



四个带有标记性状的棉花 CMS 恢复系的主要农艺与光合生理特性

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Evaluation of Cotton CMS Restorers with Different Indicator Traits for Yield, Quality and Photosynthetic Physiological Characteristics

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摘要

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摘要 为了克服细胞质雄性不育恢复系恢复基因鉴定难和保纯难的问题, 选育了丛生铃恢复系、鸡脚叶恢复系、海岛棉恢复系和无腺体恢复系。对这 4 个标记恢复系进行了产量、品质和光合生理特性的比较。结果表明, 丛生铃恢复系的产量、品质和光合生理特性总体表现最优; 鸡脚叶恢复系具有早熟、通透好、烂铃少和纤维品质较好的特点; 海岛棉恢复系的纤维品质最优, 铃数最多; 无腺体恢复系除了棉副产品综合利用的优势外, 在光合生理特性、产量和品质性状上表现仅次于丛生铃恢复系。4 个恢复系的标记性状明显, 在三系杂交棉育种、制种和繁种中具有良好的利用价值。

关键词: 棉花 标记性状 恢复系 杂交棉制种

Abstract: Four cotton CMS (cytoplasmic male sterility) restorers with three indicator traits, okra leaf, glandless, and clustered boll, were developed to overcome the difficulties in determination of restorer gene and preservation of pure state in hybrid seed production. Three upland cotton restorers and one sea island cotton restorer were used in this research. Their yield, quality and photosynthetic physiological characteristics were measured and evaluated in cotton hybrid production at seedling, squaring, early flowering, middle flowering, boll opening, and boll harvesting stage. Compared to the three upland cotton restorers, there were the best fiber quality and the highest boll numbers per plant in the sea island cotton restorer with okra leaf indicator. Among the three upland cotton restorers, the restorer with clustered boll indicator had the highest boll weight and lint yield up to 790.32 kg·hm⁻², which were related to higher net photosynthetic rate and carbohydrate contents. And, prematurity and light permeation, which resulted in better lint quality, appeared well in the restorer with okra leaf indicator. For the restorer with glandless indicator, its appearance in yield and quality was second; moreover, its seeds were free of gossypol and suitable for human consumption. The indicator traits of the four restorers were very obvious, and had a favorable use value in preservation of pure state in hybrid seed production and parent seed reproduction. Taking example for the restorer with okra leaf indicator, we were able to distinguish the hybrid plants from selfed plants according to okra leaf indicator in the hybrid seed production.

Keywords: cotton indicator CMS restorer hybrid seed production

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