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Effect of Irrigation Systems and Spraying of Potassium Silicate on Growth, Productivity and Fiber Quality of Egyptian Cotton

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ABSTRACT

Two field experiments were conducted in El-Gemmeiza Agric. Res. Station, Agric. Res. Cent., El-Gharbiya Governorate, Egypt for two successive seasons (2013 and 2014) to study the influence of irrigation systems and spraying of potassium silicate on growth, productivity and quality of cotton Giza 86 cultivar. A split-plot design was used with four replicates. The main plots included five irrigation systems (normal irrigation every two weeks all season as a control- system 1, normal irrigation every two weeks until end of June then irrigation every 21 day to end of season- system 2, normal irrigation every two weeks until end of July then irrigation every 21 day to end of season- system 3, normal irrigation every two weeks until end of June then irrigation every 28 day to end of season- system 4 and normal irrigation every two weeks until end of July then irrigation every 28 day to end of season- system 5. The sub plots involved three treatments of spraying with potassium silicate (control without potassium silicate, spraying of potassium silicate two times at the start of flowering and every 15 days later and spraying of potassium silicate three times at squaring stage, at the start of flowering and 15 days later). Obtained results revealed that normal irrigation every two weeks all season (system 1) significantly increased height of plant, No. of fruiting branches per plant, No. of open bolls per plant, seed index, boll weight, yield of seed cotton per fed, fiber length, fiber strength and fiber fineness. Treatments of potassium silicate had significant effect on final plant height, number of fruiting branches, number of open bolls/plant, seed index, boll weight, seed cotton yield (kentar/fed), fiber length, fiber strength and fiber fineness in both seasons and lint % in one season. The highest values resulted from spraying with potassium silicate (2.5 cm3 /L) three times. The interaction between irrigation systems and spraying with potassium silicate gave a significant effect on final plant height, No. of fruiting branches /plant, boll weight, No. of open bolls/plant, seed cotton yield(kentar/fed), fiber length, fiber strength and fiber fineness, where the highest values of these traits were obtained from normal irrigation every two weeks all season (system 1) and foliar application of 2.5 cm3 /L potassium silicate three times. Finally, it could be concluded the normal irrigation every two weeks all season and foliar application of potassium silicate (2.5 cm3/L) three times at squaring stage, at the flowering initiation and 15 days later to obtain better growth, high yield and yield components and quality of fiber of Egyptian cotton (Giza 86 cultivar), under the conditions of El-Gharbiya Governorate.

Keywords: Irrigation systems, Potassium silicate, Growth, Yield, Yield components and Fiber quality.

INTRODUCTION

Environmental factors (light, CO2, temperature, water, nutrients, etc.) affected crop growth and poductivity. Water is generally considered the most limiting factor in higher plants than any other single environmental factor. Exposing cotton plants to water stress particularly during the flowering stage adversely affected plant growth and productivity (Kassem and Namich, 2003 and Meek *et al*., 2003). Therefore, it seems imperative to work for improving water use efficiency for major crops including cotton which could be achieved by searching some means helping in promoting drought tolerance. In cotton attempts, have been made to avoid adverse effects caused by water stress through making use of osmotic adjustment (Ashraf and Foolad, 2007). Cotton plant, however, reacts strongly to soil moisture conditions and the proper water supply during different stages of plant growth and development. Water deficiency particularly during fruiting stage markedly restricts over all plant growth, fruit retention and hence seed cotton yield (El-Sayed, 2005 and Hamed, 2007). Regardless of water availability, even well irrigated cotton plants usually experience some degree of water stress, particularly at midday time, due to high evapotranspirative conditions, like those prevailing in Upper Egypt, where short-duration mild water stress could damage cotton yield (Reddy *et al*., 1998). This confirms the need for enhancing cotton tolerance to water stress. Gebaly (2007) and Hamoda, (2010) found that prolonging the irrigation interval to 21 day resulted in significant reduction in plant height, no. of fruiting branches/plant, no. of open bolls/plant, boll weight, seed index, seed cotton yield/fed. and gave low fiber quality. El-Ashmoony, *et al*. (2016) found that prolonging irrigation interval to 21 day significantly decreased plant height, no. of fruiting branches/plant, no. of open bolls /plant, boll weight, seed index and seed cotton yield/fed., fiber length and strength.

The role of potassium in sugars and photsynthates translocation from sources to sinks and enzymes activation, Morteza *et al*. (2005). Productivity increased due to fertilization with potassium as mentioned by Sharma and Sundar (2007), Abou-Zaid *et al*., (2009), Emara (2012), Emara and Hamoda (2012), Sawan (2013 and 2014), Gomaa *et al*., (2014), Abdel-Aal *et al*., (2014 and 2015) and Emara (2014 and 2015).

The abundant element in the soils for most of plants is silicon (Sommer *et al*., 2006). Nutrition with silicon alleviates many abiotic stresses, i.e. drought, high temperatures and ultraviolet radiation (Epstein, 1994). Korndo¨rfer *et al*., (2004) and Mattson and Leatherwood (2010) reported that development of growth is mainly due to a higher mechanical stability in stem and leaves which caused by silicon application and this reflects on higher photosynthetic capacity due to better light interception. Fertilization with potassium silicate induced favorable effect on cotton growth, productivity and quality as reported by Almeida *et al*. (2005), Madeiros *et al*. (2005 a and b), Ferreira *et al*. (2005) and Emara (2014). El-Ashmoony *et al*. (2016) using some drought tolerance inducers on cotton and found that Humex, potassium silicate and Glycine betaine applications significantly increased final plant height, number of fruiting branches /plant, boll weight,

number of open bolls and seed cotton yield as compared with untreated plants. The Humex, potassium silicate and Glycine betaine applications to plants under normal and water stress conditions had positive effects on performance of cotton plants, which increased plant growth and yield especially under water stress conditions.

The aim of this research was to determine the influence of irrigation systems and spraying with potassium silicate on growth, productivity and quality of Giza 86 cultivar under the conditions of El-Gharbiya Governorate.

MATERIALS AND METHODS

Two field experiments were carried out in El-Gemmeiza Agric. Res. St. Agric. Res. Cent., El-Gharbiya Governorate in 2013 and 2014 seasons to study the effect of irrigation systems and spraying with potassium silicate on growth, yield, yield components and fiber quality of Egyptian cotton cultivar Giza 86. A split-plot design with four replicates was used. The main plots included 5 irrigation systems; normal irrigation every two weeks all season as a control (system 1), normal irrigation every two weeks until end of June then irrigation every 21 day to end of season (system 2), normal irrigation every two weeks until end of July then irrigation every 21 day to end of season (system 3), normal irrigation every two weeks until end of June then irrigation every 28 day to end of season (system 4), and normal irrigation every two weeks until end of July then irrigation every 28 day to end of season (system 5). The sub plots involved the three treatments of potassium silicate (control without potassium silicate, spraying of potassium silicate two times at the start of flowering and 15 days later and spraying of potassium silicate three times at squaring stage, at the start of flowering and 15 days later)

Before sowing samples of soil were taken at random from the experimental sites, where mechanical and chemical analyses were done according to Page *et al.*, (1982) and represented in Table (1).

Table 1. Soil mechanical and chemical analyses.

Mechanical analysis					
Season	**Clay (%)**	**Silt (%)**	**Sand (%)**	**O.M. (%)**	**Texture**
2013	51.33	32.20	16.47	2.01	Clay
2014	59.31	26.11	14.58	1.58	Clay

Chemical analysis												
Season	**pH**	**EC (mmhos/cm)**	**HCO_3^- (%)**	**Available element (ppm)**							
				N	**P**	**K**	**Fe**	**B**	**Zn**	**Cu**	**Mn**
2013	7.70	0.67	0.62	30.20	17.07	312.2	10.6	0.65	1.00	3.05	1.11
2014	8.10	0.52	0.86	28.10	11.08	354.8	11.8	0.42	1.30	3.51	1.31

Plot area was 21 m2 (6 ridges, 5 m long and 70cm apart). Distance between hills was 25 cm leaving two plants/hill at thinning time. Sowing date was done in hills of 25cm on 3rd and 8th April in 2013 and 2014 seasons, respectively, after Egyptian clover (Trifolium alexandrinum L.). Irrigation systems were given as the tested treatments under study.

All plots were fertilized with calcium superphosphate (15.5% P205) during land preparation at the rate of 22.5 kg P205/fed., nitrogen (ammonium nitrate 33.5% N) at the rate of 45 Kg N/fed. in two equal portions after thinning and at the next irrigation and potassium sulphate (48% K2O) at the rate of 24 kg K2O/fed. in one dose after thinning. Spraying of potassium silicate two times was at the start of flowering and 15 days later and spraying of potassium silicate three times was at squaring stage, at the start of flowering and 15 days later were applied to the tested treatments. The other cultural practices were done as recommended.

At harvest, five representative hills (10 plants) from each plot were taken to determine: Growth characters; final plant height (cm) and No. of fruiting branches/plant. Seed cotton yield and its components; No. of open bolls/plant, boll weight (g), seed index (g) and lint %. The yield of seed cotton per fed in kentars was determined from the 4 inner ridges. Fiber quality; Fiber length, fiber fineness and fiber strength were determined on digital Fibrograph instrument 630, Micronaire instrument 675 and Pressley instrument, respectively, according to A.S.T.M. (2012) at the C. R.I. laboratories.

Statistical analysis of the obtained data was done according to Snedecor and Cochran (1980), L.S.D. at 5% was used to compare between treatments means.

RESULTS AND DISCUSSION

The effect of irrigation systems, spraying potassium silicate treatments and their interaction on the studied traits in 2013 and 2014 seasons are shown in Tables 2 to 5.

A-Growth characters:

Irrigation systems treatments significantly affected growth characters under study in both seasons (Table 2). The normal irrigation every two weeks all season (system 1) gave taller plants with higher number of fruiting branches/plant followed by normal irrigation every two weeks until end of July and every 21 day until end season (system 2). Hamoda (2010) and El-Ashmoony *et al.* (2016) found similar results.

Also, data in the same Table show that spraying potassium silicate gave a significant effect on final plant height and number of fruiting branches/plant in both seasons. Spraying of potassium silicate two or three times gave the highest values of plant height and number of fruiting branches/plant compared with untreated plant by potassium silicate. Increase in plant

height due to spraying of potassium silicate is mainly attributed to the role of potassium in internode elongation and cell division stimulation, where photosynthesis and the synthesis of protein needed potassium. These results are in accordance with those found by Sharma and Sundar (2007), Abou-Zaid *et al*. (2009), Emara (2012), Emara and Hamoda (2012), Abou-Zaid *et al*. (2013), Abdel-Aal *et al*. (2014), Emara (2014), Gomaa *et al*. (2014) and Emara (2015).

Table 2. Influence of irrigation systems, spraying of potassium silicate and their interaction on growth characters of cotton during 2013 and 2014 seasons

Treatments		Final plant height (cm)		No. of fruiting branches / plants	
Irrigation systems (A)	**Spraying with Potassium silicate (B)**	**2013**	**2014**	**2013**	**2014**
System 1 (control)	Without	153.50	152.17	15.65	14.40
	Two times	170.89	164.17	18.13	15.87
	Three times	170.25	168.17	18.10	16.43
Mean		166.04	161.50	17.29	15.57
System 2	Without	154.50	152.83	14.83	14.30
	Two times	156.75	154.67	14.93	14.97
	Three times	160.25	159.50	15.97	15.13
Mean		157.17	155.67	15.24	14.80
System 3	Without	149.25	149.33	14.07	14.13
	Two times	177.00	172.50	16.45	15.70
	Three times	163.75	163.17	16.08	15.73
Mean		163.33	161.67	15.53	15.19
System 4	Without	136.00	129.67	11.90	12.27
	Two times	140.13	139.17	13.55	12.97
	Three times	144.13	139.83	13.75	13.20
Mean		140.08	136.22	13.07	12.81
System 5	Without	138.75	134.50	12.73	11.73
	Two times	146.25	144.37	14.03	13.70
	Three times	154.63	151.50	14.70	14.00
Mean		146.54	143.39	13.82	13.14
General mean of potassium silicate (B)	Without	147.40	143.70	13.84	13.37
	Two times	158.20	154.93	15.42	14.64
	Three times	158.60	156.43	15.72	14.90
LSD at 0.05 for	A	1.64	0.94	0.38	0.37
	B	0.91	0.82	0.25	0.22
	A X B	2.04	1.84	0.55	0.48

The significant effect of spraying potassium silicate on growth characters may be due to the promotive effect of potassium and silicon. Silicon deposited on the walls of epidermis and vascular tissues conferring rigidity, strength and resistance to diseases and pests (Epstein and Bloom, 2005). Many abiotic stresses including drought, high temperatures, metal toxicity, nutrient imbalance, ultraviolet radiation are alleviated by nutrition with silicon (Epstein, 1994). Korndo¨rfer *et al*., (2004) and Mattson and Leatherwood (2010) reported that development of plant growth results from a higher mechanical stability in stem and leaves which caused by silicon application and this reflects on higher photosynthetic capacity due to better light interception. Fertilization with potassium silicate induced favorable effect on cotton growth, productivity and quality. The positive effect of spraying with potassium silicate on growth parameters may be due to that potassium silicate is a source of highly soluble potassium in addition to benefits of silicate application Adatia and Besford (1986).

The interaction between irrigation systems and potassium silicate gave a significant effect on growth characters under study both seasons. The taller plants were obtained from normal irrigation every two weeks until end of July then irrigation every 21 day to end of season (system 3) in combination with spraying potassium silicate two times, while the highest number of fruiting branches/plant was obtained from normal irrigation every two weeks all season as a control (system 1) in combination with spraying potassium silicate two or three times.

C- Yield and yield components:

Irrigation systems gave significant effects on boll weight, number of open bolls/plant, seed index and seed cotton yield per fed in both seasons and lint % in one season (Tables 3 and 4). Normal irrigation every two weeks all season (system 1) was significantly increased number of boll weight, open bolls/plant, seed index and seed cotton yield per fed in both seasons

Data in Tables (3 and 4) show that spraying potassium silicate had significant effects on number and weight of open bolls/plant, seed index and seed cotton yield/fed in both seasons and lint % in the one season only. Spraying of potassium silicate three times was significantly increased number and weight of open bolls, seed cotton yield/fed and weight of 100seeds in the two seasons of study.

The significant effect of spraying potassium silicate is mainly due that the potassium silicate fertilization enhanced formation of carbohydrates, proteins, photosynthesis translocation regulation, chlorophyll oxidative, enzyme action and photo-phosphorylation of solution Mengel and Kirkby (1987). In this regard, Emara and Hamoda (2012), Abou-Zaid *et al*., (2013) and Emara (2014 and 2015) found that yield and its components were significantly increased by potassium application.

Table 3. Effect of irrigation systems, spraying of potassium silicate and their interaction on seed cotton yield and its components in 2013 season.

Treatments		Number of open	Boll weight	Seed cotton yield	Lint	Seed
Irrigation systems(A)	Spraying with potassium silicate (B)	Bolls /plant	(g)	(Ken./fed.)	%	index (g)
System 1 (control)	Without	17.98	2.94	14.42	40.40	10.77
	Two times	20.08	2.97	16.09	40.60	11.30
	Three times	20.13	2.99	16.96	40.25	11.18
Mean		19.39	2.97	15.82	40.42	11.08
System 2	Without	16.73	2.86	13.74	40.65	10.63
	Two times	17.65	2.91	14.34	39.93	10.85
	Three times	18.35	2.94	16.62	40.53	10.95
Mean		17.58	2.90	14.23	40.37	10.81
System 3	Without	15.65	2.84	13.55	40.67	10.58
	Two times	19.18	2.94	15.13	40.55	11.00
	Three times	18.98	2.94	15.29	40.13	11.05
Mean		17.93	2.91	14.65	40.45	10.87
System 4	Without	12.23	2.81	11.68	40.45	10.00
	Two times	14.67	2.82	12.67	40.73	10.43
	Three times	14.87	2.85	12.76	40.80	10.48
Mean		13.93	2.83	12.37	40.65	10.30
System 5	Without	14.60	2.66	13.18	40.65	10.33
	Two times	15.25	2.83	12.99	40.93	10.63
	Three times	16.05	2.87	13.72	40.88	10.63
Mean		15.20	2.80	12.96	40.82	10.53
General mean of potassium silicate (B)	Without	15.43	2.83	13.11	40.56	10.46
	Two times	17.37	2.90	14.24	40.55	10.84
	Three times	17.68	2.92	14.67	40.52	10.86
LSD at 0.05 for	A	0.53	0.04	0.22	NS	0.13
	B	0.26	0.02	0.54	NS	0.08
	A X B	0.57	0.05	0.53	NS	NS

Table 4. Effect of irrigation systems, spraying of potassium silicate and their interaction on seed cotton yield and its components in 2014 season.

Treatments		No. of bolls	Boll weight	Seed cotton yield	Lint	Seed index
Irrigation systems(A)	Spraying with potassium silicate (B)	/plant	(g)	(Ken./fed.)	%	(g)
System 1 (control)	Without	17.43	2.91	13.85	40.81	10.36
	Two times	18.33	3.04	15.22	41.16	10.60
	Three times	18.35	3.08	15.43	40.46	10.78
Mean		18.04	3.01	14.83	40.81	10.58
System 2	Without	17.16	2.93	13.73	40.61	10.39
	Two times	17.76	2.93	14.21	40.80	10.41
	Three times	17.85	2.95	14.38	40.31	10.41
Mean		17.59	2.94	14.11	40.59	10.40
System 3	Without	16.89	2.89	13.33	41.09	10.32
	Two times	17.52	2.98	14.26	40.46	10.47
	Three times	18.05	3.01	14.84	40.49	10.50
Mean		17.49	2.96	14.14	40.68	10.43
System 4	Without	16.05	2.58	11.31	39.98	10.03
	Two times	16.58	2.73	12.36	40.32	10.21
	Three times	16.37	2.79	12.47	40.54	10.14
Mean		16.33	2.70	12.05	40.28	10.13
System 5	Without	16.65	2.67	12.14	40.43	10.07
	Two times	16.82	2.80	12.86	40.23	10.17
	Three times	16.84	2.87	13.20	40.49	10.35
Mean		16.77	2.78	12.73	40.38	10.20
General mean of potassium silicate (B)	Without	16.81	2.80	12.87	40.59	10.23
	Two times	17.40	2.90	13.78	40.59	10.38
	Three times	17.49	2.90	14.07	40.46	10.44
LSD at 0.05 for	A	0.48	0.03	0.53	0.30	0.11
	B	0.25	0.02	0.29	N.S	0.07
	A X B	0.53	0.06	N.S	N.S	0.16

The significant increase in yield/fed due to spraying with (2.5g/L) potassium silicate three times is mainly due to:

1- The response occurs under soils of high pH as shown in Table 1. Thus, this treatment is proper under the experimental conditions.

2- This variety characterized by its greater demand to potassium and silicate due to its higher yield.

3- The higher number and heavier bolls.

These results are in accordance with those reported by Sharma and Sundar (2007), Abou-Zaid *et*

al., (2009), Emara (2012), Emara and Hamoda (2012), Abou-Zaid *et al.,* (2013), Abdel-Aal *et al.,* (2014), Emara (2014 and 2015) and Gomaa *et al.*, (2014).

The interaction between irrigation systems and spraying of potassium silicate treatments gave a significant effect on lint % in the second season, weight and number of open bolls/plant and yield of seed cotton /fed in the two seasons of study, where the highest values were produced from the interaction between normal irrigation every two weeks all season (system 1) and spraying with 2.5 cm^3 potassium silicate/liter three times in both season. Similar results were reported by Anderson and Boswell (1968), Anter *et al.* (1976) and Mefhar *et al.,* (2009).

The positive effect of the interaction on these traits may be attributed to:

- Potassium application reduces boll shedding (Zeng, 1996).
- Potassium nutrition enhanced carbohydrates partitioning through affecting growth rate of sink and/or sources organ or phloem export of photosynthesis (sucrose) (Cakmak *et al*., 1994).

D- Fiber quality traits:

Irrigation systems had significant effect on fiber length, fiber strength and fiber fineness in both seasons (Table 5).

Table 5. Averages of cotton fiber length, fiber strength and fiber fineness as affected by the irrigation systems, spraying of potassium silicate treatments and their interaction during 2013 and 2014 seasons.

Treatments		Fiber length		Fiber strength		Fiber fineness	
Irrigation systems (A)	Spraying with potassium silicate (B)	2013	2014	2013	2013	2014	2013
System 1 (control)	Without	34.70	34.16	10.20	10.0	4.67	4.67
	Two times	34.86	34.47	10.53	10.17	4.83	4.70
	Three times	34.93	35.00	10.77	10.30	5.00	4.90
Mean		34.83	34.54	10.50	10.16	4.83	4.76
System 2	Without	34.50	33.97	9.53	9.70	4.30	4.40
	Two times	34.50	34.07	9.80	9.80	4.40	4.50
	Three times	34.80	34.50	9.87	9.93	4.60	4.60
Mean		34.60	34.18	9.73	9.81	4.43	4.50
System 3	Without	34.70	33.13	9.87	9.80	4.47	4.47
	Two times	34.83	33.67	10.10	9.87	4.57	4.53
	Three times	34.20	33.90	10.20	10.06	4.70	4.70
Mean		34.82	33.57	10.06	9.91	4.58	4.56
System 4	Without	32.10	31.77	9.20	9.27	3.70	4.20
	Two times	32.40	32.40	9.37	9.40	4.13	4.23
	Three times	33.03	32.60	9.63	9.30	4.20	4.43
Mean		32.51	32.26	9.40	9.32	4.01	4.29
System 5	Without	32.37	32.10	9.50	9.53	4.13	4.43
	Two times	32.87	33.03	9.67	9.60	4.23	4.40
	Three times	33.77	33.63	9.83	9.30	4.37	4.47
Mean		33.00	32.92	9.67	9.48	4.24	4.43
General mean of potassium silicate (B)	Without	33.67	33.03	9.66	9.66	4.25	4.43
	Two times	33.89	33.53	9.89	9.77	4.43	4.47
	Three times	34.29	33.93	10.06	9.78	4.57	4.62
LSD at 0.05 for	A	0.11	0.41	0.12	0.20	0.08	0.07
	B	0.08	0.13	0.06	0..19	0.06	0.05
	A X B	0.18	0.29	0.15	0.42	0.12	0.15

Normal irrigation every two weeks all season (system 1) was significantly increased fiber length, fiber strength and fiber fineness in both seasons. Similar results were obtained by Gebaly (2007), Hamoda, (2010) and El-Ashmoony *et al.* (2016)

Data also in Tables 5 show that potassium silicate had significant effects on fiber length, fiber strength and fiber fineness in both. Spraying of potassium silicate three times was significantly increased fiber length, fiber strength and fiber fineness in both seasons. Similar results were obtained by El-Ashmoony *et al.* (2016), where they found that Humex, potassium silicate and Glycine betaine applications gave the best average from the fiber length, fiber strength and micronaire reading compared with the untreated plants.

The interaction between irrigation systems and spraying of potassium silicate treatments had a significant effect on fiber length, fiber strength and fiber fineness in both seasons, where the highest values of these traits in consideration were resulted from the combination between normal irrigation every two weeks all season as a control (system 1) and foliar application of 2.5 cm^3 potassium silicate/liter three times in both season. In this respect El-Ashmoony, *et al*. (2016) found that potassium silicate application to plants under normal and water stress conditions had positive effects on performance of cotton plants, which increased fiber length, fiber strength and micronaire reading especially under water stress conditions.

CONCLUSION

Finally, it could be concluded the normal irrigation every two weeks all season and foliar application of potassium silicate (2.5 cm^3/L) three times at squaring stage, at the start of flowering and 15 days later for producing better growth, high productivity and fiber quality of Giza 86 variety, under the conditions of El-Gharbiya Governorate.

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تأثير نظم الرى والرش بسليكات البوتاسيوم علي نمو وإنتاجية وجودة ألياف القطن المصرى

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أقيمت تجربتين حقليتين خلال موسمى النمو 2013 و 2014 بمحطة البحوث الزراعية بالجميزة بمحافظة الغربية وذلك لدراسة تاثير نظم الرى والرش بسليكات البوتاسيوم علي النمو، المحصول ومكوناته وصفات التيله لصنف القطن المصري جيزة 86 حيث زُرعت التجربه تحت تصميم القطع المنشقة مرة واحدة في أربعة مكررات حيث وضعت نظم الرى (الرى العادى كل اسبوعين طوال الموسم - نظام 1، الرى العادى طوال الموسم حتى آخر يونيه ثم الرى كل 21 يوم حتى آخر الموسم - نظام 2، الرى العادى طوال الموسم حتى اخر يوليه ثم الرى كل 21 يوم حتى آخر الموسم - نظام 3، الرى العادى طوال الموسم حتى آخر يونيه ثم الرى كل 28 يوم حتى آخر الموسم- نظام 4 والرى العادى طوال الموسم حتى آخر يوليه ثم الرى كل 28 يوم حتى اخر الموسم – نظام 5) فى القطع الرئيسيه ووضعت فى القطع المنشقه معاملات رش سليكات البوتاسيوم (بدون اضافه سليكات البوتاسيوم (كنترول) ، رش سليكات البوتاسيوم بمعدل 2.5 سم^3/لتر مرتان عند بداية التزهير ثم بعد أسبوعين و رش سليكات البوتاسيوم بمعدل 2.5 سم^3/لتر ثلاث مرات فى مرحلة الوسواس وعند بداية التزهير ثم بعد أسبوعين) . وتتلخص أهم النتائج المتحصل عليها فيما يلى:1- اعطى نظام الرى كل اسبوعين طوال الموسم زياده معنوية فى صفات طول النبات عند الجني، عدد الافرع الثمرية/نبات، وزن اللوزة، عدد اللوز المتفتح/نبات، معامل البذرة، محصول القطن الزهربالقنطار/الفدان، وطول التيله، متانة التيله ونعومة التيلة في موسمي الدراسة 2- أعطت معاملات الرش بسليكات البوتاسيوم تأثيرات معنوية علي كل من ارتفاع النبات عند الجني، عدد الافرع الثمرية/نبات، وزن اللوزة، عدد اللوز المتفتح/نبات، معامل البذرة، محصول القطن الزهربالقنطار/الفدان، طول التيله، متانة التيله ونعومة التيلة في كلا الموسمين وتصافي الحليج في الموسم الثاني فقط وذلك لصالح معاملة الرش بسيليكات البوتاسيوم بمعدل 2.5 سم^3/لتر ماء ثلاث مرات (فى مرحلة الوسواس وعند بداية التزهير ثم بعد أسبوعين) 3- أعطي التفاعل بين نظم الرى والرش بسليكات البوتاسيوم تأثير معنوية علي صفات طول النبات عند الجني، عدد الافرع الثمرية/نبات، وزن اللوزة، عدد اللوز المتفتح/نبات، معامل البذرة، محصول القطن الزهربالقنطار/الفدان، طول التيله، متانة التيله ونعومة التيلة حيث اعطى التفاعل بين نظام الرى كل اسبوعين طوال الموسم والرش بسيليكات البوتاسيوم بمعدل 2.5 سم^3/لتر ثلاث مرات (فى مرحلة الوسواس وعند بداية التزهير ثم بعد أسبوعين) افضل القيم لهذه الصفات بالمقارنة ببقية التفاعلات في كلا الموسمين. التوصية:يمكن التوصية بالرى كل أسبوعين طوال الموسم مع رش سيليكات البوتاسيوم بمعدل 2.5 سم^3/لتر ثلاث مرات (فى مرحلة الوسواس وعند بداية التزهير ثم بعد أسبوعين) للحصول على محصول عالى وصفات تيلة عالية لصنف القطن جيزة 86 المنزرع تحت ظروف محافظة الغربية.