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农学—研究报告

气候变化影响下长江流域油菜产量模拟初步研究

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摘要:

为油菜主产区油料作物种植结构调整、合理布局以及制定适应气候变化的管理措施提供理论依据。以中国三大油料作物之一的油菜为代表，针对油菜主产区之一的长江流域的油菜生产，利用引进的澳大利亚APSIM-Canola油菜模型，结合英国Hadley中心的区域气候模式PRECIS，对SRES A2、B2 2种排放情景下油菜生产状况进行模拟。同时结合多元回归统计方法，分析长江流域气候变化对油菜生产已经造成和未来可能造成的影响，并提出可能的适应性对策。研究表明：（1）油菜雨养产量与关键生育时期（现蕾—抽苔期、抽苔—开花期）内辐射和温度呈显著的负相关，与降水呈正相关。（2）A2、B2气候变化情景下油菜单产均随时间呈降低趋势，21世纪80年代减产幅度最为明显，A2情景下近期（21世纪20年代）、中期（21世纪50年代）、远期（21世纪80年代）油菜产量波动呈加强趋势，且同一时期内A2情景下产量波动趋势均大于B2情景。（3）适当采用调整播种期和栽培方式、改良作物品种等适应性对策可有效降低油菜的减产趋势。

关键词： 长江流域

Study on Canola Yield Simulation in Yangtze River Region under the Impact of Climate Change

Abstract:

It is necessary to check the potential impacts of climate change on canola production in the future. As one of the three Chinese oil-bearing crops, canola has attracted more and more attentions currently primarily due to the growing importance as a bio-energy crop. Climate change and its impacts have brought great concern to canola production, and Yangtze River region is one of the major canola growing zones in China. We assessed canola production of Yangtze River region using regional climate model (PRECIS) and APSIM-Canola crop model. Rain-fed canola growing was simulated with present climate (BS) (1961-1990), and future (2011-2100) under two climate scenarios (A2 and B2). Combine with multiple regression statistics method, canola production effects which climate change has caused in the past and will possible cause in the future was analyzed. The results showed that: (1) Rain-fed canola yield has a negative relation with radiation and temperature, but positive relation with precipitation during squaring - bolting stage and bolting - flowering stage. (2) Future simulations indicated that canola yields per unit field under A2 and B2 were both show downtrend as time going, and the lowest value appeared in 2080-2089. The variability of Rain-fed canola yields showed a growing trend from 2020 to 2089, and the variability of canola yield under A2 was much larger than which under B2 during the same period. (3)Adaptive measurements can be used to relieve the trend of yield reduction such as modifying sowing date and cultivation manner, or changing cultivar of canola.

Keywords: Yangtze River region

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