Advances in Environmental Biology, 8(7) May 2014, Pages: 2515-2518

AENSI Journals

Advances in Environmental Biology

ISSN-1995-0756 EISSN-1998-1066

Journal home page: http://www.aensiweb.com/aeb.html

Performance Evaluation of the Effect of Potassium and Super Absorbent Polymer in Water Savings of Rapeseed

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ARTICLE INFO

Article history:
Received 25 March 2014
Received in revised form 20 April 2014
Accepted 15 May 2014
Available online 10 June 2014

Key words:
Efficiency, super absorbent polymer, water conservation, rape

ABSTRACT

In the past few years as a plant oilseed rape crops in crop rotation provinces of Fars and its cultivation is increasing. To determine the efficiency of different levels of potassium and super absorbent polymer in water savings of rapeseed this experiment was conducted in 88 of the city near Shiraz, Fars province. Experimental design using split plot (split-plot) with factorial experiment in a completely randomized block design with three replications was Main plots consisted of three levels of water seven times, five times, six times the factorial irrigated plots without fertilizer, potassium sulfate three, 100 kg and 200 kg ha-ha along with three super absorbent polymer Including the use of super-absorbent, 60 kg and 900 kg per hectare, respectively. Based on yield and oil percentage and compare treatment means using analysis of variance Duncan was performed. The results indicate that much potassium fertilizer increased grain yield by 100 kg ha more than the value of the yield is not. Addition of potassium fertilizer caused the amount of water the plant, 700 cubic meters per hectare Decreased to 6,200 cubic meters per hectare yield growth without the impact caused oil. The use of super absorbent polymer and remove much 60 kg ha irrigation in a physiological stage no significant difference in the amount of oil extracted from the seeds was not observed. The combined use of 100 kg per ha and 60 kg potassium sulphate much super absorbent polymer conserves much as 18 percent of the amount of water used without reducing grain yield and oil percentage is observed.

To Cite This Article: Ali Eskandari, Dr. Karim Farsi Nejad, Seyyed Mohammad Hasan Mosavi, Hamid Rahimi, Nayyereh Hoseyni., Performance Evaluation of the Effect of Potassium and Super Absorbent Polymer in Water Savings of Rapeseed. ***Adv. Environ. Biol., 8(7), 2515-2518, 2014***

INTRODUCTION

Drought of the last few years in particular, the province has faced various products posing a serious threat Accordingly, any kind of research in order to optimize the use of water in agriculture of at least inevitable. Naseri [10]. Declared, Iran is among the countries where the cultivation of oilseeds has a long history. However, for various reasons at the moment are to provide vegetable oils in the world market requires. Allahyar [2] stated that, based on statistics from 850 thousand tonnes of vegetable oils in the country's annual demand of more than 60 percent of which are supplemented by imports from other countries. Canola crop due to its positive traits such as cold tolerance, resistance to dehydration, salt tolerance, high-value alternative, having genotypes of spring and fall easier planting and harvesting, Lower production costs and ultimately higher yield of oil per unit area than other oilseeds can be imported in most provinces in crop rotation. Malakooti *et al* [9] showed that the optimal use of water for biomass production plant to increase the production of one of basic and important addition to maintaining and modifying the conditions of soil fertility. Due to droughts in recent years, especially in the province and the country is located in the dry and semi-dry Most farmers to irrigate their crops face water shortages, especially during the spring season crops such as corn Seifi - sugar beets, Cucurbit crops like wheat and canola irrigation practice makes it difficult to agricultural methods such as the use of potassium and super absorbent polymer An important role in reducing water consumption and plant resistance to dehydration and stress can play. Therefore, using symmetric optimum use of potassium fertilizers to soils and the use of potassium and irrigation water can be saved. Using scientific methods and practical use of every drop of water

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in every region of the country based on agriculture, soil type, climatic conditions - the water level, area under different crops And farm management research and study about the optimal use of potassium fertilizers Super absorbent and water saving irrigation so as to delete one or two stages of plant growth Farmers who use the water for other products are appropriate and meaningful results could be obtained. So that eliminates one or two irrigation in the crop seed yield and oil percentage did not decrease or reduction in the minimum possible to keep. Khademi *et al* [5] showed that in studies of rape during their growing season, irrigation needs 7 to 10 About 4-5 times in the spring and with the irrigation of crops and vegetables are Seifi, So if we can save the roles of K and super absorbent water plant productivity and optimum use should be So that the decrease in performance is not restored and this water savings to be allocated to products Seifi Order to increase the acreage of crops to yield more income. Vahedi [11] stated that the country has a different climate, different soil types and farm management of water resources is different, it is necessary In each area, depending on the area of research and studies on the optimal use of chemical fertilizers, especially potassium Super absorbent material and regular irrigation schedule and the product taken separately and the results of similar surveys in each region to region with a uniform the location of conducting the experiment is recommended. Sharifi [7]. Upon the effectiveness of super absorbent polymer potassium and irrigation plan for the rape and remove one or two irrigations during the crop growth And saving water in the city would run near Shiraz, Fars Province, rapeseed cultivation has spread in India 300 years ago in 1936 and is Canada turnip. Allahyari stated that canola grown in crop rotation and in Fars Province, Iran is an emerging culture In connection with the application of potassium fertilizer experiments by the facts first (2003) was conducted on canola and Ahmadyof *et al* [1] assessed the K uptake by canola can be from 50 to 400 kilograms per hectare. Also Dehshir [6] stated that potassium fertilizer in agriculture, canola, rapeseed resistance to fungal diseases and water scarcity and water stress are. In conjunction with potassium use efficiency in oilseed rape Few studies have been done to save water However, many studies in this regard in relation to crops like wheat, sugar beet, maize, cotton is And the results indicate a lack of potassium in plant metabolism and reduce light and breathing rate, breathing rate increases with an increase in water consumption will increase. Haterman [14] showed that the addition of super absorbent polymers to increase water retention in the soil is sandy soils. The purpose of this study the possibility of reducing water consumption in agriculture, canola, rapeseed crop acreage increases, the effect of potassium on water conservation, Effects of super absorbent polymers on saving water and reducing the effects of combined potassium and super absorbent polymer water was rape.

MATERIALS AND METHODS

The survey in 2009The city Marvdasht was conducted in Fars province. Experimental design using split plot design with a factorial randomized complete block design with three replications was.
Main plots of irrigation at three levels:
a1 - 7 irrigations place against tradition includes
- Two irrigations at sowing and germination within 7 days
-An irrigation at stem elongation
- One irrigation at flowering stage
- An irrigation at pod formation stage
- An irrigation at grain filling stage
- An irrigation in the stage of physiological maturity when 20% of pods are brown.
a2 - delete an irrigation in the stage of physiological maturity
a3 - Two sheath irrigation in the production stage and physiological maturity
The treatment of potassium sulfate fertilizer factorial experimental plot not included
K0 without fertilize, K1 100 Kg per hectare, K2 200 Kg per hectare
And three super absorbent polymer containing S0 - S1 absorption without Azsvpr to 60 kilograms per hectare and S2
And three super absorbent polymer containing S0 - S1 absorption without Azsvpr to 60 kilograms per hectare and S2
90 kg ha plots would be located on treatments include:

K0S0	K1S0	K2S0
K0S1	K1S1	K2S1
K0S2	K1S2	K2S2

After tillage and soil survey results of 200 kg urea in three steps The farm was 100 kg per ha along with 50 kg ha planted in the rosette stage And 50 kg at flowering And coincides with the planting of 150 kg of superphosphate was Tertil. Varieties used in the experiment were Hayola winter varieties planted several years' experience in the city is near Shiraz. Each plot consisted of four planting line Planting distance of 50 cm and a length of 6 m and a line spacing of each plot were not planted And plot the distance between the two lines was considered Not planting. Seeding rate based on 8 kg per hectare was calculated. After all planting operations

irrigation and irrigation interval of 7 days, the second was to have a uniform field greens. The map-based super absorbent polymer was placed in the experimental plots. Operations will include the use of leaf fertilizers, pest and disease, thinning and weeding the farm was done uniformly in all plots Based on the experimental map of the irrigated plots, the main plots were done on time and the amount of irrigation water consumed by each main plot Parshal flume 3 inches above the experimental plots were installed in the irrigation channel was measured The water level in each plot by two-inch polyethylene pipe that was laid on top of each plot separately, were led into the plots At harvest time, plant height, number of seeds per pod, pods, seed weight and yield kg per ha based on the amount of oil extracted was measured Based on harvest data analysis was performed using the software MSTATC.

RESULTS AND DISCUSSION

The start time and run experiments to harvest the crop growth period, sampling was performed to measure and perform variance analysis statistical data, the following results were obtained.

Number and amount of irrigation water:

To measure the amount of water used in irrigation flume Parshal 3 inches was used. The first 120 mm of irrigation Equal to 1200 cubic meters 7 days after the second irrigation After 80 mm at a rate equal to 800 cubic meters for all treatments was applied uniformly according to the projected irrigation treatments were main plots testing.

Table 1: Number and amount of irrigation treatments and procedures millimeters.

The irrigation									
Sum	Ripe	Seed stage	Pod stage	Flowering stage	The stem	Following the water	Soil Water	Number of irrigation	Treatment
700	100	100	100	100	100	80	120	7	A1
600	--	100	100	100	100	80	120	6	A2
500	--	100		100	100	80	120	5	A3

Table 2 shows the removal of irrigation in the stage of maturity Potassium sulfate fertilizer without the use of superabsorbent polymer decreases to 776 kg per hectare of irrigated twice removed Reduction in grain yield was 1921 kg per hectare.

Table 2: The amount of water in millimeters and grain yield kg ha main plots.

A3	A2	A1	Irrigation treatments
5	6	7	Number of irrigation
500	600	700	The amount of water
185	185	185	Rainfall
685	785	885	Collected water and Precipitation
2225 C	3061 B	3485 A	Yield Kg ha
34/6 A	35/1 A	34/7 A	Oil content

Yield:

Table 3 kg grain yield per hectare for different irrigation, use of fertilizers Potassium sulphate and application of superabsorbent polymers show that the application of 100 kg of potassium sulphate 60 kg super absorbent polymer by removing an irrigation at seed maturity, Grain yield of 5170 kg per hectare as against the most appropriate treatment in this study is advisable.

Table 3: Grain yield kg per Hectare.

S2K2	S2K1	S2K0	S1K2	S1K1	S1K0	S.K2	S.k1	S.K.	Plot / The main plot
6050 A	5920 A	4734 B	4046 C	5893 A	4656 BC	5531 A	4146 C	3458 D	A1
5310 AB	5170 AB	4350 C	5370 AB	5040 B	4260 C	4870 C	3370 D	3061 E	A2
5150 AB	4420 C	4120 C	4650 BC	4530 BC	3840 D	3920 D	2750 EF	2225 F	A3
5503 A	5170 AB	4401 C	5355 A	5154 AB	4252 CD	4774 C	3089 E	2914 F	Average

Potassium sulfate superabsorbent polymers used in Table 4, the treatments and the interaction of these two variables show the application of 100 kg and 60 kg of potassium sulfate superabsorbent polymer compared to 200 kg and 90 kg of potassium sulfate Super Absorbent no significant difference in terms of performance.

Table 4: Interaction of potassium sulfate and super absorbent polymers on seed yield (kg per hectare).

Average potassium	S2	S1	S0	S / K
3856 c	4401 C	4252 Cd	2914 F	K0
4471 B	5170 Ab	5154 Ab	3089 E	K1

5210 A	5530 a	5355 A	4774 C	K2
	5024 a	4920 B	3592 C	Average

Oil content:

The test results showed no significant difference between treatments in terms of percentage of oil extracted has not been observed.

Table 5: Percentage of oil extracted in different treatments.

Average potassium	S2	S1	S0	S / K
35/11	34/83 A	32/33 A	38/17 A	K0
34/40	33/17 A	36/67 A	36/5 A	K1
34/83	36/17 A	35/17 A	33/17 A	K2
	34/72 A	34/72 A	35/94 A	Average

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