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Performance of Some Early Maturing Apple Cultivars at High Altitude of Murree Hills

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Abstract: The present studies were carried out on four high chilling early maturing cultivars viz. Saharni, Beauty of Bath, Early McIntosh and Loxton Epicure at Hill Fruit Research Station, Sunny Bank, Murree during 1990-2000. Early McIntosh fruits were significantly larger in size index (62.28) as compared to minimum size index (55.12) in Loxton Epicure. Fruit weight was maximum (108.12 gm) again in early McIntosh and minimum (74.98 gm) in Loxton Epicure. All the cultivars bloom at the same time during the second week of April. However Loxton Epicure mature early as compared to other cultivars. Significantly highest number of fruit/tree (352) and weight (26.39 kg) was attained by Loxton Epicure and least in other cultivars except Early McIntosh which was at par to Loxton Epicure. Maximum TSS were noted in Saharni and Early McIntosh while minimum in Loxton Epicure and Beanty of Bath. All other cultivars were attractive in colour with sweet aromatic taste except Loxton Epicure which was acidic. Although Loxton Epicure, McIntosh and Beauty of Bath gave more production but Saharni is recommended for attractive colour and sweet aromatic laste.

Key words: Performance, early maturing, apple cultivars, high altitude Murree hills

Introduction

In the Murree Hills, apple growing mainly practiced at altitudes between 4,500 to 7,500 ft.above sea level, with topography varying from low lying valleys to fairly steep land. At elevations above 4,500 ft, there is usually enoght winter chilling to permit satisfactory opening of buds in spring. At very high elevation (above 7,500 ft.) killing of buds may occur due to extremely low temperature. Both altitude and topography influence wind velocity, tmeperature and sunshine. Wind velocity tends to increase with altitude while temperature and sunshine decreases. These points should therefore be kept in mind while selecting apple for growing (Ali, 1956). It is also an admitted fact that apple require a cooler climate than all other fruits because the buds of this tree exhibit the longest rest period and hence require more chilling than buds of other deciduous fruits trees. Apple trees can endure temperatures as low as 31°F to 40°F (Ali, 1970). Early McIntosh is a close companion of Delicious and Golden Delicious, mature early and is recommended for high altitudes but is susceptibility to apple scab, uneven ripening and pre-mature drop (Ali, 1957; Mian and Nasir, 1983). Beauty of Bath has sound colour, tastes sweet to sub acidic and ripens in early July, Saharni has a sweet aromatic taste and attractive deep red colour with red streaks and mature early (Ahmad, 1961; Mian and Nasir, 1983). Mitra *et al.* (1991) reported that Rome Beauty and Early McIntosh are regular annual beares while Golden Delicious and Granny Smith are intermediate in biennial bearing. However Loxton superb and Yellow Newton are very much pronounced in biennial bearing. Thus in the present investigations, four high chilling apple cultivars were tested under Sunny Bank, Murree climatic conditions which is a sub-urban area of Murree city at an average elevation of 2210 meters above sea level with a mean precipitation record of 1400 - 1600 per annum.

Materials and Methods

The present studies were carried out at the Hill fruit Research Station, Sunny Bank, Murree during the year 1999-2000. Four apple cultivars viz. Saharni, Beauty of Bath, Early McIntosh and Loxton epicure, each twelve years of age were selected. Among these cultivars Saharni is a local cultivar of Murree while Beauty of Bath was brought from Early McIntosh from USA and Loxton Epicure from England during 1954. Budded plants of all these cultivars were planted at the progeny garden Sunny Bank, Murree during spring 1987. The experiment was laid out on Randomized Completely Block Desigh (RCBD) with four treatments and five trees per replication. Analysis of variance techniques were adopted at five percent probability for data processing (Steel and Torrie, 1990). Twelve fruit from each tree were picked at full maturity from all sides. Size index of fruit was measured in mms with the help of Digital vernier calipers. Yield was determined both in number and total weight per tree. Individual fruit weight was also noted with the help of Triple Beam Balance in grams. Total soluble solids were determined by Abb's Refractometer. Fruit colour was observed visually comparing it with Horticultural Colour Charts as a standard. Maturity was adjudged at getting full size of fruit with maximum total soluble solids. Taste of the fruit was noted by a panel of three judges.

Results and Discussion

Blooming period and maturity: Table 1 showed that all the apple cultivars bloom at the same time during the second week of April. The fruit of Loxton Epicure mature early as compared to all other cultivars.

Size Index and Fruit weight: The size index was measured in millimeters (Table 2). During the first year maximum size index was attained by Early McIntosh followed by Beauty of Bath. Minimum size index was found in Loxton Epicure followed by Saharni. Almost similar results were noted during the second year. Ali (1957) sustained similar results. It is evident from data presented in Table 2 that individual fruit weight has been significantly different from each other in various cultivars of apple during both years of studies. Maximum weight of the fruit was in Early McIntosh followed by Beauty of Bath and minimum weight was noted in Loxton Epicure.

Yield: Statistically significant differences were observed in yield, both number of fruit/tree and weight of fruit/tree among various cultivars (Table 3). Loxton Epicure produced maximum number of fruit per tree (352) with 26.39 kg weight/tree as compared to a minimum number in Saharni with 11.58 kg weight/tree. However early McIntosh performed well in terms of weight of crop but statistically at par to Loxton Epicure. Almost similar trend was noted udring the second year

Table 1: Blooming period and maturity in some early maturing apple cultivars

Cultivars	Blooming Period		Maturity	
	1999	2000	1999	2000
Saharni	Apr. 2nd week	Apr. 2nd week	Jul. 2nd week	Jul. 2nd week
Beauty of Bath	Apr. 2nd week	Apr. 2nd week	Jul. 2nd week	Jul. 2nd week
Early McIntosh	Apr. 2nd week	Apr. 2nd week	Jul. 2nd week	Jul. 2nd week
Loxton Epicure	Apr. 2nd week	Apr. 2nd week	Jun. 4th week	Jun. 4th week

Table 2: Size index and fruit weight of some early maturing apple cultivars

Cultivars	Size Index		Fruit Weight	
	1999	2000	1999	2000
Saharni	57.43 b	53.57 b	77.18 c	74.66 c
Beauty of Bath	60.29 a	57.81 a	80.17 b	77.12 b
Early McIntosh	62.28 a	59.80 a	108.12 a	104.65 a
Loxton Epicure	55.12 c	51.07 c	74.98 c	72.63 c
LSD at 5%	11.5	12.24	10.80	14.22

Table 3: Yield and total soluble solids of some early maturing apple cultivars

Cultivars	Number of fruit/tree		Weight of fruit/tree		Total soluble solid (%)	
	1999	2000	1999	2000	1999	2000
Saharni	150.00 c	245.00 c	11.58 c	18.29 c	13.59 a	13.00 a
Beauty of Bath	240.00 b	330.00 b	19.24 b	25.45 b	12.50 b	12.00 a
Early McIntosh	250.00 b	325.00 c	27.03 a	34.01 a	13.00 a	12.50 a
Loxton Epicure	352.00 a	400.00 a	26.39 a	29.05 b	12.00 c	11.50 b
LSD at 5%	50.12	48.52	4.20	5.12	0.88	0.90

Table 4: Fruit Colour and taste of some early maturing apple cultivars under hight altitude of murree hills

Cultivars	Colour of the fruit		Taste of the Fruit	
	1999	2000	1999	2000
Saharni	Deep red with red streaks		Sweet, aromatic with slight acidity	
Beauty of Bath	Deep red with red streaks		Sweet, aromatic with slight acidity	
Early McIntosh	Deep red		Sweet, aromatic with slight acidity	
Loxton Epicure	Yellow with red streaks		Highly acidic	

pertaining to both of these parameters. These results are in accordance with the findings of Mian and Nasir (1983) and Ali (1970) that the cultivars under trial are heavy yielders.

Total soluble solids: The dif ference in total soluble solids (TSS) was highly significant (Table 3). Maximum TSS were 13.50% in Saharni followed by early McIntosh (13.00%). Minimum TSS were found in Loxton Epicure (12%) followed by Beauty of Bath (12.50%). Almost similar results were found during the second year. These results are in accordance with the work of Ahmad (1961) that Saharni and Early McIntosh are more sweet and aromatic in taste as compared to other cultivars.

Colour and Taste: The skin colour and taste of the apple fruit was tested (Table 4). This revealed that Early McIntosh had deep red skin colour while Saharni and Beauty of Bath had deep red with red streaks and Loxton Epicure cultivars had yellow with red streaks. All the cultivars under test were sweet aromatic with slightly acidic in taste while loxton Epicure was highly acidic.

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