Yield and Yield Components of Dryland Wheat Genotypes Under Supplemental Irrigation.

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Abstract

In order to evaluate the yield and yield components of different dryland wheat genotypes under supplemental irrigation at different growth stages and to determine the best phonological stage for supplemental irrigation, an experiment was conducted in 1998-1999 at Ghamloo research station in Kurdistan province of Iran. A split plot design With four replications, five main plots and six sub plots were applied. Main plot treatments were consisted of five treatments including no irrigation treatment (control), irrigation at planting, flowering, milking and planting + milking stages. Sub plot treatments were consisted of six dryland wheat genotypes such as sardari, sabalan, and four superior lines. Results showed that irrigation at planting plus milking stages produced the highest yield compare to irrigation at milking stage. Among genotypes sabalan genotype with average yield of 2213 kg/ha produced the highest and sardari genotype with 1502 kg/ha had the lowest grain yield. In general supplemental irrigation caused an increment of 36 percent yield of sabalan genotype.

Introduction

Efficiency of water supplement in comparison with full water at growth period of plant is reported from 60 to 70 percent in some countries (Perrier and Salkini, 1987). Siadat (1987) reported that means of increasing wheat and barley grain yield under supplemental irrigation are 1175 and 1088 kilogram per hectare respectively. Increasing grain wheat yield under supplemental irrigation was reported about 1 ton per hectare in pakistan (Perrier and Salkini, 1987). Siadate reported that whet grain yield was increased to 1748 kilogram per hectare with using two times of supplemental irrigation at producing spike and milking stages in baladarband of Kermanshah while increasing yield with one irrigation in each above stages was 1500 kilogram per hectare.

This study was conducted in Gamlow Fallow Research Station in Kordestan province for obtaining following aims:

- Determination the best phonological growth stage of different wheat genotypes for using supplemental irrigation.
- Determination the best wheat variety or line for response the supplemental irrigation in Kurdistan.

Materials and Method

This experiment conducted in Ghamloo research Station with 47”and 30’ longitude and 35”and 10’latitude in 1998_ 1999. The soil was calcareous with silty or silty _clay texture. Because of soil fertility only nitrogen fertilizer in amount of 41.4 kilogram per hectare was used in two (21.4 kg per hectare at sowing time and 20 kilogram per hectare at stem stage). Also 20 kilogram per hectare of zinc phosphate was consumed at sowing stage. The experimental design was split plot in base of complete block design with four replications. Irrigation [without irrigation (control), one time irrigation at sowing stage, one time irrigation at flowering, one time irrigation at milking stage, two times irrigation (one time at sowing stage plus one time at milking stage) and varieties(sabalan/1-27-56/4,anza/3/pil/hys/4/sefid,sabalan,vz/tm71/3 moya”s”/bb, sardari and sx1/gelenson). treatments were randomized to the main plot and sub plot units respectively. Samples were obtained from two middle rows with elimination of border from two end of rows. During growth season, weeds were controlled with 1.5 ppm of 2-4-D. Data from this experiment was analyzed with MSTATC and duncan’s method was used for comparison the means.

Result and Discussion

There were significant differences among irrigation treatments, varieties and their interactions at %1 level. Using supplemental irrigation at each growth stages increased grain yield in comparison with control. Mean grain yield under supplemental irrigation in comparison with control treatment (dryland) was 289 kg/ha and equivalent with 18%. The most increasing grain yield was observed in two times irrigation (sowing time and milking time). Mean grain yield In this treatment was 1936 kg/ha and had %23 more grain yield than control (1569 kg/ha). Irrigation at sowing time causes early and monotonous germination, formation tiller at autumn, more fertile, probably increasing relative resistance to winter cold and increasing more grain yield per unit area. Similar results were obtained by Strak and Longley(1986). In this research spring irrigation at different growth stages affect on number of grain in spike and 1000- grain yield positively but this affect was no t the same as number of spike per square meter Mean yield increasing of irrigation treatment at flowering stage was%18 in comparison with control.

In this experiment in spite of non significant differences among irrigation levels for grain protein, irrigation decreased grain protein percent especially at end of plant growth stages that correspond to result from other researchers (Eck, 1988;jamal, 1996). Irrigation at end of plant growth increases grain weight via starch increasing (Eck, 1988). 1000-grain yield mean in irrigation treatments at milking stage and milking + sowing stages was more than other stages,In general the sabalan cultivation in dryland west region of Iran and its irrigation at the least for one time at milking stage can increase grain yield.

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