

The Impact of Tillage Systems and Herbicide Type on the Growth and Yield of Wheat and the Growth Parameters of Associated Weeds

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Abstract. The investigation was placed in the Al-Ghamij region, which is located north of Basrah in Iraq, in silty-clay soil. Three tillage systems were used in the study: conventional tillage with a moldboard plow, reduced-tillage with a disc harrow, and the no-till system. Additionally, three herbicides were used: Chevalier (300 g ha⁻¹), Granstar (15-20 g ha⁻¹), and Topic (0.75 l ha⁻¹) to control weed growth. According to the RCBD design, using split plots, with the main plots devoted to tillage techniques and the split plots to herbicide. The results showed the significant superiority of the reduced-tillage system by the disc harrow, with the fewest weeds per square meter, the fewest weeds dry weight per square meter, the tallest plants, the most tillers per square meter, the most spikes per square meter, the most grain yield, and the most biological yield totaling (48.7 plants m⁻², 3.82g m⁻², 81.67 cm, 370.78 tiller m⁻², 344.4 spike m⁻², 4519.00 kg ha⁻¹, and 10340.00 kg ha⁻¹), compared to no-till and reduced-tillage methods, conventional tillage using a moldboard plow resulted in the highest number of weeds, the highest dry weight of the weeds, the shortest plant, the fewest tillers per square meter, the fewest spikes per square meter, the smallest grain and biological yield (105.3 plants m⁻², 10.20 g m⁻², 78.33 cm, 310.22 tiller m⁻², 264.9 spike m⁻², 3296.00 kg ha⁻¹, and 9985.00 kg ha⁻¹). The results of the study demonstrated the significant superiority of the Chevalier herbicide as it exhibited lower dry weight of weeds per square meter, the highest plant, more tillers and spikes per square meter, and the highest biological yield (4.49 g m⁻², 82.33 cm, 347.89 tiller m⁻², 309.7 spike m⁻² and 10301.00 kg ha⁻¹) respectively,. On the other hand, the Topic herbicide displayed the highest weeds dry weight, shortest plants, the lowest number of tillers and spikes, and the lowest biological yield (8.87 g m⁻², 78.00 cm, 326.11 tiller m⁻², 297.7 spike m⁻² and 10023.00 kg ha⁻¹).

Keywords. Soil bulk density, Tillage practices, Weeds density, Weeds management, Yield components.

1. Introduction

Bread wheat (*Triticum aestivum* L.) is one of the world's most important crops. Iraq is considered one of the first places for the emergence of this crop and the availability of the main factors of production in it, such as soil, water, and climatic conditions, but its productivity is still low due to the failure to follow scientific methods by farmers related to the cultivation of this crop, in addition to the exposure

