少免耕模式对冬小麦花后旗叶衰老和产量的影响

Effects of minimum tillage and no-tillage patterns on flag leaf senescence after anthesis and yield of winter wheat

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中文摘要：

小麦开花后旗叶的生理活性对产量存在显著影响。为了研究少免耕耕作体系对冬小麦旗叶衰老状况的影响，采用4种土壤耕作模式（常规耕作秸秆还田、旋耕秸秆还田、耙耕秸秆还田、免耕秸秆覆盖）在山东龙口进行了3年田间试验，研究了耕作模式对小麦产量及花后不同时期旗叶超氧化物歧化酶(SOD)和过氧化物酶(POD)活性、丙二醛(MDA)和可溶性蛋白含量的影响。结果表明：与常规耕作秸秆还田模式相比，旋耕秸秆还田和耙耕秸秆还田模式旗叶衰老过程中活性氧清除系统的自动调节能力较强，SOD、POD活性变化幅度较常规耕作模式平稳；免耕覆盖模式小麦旗叶在蜡熟期MDA含量显著低于其他模式，而可溶性蛋白含量显著高于其他模式，表现出明显的贪青晚熟的特点。旋耕秸秆还田和耙耕秸秆还田模式产量与常规耕作秸秆还田差异不显著，免耕秸秆覆盖模式产量显著低于其他耕作模式。研究表明短期（1～3年）少耕耕作模式可以在该地区应用，而免耕覆盖则不适宜。

英文摘要：

There is obvious influence of the physiological activity of flag leaf after anthesis on the yields of winter wheat. In order to research the effects of minimum tillage and no-tillage patterns on yield and senescence of flag leaf of winter wheat, four tillage patterns were adopted in Longkou city, Shandong Province, China for three years. Four tillage patterns were as follows: conventional tillage with straw turnover (CS), rotary tillage with straw turnover (RS), serrated disk harrow tillage with straw turnover (HS), no-tillage with straw cover (NC). Effects of different tillage patterns on the activities of superoxide dismutase (SOD), peroxidase (POD) and the contents of malondialdehyde (MDA) and soluble protein of the winter wheat flag leaves after anthesis were analyzed. Results show that the automatic regulating ability of the active oxygen scavenging system of RS and HS patterns are stronger than that of CS. The activities range of SOD and POD of RS and HS patterns are stable. The content of MDA at dough stage under NC pattern is lower than that under other patterns, while the content of soluble protein under NC pattern is higher than that under other patterns, which represents the characteristics of delayed maturity. There is no significant difference between the yield of RS, HS and CS and the yield of NC is significantly lower than that of other tillage patterns. The researches show that RS and HS can be adopted in this region in short period within three years, while NC pattern is not suitable.

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