

施氮量对超高产夏玉米产量及氮素吸收利用的影响

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Effects of nitrogen application on yield and nitrogen use efficiency of summer maize under super-high yield conditions

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摘要

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摘要 选用登海661 (DH661) 和郑单958 (ZD958) 为试验材料, 研究了超高产条件下施氮量对夏玉米产量、氮素利用及其转运规律的影响。结果表明, 随着施氮量的增加, 子粒产量、植株氮素总积累量和氮肥利用率先增加后降低。施氮量为N 240~360 kg/hm², DH661和ZD958产量分别达12172~15080 和12011~15360 kg/hm²; 而氮素利用率和氮肥农学利用率, DH661分别为10.6~23.1%和11.5~13.6%, ZD958分别为24.1~28.6%和9.5~11.4%; 植株氮素总积累量和氮肥利用率均达到最大。施N 240~360 kg/hm², 提高了营养器官中氮素转运量和花后氮素同化量, 可以有效调控开花前氮素转运及花后直接同化, 促进子粒氮素积累, 提高产量。在本试验条件下, 施 N 240~360 kg/hm²可提高氮肥利用率, 实现玉米高产。

关键词: 夏玉米 施氮量 产量 氮素利用

Abstract: The effects of nitrogen application rates on grain yield, nitrogen translocation and use efficiency under super-high yield conditions were studied in fields. Two cultivars of summer maize (*Zea mays* L.), Denghai 661 (DH661) and Zhengdan 958 (ZD958) were selected as experimental materials. The results show that the grain yield, amount of total nitrogen accumulation in plant and nitrogen recovery efficiency are increased at first, and then decreased with the increase of nitrogen application rates. The grain yields of DH661 and ZD958 reach to 12172–15080 kg/ha and 12011–15360 kg/ha under nitrogen fertilizer application rate of N 240–360 kg/ha. Under those nitrogen fertilizer application rates, nitrogen recovery efficiency and nitrogen agronomic efficiency of DH661 are 10.6–23.1% and 11.5–13.6%, and are 24.1–28.6% and 9.5–11.4% for ZD958. For the two summer maize cultivars total nitrogen accumulation and nitrogen recovery efficiency are the highest under nitrogen fertilizer application rates of N 240–360 kg/ha. Under those nitrogen fertilizer application rates, translocation efficiency and nitrogen contribution proportion of DH661 and ZD958 after the anthesis stage could be regulated effectively. As a result, nitrogen in grain and grain yield are improved. In conclusion, under this field experiment conditions, as far as grain yield and nitrogen use efficiency are concerned, the most optimal nitrogen fertilizer rates are N 240–360 kg/ha.

Keywords: summer maize nitrogen application rate yield nitrogen use efficiency

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