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WATER AND CROP MANAGEMENT UNDER DRIP IRRIGATION TO SUIT MECHANICAL PICKING OF EGYPTIAN COTTON IN ARID REGIONS

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ABSTRACT

Sit up, operation and maintains costs of drip irrigation system are high with respect of other modern irrigation systems. This is a limited factor to spread the drip system especially in new reclaimed lands .Using lower water distribution uniformity should reduce these costs. The reducing cotton yield and quality as using lower uniformity of the system is unclear. The field experiments were conducted at Ideal farm of Oil crops. West No. baria area, Behera governorate, in the 2010 and 2011 grown seasons of cotton. Extra long staple variety (Giaz92) is used .The cultivated area is about 31 feddan. Full line of mechanization was used. Two types of cotton picker (4 row self propelled machine and 2 row trailed machine) were used. Christiansen uniformity coefficient (CU) of irrigation approximately 93%, 85% and 67% and three irrigation levels of 100% WR, 90%WR and 75%WR were used. The water requirement WP determined according to DACOM irrigation management by using soil moisture properties, weather station, weather forecast and remote sensing by using satellite technology. 1-Higher system uniformity within irrigation levels produced a more suitable plant height for mechanical picking, yield and more picking efficiency than lower system uniformity 2- The mechanical picking was reduced picking cost by 70% compared to manual picking.3- The system uniformity of 85% and water requirement of 23801m3/fed should be used of drip irrigation system and suitable for mechanical picking.4- The picker does not adversely affect the grad and lint color after pre cleaning of seed cotton used and fiber quality such as fiber length, fiber strength, length uniformity micronaire and elongation.

INTRODUCTION

Egyptian agricultural growers are facing decreasing water supplies and are becoming increasingly aware of the need to conserve limited water resources. Efforts to address this concern are to utilize modern irrigation techniques with high application efficiency such as drip irrigation system, especially in newly reclaimed lands (more than 2 million feddan). The area irrigated with this technique is estimated to exceed 30% of the total new reclaimed irrigated area in desert land. One of the greatest obstacles to the wide spread adoption of this system is the relatively high cost of initial installation and maintenance. The design of a drip irrigation system can have a major impact on the initial cost because the cost increases with the levels of system uniformity (Wild et al., 2009). Governmental efforts are going to increase cotton cultivated area in desert land.

Efficient use of irrigation water is an important consideration for commercial crop production through arid and semi-arid zones. Irrigation among other agricultural practices is the most important input ensuring high and good quality cotton production. Current irrigation and management strategies often result in extensive demand of water with aspect of in balance between demands of available water. So, surface drip irrigation has lower evaporative losses than surface, sprinkler, or micro sprinkler irrigation because surface drip system wet a smaller surface area. Reduced evaporative losses of surface drip system resulted in high irrigation uniformity, also energy requirements and costs may be less for low pressure drip irrigation systems than for high pressure system such as impact sprinkler. Fertigation and weed control are frequently easier with surface drip than with full coverage irrigation system or micro sprinkler. This is especially effective in arid region with limited rain fall during the growing season. Drip irrigation system is often designed with smaller water flow rates than sprinklers or micro sprinkler systems (Schwankl et al., 1999),Bordovisky and Porter (2008) found no significant differences in cotton yield and economic value among subsurface drip irrigation treatments having these variation (Q_{var} = 5%, 15% and 27%). It is considered that plant geometric shape is significant factor of irrigation practices in cotton because the distance between main stem nodes indicates water stress in grown cotton plant (McCality et al., 2006).

Cotton harvesting need an ample relatively cheap labor. The scarcity of labor and developments in picking, ginning and textile equipment play an important role in changing the cotton growers, view point about picking cotton mechanically. In United States hundred percent of cotton grown is mechanically harvested. And the efforts have directed and oriented to produce a machine that should pick cotton comparable to in cleanliness to cotton hand picking. Where, obtaining a good grand and preserving of fiber quality are two important phenomena playing an essential role in cotton production. IN Egypt research studies initialed early 1980s at Delta governorates to identify agricultural mechanization factors that influence yield and quality of cotton come of these factors associated with mechanical cotton planting and harvesting and their influences on yield and quality. Others evaluated the effect of chemical defoliation and growth regulators on the control the plant growth. When comparing the hand picking with mechanical picking effects on crop yield, fiber quality and production cost a large difference can be noted between them.

ANERI, (2010) executed the trails on Giza 89 indicated that the use of pix and drop (mechanical regulator and chemical defoliation) as well as the use of gated pipes system, Conventional surface irrigation system and sprinkler irrigation system resulted in reducing the plant height by 2.1, 9.9 and 6.52% respectively the distances between 1st fruit branch were 14.7, 19.4 at 19.8 cm under previous irrigation system. During the period of 1990 – 1999 the Egyptian farmers suffered from the growth of the production cost of cotton crop whereas, the crop productivity and the total money yield (total income) increased by 16.5%and 52.9% while production cost increased by 135%, in turn the return (profit) decreased by 47%. Consequently cotton cultivated decreased about 44,30,40, and 65% of year 2001, 2005, 2007 and 2008 with respect to year of 1999 (data collected and computed from Ministry of Industry and Trade, 2007 and MOAL, 2008). The reduction in seed cotton seed cotton production due to the reduction in cotton cultivated is resulted in destroyed the old.

Important industry in Egypt. It is common the major reason of reduction of cotton cultivated area is the high cost of manual picking. It is attributed to the shortage of ruler labors i.e. Social exchanges occurred preventing children labor and many crops being harvested in the same time of cotton picking. The manual cotton picking is an expensive process where, the production of one bale (12188 kg) seed cotton required 270 labor hour mechanically (El-barry 2001). Results of field trails in Egypt indicated that the production of extra long stapled variety (Giza 70) picked manually is exceeded the production of the same variety picked mechanically by 7% with losses about 12% whereas the production of long staple variety picked manually exceeds crop picked mechanically by 19% with losses of about 9.6% furthermore field capacity of mechanical picker ranged from 5.5 to6.5 fed/day. While manual picking of one fed required 40 labor/day so, suitability of mechanical picking of long and medium staple cotton is more than extra-long stabled varieties (AENRI 1985).

El-Sayed et al., (2009) found that row spacing of 0.86m with seed cotton moisture content of 8.5(b.d%) and machine forward speed of 2-35 km/h gave the minimum value of productivity (1.97 ton/h) and lower total cost (223.2LE/fed) whereas in row spacing of 0.86m forward speed of 1.8 km/h recorded the best technology and specification of lint (32.3mm minimum value of 2.5% span fiber length, 50% fiber length uniformity ration,73.1% reflectance 4.4% minimum value seed cotton trash content. The target of recent investigation directed to manage the water and crop productivity practices under drip irrigation system to suit mechanical picking of Egyptian cotton in arid zones

The target of this investigation work is to evaluate the water and crop management of growth of cotton under drip irrigation in arid zone to suit Egyptian cotton picking mechanically

MATERIALS AND METHODS

Experimental field

The field experiments were conducted at ideal farm of Oil Crops, west Nobaria, El- Behera governorate during the cotton growing seasons of 2010 and 2011. The site was newly reclaimed sandy soil at an altitude of 7m above mean sea level, 31 □ 02' N latitude and 30 □ 28' E longitude. The scare amounts of water coming from rain fall don't contribute to water requirements of summer crops. The climate is characterized by a hot summer with a mean air temperature that exceeds 32 □ c in June, July, august and September and means relative humidity of about 70% during day time for these months.

Basic relevant physical and chemical characteristics of the experimental soil were determined according to Kuta (1986) and Page (1982) respectively.

Irrigation monitoring Network Layout

The irrigation requirements of cotton crop were controlled with using DACOM irrigation management system based on soil-water balance software. The DACOM irrigation system consists of receiver, weather station, forecast station and soil water moisture sensors. This system offers a high level of irrigation controlling based on-site frequently monitoring, the climate station are fitted with sensors to measure the requested parameters and the data is sent to the receive by radio communication. Then this system recommend with when and how much water should be applied to cotton plant based on remote sensing .In addition the recommended applied water in 2011 was slightly greater than 2011with amount of 823.6 and 824 mm/season respectively with average of about 823.8 mm/season namely WR during each grown season the cotton Giza 92 (extra - long – staple variety) was watered using drip irrigation system .GR drip line was used the emitters spaces was 30 cm for all drip lines. The distance between two drip lines was 80 cm according to row spaces of picking machines. The emitter discharge was 4 L/ h. The soil prepared by two bath perpendicular paths of chisel plow (9 shanks in 2 rows 35 cm beam row spaces) and harrowing by disc harrow of 36 disc then leveled hydraulic scarper 360 cm four rows special cotton planter was used to plant line cotton seeds. Rows distance was adjusted at 80 cm. growing crop service was processed was using 5 inter-row cultivar and spraying boom with 18m width , 800 liter tank capacity and completely hydraulic folding . Two type of cotton pickers were used the first one was self-propelled machine with 4 rows and 250 hp and the other is trailed was 2 rows and no less 80 hp required power. Picking drum had 100 cm length, 12 bars on each of the front and rear 18 vertical tool head spindle on each bar.

Crop management program

The Giza 92 variety (extra – long staple – variety) was used. This variety characterized as follow 130 cm length, 18 -20 cm first fruit branch height from the soil, 2-3 bolls on each fruit branch, 65 □ tilt angle of fruit branch, 20 mature boll numbers per plant (2.8 – 2.9 g) boll weight and 160-170 days grow the period planting was done by special mechanical seeder with 30 kg lent seeds per fed treated with fungicides (Amex and Gasho at 10 L/ fed and 200 gm/ fed respectively). During soil preparation 200 kg/ fed super phosphate and 200 kg/ fed agricultural sulpher were applied. Some chemical and its applied rates were applied by using spray boom as recommended by CRL. Liquid fertilizers were injected via irrigation water. The fertilizer rates were recommended by CRL. Chemical were added in equal doses every week till 75 days after planting. Planting dates were on 20th and 10th April in 2010 and 2011 seasons, respectively. The cultivated area in the first season was 30 feddan and the second season was one feddan. The plants were treated by pix growth regulators at optimum time of application in order to control the size and the shape of cotton trees canopy. The drop was sprayed at 70% opened bolls to orient the plant being to be harvested mechanically The soil was prepared by using two path perpendicular paths of chisel plow (9 shanks in 2 rows 35 cm beam row spaces) and harrowing by disc harrow of 36 discs then leveling hydraulic scraper 12 ft. Four rows special cotton planter was used to plant lined cotton seeds. Rows distance was adjusted at 80 cm. Growing crop service was processed was using 5 row inter. Row cultivar and spraying boom with 18 m width , 800 litter tank capacity and completely hydraulic folding . Two type of cotton pickers were used the first one was self-propelled machine with 4 rows and 250 hp and the other is trolled machine with 2 rows and no less 80 hp required power . Picking drum had 100 cm length, 12 bars on each of the front and rear and 18 vertical tool head spindle on each bar. These drums powered hydro mechanically)

Experimental treatments

Three irrigation treatments were used namely 100% WR, 90%WR and 75% WR Where WR namely L_1, L_2 and L_3 is applied water through DACOM model of management of irrigation. In total 24 experimental plots were executed. Each plot included 20 plant rows and had 50 m length. Three uniformity coefficients which quantities the uniformity of emitter discharge rate were used: 95%, 85% and 65% namely CU1, CU2, CU3. For given uniformity select different emitters with different discharge rates for each emitter were tested in national lab. Of testing components of modern irrigation system ANERI, ARC, assuming the distribution of emitter discharges within a unit could be represented by normal distribution function (Nakayma et. al, 1979).The Christiansen uniformity (Christiansen , 1941) was used as follows :

$$CU = 100(1.0 - \frac{\sum_{i=1}^{n} |x_i - \bar{x}|}{nx})$$

Where CU is the Christiansen uniformity coefficient, x_i is the emitter discharge rate (l/h) and $\bar{x}$ is the mean of all n observation and n is number of observations. The emitter discharge rates of three CU treatment were measured by cans spread at 90 cm intervals (56 emitter for each laterals tested) similar irrigation scheduales were used in 2010 and 2011.

Measurements

Plant height, boll number per a plant , mean of boll mass g yield were determined from exeprimental plots along the four central rows for each plot . At harvesting some area of each plot was picked manually . For each sample plot , the seed cotton was collected along four centeral 1.5 m long rows in both 2020 and 2011 , and the total weight per feddan was estimated. Mechanical picking was carried out by 2 cotton pickers. The first one was 4 row with 240 cm working width of picking one feddan. The other with 120 cm working depth with 52 min for picking one feddan

$$\eta \ picking = \frac{Y_{sc}}{L_t + Y_{sc}} \times 100$$

Where:

Y_{sc} The yield of seed cotton Q/fed, and

L_t Total losses of seed cotton Q/fed

Water productivity

The water productivity (WP) was calculated from the followin equation realtive to water irrigation(WR)

$$WP = \frac{Yield}{WR}, Kg / m^3$$

Cotton fiber quality samples for each plot were collected to determine fiber quality parameters fiber strength, fiber length, fiber uniformity and fiber elongation. The HVI instrument was used to measure above parameters at CRI, ARC. The data collected two seasons were discussed as a mean value

RESULTS AND DISCUUSIONS

Tables (1 and 2) show some physical and chemical properties of the experimental field. The soil is sandy with > 90% sand and 1500 kg/m^3. So soil water holding capacity (WHC) is low and hence the available soil moisture (ASM) is also low and lies in the vicinity of <10% (Table1). According the low WHC of this sandy soil makes it imperative to use an irrigation technique that delivers small amounts of water as the case with drip irrigation system.

Table1. Pertinent physical characteristics soil; mechanical analysis, field capacity (FC), wilting points (WP), available soil moisture (ASM) and bulk density (Db)

Table1. Soil and mechanical properties of the experimental soil.

Soil depth, m	Mechanical analysis (%)				Texture	FC	WP	ASM	ASM (%vol)	Db kg/cm^3
	coarse sand	fine sand	silt	clay		(%wt)				
0.00-0.15	47.2	49.1	2.2	1.5	sand	11.5	5.6	5.9	8.9	1400
0.15-0.30	45.3	50.1	2.3	2.3	sand	11.0	5.3	5.7	9.6	1690
0.30-0.45	44.9	51.1	1.9	2.1	sand	9.7	4.8	4.9	8.5	1730
0.45-0.60	43.2	51.3	3.5	2.0	sand	9.0	4.4	4.6	8.3	1800

Table2. Basic chemical analysis of experimental soil.

Soil depth, m	EC (Ds/m)	ph	Water soluble cations and anions, (mmol/l)							
			Ca_2^+	Mg_2^+	Na^+	K^+	Co_3^{2+}	Hco_3^-	Cl^-	So_4^{-2}
0.00-0.30	0.35	9.13	1.23	0.54	1.56	0.17	____	1.10	1.73	0.67
0.30-0.60	0.3	9.38	1.25	0.49	1.61	0.15	____	1.07	1.74	0.69

A total of 84 mm of germination water was applied through the drip irrigation system after 9 days after planting upper limit of irrigation that was around of 85% of WR for the squaring and bloom stage after 57 days from planting. Such procedure resulted in approximately 7 days irrigation intervals during the squaring and 4 days irrigation intervals during the bloom stage.

Three irrigation levels (L1, L2 and L3) were applied under study uniformity co efficiencies of CU1, CU2, and CU3.

The effect of system uniformity and irrigation levels on plant attributes.

Data presented in Table (3) indicated the effect of system uniformity (CU_1, CU_2, CU_3) and irrigation levels on plant attributes plant height , No of bolls per plant, bolls mass, and plant density, plants per fed. in general trend by reducing the level of system uniformity , the plant increase at all irrigation treatment. However, the treatment of CU1L3 (93%, 75% of WP) recorded the smallest value a plant height (85cm) which reduced by 35% with respect to the plant height as recommended by CRI. Meanwhile, the treatment of CU3L1 recorded the highest value of plant height (110cm) which reduced by 15% compared to the recommended plant height (CRI) with respect to the No of bolls per plant by number of bolls decreasing the value level of systems uniformity the number of bolls decreased as well however, treatment of CU1L1 (93%, 100 of WR) recorded the highest bolls per plant while the treatment of CU3L3 (67%, 75% of WR) recorded the lowest number bolls per plant which reduced by 15% and 40% respectively compared to recommended number of bolls per plant by CRI. Also by reducing the value of system uniformity the bolls mass decreased as similar the number of bolls per plant, the treatment of CU1L1 and CU3 L3 recorded the highest and lowest value of bolls mass and plant density 2.49 g ,38062 plant per fed respectively.

Table3. The effect of system uniformity within irrigation levels on plant height (P.H) and plant density g/cm^3.

System uniformity	irrigation levels	plant Height, cm	No. of bolls per plant	Boll mass, g	plant density, plant/fed
CU1	L2	95	17	2.4	38062
	L2	93	16	2.2	36750
	L3	85	15	2.2	34062
	Average	91	16	2.37	36241
CU2	L2	100	15	2.2	34.788
	L2	100	14	2.2	33234
	L3	105	14	2.1	31227
	Average	101.7	14.33	2.17	33063
CU3	L2	110	13	2.1	31175
	L2	107	13	2	30396
	L3	106	12	2	29750
	Average	107.7	12.33	2.03	30440
L1	CU1	95	17	2.4	38062
	CU2	100	15	2.2	34788
	CU3	110	13	2.1	31175
	Average	101.17	15	2.23	34075
L2	CU1	93	16	2.2	36750
	CU2	100	14	2.2	35.234
	CU3	105	13	2	30396
	Average	99.33	14.33	2.13	34127
L3	CU1	85	15	2.2	34062
	CU2	105	14	2.1	31227
	CU3	106	12	2	24750
	Average	98.67	13.67	2.1	31696

Within all systems uniformity by decreasing level of applied water, plant height, no. of bolls plant, boll weight and plant density decreased as weil .so the smaller height of plant, and adequate uniformity of number of bolls per plant, boll weight and plant density are laver ably to mechanical picking. Figs (1) (from a to d) show that by transferring from high level system uniformity to low level system uniformity within three levels of irrigation average change of the plant height increased by (16% and number of bolls per each plant , boll weight gm) and plant density decreased by 24%, 11% and 16% respectively. Whereas, by increasing level of irrigation events from L1 (100%WR) to L2 (73%WR) the average change of the plant high, number of bolls of plant, boll weight and density decreased by 4%, 90%, 0% and 9% respectively.

So it is concluded that changing of levels of irrigation more uniformity distribution that the changes of system uniformity with respect to cotton plant height, no. of bolls per plant, boll weight and plant density. The effect of system uniformity and irrigation levels on manual picking, two cotton picker per for many and picking efficiency. The manifested date in table (4) indicated that by decreasing levels of system uniformity within decreasing irrigation levels, the productivity of manual picking and two pickers, in turn mechanical picking efficiency were decreased. As above mentioned, the plant length and uniform distribution of plant attribute were influenced by system uniformity within irrigation levels which effected in the cotton field productivity. Also the treatment of CU1L1 (93%, 100, % WR) recorded the highest value of manual picking (5.4 Q Int/ fed)

The Fig:(1) show The effect of system uniformity within irrigation levels and irrigation on level within system uniformity on a plant height (cm),b No. of bolls per plant,c boll mass and d plant density plant per fed.

The effect of system uniformity and irrigation levels on manual picking, two cotton picker performance (quntar/fed) and picking efficiency.

The manifested data in table (4) indicated that by decreasing levels of system uniformity within decreasing of irrigation levels water productivity of manual picking and two picker, in turn mechanical picking efficiency were decreased. As above mentioned, the plant length and uniform distribution of plant attribute were influenced by system uniformity within irrigation levels which effect on the cotton field productivity. Also the treatment of CU1L1 (93% and 100% WR) recorded the highest value of manual picking (5.4Q/fed) mechanical picking efficiency mechanical picking (5.67 Q / fed.) of row cotton picker and mechanical picking (5.67 Q/fed of 4 row cotton picker and 4.36 Q/ fed. OF 2 row cotton picker) and mechanical picker efficiency (86.4 of 4 row cotton picker and 72.4 or 4 row cotton picker.

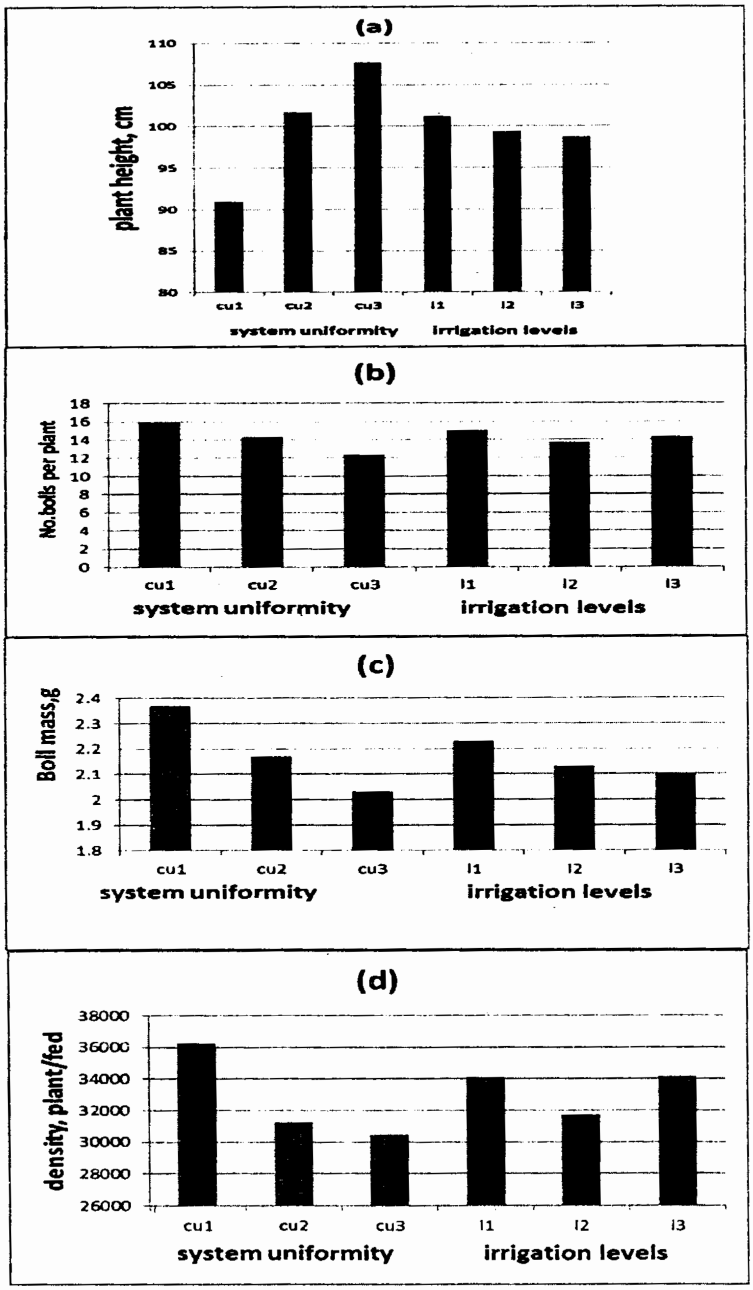

Fig. (1) The effect of system uniformity within irrigation levels and irrigation on level within system uniformity on a plant height (cm),b No. of bolls per plant, c boll mass and d plant density plant per fed.

Table (4) The manual and mechanical picking process and picking efficiency as related to manual picking.

Uniformity system	Irrigation levels m^3/fed	picking, Q/fed			Picking, Efficiency	
		manual picking	Mechanical picking			
			4 row C.P.	2 row C.P.	4 row C.P.	2 row C.P.
CU1	L1	5.4	5.67	4.36	86.7	72.4
	L2	5.3	5.4	4.22	85.7	70.1
	L3	5.2	4.31	4	84.9	68.6
	Average	5.2	5.13	4.19	85.87	70.4
CU2	L1	5.2	5.31	4.2	84.6	68.5
	L2	5.18	4.49	4.14	82.4	67.9
	L3	5.16	4.2	3.98	82.1	67.1
	Average	5.18	4.67	4.11	83	67.8
CU3	L1	5.1	4.33	3.45	81.9	66.8
	L2	5.1	4	3.4	74.2	66.5
	L3	5.1	3.96	3.38	74.4	66.14
	Average	5.1	4.1	3.41	78.5	66.52
L1	CU1	5.4	5.67	4.36	86.7	72.4
	CU2	5.2	5.31	4.2	84.6	68.5
	CU3	5.1	4.33	3.45	81.9	66.8
	Average	5.22	5.1	4	84.4	69.3
L2	CU1	5.3	5.4	4.22	85.7	70.1
	CU2	5.18	4.49	4.14	82.4	67.9
	CU3	5.1	4	3.4	79.2	66.5
	Average	5.17	4.63	3.94	82.4	68.17
L3	CU1	5.2	4.31	4	84.9	68.6
	CU2	5.1	4.2	3.98	82.1	67.1
	CU3	5.1	3.96	3.38	74.4	66.1
	Average	5.13	4.16	3.78	80.5	67.3

While the treatment of CU3L3 (67%, 75% WR) recorded the lowest value of manual picking (5.1q/fed), mechanical picking 3.96q/fed 4row cotton picker and 3.38q/fed 2row cotton picker). Fig :(5a aub) show that CU1 within irrigation levels recorded the highest cotton production (5.2Q/fed), mechanical picking, 513 Q/fed 4row cotton picker and 4.19 Q/fed 2ro cotton picker and mechanical efficiency (85.8% of 4row cotton picker and 70.4% 2row cotton picker) while treatment CU3 within irrigation levels recorded the lowest value of manual picking (5.1 Q/fed), and mechanical picking (4.1 Q/fed of 4 row cotton picker and 3.41 q/fed of 2 row cotton picker) and mechanical picking efficiency (78.5%of 4 row cotton picker and 66.52%of 2 row cotton picker) .Meanwhile the treatment L1 within system uniformity recorded the highest values of manual picking recorded the highest values of manual picking (5.22Q/fed), mechanical picking (5.1Q/fed of 4 row cotton picker and 4 Q/fed of 2 row cotton picker) and picking efficiency (84.4% of 4 row cotton picker and69.3% of 2 row cotton picker) while irrigation level L3 within system uniformities recorded the lowest value of manual picking (5.13 Q/fed), mechanical picking (4.16 Q/fed of 4 row cotton picker and 3.73 Q/fed of 2 row cotton picker and mechanical picking efficiency (80.5% of 4 row cotton picker and 67.3% of 2 row cotton picker .this wealthy mention that, the irrigation levels had more effect then system uniformity for cotton crop (Giza 92).

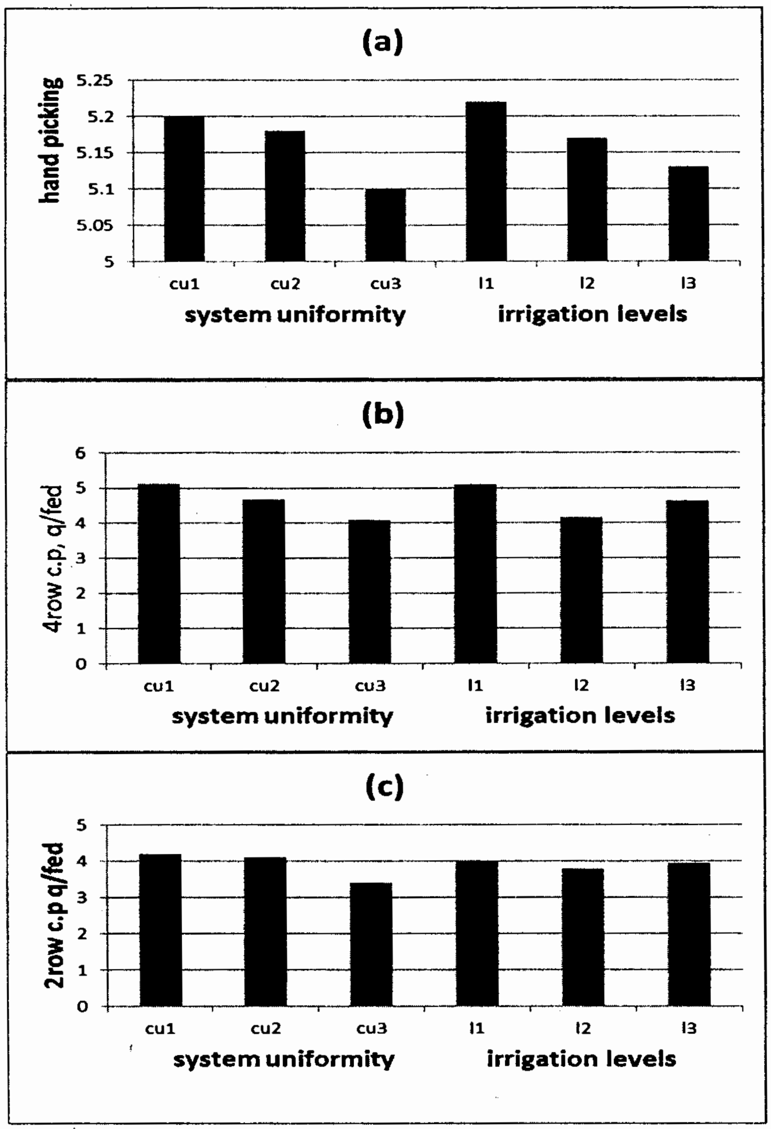

Fig. (2) The effect of system uniformity within irrigation levels with system uniformity will in irrigation levels and irrigator levels with system uniformity on a) manual picking and b mechanical efficiency

Water productivity, ton/m^3

From table (5), it is found that the water productivity was considered ably reduced by reducing the level of system uniformity within studied irrigation levels. So the water productivity under manual picking is more than mechanical picking. This due to the manual picking gave more seed cotton production than mechanical picking. Also the water productivity under 4 row cotton pickers was more than 2 row cotton picker. There is Average difference between the value of water productivity between CU1L3 and CU2L3 under mechanical picking less 0.01 kg/m^3 of 4 row cotton picker and more 0.01 kg/m3 of two row cotton picker. So, along with the strong demand of improving water productivity as one of major aspects to Coue with water scarcity. Then system uniformity of 85% and water requirement of 2380 m^3/fed. Should be used of drip irrigation system and suitable for mechanical picking

Table (5) Water productivity kg seed cotton/m3 of system uniformity within irrigation levels under drip irrigation system

system uniformity, %	irrigation levels m3/fed	water productivity, kg/m3		
		manual	4wC.P	2w C.P
CU1	(L1)3460	0.25	0.26	0.2
	(L2)3060	0.27	2.28	0.22
	(L3)2380	0.34	2.29	0.26
CU2	(L1)3460	0.24	0.24	0.19
	(L2)3060	0.27	0.23	0.21
	(L3)2380	0.34	0.28	0.27
CU3	(L1)3460	0.23	0.2	0.16
	(L2)3060	0.34	0.21	0.21
	(L3)2380	0.34	0.26	0.23

C.P cotton picker

It is know that there are three aspects to improve fiber quality (length, uniformity, strength) this are by breeding , crop management and post harvesting the recent study interties on crop and water management so as a lot of the mechanical picking table (6) so that the 4 row cotton picker produced cotton grade lease the manual picking by 1/4 grade where the fiber grade produced the values by 2 rows traded cotton pick was lease them manual of picking by 3/8 grade fiber qualities as fiber color, fiber strength , Fiber elongation , Fiber length and micronair of mechanical picked cotton are similar of the manual picked cotton by qualities of manual picking is the best. With respect to the trash area, % the 2 rows cotton picker was recorded higher value than 4 rows cotton picker and manual picking by 52% and 62% respectively where as the level of micronair is accepted by CRR. Picking cost the actual field capacity (Fed / hr) of 4 rows cotton picker and 2rows cotton picker were 4.2 and 1.2 respectively read price of one feddan produced by cotton picker determined by agriculture mechanization sector, MOAL, by 600 LE so the cost picking of 4 rows cotton picker and 2 rows cotton picker 250 LE / fed and 500LE /Fed. The mechanical picking was reduced by picking reduced by picking cost by 20% and 30% compared to manual picking. The operating cost of cotton picker includes the pieces Dix and drop.

Table (6) Fiber technical quality of extra - long staple – variety picked manually and mechanically

Technical quality	manual	Mechanical/ 4row cotton pick	2 rows cotton pick
Fiber grade	G+ 3/8	G+1\4	Good
Fiber uniformly ratio	35.6	36.2	38
Color reflection(rd)	76%	75.5	6.7.3
Color yellows (+b)	0.56	1	9.42
Fiber strength gm/tex	43.3	42	42
Fiber elongation%	7.5	7.3	7.3
Trash area %	3.62	4.43	9.42
Fiber length mm	33	32	32.5
micronair	3.2	3.2	3.6

CONCLUSION

Field experiments were conducted in sandy soil to evaluate the effects of system uniformity and irrigation amount on plant growth attributes such as, yield, picking efficiency and manual and mechanical picking extra long staple of cotton variety (Giza 93). The comparison between fiber quality manual. and mechanical cotton picking was done. Also costs of mechanical picking and manual picking were estimated the following conclusions were supported by this study.

1- Higher system uniformity within irrigation levels produced a more suitable plant height for mechanical picking, yield and more picking efficiency than lower system uniformity

2- The influence of system uniformity on yield was related to the level irrigation favorability of amount of applied water of DACOM irrigation management for obtain high yield of cotton The low system uniformity under low irrigation level produced lower yield and lower picking efficiency mechanically

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إدارة المياه والمحصول للقطن المصري ليناسب الجني الآلي تحت نظام الري بالتنقيط بالمناطق الجافة

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تحد تكاليف إنشاء وصيانة نظام الري بالتنقيط من إنتشاره بالمقارنة بطرق الري الحديثة خاصة بالمناطق جديدة الاستصلاح، كما أن استخدام تصميم نظام الري بالتنقيط ذات إنتظامية لتوزيع المياه المتخصصة وتأثيرها علي إنخفاض الإنتاجية وتقليل مواصفات الجودة للألياف غير واضحة . تم إجراء التجارب في المزرعة النموذجية للمحاصيل الزيتية بمنطقة غرب النوبارية بمحافظة البحيرة في مساحة ٣١ فدان خلال موسمي ٢٠١٠ ، ٢٠١١ وكان الصنف المستخدم جيزه ٩٢ (فائق الطول) خلال موسمي نمو القطن تم استخدام خط ميكنة كامل واستخدم للجني طرازين من حصادات القطن احدهما ما كينة ذاتية الحركة ٤ خط والثانية مقطورة ٢ خط ، كما استخدم نظام الاستفسار عن البعد واجراس الالكترونيه تم تقدير الاحتياجات المائية باستخدام برنامج DACOM للضوء بالاحتياجات المائية واستخدام معامل الانتظامية لـــ Christainsen لدراسة ثلاث انتظامية للجهاز (٩٣% ، ٨٥% و ٦٧%) تحت ثلاثة مستويات للـــري (١٠٠% ، ٩% ، و ٧٥%من الاحتياجات المائية).

يهدف هذا البحث إلي تقييم إدارة المياه ومحصول القطن تحت نظام الري بالتنقيط بالمناطق الجافة لتناسب الجني الآلي وقد أوضحت النتائج التالي :-

- اوضحت انتظامية التوزيع الاعلي (Cu_1) من خلال مستويات الري المضافة طول النبات الاكثر مناسبة للجني الآلي حيث كانت كفاءة الجني والمحصول الأعلي.
- إنخفضت تكلفة الجني الميكانيكي ٧٠% من تكاليف الجني بالمقارنة بالجني اليدوي.
- يمكن التوصية بإنتظامية التوزيع ٨٥% مع احتياجات مائية قدرها ٢٣٨٠م^{٢}/فدان تحت الري بالتنقيط في الأراضي الرملية والمناسبة للجني الآلي.
- نجاح الجني الآلي للأصناف الفائقة الطول مع تماثل الصفات التكنولوجية للاليفاف مع مثيلتها للأقطان المجنية يدويا.