基于CERES-Maize模型的华北平原玉米生产潜力的估算与分析

Estimation and analysis of maize potential productivity based on CERES-Maize model in the North China Plain

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中文摘要：

在对DSSAT4.0中CERES-Maize模型进行参数校正和验证的基础上，进一步利用华北地区具有代表性的10个气象站30年（1976～2005年）的气象资料以及华北地区典型的土壤数据展开模拟。结果表明，在一年一季的生产条件下，华北平原各地区玉米多年平均光温生产潜力为13.53～22.56 t/hm2；各地区玉米产量在4月下旬至6月中旬的播期范围内均呈随播期的延迟而增加的趋势，对这一趋势和各气象指标进行相关分析表明，在华北北部主要驱动因子是灌浆期平均日辐射量，而华北中南部主要驱动因子是灌浆期的温度。华北平原自北向南，优化播期呈逐渐推迟的趋势：北部怀来地区5月上旬播种较为适宜，北京、乐亭和天津地区以5月下旬至6月初播种产量最高；中南部以6月中上旬播种（夏播）较适宜。

英文摘要：

A field experiment with three nitrogen managements was conducted from 2005 to 2006 in Beijing Dongbeiwang experimental station to calibrate CERES-Maize model in DSSAT 4.0. Another two field experiments regarding irrigation amounts and sowing dates were conducted in 2006 to validate CERES-Maize model. After model validation, normal maize production and photothermal potential productivity were simulated by using 30 years weather data from 10 weather stations in the North China Plain (NCP). The results show that average photothermal potential productivity is in the range of 13.53 to 22.56 t/hm2 in the NCP under the condition of one crop one year. Maize photothermal potential yield increased by delaying sowing date in range of the end of April to middle of June, and the main driving factor of this trend was average daily radiation during grain filling stage in the north NCP, while that in the south and middle NCP was on daily temperature condition. There was a delaying trend about optimized sowing dates from north to south in the NCP. In the north NCP, optimized sowing date was around early May in Huailai region (40.23 oN Latitude), while it was late May in region of Beijing, Tianjin and Laoting (39.05oN～39.48oN Latitude). And in the south and middle NCP (35.34 oN～38.20 oN Latitude), maize sowed in early June could reach the maximum yield.

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