PERFORMANCE OF GRAPE FRUIT CULTIVARS UNDER AGRO-CLIMATIC CONDITIONS OF CHAKWAL

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Four grapefruit cultivars viz: Marsh seedless, Shamber, Red blush and Duncan grafted on Rough lemon were evaluated in experimental field of Barani Agricultural Research Institute, Chakwal during 1999 to 2002. It was observed that Shamber and Red blush showed superiority in physical characteristics having more than 51% juice contents with 503 to 510g/fruit weight which contained less than 31% peel and 18% rag. However, Duncan fruit occupied lowest rank in juice contents (44.9%) with maximal weight of fruit (539g/fruit), peel (33.6%) and rag (21.2%). Analysis of chemical characteristics indicated that Shamber dominated in acidity (1.56%) while Duncan secured top position in TSS (8.02%) and TSS acid ratio (5.94). Fruit yields showed non significant results among the cultvars.

Keywords: -Citrus, grapefruit cultivars, Shamber, Duncan, Red blush, Marsh seedless

INTRODUCTION

The whole scenario of Pakistan fruit culture is dominated by citrus with an area (183.8 thousand hectare) and production (1943.7 thousand tons) (FAO 2004-05). Punjab produced 95% of the total production of Pakistan. In Punjab, main citrus growing districts are Sargodha, Toba Tek Singh, Sahiwal and Khanewal located in canal irrigated area. Though citrus cultivation has got firm footing in irrigated area yet it has to be propagated in Potohar tract where climate is comparatively cooler than central and southern Punjab. Grapefruit is an important member of the citrus family.

Previous studies conducted on adaptation of mandarin (Hafiz *et al*., 1997) and sweet orange (Ishfaq *et al.,* 1999); winter injury (Awan *et al.,* 1995) water scarcity (Hafiz *et al*., 1992) and incidence of citrus canker (Awan *et al.,* 1995, Ijaz *et al,* 1999) confirmed that citrus could grow successfully. However further studies are being conducted as agro-climate has strong influence on fruit yield and quality. Various varieties exhibit different behaviour in different climate. Fruits produced in specific environment share a common set of quality characteristics (Hales *et al.,* 1968, Fucik & Norwine, 1979).

Grapefruit is one of prominent groups of citrus having nutritional and therapeutic qualities. It is invariably suggested for diabetic and blood pressure patients. The cultivation of grapefruit in the area will have positive impact on improvement of social life as well as health of farming community.

Thus the present study has been undertaken to examine the performance of grapefruit cultivars in specific agro climate for the purpose of commercial cultivation.

MATERIALS AND METHODS

Four Grapefruit cultivars namely Marsh seedless, Shamber, Red blush and Duncan grafted on Rough lemon rootstock were evaluated for their performance in experimental field of Barani Agriculture Research Institute, Chakwal under the prevailing agro-climatic conditions of Potohar. One plant of each cultivar was repeated 5 times in RCBD. There was six meters apart between lines and plants. The plants were watered by drip system for initial two years, then by coupling pipe system whenever needed. NPK @ 900-450-450g alongwith 40kg FYM per plant per annum were applied during study period.

Fruit yields per plant on weight basis were recorded from 1999-2002. Ten fruits per plant were picked randomly during January of each year to determine fruit weight (g), juice contents (%), peel (%), total soluble solids (%), acidity (%), total soluble solids acid ratio.

RESULTS AND DISCUSSION

It is quite obvious from Table 1 that varieties had significantly differences in fruit weight, juice contents, peel and rag except fruit yield. The range of fruit yield remained from 166 to 180 fruits/plant/annum. Duncan produced fruit with heavy weight (539g/fruit) as compared with other varieties. Fruit weight of other three cultivars ranging 503-510g/fruit remained at par with each other statistically. Shamber and Red blush showed superiority in juice contents containing more than 51%. Duncan stood at bottom with 45.2% juice contents.

Table 1. Mean values of fruit yield and physical characteristics of Grapefruit cultivars

Varieties	Fruits/plant	Fruit weight (g)	Juice (%)	Peel (%)	Rag (%)
Marsh seedless	177	505.0 b	48.50 b	32.9 a	18.60 b
Shamber	175	503.0 b	51.70 a	31.2 b	17.10 c
Red blush	180	510.0 b	51.64 a	31.6 b	1676 c
Duncan	166	539.0 a	45.2 c	33.6 a	21.20 a
LSD	NS	12.09	1.147	1.456	1.383

Maximum peel (33.6%) was found in Duncan closely followed by Marsh seedless having 32.9% peel. Shamber had minimum peel (31.2%). Other three varieties containing 32.9 to 33.6% peel did not differed statistically with each other. Duncan having 21.2% rag lead other varieties while Red blush appearing 16.76% rag was at bottom. Shamber showing 17.1% rag followed the Red blush in ascending order.
Table 2 depicts that varieties also differed statistically in total soluble solids, acidity, total soluble solids acid ratio and vitamin C. Duncan and Red blush contained higher (8.02%) and lower (6.5%) total soluble solids respectively while Marsh seedless and Shamber had medium total soluble solids. Shamber dominated in acidity with 1.56%, followed by Marsh seedless. Duncan remained at bottom in this respect.

Table 2. Mean values of chemical characteristics of fruit of grapefruit cultivars

Cultivars	Total soluble solids (%)	Acidity (%)	TSS/acid ratio
Marsh seedless	7.50 b	1.48 b	5.07 ab
Shamber	7.22 b	1.56 a	5.23 ab
Red blush	6.50 c	1.38 c	4.71 b
Duncan	8.02 a	1.35 d	5. 94 a
LSD	0.439	0.026	0.984

As regard TSS acid ratio, Duncan achieved first position but was found statistically at par with Shamber and Marsh seedless cultivars. Despite last position of Red blush in TSS acid ratio but it had non significant difference with Shamber and Marsh seedless.

CONCLUSION

It is concluded that fruit produced in agro-climate of Chakwal contained more juice with higher fruit weight as compared with fruit produced in comparatively warmer agro-climate of Sahiwal. Our results are correlated with previous study (Ishfaq *et al.,* 1999). Shamber and Red blush declared as superior cultivars bearing better physio chemical characteristics. Similar findings were reported by Chaudhary *et al.,* 1991. Hence Shamber and Red blush cultivars are suggested for commercial cultivation in Potohar tract.

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