

COMPARISON BETWEEN PROGENIES OF SHANDWEEL SINGLE CENTER AND SOME EGYPTIAN ONION CULTIVARS

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ABSTRACT

This work was carried out at Shandweel Experimental Station, Sohag Governrate during the period from 1995 to 1998 to compare of Shandweel single center progenies with Shandweel-1, Giza 6 Mohassan and Giza 20 for some bulb characteristics. The mean results could be summarized as followed :

- 1- Percentages of single center bulbs, internal and external doubles, total and culls yield, average bulb weight, percentage of internal doubling at the end of the storage period 6 months were significantly decreased in the progenies of the parent bulbs with single growing point compared with local Egyptian cultivars .
- 2- Percentages of single growing point for freshly harvested bulbs and single growing point remained as such though at the end of storage period which gave the highest significant increase with progeny of single growing point bulbs.
- 3- Percentage of single center bulbs was significantly increased with progeny of internal doubles bulbs of the freshly harvested bulbs, while, it gave the highest value with progeny of single center bulbs at the end of the storage period in comprasion with the Shandweel-1, Giza 6 Mohassan and Giza 20 Egyptian cultivars .
- 4- Total onion yield markedly improve using the Giza 20 ranked by Shandweel 1, Giza 6 Mohassan, compared with the rest of Shandweel S. C. progeny .

INTRODUCTION

Onion (*Allium cepa* L.) is an important exportable commodity in Egypt. In order to ensure that the Egyptian onion bulbs are exported free from external and internal doubles. It is required and important to develop the early mature Shandweel single center (Sh.S.C.).

Stino et al (1960) indicated that the average visible number of growing points in "Giza 6" onion bulbs was 2.84%. More than 2.59% growing points were found in " Behairy " . In both varieties the freshly harvested bulbs with one, two or three growing points remained as such up to 20 weeks of common storage.

Shalaby (1966) indicated that internal doubling in onions is controlled by several genes. These genes control the number of growing points, time of their initiation, or both. The genotype and environment contribute to internal doubling expression.

Ahmed and Ahmed (1976) reported that the percentage of single center bulbs was increased in transplanted onion from one to 37% through one generation of selection in " Giza 6 Mohassan " variety. Percentage of bulbs with two contact centric growing centers was also increased from 9 to 35%, while that of internal doubles was decreased from 90 to 28% .

Abd El-Hafez et al (1976) indicated that among 12 Cvs. Studied, Behairy had the highest number of growing points, while' Yellow Bermuda

Ecell 986, Texas Yellow Grano and New Mexico Early Grano had the lowest number of growing points.

Dowker and Fennell (1981) compared five open-pollinated populations with three inbreds of onion at five localities. They found that all open-pollinated populations gave higher yields than inbreds. Inbreds had less doubles than open-pollinated populations.

Pike et al (1988) derived Texas 1015 Y from original single bulb selection of Texas Early Grano 951 through 5 generations of selection. It is a yellow onion with a higher percentage of single center bulbs than Texas Early Grano 951, Early Grano 502 or Ringer onions.

Sherif et al (1988) reported that F₁ bulbs had more growing points than the better parent "Kerdasy" with few growing points in Egypt.

Abd El-Rehime et al (1996) after two cycles of mass selection showed that yield of "Giza 20" onion improved through the percentage of bulbs with single growing points, single center, exportable yield, while internal and external doubling, average weight of bulb, total and culls yields were decreased.

MATERIALS AND METHODS

The aims of the present were to make the comparisons between the performance of progenies of Shandweel single center (Sh S. C. population used this study is a selected from Shandweel 1 after three cycles of mass selection for single growing character) and some other Egyptian onion cultivar to develop new exportable cultivars.

The present study was carried out at Shandweel Research Station (Sohag) during the period from 1995 to 1998. The soil was loam clay in texture.

About 2500 Shandweel single center (Sh.S.C.) bulbs with diameters exceeding 7 cm. were halfway horizontally sectioned in November, 1995. Number of bulbs with a single growing point was 1961 (approximately 78.44 percent). Those with a single centers were 366 bulbs with innermost ring containing 1,2 or more growing points (approximately 14.64 percent). Internal doubles were 173 with contact two or more growing center (approximately 6.92 percent).

The 1961 single growing point bulbs were selected, grown for seed production, and permitted to interpollinate under a lumite cage (isolation). The 366 single center bulbs with contact two or more growing points enclosed in the interior innermost ring were grown under a second lumite cage. The rest 163 bulbs of internal doubles with only two or more growing centers per bulb were grown in a third cage. In June 1996, seed yield of each cage was harvested. Seed yield in the cages and more three commercial varieties, namely Shandweel1, Giza 6 Mohassan and Giza 20, were sown in seed beds on mid September and transplanted in field trials with four replications on mid November in both seasons of study in a complete block design.

Plots were 2 × 3 m. and consisted of 10 rows 20 cm apart and 3 meter long (1/700 feddan). Normal practices for growing transplants were followed. Harvesting took place at maturity, i.e, when 75 % of tops fell down.

Onion plants were cured in the field for two weeks. Roots and tops were cut. Data were recorded for: -

- 1- Average bulb weight (g) (a.b.w)
- 2- Percentage of external doubling. (ext.d)
- 3- Total yield (t/f).
- 4- Exportable yield. (t/f) (sound bulbs)
- 5- Culls yield (t/f)

Moreover hundred freshly harvested bulbs were taken from each plot and cross sectioned to record .

- 1- Percentage of single growing point bulbs. (s.g.p)
- 2- Percentage of single of center bulbs with two or more contact growing points enclosed in the innermost ring (s.c.b)
- 3- Percentage of internal doubles bulbs with two or more centers per bulb.(int.d)

Bulbs of each of the six entries were stored in bulk under room laboratory conditions of Shandweel Research Station. Storage was ended after 6 months, in November 1997 and 1998. Bulb samples were cross sectioned to find out the percentages of single growing point bulbs , single center bulbs and internal doubles .

Data were statistically analyzed using the normal F. test for the complete block design and the means for genotypes were compared using the L.S.D method (Steel and Torrie , 1982)

RESULTS AND DISCUSSION

The parent Shandweel single center population used in this study was a selection of the commercial Shandweel-1 which had maturity of bulbs with single growing point and /or center and is referred to here as Shandweel S. C.. Number and comparison of the commercial Shandweel and parent selected Shandweel S. C. (used in this study), show the apparent (improvement) in percent single growing bulb i.e from 9.72 and 33.33% in the former to 78.44 and 14.64% in the latter internal and external doubles were also decreased from 57.14 and 8.0% to 6.92 and 0.0% , respectively .

1- Bulb yield components:

Results in table (1) show total , exportable and culls , yields .

Total yield significantly varied in progenies of single growing point Sh.s.c (11.26 and 11.03t/f), while, " Giza 20 " produced the highest total yield (17.63 and 17.13 t/f) in the first and second seasons respectively.

Total yield was statistically similar in all progenies of Shandweel S. C.. The total yield progenies of S. G. P. was lower than that of the commercial Shandweel 1, Giza 6 Mohassan and Giza 20 (with the latter statistically similar) .

Exportable yield were statistically similar, culls yield were lowest in progenies of S. G. P. and S. C. B. (0.03 and 0.27 t/f) and became were in progenies of internal double, and became as high as 2.23, 3.16 and 2.6 t/f in Shandweel-1 commercial, Giza 6 Mohassan and Giza 20 (Table 1) .

Since the progeny of single growing point produced no doubles, culls were mainly scallion bulbs and pickles. These results are in agreement with

those obtained by Dowker and Fennell (1981) and Abd El-Rehim et al (1996) who found that open pollinated populations yielded larger bulbs than did inbreds.

Apparently, selection of internal doubles qualities (i.e., number and location of growing points) is rewarding, as evidenced from results of the progenies of selection male from the selected Shandweel-1 improvements are quite feasible in Giza 6 Mohassan and Giza 20 selections. Seeded for direct seeding and bulb production from sets may be developed from both cultivars which mature later than Shandweel 1.

Table (1) : Yield components for some progenies of Egyptian onion in 1996/97 and 1997/98 seasons.

Genotype pedigree	1996/1997			1997/1998		
	Characters					
	Total yield	Expo.* yield	Culls yield	Total yield	Expo. yield	Culls yield
Progeny of single growing point bulbs	11.26	11.21	0.05	11.03	11.00	0.03
Progeny of single center bulbs	13.50	13.30	0.20	12.93	12.66	0.27
Progeny of internal doubles	14.06	12.16	1.90	13.93	12.33	1.60
Shandaweel 1	16.53	14.30	2.23	14.10	12.43	1.67
Giza 6 Mohassan	16.86	13.70	3.16	16.06	13.81	2.25
Giza 20	17.63	15.03	2.60	17.13	14.60	2.53
L.S.D at 05	3.93	N.S	0.83	2.79	N.S	0.54

* Expo. = Exportable yield

2- Quality characters of freshly harvested bulbs:

Doubles refer to bulbs which could be so judged without horizontal sectioning.

Percentages of single center bulbs, internal and external doubles were highly significantly variable in different progenies (Table 2).

However, average bulb weight significantly decreased in the progeny of single growing point (70.42 gm) and (68.95 gm) in the two seasons, respectively. In this respect "Giza 20" bulb weight was the highest in both seasons (Table 2).

Percentage of bulbs with single growing point was significantly increased in the progeny of single growing point, i.e. almost 100 % in both seasons (table 2). Similar results were obtained by Ahmed and Ahmed (1976) Abd El-Hafez et al (1976), pike et al (1988) and Abd El-Rehim (1996) who reported that there were increase in single growing point, and single center bulbs, by selection. Oppositely, bulb weight, external and internal doubles were decreased.

However, in this commercial Shandweel cv. bulb weight was significantly in them that produced from progenies of S. G. P. of the Shandweel S. C. population. It may be advisable that selection for S. G. P., could be for only bulbs required to produce those sowed for direct seeding for bulb production from sets or parents of future hybrid onion in the breeding program. To increase bulb weight in progenies of S. G. P., selection to maximize bulb weight should be practiced for several cycles.

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3- Quality characters of bulbs after 6 months of storage:

Percentage of bulbs with single growing point was highly significantly increased in the progeny of single growing point 75 % and 73.39 % in both seasons respectively, while percentage of internal doubles was decreased (Table 3) .

However, percentage of single center bulbs was increased in the progeny of single center bulbs by 63.04 % and 63.66 % in both seasons respectively (Table 3) . These results agreed with those obtained by Stino et al (1960) who noticed more growing points in bulbs after 20 weeks of common storage.

Generally, it could be concluded that high quality bulbs were obtained with progeny of single growing points bulbs.

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مقارنة بين نسل شندويل ذات القمة الواحدة و بعض أصناف البصل المصري

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- أجرى هذا البحث في محطة البحوث الزراعية بجزيرة شندويل في الفترة من 1995 حتى 1998 لمقارنة نسل السلالة شندويل ذات القمة الواحدة المنتخبة من الصنف شندويل 1 و بين جيزه 6 محسن مع جيزه 2. وشندويل 1 حيث قطعت أبصال السلالة ذات القمة الواحدة عرضيا و صنفنت الى أبصال ذات برعم واحد - أبصال ذات قمة واحدة تحتوي أكثر من برعم - أبصال بها أكثر من قمة (مزدوج داخليا) و زرعت كلا منها على حدة منعزله و اختبر نسلها مقارنة مع نسل بعض الأصناف الأخرى و أظهرت النتائج ما يلي :-
- 1- نقصت النسب المئوية للأبصال ذات القمة الواحدة و الأبصال المزدوجة داخليا و المزدوجة خارجيا نقصاً معنوياً و أيضاً نقص المحصول الكلي و البصل النقضة و معدل وزن البصلة بعد الحصاد . كما أن الأبصال المزدوجة داخليا نقصت معنوياً في نهاية فترة التخزين في نسل الأبصال ذات البرعم الواحد 0
 - 2- ازدادت النسبة المئوية للأبصال وحيدة البرعم بعد الحصاد و بعد نهاية فترة التخزين زيادة معنوياً مع نسل الأبصال ذات البرعم الواحد 0
 - 3- ازدادت الأبصال ذات القمة الواحدة في نسل الأبصال ذات القمة الواحدة زيادة معنوياً.
 - 4- زاد محصول البصل الكلي معنوياً بزراعة الصنف جيزه 20 و تبعه مباشرة الصنف جيزه 6 محسن وشندويل 1 مقارنة بنسل أبصال العشيرة المنتخبة.
- توضح نتائج هذا البحث ان زراعة الابصال وحيدة البرعم انتجت الابصال الاعلى جودة.

Table (2): Quality characters of freshly harvested bulbs for some progenies of Egyptian onion in 1996/97 and 1997/98 seasons

Genotypes pedigree	1996/1997					1997/1998				
	Characters									
	% s.g.p	% s.c.b	% int.d	% ext.d	a.b.w g	% s.g.p	% s.c.b	% int.d	% ext.d	a.b.w g
-Progeny of single growing point bulbs (s.g.p)	100.0	0.00	0.00	0.00	70.42	99.33	0.67	0.00	0.00	68.95
-Progeny of single center bulbs (s.c.b)	60.00	31.43	8.57	1.00	84.37	60.03	30.66	9.30	1.69	80.83
-Progeny of internal doubles	4.17	62.50	33.33	6.50	87.91	5.00	61.00	34.00	7.00	87.08
-Shandaweel 1	9.72	33.33	57.14	8.00	103.33	10.00	32.55	58.44	8.36	88.12
-Giza 6 Mohassan	10.30	43.33	46.36	6.40	105.41	10.31	42.00	47.68	6.96	100.41
-Giza 20	10.00	50.00	40.00	6.70	110.2	9.06	48.60	41.33	7.00	107.08
L .S.D at 05	4.84	10.46	8.21	2.61	24.59	3.60	7.55	3.93	1.97	17.39

s.g.p. = single growing point.
 int.d. = internal doubling.
 a.b.w. = average bulb weight (gm).

s.c.b. = single center bulbs.
 ext.d.= external doubling.

Table (3): Positional of growing point for some progenies of Egyptian onion at the end of storage period in 1996 / 97 and 1997 / 98 seasons.

Genotypes pedigree	1996 / 1997			1997 / 1998		
	Characters					
	% s.g.p	% s.c.b	% int.d	% s.g.p	% s.c.b	% int.d
Progeny of single growing point bulbs	75.00	25.00	0.00	73.39	27.60	0.00
Progeny of single center bulbs	13.04	63.04	23.91	12.00	63.66	24.33
Progeny of internal doubles	2.08	39.58	58.33	1.00	40.44	58.55
Shandaweel 1	0.00	12.50	87.50	0.00	10.69	89.30
Giza 6 Mohassan	0.00	5.56	94.44	0.00	6.51	93.48
Giza 20	0.00	3.45	96.55	0.00	4.18	95.81
L . S . D at 05	7.60	7.34	7.23	6.27	5.73	6.09