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Influence of various training systems on yield and quality of Muscat Hamburg grapes

by

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Der Einfluß verschiedener Erziehungssysteme auf Ertrag und Qualität der Rebsorte Muskat Hamburg

Z u s a m m e n f a s s u n g . — In einem sechsjährigen Versuch wurde der Einfluß verschiedener Erziehungssysteme auf die Ertrags- und Qualitätsleistung von Muskat Hamburg verfolgt. Obwohl die Fläche und die Düngergabe je Rebe durchweg gleich waren, erbrachten die Reben bei Pergolaerziehung im Durchschnitt den fünffachen Ertrag wie bei Kopferziehung (9,0 kg/Rebe gegenüber 1,8 kg). Bei einseitiger Kniffin-, einseitiger „Telephon"-, zweiseitiger „Telephon"- bzw. zweiseitiger Kniffin-Erziehung wurden Durchschnittserträge von 5,4, 5,6, 5,8 bzw. 6,7 kg/Rebe erzielt. Ein meßbarer Einfluß der Erziehungsform auf die Beerenqualität lag nicht vor.

Introduction

To all intents and purposes grape culture in north western India is still in its initial stage. As the competition for marketing is increasing and profit margin is shrinking, only the well managed enterprises will be able to survive. A single major factor which affects fruit quality, yield and profit is the training structure (BINDRA and BRAR 1978 a and b). Muscat Hamburg is a mid-season cultivar which resists rain damage very well. Having marked muscat flavour and high sugar content (JAWANDA and CHADHA 1977) it can give excellent juice and wine besides being good for table purposes.

Keeping in view the importance of this cultivar a comprehensive study was undertaken to assess its yield potential and fruit quality on various training systems.

Material and methods

The experiment was conducted in the vineyard of Punjab Agricultural University, Ludhiana. The soil was sandy loam, deep alluvium. The pH of the upper 15 cm soil was 8.0 and organic matter content was 0.30 %. The vines were planted in 1968 at a distance of 3 × 3 m and trained on six different systems of training. Regular observations on yield and quality were recorded from 1972 to 1977. The vines were given uniform cultural practices. Data were subjected to statistical analysis deploying randomized-block-design for six training systems, three replications, using two vines as a plant unit.

Conventional methods were used for recording the physical data. Acidity was estimated by titrating the juice against n/10 NaOH using phenolphthalein as indicator

and results were expressed in per cent tartaric acid. Total soluble solids were recorded by a hand refractometer. The following systems of training were tried:

Head system

The vines were trained on stakes with a head height of 1.5 m. At the top main stem gave rise to 4—5 arms which carried the load of spurs and canes.

Telephone system

The vines were trained on three-wire horizontal trellis. They were trained to cordons, one arm running along each wire. Half of the vines were in the form of unilateral cordons and the other half on bilateral cordons.

Kniffin system

The vines were trained on three-wire vertical trellis. Unlike a true Kniffin system a cordon was developed along each wire. Half the vines had unilateral cordons and the other half bilateral cordons.

Bower system

The height of the wire netting was 2.3 m above the ground level. The main trunk was divided into two primary cordons, which bore secondary cordons. Distance between two secondary cordons was 0.45 m and these cordons carried the load of fruiting and renewal spurs.

Results and discussion

Bower trained vines of the cultivar Muscat Hamburg gave the highest yields, whereas head training drastically reduced yield. The yields of the Kniffin and telephone trained vines were comparable. The ratio on bower, unilateral Kniffin, bilateral Kniffin, unilateral telephone, bilateral telephone and head system was 9 : 5 : 7 : 6 : 6 : 2, respectively (Table).

Although the amount of fertilizer and space allotted per vine was the same, still there was a fluctuation in bearing trend of vines on various systems. The variation in the performance of different varieties on different systems is a well known phenomenon. BINDRA and BRAR (1977) have also reported marked difference in the yields of Beauty Seedless cultivar on various training systems. Fluctuations in yield from year to year and due to different training systems have also been reported by KASIMATIS et al. (1976). They found that a training system which enables vines to have more exposed leaf surface enables it to photosynthesize at higher level to give more yield irrespective of the training systems. The low yield on head system might be due to the severe pruning to which the vines are subjected to year after year.

Average bunch weight was highest on the vines trained to bower system and it was lowest on head system. There was no difference in bunch weight between telephone and Kniffin trained vines. KASIMATIS et al. (1976) working with three systems of training for four years could not find out any significant difference for cluster or berry weight. Generally, there was no significant difference in TSS content; also acidity and TSS ratio were not affected significantly by any of the training systems.

Training system	Yield (kg/vine)						
	1972	1973	1974	1975	1976	1977	Av.
1. Bower	11.3	14.4	9.5	5.3	7.3	6.3	9.0
2. Kniffin							
a) Unilateral	2.5	10.6	5.6	3.6	4.5	5.7	5.4
b) Bilateral	3.8	11.3	6.9	6.2	5.2	6.6	6.7
3. Telephone							
a) Unilateral	5.0	7.6	5.4	4.6	7.0	4.3	5.6
b) Bilateral	6.7	10.0	4.6	2.8	5.0	5.7	5.8
4. Head	1.3	2.2	2.9	1.2	1.6	1.3	1.8
CD at 5 %	5.1	7.3	2.5	4.5	2.3	8.0	—

Training system	T.S.S. (%)						
	1972	1973	1974	1975	1976	1977	Av.
1. Bower	17.2	14.7	14.2	17.6	16.4	17.5	16.2
2. Kniffin							
a) Unilateral	16.4	14.6	14.7	17.1	16.3	16.0	15.8
b) Bilateral	17.6	14.2	14.3	16.1	17.0	15.6	15.8
3. Telephone							
a) Unilateral	17.2	14.4	14.6	17.4	17.8	14.5	15.9
b) Bilateral	16.4	14.2	14.0	16.3	17.1	15.3	15.5
4. Head	17.8	15.8	15.5	16.5	16.5	17.1	16.5
CD at 5 %	NS	0.7	NS	NS	NS	1.7	—

Summary

Effect of different training systems on the performance of Muscat Hamburg was studied as regards yield and quality for six years. Although the space allotted and fertilizer applied per vine were the same, the vines trained on bower system gave yields five times as high (9.0 kg/vine) as those trained on head system (1.8 kg/vine). Unilateral Kniffin, unilateral telephone, bilateral telephone and bilateral Kniffin gave yields of 5.4, 5.6, 5.8 and 6.7 kg/vine, respectively. There was no measurable effect on quality of fruit.

Acknowledgements

T a b l e

Effect of various training systems on yield and quality of Muscat Hamburg grapes

Einfluß verschiedener Erziehungssysteme auf Ertrag und Qualität der Sorte Muskat Hamburg

Av. bunch weight (g)						
1972	1973	1974	1975	1976	1977	Av.
185	139	164	113	155	108	144
121	113	173	82	80	107	112
110	140	162	86	96	116	120
173	150	110	112	75	116	121
122	126	111	78	108	140	112
102	134	145	72	74	76	101
44.6	NS	43.5	NS	18.1	38.0	—

Acidity (%)							T.S.S. / acidity ratio						
1972	1973	1974	1975	1976	1977	Av.	1972	1973	1974	1975	1976	1977	Av.
0.31	0.36	0.39	0.69	0.56	0.60	0.52	33.7	40.8	36.4	25.5	29.8	29.1	32.5
0.42	0.44	0.38	0.47	0.39	0.62	0.45	39.0	33.1	38.6	36.3	41.8	25.8	35.8
0.39	0.42	0.36	0.51	0.49	0.68	0.48	45.1	33.0	39.7	32.5	34.7	22.9	34.5
0.43	0.41	0.47	0.59	0.54	0.67	0.52	40.0	35.1	31.0	29.5	32.9	21.6	33.0
0.42	0.47	0.45	0.65	0.51	0.65	0.52	39.0	30.2	31.1	25.1	33.5	23.5	30.4
0.49	0.42	0.44	0.53	0.51	0.65	0.51	36.3	37.6	35.2	31.1	32.3	26.3	33.1
NS	NS	NS	NS	NS	NS	—	NS	NS	NS	NS	NS	NS	—

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