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Water limited stress at jointing stage on fresh waxy maize yield and its interactions with plant density under field conditions

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ABSTRACT

Background Limited research on waxy maize yield and commercial value in response to water-limited (WL) stress and its interactions with plant density (PD) in the field. Methods: In this study, we examined the effects on two water treatments the water-limited group, and the well-watered (WW) group at one location (Fangshan, China) for fresh waxy maize hybrid (JKN 2000), and three plant densities (3.75, 5.25, and 6.75 plants m⁻²) in 2017 and 2018 using a block design split randomly in the field. Results: fresh waxy maize ear yield, grain yield, and yield components were affected for all treatments after WL stress lasted more than 9 d at the jointing stage. Compared with the WW treatment, WL treatment significantly decreased the fresh ear yield by 4.95%, due to decreasing ear length in waxy maize. In contrast, fresh grain yield significantly reduced by 3.75%, largely because of decreasing kernel weight and numbers per ear. The optimal PD of fresh ear yield was 6.75 plants m⁻². Conclusions: across all plant densities, WW treatment significantly increased the ear length distribution percentage by 15.19%, which effectively expand the commercial value of fresh ears of waxy maize. We concluded that waxy maize yield and commercial value of single-ear could be enhanced by the application of WW treatment at the jointing stage under field conditions.

Keywords: Waxy maize; Yield components; Water limited stress; Plant height and ear height; Ear length

鲜食糯玉米的生长发育受到包括干旱和水淹等逆境的不利影响, 其产量及商品性状与水分胁迫密切相关。郑洪建团队与国内多家单位合作, 揭示了水分胁迫与栽培密度互作对鲜食糯玉米产量及其商业价值相关农艺性状的调控效应。研究人员发现, 鲜食糯玉米拔节期的水分亏缺, 可导致鲜穗产量降低4.9%, 鲜籽粒产量降低3.7%。理想水分条件下, 鲜食糯玉米大田栽培密度增加到4500株/亩, 仍可获得较高的鲜穗产量, 且其穗长比例平均增加19.2%, 有助于增益糯玉米鲜穗的商品价值。该研究相关结果为鲜食糯玉米生产区域农业产业结构调整提供了新的科学参考; 同时, 对于探索发展鲜食玉米带动精准扶贫, 延伸产业链、价值链也具有一定的实践意义。

【打印正文】



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