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Some Quality Characters of Six Sudanese Onion Cultivars

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Abstract – **This research was carried out at Hudeiba Research Station Farm, in the River Nile State, in season's 2003/04-2004/05 to study the performance of six Sudanese open pollinated onion cultivars namely; Saggai, an improved cultivar with pink red skin color; Kamleen with yellow skin color; El-Hillo (Nassi) white skin color; Abufrawa with deep red skin color; Wadhamid with yellow skin color and Zeidab with red skin color. The results showed a considerable variation the released cultivars, Saggai, Kamleen and El-Hilo showed the best quality characters. Cultivars Wadhamid, Abufrawa and Zeidab gave the lowest values in some quality characters (premature bolting, dry matter content and total soluble solid).**

Keywords **– River Nile State, Onion Cultivars, Six Sudanese, Skin Color.**

1. INTRODUCTION

Onion (*Allium cepa L.*) is the most important of the bulb crops and is one of the most important vegetable crops grown in most parts of the world. Onion is probably a native of Asia. It belongs to the family Amaryllidaceae, genus Allium. Onions have relatively high nutritive value, being rich in vitamins moderate in carbohydrate, calcium and riboflavin. Its extract has antibacterial properties. Also the shoot system of onion is rich in a number of vitamins.(*Slimestad et al 2007*).

Onion is the leading vegetable crop in the Sudan. It is eaten fresh, pickled, and dry or cooked. Onion planted annually as a winter crop. Estimation of total production of onion in Sudan is one million tons from 84, 000 hectors (*Mohmedali(2009*) and River Nile 162,648 tons from 27,000 feddan (*Mohamed et al(2003)*. Sudanese onion cultivars good in quality characters(Total soluble solid, dry matter and etc...) *(Nouri(2003).* The present study was conducted to test and compare the quality of six different local released and promising onion cultivars relating to some quality characters.

2. MATERIALS AND METHODS

Six local Sudanese cultivars of onion (*Allium cepa* L.) namely Saggai, kamleen, Nassi (Hilo), Abu frawa, Wad hamid and Zeidab were tested for yield and quality. The experiment was carried out during seasons, 2003/04 and 2004/05, at Hudeiba Research Station (Lat 17° 34' N, Long 33° 56' E, elev. 350m) in the Nile State. The soil is thick loamy with pH 7.8 – 8.4 The source of seeds was the Agricultural Research Corporation. The seeds were sown during the first week of October in the nursery, transplanted to the field after 60 days. A randomized complete block design with six replications was used. Seedlings were planted on both Sides of the ridge 60cm width at 10 cm spacing between plants. Irrigation was applied at 8 Days interval and stopped 15 days before harvesting. Manual weeding was practiced. Fertilization and insects control used as recommended doses.

Quality parameters:

1. Total soluble solids: Three bulbs of different sizes (large, medium and small) were randomly selected from each plot for the determination of total soluble solids (TSS) and dry matter content (%). For determination of total soluble solids a crock borer was drown horizontally through the center of the bulb to collect the sample. The samples obtained from the three bulbs were crushed gently in separate containers and drops of the juice were placed in a hand refractometer for TSS determination. The values obtained were corrected since refractometer used is calibrated at 25°C.

2. Determination of dry matter content: The sample used in determination of TSS were used in determination of dry matter content, the outer dry leaves were removed. Bulbs were cut in quarters using sharp knife with minimum loss of juice, weighed and then dried in oven at 75° C for 48 hours to a constant weight. Percentage of dry matter content was calculated by using the formula:

Dry matter content (%) = sample dry weight / sample fresh weight x 100

3-Doubles and bolters (%): The total number of premature bolters, doubling and splitting were counted and expressed as percentage in each plot.

Analysis of variance:

Analysis of variance was carried out for each experiment separately with mean separation for comparison among means (LSD) at 5% level of significance following Gomez and Gomez, 1984.

3. RESULTS

Quality Characters:

1. Total soluble solids (T.S.S.): Differences among the six cultivars were significant in both seasons (Table 1). In the first growing season, cultivar Kamleen gave the highest TSS of 17.43%, while in the second Nassi (Hilo) had the highest TSS of 17.78%, Cultivar Zeidab had the lowest TSS of 14.18% in the first season and Wad hamid had lowest TSS of 15.07%, in second season.

*2. Dry matter content (%):*Differences among six cultivars were no significant in the two seasons (Table 1).

In both seasons Kamleen gave the highest dry matter content percentage of 15.73 in the first season and 16.40 in the second season, while Wad hamid had the lowest in the first season 13.95% and Abufrawa 13.88% in the second season.

3. Percentage of doubles and splitting: Significant differences among the six cultivars were obtained in doubles and splitting percent in the two seasons (Table 1). The cultivars Zeidab and wadhamid produced highest percentage in doubles and splitting of 13.22% and 15.77% in the first and second seasons respectively. On the other hand, cultivar Kamleen produced the lowest percent 7.83% in the first season and Saggai 9.83% in the second season.

4. Percentage of premature bolting: Table (1) shows that the differences among the six cultivars were significant in both seasons. Cultivar Zeidab produced the highest percentage of premature bolting of 9.83% in the first season and 17.08% in the second season while cultivar Nassi produced lowest premature bolting in the second season 8.55%.

4. DISCUSSION

The analysis showed significant differences among the six cultivars in premature bolting. Cultivars Kamleen, Saggai and Nassi showed lowest percentage of bolting, while cultivars Wadhamid, Abufrawa and Zeidab showed highest percentage of bolting. This is in line with the result of *Abdalla and El-Hassan (1977*). They found that higher temperature from July to October in the Sudan tend to promote leaves production resulting in large plants which are more susceptible to premature bolting when exposed to low temperature of the winter season. Also agrees with the finding of *Brewster and James (1994),* they reported that cultivars vary considerably in their susceptibility to bolting. The total soluble solids of the six Sudanese onion cultivars studied in both seasons differed ranging between 14.18% and 17.78%. The dry matter content also ranged between 13.88% and 16.40%. High total soluble solids and dry matter content is positively correlated with good keeping quality. These results agree with finding of *Randle (1992).*Heobserved that cultivars vary in dry matter from 3.03 to 20%. Also *Yoo et al.,(2006) and Chope et al.,(2007*) they finding the accumulation of organosulphur compounds in onions depends upon many factors, especially sulphr-based fertilization, the environment and the genotype of the cultivars. There were significant differences among the cultivars in doubling and splitting percent in both seasons. This is in agreement with the finding of *Ahmed (1984*), who reported that the percentage of splitting differs from one cultivar to the other.

Table 1

Cultivars	2003/04				2004/05			
	TSS %	Dry mat %	Doub %	Bolt%	TSS %	Dry at %	Doub %	Bolt%
Saggai	15.88	15.12	9.08	8.69	16.12	14.9	9.83	9.08
Kamleen	17.45	15.73	7.83	6.90	17.20	16.4	9.85	8.55
Nassi	16.85	15.68	10.75	4.98	17.78	13.9	14.87	9.03
Abufrawa	15.17	15.35	11.17	9.62	15.75	13.8	13.17	14.17
Wadhami	14.27	13.95	13.14	7.48	15.07	15.3	15.77	13.57
Zeidab	14.18	14.17	13.22	9.83	15.62	14.7	15.15	17.08
C.V. (%)	7.22	9.24	14.34	15.55	8.60	13.3	13.37	18.52
LSD	1.34	1.65	1.85	1.46	1.66	2.37	2.08	2.62

Table 2.Temperature data during experimental period (2003– 2005).

Month	Season 2003/04	Season 2004/05
	(ºC)	(ºC)
October	39.2	41.7
November	39.0	40.6
December	37.1	33.5
January	35.9	34.2
February	40.3	37.3
March	42.0	38.7
April	41.7	41.5
May	46.6	44.3

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