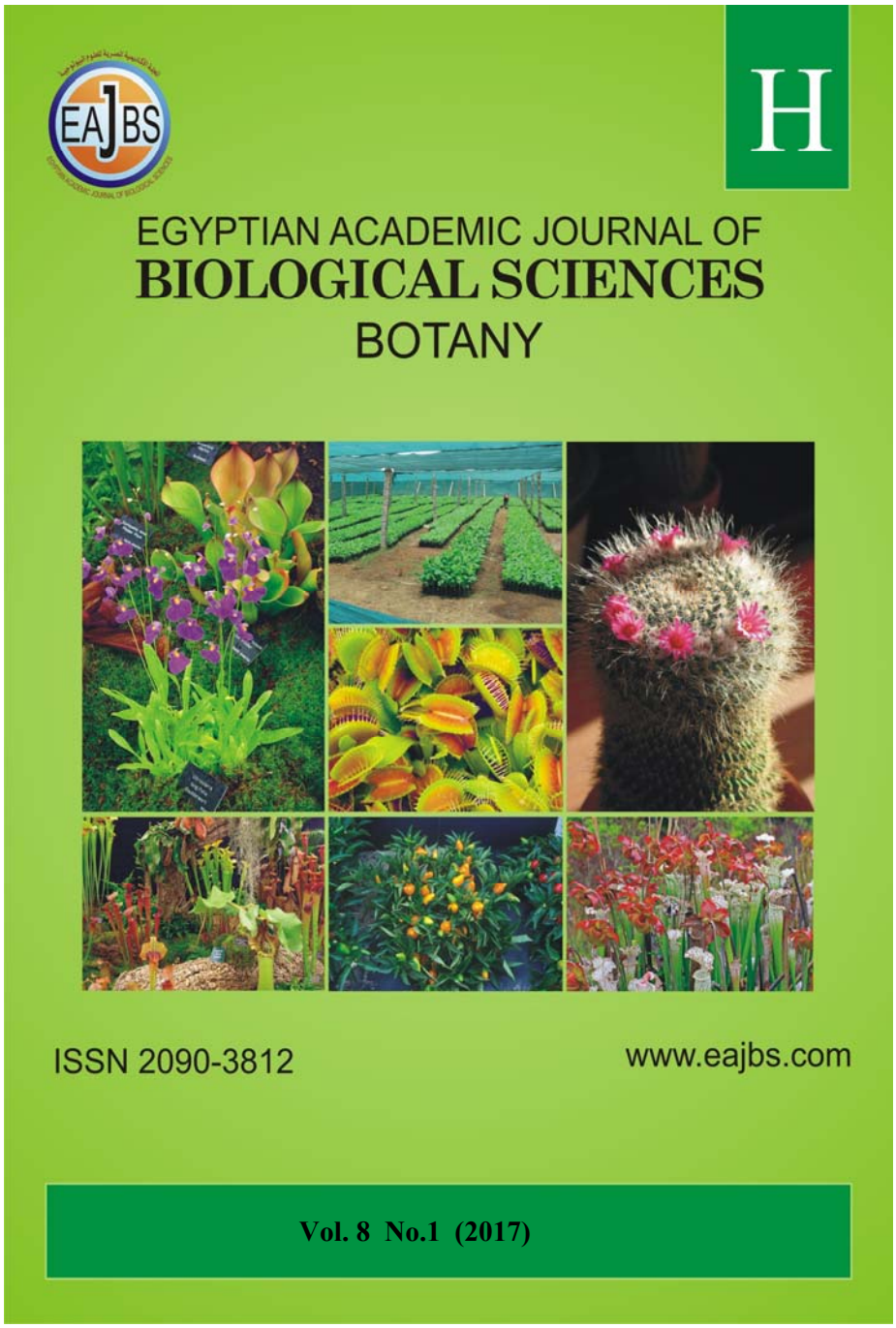

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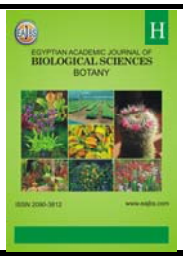

Impact of Irrigation Deficit, Soil Conditioner, and Antitranspirant on Growth and Quality of Potato Crop

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ABSTRACT

An investigation concerning potato crop was carried out during the two successive summer seasons of 2015-2016 and 2016-2017 at a newly reclaimed area, at EL-Nubariya city south of Alexandria governorate, Egypt. The experiments were designed to study the efficiency of the film –forming antitranspirant (folicote) concentration (15%(v/v)) or/and soil conditioner (farmyard manure) of the rate 20m^3/fed., on optimization of irrigation water in low-water supplx areas. Three irrigation rates were applied; 2100m^3/fed. (Common rate), 1575m3/fed, and 1050m^3/fed to investigate the effects of water deficiency on some important economic traits of potato crop. The results showed that irrigation at the rate of (2100m^3/fed.) only, or addition of farmyard manure or, spray folicote or, mix of folicote spraying and farmyard manure recorded the maximum values of plant height, shoot number, no of tuber yield /plant, weight of marketable tuber / (gm./ plant), weight of total tuber yield / (ton/fed.), dry matter(%) and starch content showed no significant differences between them and treatment of irrigation quantity (1575m^3/fed.) with farmyard manure soil application or mix of folicote spraying and farmyard manure soil application in the two seasons. The interaction between irrigation water quantities and antitiranspirant or/and soil conditioner was insignificant regarding total sugars and reducing sugar with one except reducing sugar in2017 season. While, the interaction between irrigation at (1575m^3/fed.) with farmyard manure or mix of folicote spraying and Farmyard manure, soil application, gave the highest value of water use efficiency in the two seasons.

INTRODUCTION

One of the most important solanaceous vegetable crops grown in Egypt is potato (*Solanum Tuberosum* L.). Its tubers are rich in carbohydrates and considerable amounts of proteins, vitamins, and minerals. Potato is the fourth most important world crop, after rice, wheat, and maize (Spooner and Bamberg, 1994) and it is a major source of inexpensive energy.

Emerged in the recent years, the problem of water shortages and the emergence of conflicts between states over water sources. This problem has affected a lot of countries

specially Egypt where this problem arose disputes between the Nile Basin countries to re-divide the water among them. In this respect, The Egyptian Ministry of Agriculture directs a lot of their policies in order to reduce the consumption of irrigation water in various ways so as to meet the shortage of irrigation water potential during the next few years. The understanding of the water needs of different crops, compared with its addition of irrigation water, is considered a basic and useful concept in order to reduce the quantities of water consumed a great deal (Sujatha and Krishnappa, 1995).

The addition of antitranspirants, compounds applied to the leaves of plants to reduce transpiration, is considered one of the important subjects, which also benefit the plants resistance to drought. Abdel-Nasser and EL-Gamal (1996) illustrated that such antitranspirants may be categorized into two types i.e., 1) physical agents which either reduce energy available for conversion to latent heat by reflecting and decrease the load of heat on leaf surface (reflecting materials) or related vapor loss by the formation of thin film which coat leaf surface that are more permeable to co_2 and o_2 and impervious to water vapor (film-forming antitranspirants). Examples include silicone oil and waxes.

2) Active biochemical materials (metabolic inhibitors) which physiologically induce stomatal closure of inhibiting stomatal opening hence reduce water vapor loss (stomatal antitranspirants). Examples include phenylmercuric acetate, abscicic acid (ABA), and aspirin.

The antitranspirants which cause the closing of stomata affect the plant metabolism frequently causing toxic effect and reduce proportionally the intensity of transpiration and photosynthesis (Parkinson, 1970; Davenport *et al.,* 1971; Mishra and Pradhan, 1972; and Kreith *et al.,* 1975). On the other side, film-forming and reflecting antitranspirants which form a protective layer on the leaf surface have been found to be not toxic and have a longer duration of effectiveness than metabolic materials (Davenport *et al.,* 1974; Kreith *et al.,* 1975; and Patil and De, 1967).

Organic fertilizers of which the farmyard manure (FYM) is the principle component which plays extraordinary role in potato cultivation, not only as the source of the nutrients, but also as improving agent to physical and chemical properties of the soil (Sujatha and Krishnappa, 1995).

The objective of this study is improving potato crop productivity through increasing water use efficiency by adding soil conditioners and/or antitranspirant to the potato crop.

MATERIALS AND METHODS

Experimental Site:

Two field experiments were carried out at EL-Nobaraya region 90km away from Alex-Cairo desert road, Beheira Governorate, during the summer seasons of 2016 and 2017 to study the effect of irrigation deficit, soil conditioner, and antitranspirant on growth and quantity of potato yield. Some of physical and chemical properties of employed soil were determined before carrying out the experiments according to Jackson (1973), and the the determinations are presented in Table (1). The permanent wilting point (P.W.P.) and field capacity (F.C.) of the trial soil were determined according to Israelsen and Hansen (1962) and are shown in Table (2).

Table (1): Initial physical and chemical properties of the investigated soil.

			Soluble Cations (meq/l)					**Soluble Anions (meq/L)**		**Available Nutrients (ppm)**						
$CaCO^3$%	PH	EC,ds/m	O.M%	Na^+	Ca^{++}	Mg^{++}	K^+	CL^-	HCO_3^-	N	P	K	Zn	Cu	Mn	Fe
31.4	8.11	2.44	0.59	12.2	8.2	6.12	0.78	7.2	2.6	18.6	35.7	70.59	1.19	1.12	2.41	4.42
Particle size distribution			Sand			Silt		Clay		Soil Texture						
			55.87			12.11		32.02		Sandy Clay Loam						

Table (2): Field capacity, wilting point, and soil bulk density of the experimental location (average of the two years).

Soil Depth (cm)	**Field Capacity (%)**	**Wilting Point (%)**	**Soil Bulk Density**
0-30	19.30	10.01	1.38
30-60	18.9	9.30	1.46

Planting Material:

Certified potato seed, named Hermes which were imported from Netherland, were tested in the first of January of both seasons in a wet soil, using whole seed tubers. One hundred seed tubers were planted in two rows, 0.70m wide, 12.5m long and 0.25m apart between hills, making an area of17.5m^3 for each experimental plot. The experiments were laid out in a split plot design with three replicates. The planting was under a drip irrigation system

Agricultural Operations :

Phosphorus fertilizer was applied at the rate of 46.5 kg P_2O_5/fed. In the form of superphosphate, (15.5% P_2O_5) added once in the opened row at planting time to all of the experimental plots. Nitrogen fertilizer was added at the rate of 120kgN/fed., (the remained doses) to the soil in four equal doses, the first one was added at soil preparation, the second, the third, and the fourth doses were added at 30, 40, and 60 days after planting in the form of ammonium nitrate (33.5%). Potassium was added at the rate 120 kg k_2o/ fed., in three equal doses, the first one was applied during soil preparation and, the 2nd and the 3rd doses were added at 45 and 60 days after planting in the form of potassium sulphate (48%k_2o).

Treatments:

Each experiment contained three irrigation treatments (1050, 1575, and 2100"common used"m^3/fed.), one folicote (a film-type antitranspirant) spraying concentrations; i.e., (15%(v/v)) one rate of Farmyard manure concentration (20m^3/fed.), mix of folicote spraying and Farmyard manure application and without in addition to the control treatment.

Folicote was sprayed on the vegetative growth pressure sprayed with hand until plants were dripping. The foliar spraying with folicote was applied four times during the growing season. The first spraying application was done 20 days of planting, the second

was 40 days , the third was 60, and the fourth was 80 days of planting. All the experimental units received 100m^3water/fed. during germination. The folicote used in this study is a hydrocarbon paraffin wax emulsion (an emulsion wax polymers). The rate of Farmyard manure (20 m^3/fed) was applied at the soil preparation. The amounts of irrigation water (m^3/fed.) were added by using water counter and pressure gauge at 0.5 bar, which were calculated and expressed in terms of time based on the rate of water flow through the dippers (2 liter/h.) to give such amount of water .

Irrigation times in every irrigation were 31.36, 48.52, and 66.0 min. for 1050, 1570, and 2100m^3water/fed. Respectively, irrigation number was 44 for each treatment. The irrigation treatments were applied, at two days intervals began (20 days after planting) and ended by 7 days before harvesting, in the two seasons.

Data Recorded:

Vegetative and Yield Characters :

Ten randomly plants were sampled to determine the plant length (cm) and number of shoots. After 120 days of planting, nine random plants from each treatment were used for determining the number of marketable tuber/plant, weight of marketable tuber/plant (kg), and yield (ton/fed).

Tuber Root Quality:

Percentage of tubers dry matter% was determined in tubers slices, by weighting a certain weight of fresh tubers and then oven dried at 70^oC for 48 h. Percentages of total sugars and reducing sugars of the tubers were determined using 5 g of fresh tuber root, using sulphuric acid and phenol (5%). Then they colourimetrically determined, according to the method described in (Dubios *et al.,* 1965). Starch content (%) was determined in tuber roots using the method described in A.O.A.C.(1970).

Water-Use Efficiency (WUE):

Water-use efficiency (WUE) was calculated as kg of potato tuber yield produced per cubic meter of water consumed (Doorenbos and Kassem, 1979; Ahmed, 1987).

$$WUE=\frac{\text{tuber root yield produced (kg/fed.)}}{\text{Water used (m3/fed.)}}$$

Experimental Design and Statistical Analysis:

A split plot technique in a randomized complete blocks design (R.C.B.D) with three replicates was followed during both years of this study. Irrigation quantities were randomly distributed in the main plots. While folicote, farmyard manure, mix of folicote, and Farmyard manure and untreated plant (control) were randomly distributed in the sub-plots.

The collected data were tabulated and statistically analyzed using the analyses of variance method as reported by Snedecor and Cochran (1980).

RESULTS AND DISCUSSION

Effect of Irrigation Quantities, Folicote, Farmyard Manure, Mix of Folicote Spraying, and Farmyard Manure and Their Interaction on Potato Vegetative Characters:

Data in Table (3) showed that plant length and number of shoots were significantly affected by the irrigation quantities. Irrigation with (2100m^3/fed.) produced the highest value of plant length and number of shoots in both seasons. Ezzat *et al.,* (2009) found that the vegetative growth characters of potato expressed on plant height, number of main stems per plant, were significantly influenced by water quantity. On the other hand, the lowest value of all plant growth characters were obtained under water stress in both seasons.

Table (3) Effect of irrigation quantities, folicote, farmyard manure, mix of folicote spraying, and farmyard manure and their interaction on potato vegetative characters.

Treatment	Season(1)		Season (2)	
	No of shoot	Plant length)cm(	No of shoot	Plant length (cm)
Irrigation quantities				
2100m^3/fed	8.92a	76.8a	8a	69.8a
1575m^3/fed	7.58b	71.45b	6.83b	64.65b
1050m^3/fed	4.75c	55.5c	4.92c	46.83c
Antitranspirant or/ and soil conditioner				
Un treatment	6.22b	64.63b	6.33b	56.55b
Folicote spraying	6.89ab	66.6b	6.33b	59.93ab
Mix of folicote and farmyard manure	7.78a	70.1a	7a	63.55a
farmyard manure	7.44ab	70.33a	6.89a	61.69a
Irrigation quantity(2100m3/fed)x Antitranspirant or/ and soil conditioner				
Un treatment	8.67a	76.7a	8ab	68.95ab
Folicote spraying	8.67a	76.9a	7.6ab	69.35ab
Mix of folicote and farmyard manure	9a	77.6a	8.33a	70.55a
farmyard manure	9.33a	76a	8ab	70.35a
Irrigation quantity(1575m3/fed)x Antitranspirant or/ and soil conditioner				
Un treatment	6.33bc	66.2b	6cd	59.25c
Folicote spraying	7b	69.9b	6.33c	62.25bc
Mix of folicote and farmyard manure	8.67a	74.7a	7.6ab	68.75ab
farmyard manure	8.33a	75a	7.33b	68.37ab
Irrigation quantity(1050m3/fed)x Antitranspirant or/ and soil conditioner				
Un treatment	3.67e	51d	4.33f	41.45e
Folicote spraying	5cde	53d	5ef	48.2de
Mix of folicote and farmyard manure	5.67bcd	58c	5ef	51.35d
farmyard manure	4.67de	60c	5.33de	46.35de

Concerning the effect of Farmyard manure or the mix of folicote spraying and farmyard manure clear from data in Table (3) that both treatments showed were the superior treatment for plant height and number of shoot. Cook ,G.W. (1972) reported that application of organic matter to soil may increase the exchangeable NPK and the uptake of these elements which consequently increasing cell division and cell enlargement and as a result this might be reflected on the plant growth. Also, this effect might be taken place due to the availability of more water in the plant tissues because of folicote applications that enable more plant growth, as explained by Abd-Allah (1996).

As for the interaction between water quantity and antitranspirant, it was clear from the data presented in Table (3) that the treatment of irrigation quantity at the level of (2100m^3/fed.) only or with addition of farmyard manure or folicote spray or the mix of folicote spraying and farmyard manure recorded the maximum values of plant height and number of shoot with no significant differences between them and treatment of irrigation quantity (1575m^3/fed.) with addition of organic matter or mix of folicote spraying and organic matter at the two seasons. Abou EL-Khair *et al.,* (2011) found that irrigation rate quantity at 1750m3/fed. and FYM at levels of 20 or 30 m3/fed recorded the maximum values of plant height of potato. Water stress also affects carbohydrate metabolism, protein synthesis, and the activities of many enzymes that may reflect a change in the balance between rates of synthesis and degradation leading to decrease in plant growth and dry

matter accumulation (Hamlyn, 1986), Hang and Miller (1986), Jerez *et al.,* (1991) and Anwar (2005) found that increasing water quantity levels increased plant growth characters of potato. Gale and Hang (1966) reported that the antitranspirant may form a coating film on the leaf surface, leading to increase in the diffusive resistance of water vapor from stomata, thus, more water might be hold in plant tissues due to reducing the transpiration rate. Abdel-Nasser and EL-Gamal (1996) concluded that folicote could be minimize the moisture losses from leaf surface, because of it is a wax emulsion then when sprayed on the foliage, it dries out to form an invisible discontinuous thin film that prevent the escape of water vapor from stomata.

Effect of Irrigation Quantities, Folicote, Farmyard Manure, Mix of Folicote Spraying and Farmyard Manure and Their Interaction on Potato Yield :

Data presented in Table (4) showed that the number of tuber/plant, weight of marketable tuber/plant (gm), weight of total tuber yield (ton/fed.), and dry matter was significantly affected by the irrigation quantities. Irrigation quantity (2100m^3/fed.) produced the highest value of tuber yield/plant, weight of marketable tuber/plant (kg), weight of total tuber yield/fed.(ton), and dry matter(%) in both seasons. Salter and Goode (1967) illustrated that increasing water quantity applied to potato plant led to keep higher moisture content in the soil and this in turn might favored the plant metabolism that leads to produce higher dry matter carbohydrate metabolism and protein synthesis. They added that water stress also affects carbohydrate metabolism, protein synthesis, and the activities of many enzymes that may reflect a change in the balance between rates of synthesis and degradation leading to decrease dry matter accumulation. Abou EL-Khair *et al.,* (2010) reported that irrigation water quantity had significant effects on average tuber weight, tuber yield per plant and per fed of potato. The highest average tuber weight and tuber yield/plant and /fed were obtained by increasing irrigation water quantity.

Concerning the effect of Farmyard manure soil application or the mix of folicote spraying and Farmyard manure soil application, it is quite clear from data in Table (3) that both treatments had positive effects on tuber yield/plant and weight of marketable tuber/plant (gm.) in the two seasons. On the other hand, organic matter addition had positive effects on total tuber yield/fed in second season. Both total tubers yield/fed in first season and dry matter (%) in both seasons were not significantly affected by any treatment of this study. Abou EL-Khair (2010) reached that facts that using organic matter increases the availably of nutrients, rizosphere microrganisms that release phyotohrmones and substances which led to increasing growth and dry matteraccumulation and this in turn might increase average tuber weight, hence, the total yield. Moreover, the positive impact of spraying waxy type materials on a significant increase of yield parameters, may be due to the active role of the waxy substance in maintaining the cells turgid and reducing water loss from the plant by partial closing of stomata and reducing the rate of transpiration (Devanport, D.C., 1977), and keep continues of the normal rate of biological processes, especially photosynthesis, and this is reflected in the positive growth and yield of plant. It has been noticed by Abdel-Nasser and el-Gamal (1996) that the effect of antitranspirants on plant growth is through improving water potential of the plant at the stage that plant growth depends on the water status more than photosynthesis as reported by Ibrahim *et al.,* (1993).

Data presented in Table (4) show that the interaction between irrigation water quantity at the rate of 2100 m3/fed. only or with the addition of Farmyard manure to soil or spray folicote or mix of folicote spraying and Farmyard manure recorded the maximum values of tuber root no. /plant; weight of marketable tuber/plant (kg), weight of total tuber yield/(Ton/fed.) and dry matter (%) with no significant differences with the interaction treatment of irrigation quantity (1575m^3/fed.)with addition of organic matter or the mix

of folicote spraying and organic matter in the both seasons. Abou EL-Khair *et al.,* (2011) reported that the interaction between irrigation water quantity at 1750 m2/fed. and FYM at 30 m3/fed. gave the highest values of yield/plant and total yield/fed.in both seasons. Abde-Nasser and EL-Gamal (1996) explained that the increasing happened for sweet potato and the subsequent root yield and characteristics as a result of folicote applications was primarily referred to the effect of this material on improving the plant water potential at the time when the growth of plant was more dependent on water status than on photosynthesis. The authors added that root formation stage is also more related to plant water status, which is related with available moisture in the root zone.

Table (4) Effect of irrigation quantities, folicote, farmyard manure, mix of folicote spraying, and farmyard manure and their interaction on potato yield

Treatment	Season(1)		Season (2)	
	Tuber yield./plant	Weight of marketable tuber/plant(kg)	Tuber root NO./plant	Weight of marketable tuber/plant
Irrigation quantities				
2100m^3/fed	9.5a	935.5a	7.83a	832.5a
1575m^3/fed	8.08b	859.75b	7.25a	750.25b
1050m^3/fed	4.75c	502c	4.25b	477.83c
Antitranspirant or/ and soil conditioner				
Un treatment	6.67b	723.67b	6b	645.33b
Folicote spraying	7.33a	745.67b	6.33ab	674.67ab
Mix of folicote and farmyard manure	7.89a	794.67a	6.78a	716a
farmyard manure	7.89a	799a	6.67a	711.44a
Irrigation quantity(2100m3/fed)x Antitranspirantand or/and soil conditioner				
Un treatment	9.33a	922ab	7.33ab	822a
Folicote spraying	9.33a	925ab	8ab	812a
Mix of folicote and farmyard manure	9.67a	945a	8.33a	837a
farmyard manure	9.67a	950a	7.67ab	859a
Irrigation quantity(1575m3/fed)x Antitranspirant or/and soil conditioner				
Un treatment	6.67c	780c	6.67b	681c
Folicote spraying	8b	832bc	7ab	711bc
Mix of folicote and farmyard manure	8.67ab	916ab	7.66ab	800ab
farmyard manure	9a	911ab	7.67ab	809a
Irrigation quantity(1050m3/fed)x Antitranspirant or/ and soil conditioner				
Un treatment	4e	469d	4.0c	433d
Folicote spraying	4.67de	480d	4.0c	501d
Mix of folicote and farmyard manure	5.33d	523d	4.33c	466.33d
farmyard manure	5d	536d	4.67c	466.33d

Cont.

Treatment	Season (1)		Season (2)	
	Weight of tuber(ton)/fed	Dry matter (%)	Weight of tuber (ton)/fed.	Dry matter (%)
Irrigation quantities				
2100m^3/fed	16.67a	23.63a	15.03a	21.37a
1575m^3/fed	15.33b	21.83ab	13.72b	20.60a
1050m^3/fed	9.83c	19.40b	9.19c	17.51b
Antitranspirant or/ and soil conditioner				
Un treatment	13.25a	20.85a	12b	19.5a
Folicote spraying	13.88a	22.44a	12.49ab	19.52a
Mix of folicote and farmyard manure	14.19a	22.16a	13.02ab	19.97a
farmyard manure	14.44a	22.04a	13.09a	20.32a
Irrigation quantity(2100m3/fed)x Antitranspirant or/ and soil conditioner				
Un treatment	16.439ab	23.0a	14.84a	21.33a
Folicote spraying	16.473ab	23.67a	14.71a	21.12a
Mix of folicote and farmyard manure	16.847a	23.88a	15.08a	21.39a
farmyard manure	16.89a	24.0a	15.49a	21.63a
Irrigation quantity(1575m3/fed)x Antitranspirant or/ and soil conditioner				
Un treatment	14.178c	20.33c	12.6b	19.78abc
Folicote spraying	14.45bc	21.34bc	13.02b	20.23ab
Mix of folicote and farmyard manure	16.393ab	22.93ab	14.55a	21.19a
farmyard manure	16.29abc	22.72ab	14.69a	21.21a
Irrigation quantity(1050m3/fed)x Antitranspirant or/ and soil conditioner				
Un treatment	9.13d	19.22c	8.57c	17.39bc
Folicote spraying	10.72d	19.31c	9.72c	17.21c
Mix of folicote and farmyard manure	9.34d	19.67c	9.41c	17.32bc
farmyard manure	10.13d	19.40c	9.08c	18.11bc

Effect of Irrigation Quantities, Folicote, Farmyard Manure, Mix of Folicote Spraying and Farmyard Manure and Their Interaction on Yield Component and Water Use Efficiency (WUV) of Potato Traits:

Data presented in Table (5) showed that irrigation water quantity had significant effects on starch content (%) and water use efficiency. The highest value of starch content and water use efficiency were obtained by increasing irrigation water quantity. While, irrigation water quantity had no significant effects on total sugars and reducing sugars in both seasons. This result is not in accordance with that obtained by Ezzat *et al.,* (2009). The authors found that the value of WUE gradually decreased with increasing water quantity up to the highest level and showed opposite trend to that of total yield. Moussa, S.A.M. (2012) illustrated that water use efficiency was positively increasing as water quantity increased from 1800m^3/fed up to the common treatment (2640m3/fed.). The author added that the non-reducing sugars percentage did not affect with the varying in irrigation quantities the highest starch content on sweet potato was obtained with the treatment 2080m3/fed. without significant differences with the treatment 2360m3/fed and 1800m3/fed.

As regards to the effect of spraying folicote; addition of Farmyard manure soil application, with the mix of folicote and Farmyard manure application soil or without had no significant effects on starch content, total sugar, reducing sugar, and water use efficiency. Moussa, S.A.M. (2012) detected that reducing sugars content is not affected

with the varying in folicote concentrations from zero up to 15% on sweet potato, i.e., reducing sugars and starch percentages differently responded from year to another with respect to folicote concentrations. On the contrary, Abou EL-Khair (2010) had significant effects on water use efficiency

The interaction between irrigation water quantities and antitiranspirant was insignificantregarding total sugars and reducing sugars with one exception reducing sugar in season two. the interaction between irrigation water quantity at (2100 m3/fed.) only or with addition organic matter or spray folicote or mix of folicote spraying and farmyard manure recorded the maximum values of total sugar and starch content without significant differences with the interaction treatment of (1575 m^3 water/fed.) with addition organic matter or mix of folicote spraying and organic matter in the both season. While, the interaction between irrigation quantities at (1575m^3/fed.) with addition organic matter or mix of folicote spraying and organic matter give the highest value of water use efficiency in two seasons.

Table (5) Effect of irrigation quantities, folicote farmyard manure, mix of folicote spraying and farmyard manure and their interaction on yield component and water use efficiency (WUV) of potato traits

Treatment	Season (1)		Season (2)	
	Starch content (%)	Total sugars (%)	Starch content(%)	Totall sugars(%)
Irrigation quantities				
2100m^3/fed	15.64a	5.71a	15.60a	5.67a
1575m^3/fed	14.66a	5.28a	14.51a	5.64a
1050m^3/fed	11.97b	5.25a	12.29b	5.39a
Antitranspirant or/ and soil conditioner				
Un treatment	13.71a	5.34a	13.89a	5.59a
Folicote spraying	13.82a	5.35a	13.81a	5.59a
Mix of folicote and farmyard manure	14.32a	5.26a	14.44a	5.65a
farmyard manure	14.51a	5.3a	14.4a	5.42a
Irrigation quantity(2100m3/fed)x Antitranspirant or/and soil conditioner				
Un treatment	15.41ab	5.48a	15.35a	5.41a
Folicote spraying	15.59ab	5.42a	15.37a	5.34a
Mix of folicote and farmyard manure	15.71a	5.25a	15.93a	5.56a
farmyard manure	15.85a	5.48a	15.76a	5.23a
Irrigation quantity(1575m3/fed)x Antitranspirant or/and soil conditioner				
Un treatment	13.92b	5.21a	14.11b	5.74a
Folicote spraying	14.13ab	5.39a	13.98b	5.71a
Mix of folicote and farmyard manure	15.11ab	5.23a	14.89ab	5.61a
farmyard manure	15.48ab	5.27a	15.07ab	5.59a
Irrigation quantity(1050m3/fed)x Antitranspirant or/ and soil conditioner				
Un treatment	11.81c	5.33a	12.21c	5.61a
Folicote spraying	11.73c	5.23a	12.09c	5.73a
Mix of folicote and farmyard manure	12.13c	5.29a	12.51c	5.78a
farmyard manure	12.21c	5.15a	12.37c	5.43a

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ARABIC SUMMARY

تأثير نقص الرى و محسنات التربة و مثبط النتح على النمو و جودة محصول البطاطس

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اجريت تجربتين حقليتين علي محصول البطاطس باحدي المزارع الخاصة بمنطقه النوبارية ٩٠كم جنوب مدينه الاسكندرية- جمهوريه مصر العربية وذلك بغرض التعرف علي تاثير نقص الرى ومحسنات التربه ومثبط النتح علي النمو وجودة محصول البطاطس.

زرعت تقاوي الصنف الهولندي هيرمس بدءا من شهر يناير لعامي ٢٠١٦،٢٠١٧ علي التوالي ،قد تم الحصاد عند عمر ١٢٠يوما خلال موسمي الزراعه.

نقذت ثلاث مستويات من المياه١٠٥٠م٣/فدان،١٥٧٥م٣/فدان،٢١٠٠م٣/فدان(الكميه الشائعة الاستخدام في تلك المنطقه من قبل المزارعين)كذلك تم اضافه بيت موس بمعدل ٢٠م /فدان ،رش النبات بالفيليكوت بتركيز١٥%،اضافهة سماد بلدي بمعدل ٢٠طن للفدان مع الرش بالفيليكوت بمعدل ١٥%، او بدون وكان الهدف من البحث تحسين الكفائه الانتاجيه لمحصول البطاطا من خلا ذياده الكفائه الاستخداميه للمياه بواسطه استخدام محسنات التربه او مضادات النتح وذلك في الاراضي الجديده

استخدم في تطبيق التجربتين نظام القطع المنشقة في تصميم القطاعات الكاملة العشوائيه وذلك بثلاث مكررات ، حيث وزعت عشوائيا معاملات الري علي القطع الرئيسية بينما معاملات تركيزات مضادات النتح ومحسنات التربه فوزعت علي القطع تحت رئيسيه.

وكانت ابرز النتائج كالاتي:-

١-مستوى مياه الري ٢١٠٠م٣/فدان سواء مع اضافه بيت موس او رش فيليكوت او الاثنين معا او بدون اى رش او اضافه اعطي اعلي قيمه لصفه طول النبات و عددالفروع/ نبات ، الوزن الصالح للجذور/نبات (كجم)، عدد الجذور /نبات ، الوزن الكلي للجذور/ فدان (طن) ، نسبه المادة الجافه للجذور، محتوى الجذور من النشا بدون وجود اي فرق معنوي مع مستوى المياه ١٥٧٥م٣/فدان مع اضافه سماد بلدي فقط او اضافه سماد بلدي مع رش النبات بالفيليكوت.

٢- عدم ظهور اي فرق معنوى بين المعاملات و كذلك التداخل بينهم في صفتي السكريات الكليه والسكريات المختزله

٣- مستوى مياه الري ١٥٧٥م٣/فدان سواء مع اضافه سماد بلدي او الرش بالفيليكوت او الاثنين معا او بدون اعطي اعلي قيمه لصفه الكفائه النسبيه لاستخدام المياه.