

## 施氮和垄膜沟播种植对晋南旱地冬小麦水分利用的影响

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## Effects of nitrogen application and ridge film furrow planting on water use of winter wheat in dry land of South Shanxi.

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- 摘要
- 参考文献
- 相关文章

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**摘要** 通过2008—2010年两年的大田试验,研究了基施氮、追氮和垄膜沟播种植对晋南雨养区冬小麦生育期0~2 m土层土壤水分、冬小麦产量和水分利用效率的影响.结果表明:不同处理下冬小麦生育期土壤水分变化趋势一致,表现为播前至返青期稳定升高,返青至抽穗期急剧降低,之后至成熟期又逐渐回升,其中返青期到抽穗期土壤耗水量最大.增施氮肥或追氮可增加土壤耗水量,试验年份生育期间土壤水分变幅较大的活跃层逐渐加深,水分变幅较小的相对稳定层也相对下移,追氮可显著提高旱地冬小麦产量.垄膜沟播种植可减少土壤水分损耗,提高水分利用效率,两年分别比传统种植模式高23.4%和39.1% ( $P<0.05$ ).垄膜沟播+追氮处理的小麦籽粒产量为 $3643 \text{ kg} \cdot \text{hm}^{-2}$ ,显著高于单一垄膜沟播处理和追氮处理,水肥耦合效应较好.

**关键词:** 旱地 冬小麦 追氮 垄膜沟播种植 水分利用效率

**Abstract:** A 2-year (2008-2010) field experiment was conducted to study the effects of basal dressing nitrogen, topdressing nitrogen, and ridge film furrow planting on the 0-2 m soil moisture status and the grain yield and water use efficiency of winter wheat in rain-fed area of South Shanxi Province. In all treatments, the soil moisture status during winter wheat growth period had the same change trend, being increased steadily from pre-sowing to revival stage and decreased sharply from revival stage to heading stage, and then increased gradually till maturity stage. From revival stage to heading stage, the soil water consumption was the most. Increasing nitrogen basal application rate or topdressing nitrogen increased the soil water consumption, widened the soil moisture active layer, and deepened the relatively stable layer. Topdressing nitrogen increased grain yield significantly; ridge film furrow planting decreased soil water consumption obviously. The water use efficiency under ridge film furrow planting was 23.4% and 39.1% higher than that under conventional planting system in 2009 and 2010 ( $P<0.01$ ). The grain yield under ridge film furrow planting plus topdressing nitrogen was  $3643 \text{ kg} \cdot \text{hm}^{-2}$ , which was significantly higher than that under single ridge film furrow planting or topdressing nitrogen, displaying a preferable water-fertilizer coupling effect.

**Key words:** dry land winter wheat topdressing nitrogen ridge film furrow planting water use efficiency

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