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5-Summary

Effect of Different Sowing Dates and Irrigation Regimes on Growth, Yield and Consumptive Use for Some Wheat Varieties under Sohage Governorate Conditions.

Field experiments were conducted at Shandaweel Agricultural Research Station, during the three winter successive seasons 2012/2013, 2013/2014 and 2014/2015 to find out the effect of two different sowing dates 20th November and 5th December and irrigation regimes intervals 21, 28 and 35 days on growth, yield and consumptive use of three wheat varieties Shandaweel-1, Giza-168 and Sides-12 under Sohage governorate conditions. The experiment was laid out in a split – split plot design with three replications.

The experiment was laid out in a split – split plot design with three replications. The plot area was 42.0 m² (6 x 7 m). The main plots were devoted to sowing dates of S1 = first sowing date (20th November) S2 = second sowing date (5th December); the sub plots were assigned to the irrigation regime as intervals of I1= 21 days, I2= 28 days, and I3= 35 days, and the sub_ sub plots were assigned to three wheat cultivars including V1 = Shandaweel 1, V2 = Giza 168 and V3 = Sides 12. Results revealed that sowing dates, irrigation regimes intervals and wheat cultivars were resulted in significant differences in most studied traits through the three seasons.

The obtained results could be summarized as follows:-

1- Water relations for wheat.

1. 1. Irrigation water applied.

The average of irrigation water applied for wheat crop through the three seasons 2012/13, 2013/14 and 2014/15 for irrigation treatments 21, 28

and 35 days intervals were 4364, 3730 and 3008 m³/fed, respectively these for the first sowing date 20th November, where in the second sowing date 5th December were 4425, 3587 and 3089 m³/fed, in the same respective.

1. 2. Actual evapotranspiration (ETa) for wheat.

The mean average of ETa for the first sowing date 20th November were 1908, 1857 and 1778m³/fed and it were 1855, 1879 and 1777 m³/fed for the second sowing date 5th December through the three growth seasons 2012/13, 2013/14 and 2014/15, respectively.

The mean average of ETa was affected by the irrigation intervals, where the irrigation treatment 21days interval recorded the highest rate of ETa 2194, 2104 and 2030 m³/fed through the three growth seasons 2012/13, 2013/14 and 2014/15, respectively, these for increased in the irrigation applied number and the increased in the available soil moisture after each irrigation .

Wheat cultivar Giza 168 produced the highest value for the estimated ETa, where wheat cultivar sides12 was the lowest in ETa.

Actual evapotranspiration rate was low in the begging of the season during the early stage they increased to reach their maximum values in third stage mid-season due to the maximum temperature and plant canopy, and then tended to decline again until the crop maturity due to crop canopy changes.

1. 3. water use efficiency (WUE).

The second sowing date 5th December recorded the highest values of WUE 1.255, 1.323 and 1.409 kg of wheat grain/m³ through the three growth seasons 2012/13, 2013/14 and 2014/15, respectively.

The irrigation at 21 days interval produced the highest value of WUE 1.251 kg of wheat grain/m³ during the first season 201/13, while the irrigation treatment 35 days interval recorded the highest values of WUE 1.382 and

1.380 kg of wheat grain/m³ through the second and third seasons 2013/14 and 2014/15, respectively.

Wheat cultivar Shandaweel 1 recorded the highest rates for WUE 1.145, 1.340 and 1.332 kg of wheat grain/m³, through the three seasons.

1.4. Reference evapotranspiration (ET₀) & Crop evapotranspiration (ET_c).

Penman equation recorded the highest ET₀ l values through the three seasons.

The maximum monthly values of ET₀ calculated using Penman Monteith, Modified Penman, Doornbos and Pruitt, Jensen and Haise, evaporation Pan, Blaney- Criddle and Turc equations for Wheat crop were found in April in the three studied seasons this due to the increased in the air temperature during this month. ET_c results take the same direction of ET_c through the three seasons but, the maximum monthly calculated values of ET_c for wheat crop were in mid season stage in March.

1. 5. Crop coefficient (K_c).

Evaporation Pan recorded the highest value of K_c, while modified penman equation recorded the lowest value of K_c, through the three growth seasons, at the beginning of the growing season the values of K_c were low, because plant vegetation growth has not established yet and so the loss of moisture is mostly by evaporation from soil surface. As the plant growth stages developed, a gradual increase is observed in crop coefficient. The crop coefficient reached their peaks in the third growth stage. After reaching the peak of vegetation development, the rate of crop coefficient pronouncedly decrease during the late season.

1. 5. Ratio between the estimated crop evapotranspiration (ETc) and the actual evapotranspiration (ETa).

These ratio showed who mush the estimated ETc data are close range with the actual evapotranspiration.

The best equations to estimate the ETc of wheat crop at Shandaweel region were Penman Monteith and Modified Penman equations .

2. Growth and Yield Parameters:

All the experiment treatments from sowing dates, irrigation treatments intervals and wheat cultivars produced significant differences.

2. 1. Plant height (cm):

The second sowing date 5th Dec, recorded the best results for plant height as an average of the three seasons 94.6 cm, and increase the plant height by 2.8% more than the first sowing date 20th November.

Irrigation treatment 21 and 28 days interval produced the highest values of plant height 93.6 and 93.4 cm as an average of the three seasons, and increased the plant height by 0.9 and 0.7, more than the irrigation treatment 35 days interval, respectively.

Wheat cultivar Shandaweel 1 produced the highest values of plant height 95.8 cm as an average of the three seasons and increased the plant height by 4.6% more than 92.4 cm from wheat cultivar Giza 168.

2. 2. Number spikes / m²:

The second sowing date recorded the best results for number spikes/m² as an average of the three seasons 468 spikes/m², and increase the spikes/m² by 3.97% more than the first sowing date 20th November.

Irrigation treatment 21 and 28 days interval increased the number spikes/m² average of the three seasons, by 23.9 and 8.34 % more than the irrigation treatment 35 days interval, respectively.

Wheat cultivar Shandaweel 1 produced the highest values of spikes/m² 471.8 spikes/m² as an average of the three seasons and increased the spikes/m² by 5.71% more than wheat cultivar Giza 168.

2. 3. Spike length (cm):

The second sowing date recorded the best results for Spike length as an average of the three seasons 12.1 cm, and increase the spike length by 3.84 % more than the first sowing date 20th November.

Irrigation treatment 21 and 28 days interval increased the spike length average of the three seasons, by 8.26 and 3.42 % more than the irrigation treatment 35 days interval, respectively.

Wheat cultivar Shandaweel 1 produced the highest values of Spike length 12.2 cm as an average of the three seasons and increased spike length by 6.53 % more than wheat cultivar Giza 168.

2. 4. Number spikelet in spike:

The second sowing date recorded the best results for Number spikelet in spike as an average of the three seasons 20.6 spikelet / spike, and increase the Number spikelet in spike by 1.5 % more than the first sowing date 20th November.

Irrigation treatment 21 and 28 days interval increased the Number spikelet in spike average of the three seasons, by 7.8 and 2.9 % more than the irrigation treatment 35 days interval, respectively.

Wheat cultivar Shandaweel 1 produced the highest values of number spikelet in spike 21.2 spikelet / spike as an average of the three seasons and increased Number spikelet in spike by 6.9 % more than wheat cultivar Giza 168.

2. 5. Grains number in Spike:

The second sowing date recorded the best results for grains number in spike as an average of the three seasons 69 grains, and increase the grains number in Spike by 13.9 % more than the first sowing date 20th November.

Irrigation treatment 21 and 28 days interval increased the grains number in spike average of the three seasons, by 13.3 and 5 % more than the irrigation treatment 35 days interval, respectively.

Wheat cultivar Sides 12 produced the highest values of grains number in spike as an average of the three seasons and increased grains number in spike by 12.3 % more than wheat cultivar Giza 168.

2. 6. Grains Weight of 5 Spikes (g)

The second sowing date recorded the best results for grains weight of 5 spikes (g) as an average of the three seasons 13.7 g, and increase the grains weight of 5 spikes (g) by 5.6 % more than the first sowing date 20th November.

Irrigation treatment 21 and 28 days interval increased the grains weight of 5 spikes (g) average of the three seasons, by 32.7 and 10.6 % more than the irrigation treatment 35 days interval, respectively.

Wheat cultivar Shandaweel 1 produced the highest values of grains weight of 5 spikes (g) 14 as an average of the three seasons and increased grains weight of 5 spikes by 9.1 % more than wheat cultivar Giza 168.

2. 7. Seed index (g/1000 grains):

The second sowing date recorded the best results for Seed index as an average of the three seasons 42.4 g, and increase the Seed index by 1.4 % more than the first sowing date 20th November.

Irrigation treatment 21 and 28 days interval increased the Seed index (g) average of the three seasons, by 14.9 and 7.1 % more than the irrigation treatment 35 days interval, respectively.

Wheat cultivar Shandaweel 1 produced the highest values of Seed index (g) 14 as an average of the three seasons and increased Seed index by 4.3% more than wheat cultivar sides 12.

2. 8. Total biological yield weight (tons/fed):

The second sowing date recorded the best results for Total biological yield as an average of the three seasons 6.444 tons/ fed and increase the Total biological yield by 7.98 % more than the first sowing date 20th November.

Irrigation treatment 21 and 28 days interval increased the Total biological yield average of the three seasons, by 23.41 and 11.27 % more than the irrigation treatment 35 days interval, respectively.

Wheat cultivar Shandaweel 1 produced the highest values of Total biological yield 6.389 tons/fed as an average of the three seasons and increased Total biological yield by 4.7% more than wheat cultivar sides 12.

2. 9. Grain yield (kg /fed):

The second sowing date recorded the best results for grain yield as an average of the three seasons 2419.2 kg/ fed and increase the grain yield by 17.5 % more than the first sowing date 20th November.

Irrigation treatment 21 and 28 days interval increased the grain yield average of the three seasons, by 33 and 12.4 % more than the irrigation treatment 35 days interval, respectively.

Wheat cultivar Shandaweel 1 produced the highest values of grain yield 2316.2 kg/fed as an average of the three seasons and increased grain yield by 7.3 % more than wheat cultivar sides 12.

2. 10. Straw yield (tons/ fed):

The second sowing date recorded the best results for straw yield as an average of the three seasons 3.99 tons / fed and increase the straw yield by 2.52% more than the first sowing date 20th November.

Irrigation treatment 21 and 28 days interval increased the straw yield average of the three seasons, by 18.12 and 9.76 % more than the irrigation treatment 35 days interval, respectively.

Wheat cultivar Shandaweel 1 produced the highest values of straw yield 4.065 tons /fed as an average of the three seasons and increased straw yield by 4.82 % more than wheat cultivar sides 12.

CONCLUSIONS

To maximize wheat crop production in Shandaweel region use 5th December as sowing date.

Use the irrigation interval 21 days .

Use wheat cultivar Shandaweel 1 to get the highest yield.