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论文

中原腹地气候变化对冬小麦产量的影响——以商丘地区为例

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摘要:

为探明气候变化对商丘地区冬小麦产量的影响,根据1991～2010商丘市气候资料和小麦产量资料,利用数学统计与Thornthwaite Memoriae模型,结合未来气候预测结果定量分析了气候变化对冬小麦产量的影响。结果表明,冬小麦产量整体上呈波动上升趋势;主成分分析表明,气温、降水量、蒸发量与极端温度为影响冬小麦产量的主要气候因子,蒸发量过大及极端低温对冬小麦生产不利。商丘地区"暖湿型"气候有利于冬小麦生产力的提高,"冷干型"气候对冬小麦生产最为不利;未来几十年内气候可能将向"暖湿型"变化,对商丘地区粮食作物产量的提升较为有利。

关键词: 气候变化 商丘 冬小麦 产量

Impacts of climate change on winter wheat yield in Central Planins of China:Case study of Shangqiu

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Abstract:

Global climate change has significant impacts on agricultural production.Climate variability adversely impacts crop production and imposes a major constraint on farming planning,mostly on how to enhance the yileds of winter wheat,across the world.Owing to the fundamental importance of food to human welfare and of climate to crop and livestock production,various investigations showed that agriculture has been a focus of research on the impacts of climate change on wheat yield.However,considering the recent investigations in the field of the impacts of climate change on wheat yield,many studies were focused on the climate change in large scale regions.Few studies have been done with respect to the impacts of climate change on wheat yields in small scale regions.Therefore,in order to determine the effects of the climate changes on winter wheat yields in the Central Plains,taking Shangqiu,Henan as a study area,the climate data and wheat yields of observation stations from 1991 to 2010 were used in analyses with principal component analysis,correlation analysis,multiple linear regression analysis and Thornthwaite Memoriae model.The prediction results in the future and possible increase extent of the climate productivity of winter wheat were discovered.The results showed that winter wheat yields increased with fluctuations in recent 20 years.The results of principal component analysis illustrated that the main factors affecting winter wheat yields were temperature,precipitation,evaporation and extreme temperature.Excessive evaporation and extreme low temperature had adverse effects on the winter wheat production.The warm-wet climate was beneficial to wheat production,while the cold-dry climate was detrimental to wheat production.In the future decades,the climate variation will present a warm-wet tendency,which could be favorable to the grain yields in the Central Plains,especially in Shangqiu.

Keywords: climate change Shangqiu winter wheat yield

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