

QUALITY AND YIELD OF ONION GROWN BY SETS AS AFFECTED BY DIFFERENT IRRIGATION REGIMES UNDER ASSUIT CONDITIONS

Attallah, Shreen Y.

Horticulture Dept. , Faculty of Agriculture, Assiut University, Egypt

ABSTRACT

This work was carried out to improve the quality and yield of Onion Giza 6cv. that grown by sets . Sets were grown on September 12 and 16 in 2006/ 2007 and 2007/ 2008 seasons ,respectively .Plants were subjected to irrigation treatment intervals. Results showed that , increasing the period between irrigations led to a significant reduction in percentage of double bulbs. Application of irrigation later in the growing seasons gave a simultaneous increase in total yield. Plots that received 4 irrigations , gave the lowest weight loss .

INTRODUCTION

Onion(*Allium cepa*) is one of the most important vegetable crops in Egypt. The quality of onion that grown by sets wants to improve. So we are modifying our traditional culture practices such as ,applying different irrigation regimes in order to reach proper bulb quality for consumption and to improve yield and storability of onion. Orta and Ener (2001) indicated that the yield and yield components in bulbs were affected by irrigation. Halim and Ener (2001), Kumar *et al.* (2007) and Enciso *et al.* (2009) found that irrigation highly affected the total onion yield, yield components and morphological characteristics of onion bulb

MATERIALS AND METHODS

The present work was carried out at the Experimental farm of the faculty of Agriculture, Assiut University, Assiut during 2006/2007 and 2007/2008 seasons.The soil of the farm was clay. Onion Giza 6cv. was used in this work. Sets were grown on September 12 and 16 in 2006/2007 and 2007/2008 seasons respectively. Sets were grown on rows of 3.5 m long and 50 cm wide at 5-7 cm between plants and sowing were at two sides of row. Three rows were included in each plot..After 30 days from sowing sets, plants were subjected to irrigation treatment intervals, i.e.,15,21 days as follows:

- 1- Plots were irrigated at 2-weeks interval until 15 January (received 8 irrigations), then plant left without irrigation until maturity.
- 2- Plots were irrigated at 2 weeks interval until 30 December (received 7 irrigations), then plants left without irrigation until maturity.
- 3- Plots were irrigated at 2-weeks interval until 15 December (received 6 irrigations), then plants left without irrigation until maturity.
- 4- Plots were irrigated at 3-weeks interval until 22 January (received 6 irrigations), then plants left without irrigation until maturity

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- 5- Plots were irrigated at 3-weeks interval until 2 January (received 5 irrigations), then plants left without irrigation until maturity.
- 6- Plots were irrigated at 3-weeks interval until 15 December (received 4 irrigations), then plants left without irrigation until maturity.

The water requirement in all treatments was constant (0.4 m³/ plot) in each time and was calculated by water meter. All treatments were harvest when reached maturity i.e. when about 75% of the vegetative part plants were fall down. Irrigation treatments were arranged in Randomized Complete Block Design with three replicates.

Data records:

When about 75% of vegetative part plants in each plot were fall down, plants that showed annual bolting in each plot were discarded. Then harvesting was done by digging. Ten plants were randomly taken from each plot on which the following data were recorded and averaged.

1-Plant height (cm):

Measured from the base of the blub neck to the top of the longest leaf blade.

2- Fresh weight of whole plant (gm):(F.W.of whole plant)

After harvesting, bolters were discarded and bulbs were left for curing for about 15 days before cutting off dry leaves and roots. The following characters were recorded:-

3- Percentage of doubles (%):

Percentage of double bulbs were estimated as number of external doubling (split bulbs)/number of planted set.

4- Total yield (ton/ fed):-

All harvested bulbs in each plot were weighed and bulb yield/fed. was calculated.

After classification, Random samples of 20 single bulbs from each plot were used for the determination of:-

5 -Bulb diameter (cm):

6-Average bulb weight (gm):

The twenty single bulbs were weighed and averaged.

7-Total soluble solids TSS (%):

Five bulbs were randomly taken from each plot, cut and mixed together after removing the outer 2 leaves. The percentage of total soluble solids was measured by refractometer .

8-Weight loss:

Fifteen bulbs were randomly taken from each plot. The storage period started after harvesting till the fifth of December and the weight loss during storage was calculated.

Statistical analysis:

Data were subjected to statistical analysis according to Snedecor and Cochran (1980) and means of treatments were compared using L.S.D.

RESULTS AND DISCUSSION

1- Plant height (cm):

Data presented in (Table 1), showed that, plots received eight or seven irrigations at 2 weeks interval showed the highest plant height. It could be, generally noted that, the highest number of irrigations received, the highest plant height will be obtained. Application of irrigation later in the growing seasons gave a simultaneous increase in plant height. For example, in the first season, withholding irrigation as early as January,15, the average of plant height was 68.33 cm but when we stopped irrigation treatment 45 days before harvest, the average of plant height was 61.58. These results are in line with Basiliou (1975) who indicated that, an increase in foliage growth with higher moisture levels.

2- Fresh weight of whole plant (gm):

Data on fresh weight of whole plant as affected by irrigation treatments are shown in Table (1) .It could be generally, noted that, plots received eight irrigations at two weeks interval up to January,15 gave the highest value of plant fresh weight. Plots which received 8 or 7 times of irrigations showed significantly higher fresh weight of whole plant.

3- Percentage of double bulbs:(%)

Results presented in Table (1) indicated that, application of irrigation later in the growing season gave a simultaneous increase in percentage of double bulbs. On the other hand, by increasing the period between irrigations a significant reduction in percentage of double bulbs was noted. These results agree with Hassan(1984) who indicated that, shortening the irrigation interval increased bulb doubling,

4- Total yield:(ton/fed.)

Total yield (ton/ fed.) was significantly affected by the tested irrigation treatments (Table 1). Plots received 8 irrigations at 2 weeks interval gave significantly higher total yield comparing with the other treatments in both seasons. Application of irrigation later in the growing season gave a simultaneous increase in total yield. These results are in agreement with Orta and Ener (2001) they indicated that the yield and yield components in bulbs were affected by irrigation. Halim and Ener (2001), Kumar *et al.* (2007) and Enciso *et al.* (2009) found that irrigation highly affected the total onion yield , yield components and morphological characteristics of onion bulb. Irrigation at 2 weeks interval, led to increase of the root-zone water storage, better crop ,water availability through the whole root zone and higher yields.

Table (1): Effect of some irrigation treatments on plant height, F.W. of whole plant, Double(%) and total yield of onion Giza 6 cv. During 2006/2007 and 2007/2008 seasons under Assiut condition.

2006/2007 season				
Irrigation treatments	Plant height (cm)	F. W. of whole plant (gm)	Double (%)	Total yield (ton/fed.)
8 irrigations at 2 weeks interval until 15 Jan.	68.33	255.56	2.87	14.920
7 irrigations at 2 weeks interval until 30 Dec.	68.20	248.63	2.20	11.360
6 irrigations at 2 weeks interval until 15 Dec.	61.58	179.57	1.80	12.320
6 irrigations at 3 weeks interval until 22 Jan.	60.93	170.23	2.29	12.880
5 irrigations at 3 weeks interval until 2 Jan.	60.10	166.60	1.67	9.350
4 irrigations at 3 weeks interval until 15 Dec.	54.31	164.51	1.71	8.200
L.S.D 0.05	2.96	20.32	0.49	2.030
2007/2008 season				
8 irrigations at 2 weeks interval until 15 Jan.	67.20	226.73	2.97	11.470
7 irrigations at 2 weeks interval until 30 Dec.	68.20	208.03	2.40	9.010
6 irrigations at 2 weeks interval until 15 Dec.	61.26	170.83	2.17	10.750
6 irrigations at 3 weeks interval until 22 Jan.	61.70	168.90	2.20	10.360
5 irrigations at 3 weeks interval until 2 Jan.	57.80	154.40	1.96	7.560
4 irrigations at 3 weeks interval until 15 Dec.	54.56	153.43	1.52	6.820
L.S.D. 0.05	2.86	18.92	0.20	0.893

5- Bulb diameter (cm):

As shown in Table 2, it was found that, plots that received 8 irrigations gave the highest bulb diameter. These results agree with Abdulaziz and Al-Harbi (2002) who indicated that average bulb diameter was significantly increased at higher levels of irrigation water. Assuming high irrigation frequency, better scheduling may be expected to increase applied fertilizer use efficiency, to reduce leaching and improve onion yields by increasing bulb size.

6- Average bulb weight (gm):

Data presented in Table 2 showed that, average bulb weight was increased when the period between the irrigation decreased. On the other hand, the average bulb weight was increased by increasing the number of irrigations

and when the application of irrigation continued later in the growing season . For example, plots that received 6 irrigations and were irrigated until Jan.,22 achieved higher average bulb weight than plots that received 6 irrigations and were irrigated until Dec.,15.

Abdulaziz and AL-Harbi (2002) indicated that average bulb weight was significantly increased at higher levels of irrigation water.

7- Total Soluble Solids TSS (%):

Results presented in Table 2 indicated that, the highest value of TSS was obtained by increasing the period between irrigations .Plots that received 4 irrigations gave the highest value of TSS .

8-Weight loss (gm):

Plots that irrigated at 3- weeks interval until 15 December (received 4 irrigations)gave the lowest weight loss ,so it achieved the highest storability (still good without rotting or sprouting for long time) .Bhonde et al (1996) indicated that, the effect of withholding irrigation for 12 days prior to harvest, followed by 3 days curing ,resulted in lower storage losses compared with later irrigation and longer curing times.

Table (2): Effect of some irrigation treatments on bulb diameter, average bulb Weight, TSS and weight loss of onion Giza 6 cv. during 2006/2007 and 2007/2008 seasons under Assiut Condition.

2006/2007 season				
Irrigation treatments	Bulb diameter (cm)	Average bulb weight (gm)	TSS (%)	Weight loss (gm)
8 irrigations at 2 weeks interval until 15 Jan.	6.37	104.450	13.00	0.816
7 irrigations at 2 weeks interval until 30 Dec.	6.26	94.550	14.33	0.750
6 irrigations at 2 weeks interval until 15 Dec.	5.97	80.220	15.91	0.716
6 irrigations at 3 weeks interval until 22 Jan.	6.04	89.510	13.16	0.616
5 irrigations at 3 weeks interval until 2Jan.	5.87	88.440	15.50	0.566
4 irrigations at 3 weeks interval until 15 Dec.	5.62	76.110	17.41	0.400
L.S.D 0.05	0.26	7.949	1.16	0.079
2007/2008 season				
8 irrigations at 2 weeks interval until 15 Jan.	6.06	97.830	13.50	0.783
7 irrigations at 2 weeks interval until 30 Dec.	5.84	84.380	14.41	0.766
6 irrigations at 2 weeks interval until 15 Dec.	5.54	79.970	15.50	0.683
6 irrigations at 3 weeks interval until 22 Jan.	5.74	83.430	13.91	0.616
5 irrigations at 3 weeks interval until 2Jan.	5.64	80.000	15.41	0.483
4 irrigations at 3 weeks interval until 15 Dec.	5.35	74.300	16.25	0.366
L.S.D. 0.05	0.19	5.167	1.25	0.068

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الجودة والمحصول فى البصل المزروع بالبصيلات باستخدام معاملات رى مختلفة
تحت ظروف اسبوط
شرين يعقوب عطالله
قسم البساتين (خضر) – كلية الزراعة – جامعة اسبوط

أجرى هذا البحث بمزرعة كلية الزراعة بأسبوط خلال مواسم 2007/2006،
2008/2007 لدراسة تأثير معاملات الرى المختلفة على الابصال المزروعة بالبصيلات
بهدف تحسين المحصول وجودته. وكان الرى كل اسبوعين وكل ثلاثة اسابيع مع إيقاف
الرى قبل الحصاد ب 15 يوم، شهر، شهر ونصف . وكانت المقننات المائبة لكل المعاملات
ثابته (0.4 م³/حوض) فى كل مرة.
وتتلخص اهم نتائج الدراسة فيما يلى :-

- هناك نقص واضح فى النسبة المئوية للابصال المزروجة بزيادة الفترة بين الريات.
- تطبيق الرى متأخرا فى موسم النمو ادى الى زيادة المحصول .
- الابصال التى اخذت 4 ريات وكان الرى كل 3 اسابيع اعطت اقل فقد فى الوزن .
- اعطت المعاملة (8 ريات خلال الموسم والرى كل اسبوعين مع إيقاف قبل الحصاد ب 15 يوم) اكبر طول للنبات واعلى وزن طازج للنبات وايضا اعطت اعلى القيم لكل من متوسط وزن البصلة والمحصول الكلى بينما اعطت هذه المعاملة تأثير سىء على جودة الابصال حيث اعطت اعلى نسبة مئوية للابصال المزروجة واعلى فقد فى الوزن اثناء التخزين وقل نسبة مئوية للمواد الصلبة الذائبة الكلية .
- اعطت المعاملة (6 ريات خلال الموسم والرى كل اسبوعين مع إيقاف قبل الحصاد ب 45 يوم) اقل نسبة مئوية للابصال المزروجة وقيم متوسطة لكل من قطر الابصال ، متوسط وزن البصلة، المحصول الكلى ، الفقد فى الوزن اثناء التخزين ،النسبة المئوية للمواد الصلبة الذائبة الكلية.

قام بتحكيم البحث

كلية الزراعة – جامعة المنصورة
كلية الزراعة – جامعة اسبوط

أ.د / سمير طه محمود العفيفى
أ.د / ابو المعارف محمد الضمرانى