

研究论文

农牧交错带不同耕作方式土壤水分动态变化特征

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摘要 从耕作方式、覆盖和轮作3个因素系统地对苜蓿整个生育期土壤含水量进行了动态的观测研究, 结果表明, 干旱地区单纯的免耕在提高土壤水分含量上作用不太明显, 尤其是降低了表层土壤的含水量, 免耕只有在覆盖下, 才能真正起到增加土壤水分含量, 提高水分利用效率的作用; 而对于深松处理, 无论是覆盖还是不覆盖, 与传统翻耕处理相比, 土壤水分均明显提高; 同种耕作措施覆盖与无覆盖相比, 覆盖处理下土壤含水量明显高于无覆盖处理; 说明保护性耕作之所以能够提高土壤水分含量, 关键因素在于残茬覆盖; 同种耕作方式下轮作种植土壤水分含量与水分利用效率明显高于连作。可以看出, 从理论上轮作深松覆盖处理是当地应采用的最佳耕作方式, 然而, 由于当地缺乏覆盖材料, 因此, 轮作深松是目前当地最适合的耕作方式。

关键词 [农牧交错带](#) [保护性耕作](#) [土壤水分](#)

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Dynamics of soil water content under different tillage in agriculture-pasture transition zone

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Abstract The dynamics of soil water content under different tillage systems were studied throughout the growing period of oat (*Avena sativa* L.). The treatments included tillage (zero tillage, sub-soiling, and moldboard plow), residue cover (with and without mulch), and crop rotation (continuous cropping and crop rotation). The results indicated that soil water content and crop water use efficiency was improved under zero tillage with mulch. When crop residue was removed, soil water content under zero tillage was reduced, especially in the surface layer. Comparing to the moldboard plow, sub-soiling increased soil water content and storage, either with mulch or without mulch. For all the three tillage treatments, soil water content with mulch was significantly higher than that of without mulch. Furthermore, soil water content and crop water use efficiency under crop rotation was consistently higher than the continuous cropping. We concluded that sub-soiling with mulch was the optimum management system in this area. At present, however, a combination of crop rotation and sub-soiling is a viable option, since there is not enough crop residue available for mulching.

Key words [agriculture-pasture transition zone](#) [conservation tillage](#) [soil water](#)

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