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The study of reciprocal effect of potassium fertilizer and irrigation stress upon function, also fynologic and physiologic traits of seed sorghum to suggest cultivation with the most management and yield at Isfarayen region environment

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Abstract

To consider the original effect of irrigation limes, potassium fertilizer and determination of their reciprocal effect on physiology, morphology and physiology traits of Sorghum plant for cultivation plan in the best management and the most experimental in yield the pattern of split plot base on accident a full bloc for agricultural years 90-91,with three repetition at the form of imam Reza agricultural school located at Esferayen city. The research was conducted by four original cares of irrigation (first eastern, rising, irrigation of flowering phase, irrigation at the end of flowering phase ,irrigation to reach physiologic and the four sub ordinate cares obtained from potassium fertilizer (0.20.40.60 kg per Hectare). The average comparisons at fertilizer levels at any level of irrigation related to the Dounkene way indicated that each level on other factor level suggest us that each factor effect can be considers in fixed levels of other factor thus we would exactly estimate any factor level also in this research we used the third fertilizer level (40 kg per hectare) including each four distinctive phases for the study of experimental traits. In this study above characteristics were considered in high degrees. One of the well resulted traits was identified as a reciprocal effect related to irrigation at the end of flowering as well applying 40 kg per hectare of potassium fertilizer to obtain the panicool long.

Keywords: seed sorghum, irrigation levels, potassium fertilizer, phonologic and physiologic traits.

Introduction

Iran Country has located in a hot region and intensive fluctuation of raining at daily season and yearly levels cause non-sufficient attention to the lowest raining required to the agricultural consumption (Hamedi et al, 2005).

On the other hand, expenstion of water is at very low level in Iran. So, it would be necessary to have a protection factor, effective use of water and employing modern irrigation methods (Heydarisharifabad, 2004).

One of the most important environmental stresses is drought with its following stress that leads to a limitation in agricultural products as well reduces the potential of semi-arid and arid regions,(kardovani, 1997).

Such problem would be of high importance in areas where included Mediteranian climate condition like Iran there for, it imployes that effective use of water sources is unavoidable.

Obtaining the system function leads to the most effective use of irrigation water, is one of the proposed strategy for the management and development of irrigation potential.(Rahnama, 2003).

Thus, it would be effective to know the relation, exists among the soil water deficit due to

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product growth ,study and physiological stress relating to stress, raising tolerable plants and other cases resulted in the high productivity of plan in semi arid and arid regions,(kardovani 1997, Rahnama, 2003).

Agricultural plants constantly are facing with water deficit so, they respond to the in various ways.

Understanding methods and production degree in environmental stresses. (Ahmadi et al 2006).

Giant millet, contains small holes ,ability to swing self-leaves ,holes control . Will have much adaptation to a wide range of ecologic status in comparison with various agricultural plants (Nourmohammadi et al 2007).

There for, stress appears where plant treatment brings into effect and leads to less productivity accordingly, the intensity of variances will be different, in terms of plant stage and respiration intensity (Roshdi and Rezadost, 2005).

Drought stress brings negative effects on work performance in generative period of growth and in three stages of formation flowering pollination and swollen seeds.(Berenguer and Faci, 2001).

In a research based on sorghum function under moisture various cares concluded that due to reduced water availability resulted in decrease in function harvest index and all productive dry material.

Decrease in negative effects of drought stress and developing the high potatial of water through potassium were approved many experts.

Potassium is the basic osmotic solution in plants (Wynjonenz et al., 1979).

Aggregation of potassium ion resists vegetable organs to drought and salinity because potassium as a active osmotic solution contributes to absorption of surface water in cell and all plant area.

Potassium produces high efficiency in water use minor drought stress by opening and closing of holes maintaining of cellular timidity reducing water loss withered state water balance in plant tissue.

Mohamadi and Haghighi (2007)stated that potassium decreases if there is low moisture value of soil.

Esfarayen city of north khorasan province located at a region where the amount of vaporization is high with low rainfall so this situation would lead to sufficient water deficit required to agricultural crops development.

Consequently the most important problem in this province is deficit in quality and quantity irrigation water leads to reduction in land potential.

In terms of these limitations firstly they tend to plant crops that are resistant to bad environmental stresses secondly water unit efficiency (WUE) become high in the crops.

Thus sorghum is the most productive plant among fodder (grass) crops that can produce above mentioned advantages.

That would be of high importance to study the fertilizer use for each product.

So that the most apply of chemical fertilizers particularly nitrogen and potassium play an important role in vegetable products.

Many scientists have studied resources related to salinity studies productivity (yield) at field research.

Their researches indicate following results are contrary to particular conditions at esferayen such as salinity and dryness of water and soil.

Fluctuations in heat degree and sorghum tolerance to these factors.

On the basis of influence potassium element on developing the function of two parts as physiologic and morphologic has been proved in developing of the agricultural plants function faced with drought stress potassium acted properly.

There are lots of limitations at esfarayen city included in Water deficit insufficient water source disallowing of well dig that highly related to sustainable lands.

So performance of drought strategy by means of low irrigation level economize in water use for irrigation water deficit conditions for former availability and developing the under crop area increasing the product content recommendation for adjusted use of fertilizer which is necessary for available limitation water to obtain the most effect of biologic work and seed function per hectare contains the research objects.

Finally the project was conducted to assess the reciprocal potassium fertilizer effect and sorghum plant irrigation stress at esfarayen surrounding.

Materials and Methods

This study was performed in 2011-2012 at field research of agricultural school of imam reza located at 40 Km far from esferayen city (56 grade,57 minutes,58 grade,7 minutes eastern longitude and 36,grade,40 minutes to 37 grade and 17 minutes of north grade located at level of

Table 1. Mean of squares for studied treats at four irrigation times and four fertilizer level based on the split plot

Sov (source of variance)	Degree of free	Seed yield	Biological yield	Harvest index
Rep (R)	2	17090.040 ^{ns}	1048669.348^{ns}	9.333 ^{ns}
Irrigation times (A)	3	2411230.577**	114453304.258**	421.444**
Error a	6	6972.421	1090132.823	14.361
Fertilizer levels (B)	3	1092651.610**	33352036.869**	88.389**
(A*B)fertilizer * irrigation	9	274033.991**	11538391.882**	92.019**
Error b	24	5667.186	665774.616	10.049
Coefficient of variance	---	2.96	8.48	8.70

**,*ns significant at the %1 and %5 level of probability and non significant respectively.

1265m from sea level).This region considered to be moderate one according to classification of Marton .running the average rain fall is 197/8mm and realy temperatures 14/2 centigrade .The tested soil is loumy tissue .bed operation includes autumn. completed spring, plough, leveling off drive ,fertilizer scattering ,based on the analytic results of soil. Each tested court includes 6 row of cultivation in form of gutter in length 4m with distance 50 cm and distance among bushes was 10 cm after operation. Cultivation operation was conducted in 2012year at 8th June .To protected the next courts from probable moisture .each court distance considered to be 3m .The research was performed in pattern of split plot based on accidental full bloc with three sets. Four original cares of irrigation (irrigation at stem rising at flowering phase at the end of flowering phase irrigation to reach physiologic stage) contains as original test cares also fertilizer levels at four levels (0,20,40,60 kg per hectare)considered to be minor cares. After performing the mentioned care it would be necessary to state that there wasn't irrigation until the end of growth season. For obtaining the effect of study traits choosing the sample with required to %5 m edge from beginning to end of lines throught 4 rows was performed all trait Evolution based on selection by chance from 4 interline apart from seed function and after physiological sorghum development Chancely, 16 bushes were picked up through each court and four line by other line to evaluate the parts function. The time in which the seeds physiological ripe determined by observing the black layer existed on the end of seeds. To evaluate the seed effect they picked up from each count and their separation of seeds in traditional way and to dry them in natural condition got balanced .Samples put in oven with 72 centigrade temperature for 48 hours then token measures by a digital scale with accuracy of %1 g .For taking the weight measure of dried straw including leaf stem branch all weight of dried product (weight of dried straw as well seed function) considered equal to function of biologic through each harvest index represented. Obtaining data analyzed variance by software statistic Mstatc and averages were compared to multi seeds Duncan trial test at %5 level of probability and related figures and tables were presented by excel soft ware.

Results and Discussion

Results of variance analysis represented (Table 1) that among irrigation levels and fertilizer levels and their reciprocal effects there would be a significant difference (variance) of %1 probability for weight seed traits per ponicool seed number per cluster (spike)and harvest index hole number on leaves was indicative of a significant variance at %5 level of probability between irrigation and fertilizer levels but no significant on their reciprocal effect.

There was a significant variance at %5 level of probability for hole number trait axisted under x fertilizer level.

Thus no significant variance observed among the irrigation levels.

The hole number on the stamen leaf indicated a significant variance at %1 level of probability between irrigation and fertilizer level.

But no significant at their reciprocal effect,

Seed and biologic functions showed significant variances among irrigation fertilizer levels and reciprocal effects of irrigation level x fertilizer level.

Pure to analysis of variance based on split plat indicated at some traits means of squares second factor error (b) is more than means of squares of first factor error.

Therefore the data should be analyzed in terms of factorial and related plan after studying a set of probability if M seb is more than M sea .

In this study M seb related to sub ordinate branches characteristics the last stamen leaf expanse length of the last stamen leaf ponicool

Table 2. Mean of squares for studied treats at four irrigation times and four fertilizer levels based on factorial experiment

Sov	Degree of free	Height (high)	Length of the last stamen leaf	Width of the last stamen leaf	Punicool long	Weight of 1000 seeds	Subordnate branch
Rep (R)	2	9.333 ^{ns}	1.226 ^{ns}	0.260 ^{ns}	8.688 *	1.188 ^{ns}	0.003 ^{ns}
Irrigation times (A)	3	78.139 *	17.659 **	6.045 **	103.806 **	59.243 **	0.00001 ^{ns}
Fertilizer levels (B)	12	2357.194 **	539.109 **	0.708 **	30.806 **	10.688 **	0.00001 ^{ns}
A*B	36	54.657 *	6.201 *	1.376 **	2.824 ^{ns}	6.947 **	0.006 ^{ns}
Error	104	17.844	2.309	0.143	2.021	1.654	0.017
Cv %	---	5.64	4.54	9.39	7.24	6.03	2.31

Sov	Degree of free	Stem diameter at 10 cm	Seed diameter	Hole number under stamen leaf	Manual leaf area	Leaf area with machine
Rep (R)	2	0.016 ^{ns}	0.016 ^{ns}	25231002.083 ^{ns}	1.688 ^{ns}	4.423 ^{ns}
Irrigation times (A)	3	0.596 **	0.201 ^{ns}	2199008316.667 **	402.144 **	550.012 **
Fertilizer levels (B)	12	0.301 **	0.174 ^{ns}	642700516.667 **	87.797 **	674.374 **
A*B	36	0.188 **	0.095 ^{ns}	152019096.296 **	26.116 **	110.295 **
Error	104	0.029	0.077	15586533.194	2.549	8.401
Cv %	---	11.08	7.78	3.20	2.75	10.94

**,*ns significant at the %1 and %5 level of probability and non significant respectively

length weight of 1000 seed 10 cm diameter of stem seed diameter plant height the hole number under stamen leaf manual leaf area machinery leaf area were larger than M sea.

Thus the above traits were analysed due to factorial and accidental full bloc plan see results in Table 2

This result (Table 2) represented that there were no significant variances among the irritation, fertilizer levels and their reciprocal effects, for the trait of subordinate branch number.

In other word, various irrigation and fertilizer levels had no important effect on the number of subordinate branch.

The bush height indicated remarkable variances at %5 level of probability for irrigation levels and their reciprocal effects x fertilizer level and also showed remarkable variances at %1 level of probability for different ranges of fertilizer.

Within irrigation and fertilizer levels at %1 level of probability and their reciprocal effects %5 level of probability for the last stamen leaf expanse between irrigation, fertilizer level and their reciprocal effects.

The length feature of ponicool showed significant variances at %1 level of probability between irrigation and fertilizer level while no significant variance appeared to their reciprocal effects.

The weight of 1000 seeds and stem diameter indicated the significant variances at %1 level of probability between irrigation fertilizer levels and their reciprocal effects.

The seeds diameter feature showed insignificant variance for none of original cares and their reciprocal effects.

The hole number under stamen leaf, taking measure of leaf area with hand and apparatus showed significant variance between irrigation and fertilizer levels and reciprocal effect of irrigation levels x fertilizer levels.

It would be necessary to mention that low CV degree of above traits is indicative of high accuracy in study. (research).

Results represented that plant would require more energy and nutrition when the plant is transferring from formation stage into generative stage (beginning of flowering).

So, if we had opportunity of irrigation, we would get the most product by using potassium 60Kg per hectar.

At other stages, the most product will be obtained by using 40KG potassium per hectar.

Really, average comparison of one factor level with any other factor level enables researcher to get high advantage due to the best management, plan, suggest, also whit available sources and present conditions, economical interest.

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