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轮作条件下免耕对黄土高原旱作土壤水分入渗特性的影响

Effects of no-tillage on dryland soil water infiltration characteristics under rotation in Loess Plateau

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中文摘要:

为明确免耕轮作对旱作农田土壤水分入渗时空特征的影响，2005－2010年，在内蒙古清水河县进行了3种轮作模式（燕麦-大豆-玉米，大豆-玉米-燕麦，玉米-燕麦-大豆）下免耕留低茬（NL）、免耕留高茬（NH）、免耕留低茬覆盖（NLS）、免耕留高茬覆盖（NHS）和常规耕作（T）5种耕作方式对土壤水分入渗特性影响的研究。结果表明：免耕、轮作，特别是两者的叠加效应能明显提高土壤入渗能力，其中免耕结合燕麦-大豆-玉米模式对土壤入渗性能的改善作用最好。当0～20?cm土壤质量含水率较高（低）时，土壤水分初始入渗率较低（高），而土壤水分稳定入渗率与质量含水率呈相同变化趋势，且随土层加深，土壤水分稳定入渗率整体呈降低趋势。轮作2个周期后NL、NH、NLS和NHS分别较T，土壤初始入渗率降低了18.60%、24.93%、27.31%和29.95%，土壤稳定入渗率提高了22.22%、34.61%、82.05%和104.70%。可见免耕轮作能明显改善土壤水分入渗特性。

英文摘要:

In order to investigate effects of no-tillage combined with rotation on the time-space variation characteristics of soil water infiltration in dry-farming land during 2005-2010, effects of conventional tillage (T) was compared with no-tillage with low stubble (NL), no-tillage with high stubble (NH), low stubble with mulching (NLS), high stubble with mulching (NHS) on soil water infiltration characteristics under three crop rotation patterns(oat-soybean-corn、soybean-corn-oat, corn-oat-soybean) in Qingshuihe county of Inner Mongolia. The results showed that no-tillage and rotation, especially the combined tillage measure improved the soil water infiltration capacity obviously and the effects of no-tillage with oat-soybean-corn pattern were best. When soil water content in 0-20cm soil layer was high(low), soil water initial infiltration rate was low(high), but soil water stable infiltration rate had the same trend with soil water content and the soil water stable infiltration rate decreased with the depth of soil layer increased. After two rotation cycles, the soil water initial infiltration rate of NL, NH, NLS and NHS decreased by 18.6%, 24.93%, 27.31% and 29.95% respectively, and the soil water stable infiltration rate of them increased 22.22%, 34.61%, 82.05% and 104.70% compared to that of T. So no-tillage combined with rotation can improve soil water infiltration characteristics obviously.

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