

## Effects of Hydrogel and Vermicompost on Water Use Efficiency of Wheat

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### Abstract

Kashmar plain is located in an arid region and recent consecutive drought events have attracted serious attention to water use management. In this research, the effects of four levels of super absorbent polymer A200 (0(V<sub>0</sub>), 0.1% (V<sub>1</sub>), 0.2% (V<sub>2</sub>) and 0.3% (V<sub>3</sub>) wt%), four levels of vermicompost (0(V<sub>0</sub>), 7(V<sub>1</sub>), 10(V<sub>2</sub>) and 15(V<sub>3</sub>) tons per hectare), and three levels of irrigation (60%(W<sub>1</sub>), 80%(W<sub>2</sub>) and 100%(W<sub>3</sub>) of water requirement) were evaluated on water use efficiency (Irrigation water and rain) (WUE) and irrigation water use (WUE<sub>i</sub>) of wheat. The study was conducted in research farm of Kashmir Higher Education Institute. Factorial experiment was performed using a completely randomized design with 144 pots. The results showed the highest WUE and WUE<sub>i</sub> in S<sub>3</sub>V<sub>3</sub>W<sub>3</sub> treatment as 1.49 kg/m<sup>3</sup>/ha and 2.26 kg/m<sup>3</sup>/ha, respectively. The lowest WUE and WUE<sub>i</sub> were observed in S<sub>0</sub>V<sub>0</sub>W<sub>1</sub> treatment and were 1.03 kg/m<sup>3</sup>/ha and 1.56 kg/m<sup>3</sup>/ha, respectively. Totally, it can be concluded that superabsorbent and vermicompost increased the WUE and WUE<sub>i</sub>. Under the conditions of this experiment, according to the analysis of variance, the combined application of superabsorbent and vermicompost was not significant. Also, according to the comparison of means at 5% significance level, in separate application of superabsorbent and vermicompost, the best value for achieving maximum WUE and WUE<sub>i</sub> is 0.2% (weight percent) superabsorbent or 10 ton/ha of vermicompost. By using the maximum superabsorbent and vermicompost and increasing water application from 60% to 80% and from 80% to 100%, WUE<sub>i</sub> increased by 6.5 percent and 19.7 percent, respectively.

**Keywords:** Wheat Alvand cultivar, Kashmir, Moisture super absorbents, Water stress

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