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VARIETAL STUDY OF DATE CULTIVARS UNDER CENTRAL PUNJAB CONDITIONS

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ABSTRACT

Twenty five varieties of dates were evaluated under conditions of Central Punjab (Jhang) on the basis of their performance at Khalal stage, (ripe dates) Tamar stage and choharas (wrinkled dried dates). The fruit of varieties, edible at Khalal stage, i.e., cv. Mekran and cv. Hillawii excelled all other varieties over yield, taste and quality of the fruit. Whereas, the blushed fruit of cv. Mekran showed unmatched taste and flavor than cv. Hillawii. Anyhow, both are recommended for the commercial plantation and marketing at Khalal stage. The curing of dates under natural conditions is not practically possible as A- grade ripe dates could not be produced under sun in case of any of the variety, under study. Nonetheless, choharas of excellent quality were successfully prepared in cv. Dhaki (A-1), followed by cv. Assil (A), cv. Zirin and cv. Chohara (B). All other varieties failed to produce good quality choharas.

Key words: Germplasm, Khalal stage (doka), Tamar stage, wrinkled dried dates (choharas), cultivars, organoleptic evaluation.

INTRODUCTION

Pakistan is the fifth biggest date producer of the world with total date production of 625.0 thousand tones annually (Anonymous, 2003) and Punjab shares 15.98 % in the total date production of the country. A number of varieties had been planted in the germplasm collection, to ascertain their suitability for commercial gardening under the Central Punjab conditions. The objectives were laid down for the evaluation of the varieties under observation, i.e., (1) fruit at Khalal stage (doka), (2) cured ripe dates (Tamar) and (3) wrinkled dried dates or Choharas. The varieties, consumed at Khalal stage, are easily marketable earlier without involving any stage of curing for ripe dates or choharas. All other varieties are processed for curing. Therefore, their evaluation on separate criteria is required. The present study was aimed on these lines.

MATERIALS AND METHODS

Twenty five varieties from the germplasm of 34 varieties were selected for the study. These varieties were Khadrawi (1), Zaidi (2), Hillawii (3), Zirin (4), Shamran (5), Deglet Noor (6), Peladora (7), Shado (8), Zardo (9), Rachna (10), Kohrba (11), Wahenwali (12), Neelum (13), Akhrot (14), Kozanabad (15), Kantar (16), Mekran (17), Jhonsohar (18), Kerblian (19), Dhaki

(20), Assil (21), Chohara (22), Seb (23), Barehmi (24) & Jaman (25). Three uniform and healthy trees in each variety were labeled for the study. The physico-chemical analysis of the fruit at Khalal stage was made (Tables 1 and 2).

The data regarding yield / tree, wt. of fruit (g), length of fruit (cm), breadth of fruit (cm), wt. of stone (g), length of stone (cm), breadth of stone (cm), T.S.S. (^{o}Brix), color of fruit and their ripening times were recorded. In other experiments, the organo-leptic studies of six varieties, edible at Khalal stage (doka), i.e., cvs. Hillawii, Mekran, Akhrot, Jaman, Seb and Kantar and other varieties, consumed as cured ripe dates or wrinkled dried dates (Choharas) was made. The observation regarding skin-separation and quality of ripe dates and color and quality of Choharas were based for the evaluation in the study.

RESULTS AND DISCUSSION

The averaged results of the year 2002 and 2003 revealed that the heaviest fruit of dates has been found in cvs. Seb, Jhonsohar and Dhaki, ranging from 15.41 to 17.32 g/fruit and medium sized dates have been noticed in cvs. Khadrawi, Hillawii, Rachna, Kohrba, Neelum, Kozanabad, Kentar, Mekran, Kerblian and Chohara, i.e., from 10.05 to 13.70 g/ fruit (Table 3). Whereas, some good varieties, presently on the recommended list for cultivation, have small to medium sized fruits, viz., cvs. Deglet Noor (6.81 g), Zaidi (7.86 g), Shamran 98.35 g), Akhrot (8.54 g), Assil (8.13 g), Zirin (9.96 g). Nonetheless, the lightest stones were recorded in cvs. Deglet Noor and Jaman, i.e., 0.76 to 0.77 g/ seed, medium sized stones in cvs. Peladora, Shado, Zardo, Rachna, Kohrba, Akhrot, Kozanabad, Kentar & Assil, ranging from 0.83 to 0.98 g/ seed. Though the wt. and size of the stone indirectly determines the increase in the edible portion of the fruit yet the parameters of quality, color, taste, size of dates and yield supercedes all other factors. A lot of variations in wt. and sizes of date fruits and stones recorded but these are in accordance with the ranges described by Zaid and Jimenez (1999), i.e., fruit wt. (2-60 g), length (1.8-11.0 cm), width (0.8-3.2 cm), seed wt. (0.5-4.0 g), length (1.2-3.6 cm) & breadth (0.6-1.3 cm). The T.S.S. contents of date fruit at Khalal stage have also shown great variation, i.e., cvs. Hillawii, Zaidi, Zirin and Shado, ranging from 40.0 to 45.5 %. It is more than the T.S.S. contents, reported by Rashid and Ali (1972) in cvs. Hillawii & Khadrawi (from 32.42 to 32.43 %). This increase may be due to time of picking of the fruit from the tree. The least T.S.S. contents have been recorded in cvs. Shamran, Deglet Noor, Kozanabad, Jhonsohar, Kerblian, Assil and Jaman, i.e., from 17.5 to 29.5 %.

The yield from the selected healthy trees showed great variation. It was calculated maximum in cvs. Hillawii (144.0 kg), followed by Dhaki (121.0 kg), Mekran (108.5 kg) and Zaidi (102.5 kg) per tree. The response of all other varieties to soil and climatic conditions was poor, showing yield out put from 39.5 to 73.0 kg/ palm. Although the color of the fruit at Khalal stage (doka) have great attraction, yet it only pays in case of varieties, edible at this stage, as the other varieties while going through curing, loses all of its shines and reflections of various colors. Previously, similar findings have been reported by some workers, in cvs. Jhonsohar (60 kg), Kerblian (160 kg) and Kozanabad (30 kg) (Ahmed and Raheem, 1972), cvs. Dhaki (80 kg), Assil (160 kg), Hillawii (100 kg) and Zahidi (80 kg) (Smead and Chaudhry, 1972), Hillawii (100 kg), Khadrawi (80 kg), Shamran (50 kg), Zahidi (60 kg) and Zirin (40 kg) (Ahmed and Farooqi, 1972), cvs. Medjool (80-120 kg) and Barhee (200 -500 kg/palm).

Edible Fruit at Khalal Stage (Doka)

The organo-leptic evaluation of six varieties, consumable at Khalal stage has shown a lot of difference among the varieties (Table 4). The cv. Mekran showed highest points, followed by cv. Hillawii and Akhrot, i.e., 27, 21 and 18, respectively. Other three varieties remained at the bottom with 10 to 15 points, i.e., cvs. Jaman, Seb and Kentar. Yield wise, cv. Hillawii was at the top with 144 kg and the cv. Mekran, the next with 108.5 kg/tree. Moreover, the cv. Hillawii was an early season variety, having the character of uniform bunch ripening offered ease in harvesting than the cv. Mekran which was mid. season variety with fruit of excellent quality but with

different ripening habit, i.e., each fruit ripens at different times, which demands daily picking of the fruit. The cvs. Akhrot and Jaman having colored fruits can be planted as choice or ornamental purpose in the orchard or the home garden.

Cured Ripe Dates

Curing of ripe dates under the sun (under natural conditions) could not produce encouraging results. The skin of the cured date becomes separated from the ripened pulp of the fruit. The highest level of skin separation has been observed in cvs. Shamran and Khadrawi, medium in cvs. Dhaki, Zirin and Deglet Noor but least in cvs. Assil and Zaidi (Table 5). This problem can possibly be overcome by mechanical means of curing as it needs temperature range of 50-70 ^{o}C (under controlled environment), which is not possible under natural conditions at the Experimental Orchard of Dates, Jhang. This factor is a great handicap in the curing of dates and marketing in the central Punjab region. The pressing technique is likely to be tested in future to minimize this problem.

Wrinkled Dried Dates (Choharas)

Unlike curing of dates, the process of Choharas making is successful. The varieties under test have shown promising results with significant variation in color and quality of Choharas. The excellent quality of Choharas (A-1) has been obtained in cv. Dhaki, i.e., color, size and quality, excelling all other varieties. The cv. Assil proved the second good variety with A-grade Choharas. All other varieties for Choharas making are not acceptable. The previous study conducted by Ahmed and Sheikh (1972) showed A-grade Choharas in cvs. Chohara, Zirin and Shamran, B-grade Choharas in cvs. Zaidi, Seb and Dora but C-grade Choharas in cvs. Hillawii, Jaman, Kentar, Khadrawi, Barehmi and Akhrot. The slight difference is due to the inclusion of two other varieties, i.e., cvs. Dhaki and Assil, which have the potential to influence the previous results.

It is concluded that the cvs. Dhaki and Hillawii are the future varieties of the province of Punjab for the commercial plantation of dates at the growers' orchards of this region, having potential of high yield, quality and market acceptability.

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TABLES

Table 1: Physico-chemical analysis of date-fruit (at Khalal stage) during the year 2003

S. No.	Variety	Yield (kg/tree)	Fruit Wt. (g)	Fruit length (cm)	Fruit breadth (cm)	Stone Wt. (g)	Stone length (cm)	Stone breadth cm)	TSS (°Brix)	Fruit colour	Ripening time
1.	Khadrawi	75.0	13.89	4.2	2.6	1.33	2.7	0.9	40.0	Yellow	Mid.July
2.	Zaidi	110.0	7.95	3.5	2.3	1.02	2.4	0.8	46.0	"	2nd week of August
3.	Hillawii...**D**	152.0	12.80	4.0	2.2	1.85	2.7	0.9	45.0	"	1st week of July
4.	Zirin	58.0	10.35	4.0	2.4	1.41	2.7	1.0	40.0	Dull Red	2nd week of August
5.	Shamran	55.0	8.20	3.5	2.1	1.42	2.4	0.9	29.0	Yellow	Mid.July
6.	Deglet Noor	62.0	6.00	3.1	1.5	0.75	2.0	0.8	24.0	"	1st week of August
7.	Pela Dora	53.0	8.26	3.6	2.2	0.85	2.4	1.0	30.0	Yellow, Base blushed	End July
8.	Shado	48.0	4.90	3.5	1.7	0.92	2.5	0.9	40.0	Yellow	"
9.	Zardo	41.0	5.46	3.0	1.8	0.81	2.0	0.9	37.0	"	1st week of August
10.	Rachna	73.0	11.02	3.5	2.7	0.95	2.1	1.0	35.0	"	2nd week of August
11.	Kohrba	78.0	9.90	4.1	2.4	0.85	2.5	0.8	35.0	Maroon	Mid.August
12.	Wahenwali	69.0	6.41	4.0	1.8	1.44	3.1	1.0	35.0	Dull Red	"
13.	Neelum	70.0	12.98	4.5	2.2	1.25	2.9	0.8	30.0	Red	"
14.	Akhrot…**D**	58.0	8.84	3.0	2.3	0.89	1.9	1..0	30.0	Dark Red	End July
15.	Kozan-Abad	45.0	10.58	4.3	2.3	0.98	2.6	0.7	27.0	Yellow	End August
16.	Kantar…**D**	54.0	10.04	3.5	2.4	0.88	2.1	0.8	32.0	"	Mid.August
17.	Mekran..**D**	115.0	11.95	3.8	2.5	1.54	2.5	0.9	38.0	Yellow + Blused	3rd week of July
18.	Johnsokar	56.0	16.86	4.0	3.0	1.08	2.4	0.8	15.0	Yellowish green	End August
19.	Kerblian	49.0	11.35	4.0	2.1	1.15	2.5	0.9	25.0	Red	"
20.	Dhaki	119.0	14.60	5.5	2.7	1.12	2.9	0.8	40.0	Yellow	Mid.August
21.	Assil	77.0	7.90	3.4	2.4	0.91	2.2	0.9	28.0	"	End July
22.	Chohara	90.0	9.74	4.8	2.8	1.32	3.0	0.9	35.0	"	"
23.	Seb……**D**	63.0	18.93	4.3	3.2	1.53	2.6	1.1	40.0	"	"
24.	Bayrehmi	54.0	10.04	5.0	2.2	1.50	3.0	0.8	30.0	Yellow & End blushed	End August
25.	Jaman…**D**	57.0	6.57	3.5	2.0	0.82	2.2	0.8	28.0	Dark Purple	End July

D: Doka stage consumption

Table 2: Physico-chemical analysis of date-fruit (at Khalal stage) during the year 2002

S. No.	Variety	Yield (kg/tree)	Fruit Wt. (g)	Fruit length (cm)	Fruit breadth (cm)	Stone Wt. (g)	Stone length (cm)	Stone breadth (cm)	TSS (°Brix)	Fruit colour	Ripening time
1.	Khadrawi	63.0	13.52	4.0	2.5	1.34	2.5	0.9	38.0	Yellow	Mid.July
2.	Zaidi	95.0	7.78	3.5	2.2	1.05	2.4	0.8	45.0	"	2nd week of August
3.	Hillawii...**D**	136	12.95	4.1	2.3	1.88	2.6	0.9	45.0	"	1st week of July
4.	Zirin	65.0	9.57	4.0	2.4	1.40	2.6	0.9	40.0	Dull Red	2nd week of August
5.	Shamran	50.0	8.50	3.6	2.2	1.38	2.3	1.0	30.0	Yellow	Mid.July
6.	Deglet Noor	59.0	7.63	3.3	1.5	0.80	2.0	0.8	26.0	"	1st week of August
7.	Pela Dora	48.0	8.00	3.1	2.0	0.82	2.3	1.0	34.0	Yellow, Base blushed	End July
8.	Shado	42.0	4.75	3.2	1.6	0.95	2.1	1.0	40.0	Yellow	"
9.	Zardo	38.0	5.28	3.0	1.7	0.85	2.0	0.9	38.0	"	1st week of August
10.	Rachna	61.0	10.00	3.3	2.6	1.02	2.1	1.0	35.0	"	2nd week of August
11.	Kohrba	68.0	10.21	4.0	2.5	0.91	2.4	0.8	36.0	Maroon	Mid.August
12.	Wahenwali	60.0	7.36	3.8	1.8	1.27	3.0	0.9	34.0	Dull Red	"
13.	Neelum	59.0	11.50	4.2	2.1	1.24	2.8	0.9	32.0	Red	"
14.	Akhrot…**D**	55.0	8.25	3.0	2.2	0.92	1.8	1.0	35.0	Dark Red	End July
15.	Kozan-Abad	47.0	10.16	4.2	2.1	0.83	2.5	0.8	29.0	Yellow	End August
16.	Kantar	62.0	11.37	3.5	2.5	0.80	2.1	0.9	34.0	"	Mid.August
17.	Mekran..**D**	102	12.41	3.8	2.6	1.63	2.5	0.9	39.0	Yellow + Blused	3rd week of July
18.	Johnsokar	60.0	14.58	3.9	3.0	1.10	2.3	0.8	20.0	Yellowish Green	End August
19.	Kerblian	46.0	11.15	3.8	2.2	1.02	2.4	0.9	26.0	Red	"
20.	Dhaki	123	16.22	5.5	2.9	1.20	2.8	0.9	38.0	Yellow	Mid.August
21.	Assil	64.0	8.36	3.3	2.5	0.98	2.3	0.9	30.0	"	End July
22.	Chohara	81.0	10.41	4.7	2.6	1.24	3.0	0.9	34.0	"	"
23.	Seb	52.0	15.72	4.0	3.0	1.41	2.5	1.1	40.0	"	"
24.	Bayrehmi	49.0	9.68	4.5	2.1	1.23	2.9	0.8	32.0	Yellow & End blushed	End August
25.	Jaman…**D**	44.0	4.31	3.5	1.9	0.76	2.3	0.8	31.0	Dark Purple	End July

D: Doka stage consumption

Table 3: Physico-chemical analysis of date-fruit (at Khalal stage) during the year 2003-2002 (average)

S. No.	Variety	Yield (kg/tree)	Fruit Wt. (g)	Fruit length (cm)	Fruit breadth (cm)	Stone Wt. (g)	Stone length (cm)	Stone breadth (cm)	TSS (°Brix)	Fruit colour	Ripening time
1.	Khadrawi	69.0	13.70	4.10	2.55	1.33	2.60	0.90	39.0	Yellow	Mid.July
2.	Zaidi	102.5	7.86	3.50	2.25	1.03	2.40	0.80	45.5	"	2nd week of August
3.	Hillawii...**D**	144.0	12.87	4.05	2.25	1.86	2.65	0.90	45.0	"	1st week of July
4.	Zirin	61.5	9.96	4.00	2.40	1.40	2.60	0.95	40.0	Dull Red	2nd week of August
5.	Shamran	52.5	8.35	3.55	2.15	1.40	2.35	0.95	29.5	Yellow	Mid.July
6.	Deglet Noor	60.5	6.81	3.20	1.50	0.77	2.00	0.80	25.0	"	1st week of August
7.	Pela Dora	50.5	8.13	3.35	2.10	0.83	2.35	1.00	32.0	Yellow, Base blushed	End July
8.	Shado	45.0	4.82	3.35	1.65	0.93	2.30	0.95	40.0	Yellow	"
9.	Zardo	39.5	5.37	3.00	1.75	0.83	2.00	0.90	37.5	"	1st week of August
10.	Rachna	67.0	10.51	3.40	22.65	0.98	2.10	1.00	35.5	"	2nd week of Aug.
11.	Kohrba	73.0	10.05	4.05	2.45	0.88	2.45	0.80	35.5	Maroon	Mid.August
12.	Wahenwali	64.5	6.88	3.90	1.80	1.35	3.05	0.95	34.5	Dull Red	"
13.	Neelum	64.5	12.92	4.35	2.15	1.24	2.85	0.85	31.0	Red	"
14.	Akhrot…**D**	56.5	8.54	3.00	2.25	0.90	1.85	1.00	32.5	Dark Red	End July
15.	Kozan-Abad	46.0	10.37	4.25	2.20	0.90	2.55	0.75	28.0	Yellow	End August
16.	Kantar	58.0	10.70	3.50	2.45	0.84	2.10	0.85	33.0	"	Mid.August
17.	Mekran..**D**	108.5	12.18	3.80	2.55	1.58	2.50	0.90	38.5	Yellow + Blused	3rd week of July
18.	Johnsokar	58.0	15.72	3.95	3.00	1.09	2.35	0.80	17.5	Yellowish green	End August
19.	Kerblian	47.5	11.25	3.90	2.15	1.08	2.45	0.90	25.5	Red	"
20.	Dhaki	121.0	15.41	5.50	2.80	1.16	2.85	0.85	39.0	Yellow	Mid.August
21.	Assil	70.5	8.13	3.35	2.45	0.94	2.25	0.90	29.0	"	End July
22.	Chohara	85.5	10.07	4.75	2.70	1.28	3.00	0.90	34.5	"	"
23.	Seb…...**D**	57.5	17.32	4.15	3.10	1.47	2.55	1.10	40.0	"	"
24.	Bayrehmi	51.5	9.86	4.75	2.15	1.36	2.95	0.80	31.0	Yellow & End blushed	End August
25.	Jaman…**D**	50.5	5.44	3.50	1.95	0.76	2.25	0.80	29.5	Dark Purple	End July

D: Doka stage consumption

Table 4: Performance of date varieties, consumed at Khalal (doka) stage

S. No.	Variety	Taste	Colour	Flavour	Total
1	Hillawi	7	7	7	21
2	Mekran	9	9	9	27
3	Akhrot	6	7	5	18
4	Jaman	5	6	4	15
5	Seb	4	4	3	11
6	Kentar	3	4	3	10

Table 5: Evaluation of some varieties for ripe dates and choharas

S. No.	Name of variety	Skin separation	Quality	Colour	Quality grade
1	Dhaki	Medium	B	A	A-1
2	Assil	Less	B	B	A
3	Shamran	High	C	D	C
4	Zaidi	Less	B	C	B
5	Deglet Noor	Medium	B	C	C
6	Khadrawi	High	C	C	C
7	Zirin	Medium	B	C	B
8	Peladora	High	C	C	C
9	Shado	High	C	D	C
10	Zardo	Medium	C	D	C
11	Rachna	High	C	D	C
12	Kohrba	Medium	C	C	C
13	Wahenwali	Medium	C	C	D
14	Neelum	High	C	D	D
15	Kozanabad	High	C	C	C
16	Jhonsohar	Medium	C	C	D
17	Kerblian	Medium	B	D	D
18	Chohara	Medium	C	B	B
19	Berehmi	High	C	C	D

A-1: Excellent A: Very good B: Good C: Acceptable D: Poor