops. In India, grapes are still grown on their own roots. Some preliminary work on the use of rootstocks has been reported by some workers (Mukherjee and Singh, 4; Deol and Bindra, 1). However, they did not use resistant stocks for the purpose. Keeping this point in view, a long term rootstock trial was laid out to study the rootstock scion relationship on various aspects of growth, productivity and other biotic and abiotic stresses. In the first preliminary observations, some parameters were recorded to assess the ripening behaviour of Arka Kanchan growing on various rootstocks.

MATERIAL AND METHODS

The investigations were carried out at Indian Institute of Horticultural Research, Bangalore during the year 1992 with Arka Kanchan budded on different rootstocks, viz., Anab-e-Shahi, Black Champa, Dogridge, St. George, Thompson Seedless and scion on its own roots. The vines were planted 3m x 3m apart and were trained on Bower

system of training. During mid March, when berries attained their full size and started breaking straw colour, the sampling began and continued till harvest at alternate days interval. A composite sample of fifty berries of uniform size and maturity from the middle portion of the bunches were collected randomly for each rootstock combination and fresh weight were recorded. The total soluble solids were determined by using a hand refractometer and the juice extracted for this purpose was utilized to determine total acidity after titrating against N/10 NaOH using phenolphthalein as an indicator. The TSS increment between two successive dates of sampling and TSS/acid ratio were also determined from the parameters recorded already.

RESULTS AND DISCUSSION

Appreciable differences in the weight of berries with the use of different rootstocks were observed (Table 1). Initially, the weight of berries increased rapidly but after 4th sampling, it stabilized and in some cases showed decreasing trend during final stages of ripening. Such weight decrease in ripening grape berries due to physiological deterioration has already been reported by Singh *et al.* (8). The mean berry weight was highest with rootstock Dogridge (216.93 g) while it was lowest (190.64 g) with Thompson Seedless rootstock. However, the berry weights with other rootstocks tested did not differ appreciably.

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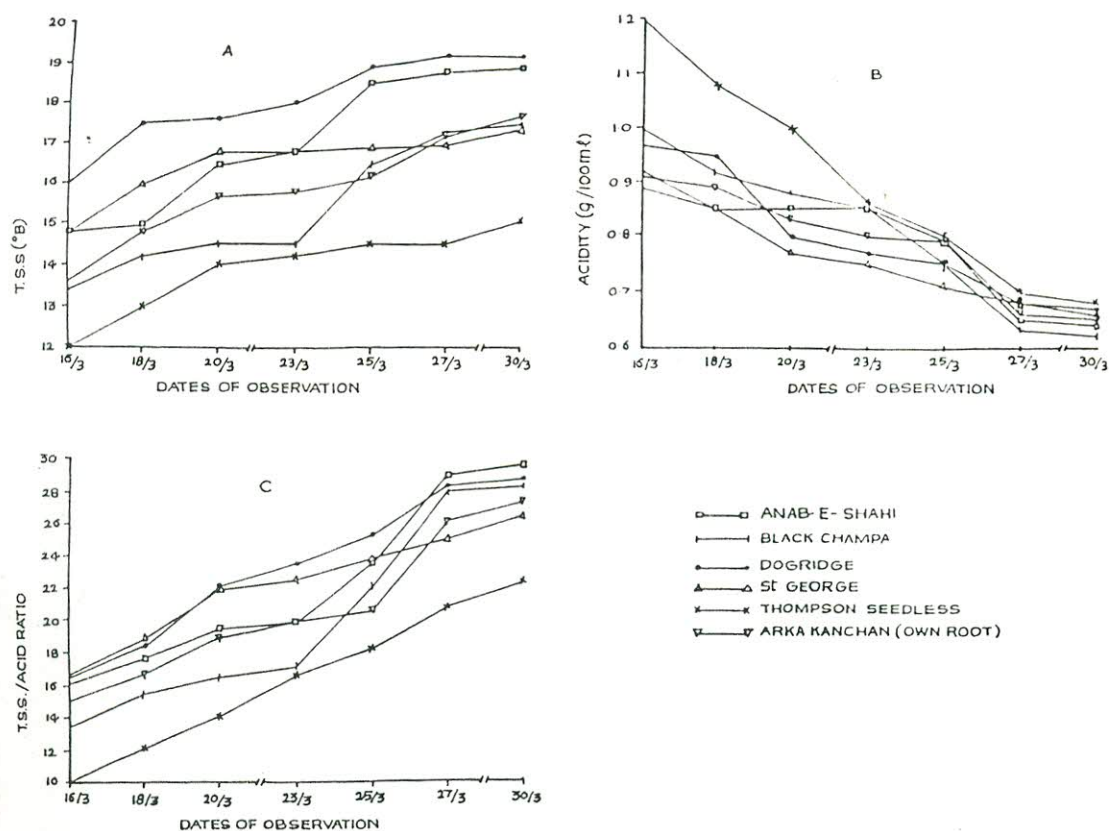


Fig. 1. Variation in T.S.S., acidity and T.S.S./acid ratio of Arka Kanchan on different rootstocks.

The total soluble solids in the berries increased in all the rootstocks employed till the final sampling except in Dogridge, where it remained constant after 27th March (Fig. 1A). On the 16th March (first sampling), TSS was highest in Dogridge (16%) and was as low 12% under Thompson Seedless. The TSS in general increased with sampling dates and at the harvest (30th March), maximum TSS was recorded under Dogridge rootstock followed by Anab-e-Shahi, while minimum TSS was in Thompson Seedless. Such variations in the TSS content with the use of different rootstocks in grapes have been reported by Hale and Brien (2), and Sarooshi *et al.* (7).

Variation in the rate of TSS increment between two successive dates of sampling as influ-

enced by different rootstocks is presented in Table 1. There was a sudden increase in TSS between 23rd and 25th March in rootstocks Anab-e-Shahi, Black Champa, Dogridge and Arka Kanchan on its own roots, while under St. George and Thompson Seedless rootstocks, the pattern was irregular with slight increases even between last two dates of sampling. The variations observed in the present studies in the rate of sugar accumulation was in conformity with the result of Patil and Gupta (5).

In general, there was a rapid declining trend in percentage acidity in all the rootstocks till 27th March but the differences narrowed down towards the end of the experiment (Table 1 and Fig. 1B). Initially, maximum acidity was recorded in Thompson Seedless rootstock followed by Black Champa

Table 1. Effect of different rootstocks on berry weight (g) and TSS increment (%) of Arka Kanchan.

Date of sampling	Anab-e-Shahi		Black Champa		Dogridge		St. George		Thompson seedless		Arka Kanchan (own roots)	
	A	B	A	B	A	B	A	B	A	B	A	B
16.3.92	189.0	0.00	197.0	0.00	203.5	0.00	194.0	0.00	179.00	0.00	195.0	0.00
18.3.92	199.5	0.20	201.0	0.80	211.5	0.50	196.0	1.20	183.00	1.00	195.5	1.20
20.3.92	201.5	1.50	204.5	0.30	212.5	0.10	203.0	0.80	189.00	1.00	203.0	0.90
23.3.92	201.5	0.30	205.5	0.00	217.0	0.40	207.0	0.00	190.00	0.20	204.0	0.10
25.3.92	205.0	1.70	206.0	2.00	219.0	0.90	208.0	0.10	196.50	0.30	206.5	0.40
27.3.92	209.0	0.30	209.0	0.80	228.0	0.30	215.0	0.10	198.50	0.00	210.0	1.00
30.3.92	208.5	0.10	209.0	0.20	227.0	0.00	217.5	0.40	198.50	0.60	211.5	0.50

A = Weight of 50 berries, B = T.S.S. increment.

and minimum was in St. George. Finally at harvest, the acidity was maximum with Thompson Seedless and minimum with Black Champa rootstocks although the differences were narrow. Similar variations in acid content with the use of different rootstocks have been reported by Deol and Bindra (1), and McCorthy and Cirami (3).

The TSS/Acid ratio increased in all the rootstocks till the final sampling (Fig. 1C). The maximum TSS/acid ratio was recorded under Anab-e-Shahi rootstock closely followed by Dogridge, Black Champa, Arka Kanchan on its own roots and St. George, while minimum was with Thompson Seedless. The observations were in agreement with those of Prakash and Reddy (6). The high acidity, low TSS and TSS/acid ratios associated with Thompson Seedless rootstock probably is an indication of delayed ripening as compared to other rootstocks.

SUMMARY

Arka Kanchan was budded on six rootstocks. The berry weight as well as TSS was found maximum with Dogridge rootstock and the same was lowest when Thompson Seedless was used as rootstock. The TSS increased till the day of final sampling i.e. harvest in all the rootstocks tried and titrable acidity showed a decreasing trend. However, at harvest the TSS/acid ratio was highest in Anab-e-Shahi followed by Dogridge and minimum in Thompson Seedless indicating that the maturity of Arka Kanchan is delayed with Thompson Seedless rootstock.

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