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# Evaluation of wheat verities (*Triticum aestivum* L.) grown under different seeding rates and ethephon in desert conditions, south of Basrah, Iraq

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Due to climate change in recent years, there has been an increasing water deficit during the winter wheat growing period due to reduce rivers water and low precipitation. Consequently, there is increasing thoughts to grow crops depending on well water under desert conditions were crops management completely different. Field experiment was conducted in winter session of 2021-2022. The aim was to evaluate the production of wheat cultivars grown under desert condition at Alahais south of Basrah, Iraq (30°46'89.07"N 46°99'36.77"E). Moreover, two seeding rate and two levels of ethephon have been applied. The experiment include three factors, eleven wheat cultivars, two rate of seeding (140 and 200 kg ha$^{-1}$) and two concentration of ethephon (0 and 2.25 ml l$^{-1}$). Factorial experiment was applied (11x2x2) according to randomized complete block design with three replicates. The area of experimental unit was 4x3 m$^2$. The results revealed that, wheat varieties differed significantly in all most traits measured. Alrasheed variety produced higher grain yield, higher grains spike$^{-1}$ and 1000 grain weight by 4.077 t ha$^{-1}$, 56.18 grains spikes$^{-1}$, and 43.17 g respectively. Moreover, increased seeding rate from 100 to 200 kg ha$^{-1}$ lead to increase spike m$^{-2}$ and grain yield by 12.53% and 11.59% respectively. In addition foliar application of ethephon lead to enhance spike m$^{-2}$, grains spike$^{-1}$ and grain yield by 5.31%, 6.81% and 11.15% respectively. For the interaction effect, the results revealed that, the increased of seeding rate improved grain yield for all wheat varieties. Moreover, the application of ethephon improved grain yield for all wheat varieties. Alrasheed variety under 140 and 200 kg ha$^{-1}$ seeding rate with foliar application of 2.25 ml l$^{-1}$ ethephon gave highest grain yield by 4.321 and 4.235 t ha$^{-1}$ respectively. In addition Alrasheed under seeding rate of 200 kg ha$^{-1}$ and ethephon foliar application produced highest biological yield by 14.261 t ha$^{-1}$. The results showed that foliar application of ethephon compensate the increase of seeding rate from 140 to 200 kg ha$^{-1}$ for grain yield of some wheat varieties.
**Keyword:** Wheat verities, desert agriculture, ethephon, grain yield, seeding rate.

## INTRODUCTION

Wheat (*Triticum aestivum* L.) is one of the major cereal crops, which provides energy requirement of the human diet across the world. Wheat grain's protein contains essential gluten, which is important for bread production (Sharma *et al*., 2015; Noaema *et al*., 2020; Alrishdi and Alhabbar, 2023). The total wheat production in the world estimated by 779.03 million tons, at a rate of 3.510 t ha$^{-1}$ (USDA, 2022). While, in Basrah Governorate which located south of Iraq, Wheat production reached to 2.624 t ha$^{-1}$ (ARMA, 2021). In addition to the decline in grain yield production per unit area in Iraq as compared to global production, climatic changes have played a major role in reduced agricultural production due to the increase water scarcity and the decrease water level of Tigris and Euphrates rivers, which consequently led to decrease cultivated area with field crops, including wheat (Lobell *et al*., 2011; Osborne and Wheeler, 2013; Kissoudis *et al*., 2016; Urban *et al*., 2017). This required searching for alternative sources of water (underground water) and moving the cultivation of this strategic crop to other new regions. This new region characterized by abundance of underground water but in other hand by extremes climate, insufficient nutrient and light soils that differ in their characteristics and so their management as compared to suitable soils for Wheat cultivation. This requires reconsideration by selecting a new varieties that are suitable for these new agricultural conditions. Varieties generally differ in grain yield production according to genetic traits and its interaction with Ecology (growth conditions). The highest yield can be obtained when

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