

Wheat straw mulching with fertilizer nitrogen: An approach for improving soil water storage and maize crop productivity

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Field studies using wheat straw mulching effects on soil water storage and maize development were conducted in China. The studies contained four treatments during three years (2014–2016): CK (no straw and no nitrogen); N (no straw mulching with 172 kg N/ha); HS + N (half straw mulching at the rate of 2500 kg/ha with 172 kg N/ha), and FS + N (full straw mulching at the rate of 5000 kg/ha with 172 kg N/ha). The FS + N treatment significantly increased soil water storage in a drought period during crop growth stages and promoted plant growth along with increased evapotranspiration. The FS + N treatment increased the soil water storage (26.5, 19.9 and 11.1 mm), grain yield (28.7, 6.93 and 2.4%), and water use efficiency (26.6, 6.64 and 2.40%) compared to CK, N and HS + N, respectively. In conclusion, compared to N, HS + N or FS + N increased the biomass (11 and 19%) and water use efficiency (4 and 5%), respectively, and are considered beneficial in Guanzhong, China. Mulching levels were superior to N and compensated the wheat nitrogen requirements. Thus, further studies with minimum fertilizer nitrogen for an environmentally friendly and effective approach are recommended in semiarid regions of China.

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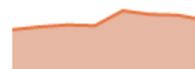
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semi-arid region; *Zea mays* L.; rainfall; soil temperature; crop yield

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