

Yield of Six Sudanese Onion Cultivars

Mohammed Ahmed Eltyeb

Hudeiba Research Station-Agricultural Research Corporation

Gaafar Mohammed Elhasan

Faculty of Agricultural University .of kh-

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 in vegetative growth among the six cultivars, where cultivars Kamleen and Wad hamid produced more foliage than others and earliness bulbing. Cultivar Kamleen gave the highest total and marketable yield (ton/ha), while Zeidab gave the lowest yield in the two seasons. Cultivar Abufrawa matured earlier, while cultivar Saggai matured latest.

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 hectares (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 evaluate the yield of six different local released and promising onion cultivars relating to yield.

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.

A. Yield data:

1. Number of leaves per plant.

2. Bulbing ratio: Bulbing ratio = bulb diameter/neck diameter

3. Average bulb fresh weight (g/bulb):

4. Average bulb dry weight (g/bulb):

5. Total yield (t/ha)= Yield (t/ha) = yield /plot x 10000/12x1000

6. Marketable yield (t/ha). The marketable yield means bulbs free from premature bolting, splitting, sprouting, sunscale, small and disease bulbs.

7. Days to maturity

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

Yield parameters:

1. **Number of leaves/plant:** Differences among the cultivars were significant (P=05). In both seasons the number of leaves increased with the plant development (Table 1). Kamleen and Wadhamid produced the highest number of leaves/plant and Zeidab gave the lowest number in both seasons.

2. **Bulbing ratio:** Significant differences among the six cultivars for bulbing ratio in the two seasons. The cultivar Kamleen produced the highest bulbing ratio and cultivar Zeidab gave lower bulbing ratio (Table 1).

3. **Average bulbs fresh weight (g/bulb):** Analysis of variance showed significant differences among the six cultivars for bulb fresh weight in the two seasons. WAdhamid(174.3 g/bulb) in first season and Kamleen(186.4 g/bulb) in second season produced the highest bulb fresh weight. The lowest bulb fresh weight of 151.1 g/bulb was produced by the cultivar Zeidab (Table 1).

4. **Average bulbs dry weight (g/bulb):** Table (1) shows significant differences among the six onion cultivars in the two seasons. Cultivar Kamleen produced the highest bulb dry weight in the first and second season 23,36 and 25,62 (g/bulb) respectively, while the



lowest bulb dry of 18.31 (g/bulb) in the first season and 20.79 (g/bulb) in the second season, was produced by cultivar Zeidab.

5- *Total yield (t/ha)*: Differences in the yield among the six cultivars were significant in both seasons (Table 1). Cultivar Kamleen produced the highest total yield followed by Wadhamid, Nassi and Saggai. While Abufrawa and Zeidab produced lowest yield in both seasons.

6- *Marketable yield (t/ha)*: Table (1) showed significant differences among the cultivars in marketable yield. Kamleen cultivar produced the highest marketable yield of about 13.28 and 15.71t/ha in the first and second seasons respectively, followed by Nassi and Saggai, while Wadhamid, Abufrawa and Zeidab cultivars produced the lowest marketable yield in both seasons respectively.

7. *Days to maturity*: Cultivar Abufrawa matured earliest(134.3) in the first season, (140.3) days in the second season and Saggai matured last one(172.2) in the first season, (165,7) days in the second season. Table (3).

The six onion cultivars under study varied considerably in their growth components including the number of leaves /plant, bulbing ratio, fresh weight (g/bulb) and dry weight (g/bulb). Also these cultivars differed in their yield. This may be due to the fact that those cultivars differ in their genetic makeup which interacts differently with the prevailing environmental conditions as temperature, humidity and soil type. This result agreed with the findings of *Brewster and James (1994)*, they found that successful onion bulb production, depends mainly upon selection of cultivars. Cultivar Kamleen gave the highest values of the number of leaves in both seasons, while cultivar Zeidab gave the lowest number of leaves. The numbers and size of leaves corresponds with high yields. These agreed with the finding of *Gough et al..(2010)* who reported that leaves production appears to be genetically controlled. Kamleen and Wadhamid showed a high percentage of bulbing ratios. The results agreed with the findings of *Maltanudar (1997)* who reported that bulbing in onion is primarily controlled by photoperiod and cultivars differ in their sensitivities to the length of the photoperiod.

4. DISCUSSION

Table 1.

Season	2003/04						2004/05						
	Cultivars	Lev/pl	Bl/rat (%)	Fr/wt (g)	Dr/wt (g)	Tot.yi (t/ha)	Mar/yi (t/ha)	Lev/pl	Bl/rat (%)	Fr/wt (g)	Dr/wt (g)	Tot.yi (t/ha)	Mar/yi (t/ha)
	Saggai	13	1.87	163.2	21.86	17.75	9.28	13	1.89	174.5	22.7	20.47	11.47
	Kamleen	14	1.86	172.6	23.36	22.4	13.28	14	1.94	186.4	25.62	23.35	15.71
	Nassi	13	1.93	158.6	18.63	19.35	12.78	13	1.84	165.7	25.24	19.94	13.85
	Abufrawa	13	1.93	144.3	18.88	15.26	7.78	13	1.84	162.5	21.13	17.1	9.47
	Wadhamid	14	1.91	174.3	21.45	19.66	5.55	14	1.91	183.1	28.04	21.87	9.57
	Zeidab	12	1.86	151.1	18.31	14.16	5.47 ^d	12	1.77	162.2	20.79	14.95	7.5
	C.V. (%)	6.72	3.01	5.27	10.27	12.46	18.2	6.72	4.12	7.22	12.88	10.2	20.91
	LSD	1	0.07	10.07	2.51	1.13	0.84	1	0.09	14.51	3.66	1	1.18

Table2. Days to maturity of six Sudanese onion cultivars evaluated at Hudeiba Research Station, seasons 2003/04 – 2004/05

Cultivar	Season 2003/04	Season 2004/05
Saggai	172	165.7
Kamleen	162.2	158
Nassi	155	164.3
Abufrawa	134.3	140.3
Wadhamid	162	160.3
Zeidab	161	155.7
SE [±]	4.52	5.11
C.V (%)	21.8	23.9

Table 3. Temperature data during experimental period (2003– 2005).

Month	Season 2003/04	Season 2004/05
	(°C)	(°C)
October	39.2	41.7
November	39	40.6
December	37.1	33.5
January	35.9	34.2
February	40.3	37.3
March	42	38.7
April	41.7	41.5
May	46.6	44.3

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