ABSTRACT

Two field experiments were conducted at Ismailia Agricultural research station in 2000/2001 and 2001/2002 seasons, to study the water and fertilizer requirements for some promising genotypes of Hull-less barley under sprinkler irrigation on poor sandy soil.

Three irrigation water quantity were used i.e. 12oo m^3 , 1000 m^3 and 800 m^3. The three barley genotypes tested namely: (LHB 93/4), (LHB 93/5) and (LHB 93/1). Three nitrogen fertilizer rates were applied i.e. 40 , 60 and 80 kg N/fed.

The experimental design used was split-split-plot in three replications.

The obtained results indicated that average of plant height, heading date, spike length, number of kernels per spike, weight of kernels per spike, 1000 kernels weight, grain and straw yield, harvest index. Water and nitrogen use efficiency decreased with decreasing irrigation water quantity applied, whereas 1200 m^3 irrigation water gave the highest grain yield per feddan (14.01 and 12.23 ardab in 2000/2001 and 2001/2002 seasons, respectively).

Results showed significant differences among hull-less barley genotypes in all studied treats in both seasons. Genotype LHB 93/1 surpassed other genotypes in plant height, heading date, spike length, weight of kernels per spike, 1000 kernels weight, and straw yield in

tons/feddan in both seasons. On the other hand, genotype LHB 93/4 had the highest value of number of kernels/spike, number of tillers/m^2, grain yield ardab/feddan as well as harvest index, water and nitrogen use efficiency in both seasons.

The obtained results revealed that the effect of fertilization treatments was significant on the average of plant height, heading date, spike length, number of kernels per spike, weight of kernels per spike, 1000 kernels weight, grain and straw yield/feddan as well as harvest index, water and nitrogen use efficiency. Applied nitrogen with a rate of 80 kg nitrogen / feddan gave the highest grain yield per feddan (16.61 and 14.01 ardab) in 2000/2001 and 2001/2002 seasons, respectively.

The interaction effects between irrigation levels and hull-less barley genotypes on all studied characters were significant in both seasons. At the highest water quantity 1200 m^3/feddan with genotype LHB 93/1 gave the highest average of plant height, heading date, spike length, weight of kernels per spike, 1000 kernels weight, grain and straw yield in tons/feddan while genotype LHB 93/4 gave the highest value of number of kernels/spike, number of tillers/m^2, grain yield ardab/feddan as well as harvest index, water and nitrogen use efficiency.

The results illustrated that the interaction effect between irrigation levels and nitrogen fertilizer rates was significant. Irrigated barley plants by 1200 m^3 and fertilized by 80 kg N/fed. gave the highest average of

plant height, heading date, spike length, number of kernels per spike, weight of kernels per spike, 1000 kernels weight, grain and straw yield/feddan as well as harvest index, water use efficiency and nitrogen use efficiency in both seasons.

The results showed that the interaction effect between fertilization treatments and hull-less barley genotypes was significant. Fertilizing LHB 93/4 genotype with 80 kg N/fed gave the highest average of number of kernels per spike, number of spikes/m^2, number of tillers/m^2, grain yield ardab/fed as well as harvest index, water use efficiency and nitrogen use efficiency in both seasons.

The results showed that the interaction effect among irrigation water quantities, hull-less barley genotypes and nitrogen fertilizer rates was significant. Irrigating barley genotype LHB 93/4 by 1200 m^3 and fertilizing by 80 kg N/fed gave the highest average of number of kernels per spike, number of spikes/m^2, grain yield in ardab/ feddan, as well as harvest index ,water and nitrogen use efficiency in both seasons.

The study concluded that LHB 93/4 hull-less barley was the most tolerant genotype to drought and low soil fertility compared to other ones tested in this study.

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