

DOI: 10.3724/SP.J.1006.2012.00675

## 耕作方式对旱地小麦耗水特性和干物质积累的影响

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**摘 要:** 黄淮海地区旱地小麦种植面积较大, 降水少且年际间变化幅度大造成其产量低而不稳。耕作措施可影响土壤的蓄水, 于 2009—2011 年连续 2 个小麦生长季, 设置条旋耕、深松+条旋耕、深松+旋耕和旋耕 4 种耕作方式处理, 研究耕作方式对黄淮海地区旱地小麦耗水特性和干物质积累的影响。结果表明, 深松+条旋耕处理有利于降低小麦播种至冬前阶段的耗水量, 提高开花至成熟阶段的耗水量及其占总耗水量的比例。2009—2010 年度, 深松+条旋耕处理播种至拔节阶段 0~20 cm 土层贮水减少量显著低于深松+旋耕和旋耕处理, 拔节至成熟阶段 40~160 cm 土层贮水减少量显著高于条旋耕和旋耕处理。2009—2010 年度的各生育时期和 2010—2011 年度的苗期、开花期、灌浆期, 深松+条旋耕处理株间蒸发量显著低于深松+旋耕和旋耕处理, 与条旋耕处理无显著差异。深松+条旋耕处理开花至成熟阶段干物质积累量显著高于其他处理, 耗水量显著高于条旋耕和旋耕处理, 水分利用效率高于深松+旋耕和旋耕处理, 与条旋耕处理无显著差异, 而且籽粒产量最高, 是本试验条件下的最优耕作方式。

**关键词:** 耕作方式; 冬小麦; 耗水量; 蒸发量; 干物质积累量

## Effects of Tillage Regimes on Water Consumption and Dry Matter Accumulation in Dryland Wheat

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**Abstract:** The area of dryland wheat is large in Huang-Huai-Hai Rivers region, where grain yield of wheat was low and unstable because of deficient and variable precipitation. Conservation tillage is an important cultivation mode to stimulate crop production and has been a hotspot in cultivation research of winter wheat. Minimum tillage and no-tillage are believed to significantly increase grain yield and water use efficiency of dryland wheat. A field experiment was conducted to study the effects of tillage modes on water consumption and dry matter accumulation of wheat in hill area of Shandong Province in 2009–2010 and 2010–2011 growing seasons. Compared to strip rotary tillage (SR), rotary tillage after subsoiling (RS), and rotary tillage (R) treatments, strip rotary tillage after subsoiling (SRS) treatment was beneficial to reduce water consumption amount from sowing to pre-winter stage, increase water consumption amount from anthesis to maturity stage, and promote the ratio of water consumption after anthesis to the total water consumption. The water reduction amount in 0–20 cm soil layer was lower in SRS treatment than in RS and R treatments from sowing to jointing, while that in 40–160 cm soil layer was higher in SRS treatment than in SR and R treatments from jointing to maturity. In the whole growing period of 2009–2010 and seedling, anthesis, and filling stages of 2010–2011, the evaporation of SRS was lower than that of RS or R treatment, which was equivalent to that of SR with no significant difference. SRS treatment had the highest dry matter accumulation amount from anthesis to maturity stage. Compared to SR and R treatments, SRS treatment had higher water consumption amount and water use efficiency. There was no significant difference between SRS and SR treatments in water consumption and water use efficiency, but the grain yield was the highest in SRS treatment. Therefore, SRS treatment is considered as the best tillage treatment under the experimental condition.

**Keywords:** Tillage; Winter wheat; Water consumption amount; Evaporation; Dry matter accumulation amount

黄淮海地区旱地小麦种植面积较大, 仅山东省 就有 133 万公顷, 占全省小麦种植面积的 1/3, 小麦

本研究由国家自然科学基金项目(30871478)和国家现代农业产业技术体系(CARS-3-19)资助。

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Received(收稿日期): 2011-09-01; Accepted(接受日期): 2012-01-19; Published online(网络出版日期): 2012-02-13.

URL: <http://www.cnki.net/kcms/detail/11.1809.S.20120213.1108.019.html>