



Evaluation of some garlic (*Allium Sativum* L.) cultivars grown in sandy soil grown under Sohag region conditions

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Abstract: This study was carried out in sandy soil at El-Kawamel Experimental Farm, Faculty of Agriculture Sohag University, during 2017/ 2018 and 2018/ 2019. Drip irrigation system was used in this experiment four garlic entries cvs namely (Balady, Balady El –Wady, "sids40" and Egaseed-1 (chinese) were tested for their some vegetative growth characters, bulb characteristics and total yield per feddan under Sohag environmental conditions. Great and major variation was observed among all garlic entries for all the studies parameters "sids 40" cultivar showed the maximum bulb weight clove weight and total fresh yield in relative to the their four garlic cvs. On the contrary, Balady and Balady El- Wady garlic cvs occupied the last position in this respect. The superiority of different four garlic cvs grown in sandy soil under Sohag conditions according to their production can be arranged a follows in descending order "sids40", Egaseed-1 "chinese", Balady and Balady El- Wady.

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Keyword: Garlic, Sids 40, Egaseed-, Balady Balady El-Wady.

1. Introduction

Garlic is considered an important vegetables grown under Egyptian conditions for local marketing and exportation.

Garlic (*Allium Sativum* L.) has been playing one of the most important dietary and medicinal roles in human being for centuries. It has been cultivated since ancient times used as a spice and flavoring and due to its potential benefits in preventive and curative medicine, has been used in many cultures (Rivlin, 2001).

Even, today the medical use of garlic is widespread and growing (Amagase, 2006).

The main edible part of garlic the bulb, consisting of "coves" which develop from axillary buds of the foliage leaves (Rahim and Fordham, 1988). The bulbing and cloving of garlic are influenced by day length and the temperature to which the dormant cloves or growing plant are exposed before bulbing begins. In general, low initial temperatures, followed by long days are essential for the formation of bulbs and cloves (Kolev, 1962).

Many efforts were made for introducing high yielding garlic cultivars to Egypt for overcoming the problem of yield decline. In addition, unbalancing cropping of Balady garlic the dominant garlic cv grown under Egypt conditions encourage garlic workers to search about more new garlic cvs. Nowadays, many new garlic cultivars and clones are greatly appeared in Egypt due to the rare and

unknown information about the success of these cvs under different climatic conditions prevailing in Egypt, Vegetable workers must carry out extensive trials for evaluating these garlic cvs for ensuring the success of these cvs under different locations of Egypt.

The great variation on the growth and fruiting of different garlic cultivars according to the different locations in Egypt was a wide field for many workers (Shalaby, 1973 , Maksud and El-Oksh, 1983, Hassan *et al.* ,1990, Gad El-Hak and Abd El-Maged. 2000, Singh and Tiwari, 2001, Hassan, 2002, Tiwari *et al.*, 2002, Pardo and Marin 2003 , Baghelian *et al.*, 2003 ; Patil *et al.*, 2003, El-Sayed, 2004, Costa *et al.*, 2004; Mohamed , 2004, Gowda *et al.*, 2007; Moustafa *et al.*, 2009 Aly, 2010 and Dawood *et al.*, 2011).

The merit of this study was evaluating the success degree of four garlic cvs Sids-40, Egaseed-1 Chinese, Balady and Balady El-Wady grown under Sohag conditions. The evaluations was depended on the vigor and production of these garlic cvs under such site.

2. Materials and Methods

This investigation was carried out new reclaimed soil at El- Kawamel Experimental Farm, Faculty of Agriculture, Sohag University during the two winter seasons of 2017/ 2018 and 2018/ 2019 Drip irrigation system was used for achieving of

this trial four garlic cultivars namely (Baldy, Balady El- Wady, " sids- 40" and " Egaseed-1" (chinese).

All garlic cvs were planted on the second week

of October during both seasons, respectively.

The obtained data for soil analysis (According to **Wilde *et al.*, 1985**) are shown in Table (1).

Table (1): analysis of the tested soil (some physiochemical characteristics of El- Kawamel experimental).

Soil depth (cm)	0-30 cm	30-60 cm	30-100 cm
Character			
Clay %	8.20	11.90	13.50
Silt %	4.50	11.50	16.00
Sand %	87.30	76.60	70.50
Texture	Gravelly sand	Sand loam	Sandy clay loam
pH (1: 2.5 external)	7.21	7.80	7.83
CEC (1: 5) dsm^{-1}	1.08	2.60	3.16
O.M. %	0.14	0.11	0.08
CaCO ₃ Mg/ 100 g	16.50	22.20	40.00
EC (1-5) dsm^{-1}	1.11	0.90	0.80

Each treatment (garlic cv.) was replicated three times one experimental cv. Area per each. The soil was formed into beds and the used experimental unit was one plot (3m long and 100 cm wide). The bed surface was carefully leveled and irrigation pipes were hand laid down to the end of the experiment. Planting was done in four rows per each bed. The cloves were spaced 10 cm apart within each row and the distance between the doubled rows in each side was 20 cm. cloves were planted on second week of October in the two successive winter seasons of 2017/ 2018 and 2018 / 2019 . Conventional other agronomic practices and pest central treatments were done as needed and were similar to those used in commercial garlic production. Drip irrigation (fertigation) was applied uniformly as recommended by Egyptian Ministry of Agriculture and harvesting was carried out on the first week of May in both seasons.

During both seasons the following parameters were recorded:

- 1- Percentage of emergence after 35 days from planting was estimated according to the following equation that reported by **Gritsenko and Katoshind (1976)**.

2-

2-Vegetative growth characters

Random sample of three plants were taken after 140 days from planning and the following characters were measured:

- Average plant height (cm²) measured from bulb base to top leaf blade.
- Average number of leaves per plant.
- Fresh weight of whole plant (g).

Bulb characteristics and total yield (tons/fed.)

After harvesting, plants were left to cure before cutting off dry leaves and roots and the following data were measured:-

1. Average bulb Weight (a).
2. Average number of cloves per bulb.
3. Average clove weight (g).
4. Total yield (ton/fed.). It was calculated by weighting of all the harvested garlic bulbs for each plot and expressed as tons/fed.

All the obtained data were subjected to the proper statistical analysis according to **Mead *et al.*, (1993)**. Means were compared using new L.S.D. at 5%.

3. Results and Discussions

1- Field emergence percentage:

It is clear from the data in Table (2) that percentage of emergence was significantly varied among all four garlic entries. Generally, after 35 days from planting, Balady followed by Baldy El-Wady showed a tendency towards higher emergence % than other entries during both seasons. Out of all the tested garlic cvs Egaseed- 1 recorded the lowest value.

The favorable environmental conditions and its coupled with genetics for Balady and Balady El-Wady garlic cvs could explain the present results.

These results are in harmony with those obtained by **Moustafa *et al.*, (2009)** and **Aly (2010)** who supported the great variation of different garlic cvs in their emergence %.

2-Some Vegetative Growth Characters:

a- Average plant height

It is clear from the obtained data that averages plant height values were depended on garlic cvs. It was significantly maximized in garlic cvs Balady and Balady El-Wady and was minimized in garlic cvs "sid-40" These results were true during both seasons.

b- Average number of leaves per plant:

The four garlic cvs significantly showed variation in their average number of leaves per plant. The highest values were recorded in garlic cvs "Sids-40 1" followed by Chinease cv. The lowest number of leaves per plant was appeared in garlic cvs Balady and Balady El-Wady. Similar trend was noticed during 2017/ 2018 and 2018/ 2019 seasons.

C- Fresh weight of whole plant:

One can state that Egaseed-1 (chinease) garlic cv ranked first for whole plant weight, followed by "Sids-40" and while Baldy and Balady El-Wady ranked the last position in this respect these results were true during both seasons.

The previous significant differences on growth characters among various as garlic cvs were confirmed by the results of **Shalaby, (973) Hussain et al., (1995); Mohamed (2004); Moustafa et al, (2009) and Aly (2010).**

3- Bulb characteristics and total yield (ton/fed.)

a- Average bulb weight:

The obtained results (Table 3) showed significant differences among all entries in average bulb weight. The highest bulb weight was recorded in garlic cv "Sids-40" followed by Egaseed-1. The minimum bulb weight was obtained in garlic cv Balady and Balady El- Wady cv during both seasons.

b-Average number of cloves per bulb:

This character was significantly varied by all the entries of garlic. Number of cloves per bulb for the investigated four entries ranged from 8.2 to 23.9 and 9.8 to 25.8 in both seasons, respectively. Number of cloves per bulb was maximized garlic cv Balady followed by Balady El-Wady garlic cs. Bulbs of cvs "Sids-40" and Egaseed-1 contained the lowest number of clovers in both seasons. These

results were true during both seasons.

c-Average clove weight:

It is clear from the obtained data that significant differences were observed among the four entries of garlic with respect to average clove weight in both seasons. During both seasons, Sids-40 and Egaseed-1 had the highest values of clove, weigh than the other tested vcs. The lowest values for average clove weight were obtained in the cultivars Balady and Balady El-Wady.

d-Total yield (ton/fed.):

It is evident from the data in Table (3) that there were significant differences among the various investigated entries with regard to yield per feddan. In both seasons, the greatest total yield was recorded in garlic cvs "Sids-40" and Egaseed-1. Significant differences on the yield was detected among the two garlic cvs namely 'Sids-40' and Egaseed-1. The garlic entries that were responsible for obtaining the minimum yield were Balady El-Wady and Balady during both seasons. Total yield/fed was 6.210 and 6.350 tons for garlic cv "Sids-40" during both seasons respectively. Balady El-Wady garlic cv produced 2.100 and 2.200tons in both seasons respectively. These results were true during both seasons.

According to the obtained data one can state that the used four garlic entries differed significantly towards their both characteristics and total yield per feddan. The best results were attributed to plantinggarlic cvs"Sids-40" and Egaseed-1 in ascending order.

On the contrary, both Balady El-Wady and Balady garlic cvs produced the minimum yield and bulb and clove weights but gave bulbs with maximum number of cloves. According to the present study it is recommended to distribute garlic cvs' Sids-40" Egaseed-1 for their higher own from yield and bulb characters.

These results are in conformity with those obtained by **Hassan (2002), Mohamed (2004), Moustafa (2009) and Dawood et al, (2011).**

As a conclusion, garlic entries "Sids-40" and Egaseed-1 were recommended for garlic production for high yielding capacity under Sohag conditions.

Table (2): Percentage of emergence and vegetative growth characters as influenced by different garlic cultivars during 2017 / 2018 and 2018/ 2019 seasons.

Different cultivars of garlic	Field emergence %		Plant height (cm)		Number of leaves/ plant		Fresh weight to whole plant (g.)	
	2017/2018	2018/2019	2017/2018	2018/2019	2017/2018	2018/2019	2017/2018	2018/2019
1-Balady	72.40	74.60	89.0	91.6	7.25	8.32	118.5	120.0
2-Balady El- Wady	70.50	72.70	90.2	92.8	7.15	8.20	117.0	119.0
3-"Sids 40"	63.55	66.00	70.8	72.5	10.78	12.15	140.5	145.0
4-Egaseed -1	59.15	62.50	75.3	77.6	7.80	9.20	148.6	150.5
New L.S.D. at 5%	1.88	2.10	2.4	2.6	0.61	0.68	2.1	2.3

Table (3): Bulb characteristic and total yield as influenced by different garlic cultivars during 2017 / 2018 and 2018/ 2019 seasons.

Different cultivars of garlic	Average bulb weight (g.)		Average number of loves / bulb		Average clove weight (g.)		Total fresh weight (ton/ fed.)	
	2017/2018	2018/2019	2017/2018	2018/2019	2017/2018	2018/2019	2017/2018	2018/2019
1-Balady	33.80	35.00	23.6	25.0	1.00	1.05	2.150	2.250
2-Balady El- Wady	33.15	34.75	23.9	25.8	0.95	0.98	2.100	2.200
3-"Sids 40"	69.50	71.00	8.2	9.8	4.18	4.22	6.210	6.350
4-Egaseed -1	49.80	53.80	11.5	12.9	3.00	3.10	4.250	4.400
New L.S.D. at 5%	2.22	2.45	1.6	1.8	1.12	1.16	1.061	1.111

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