

研究论文

隐性长穗颈光温敏核不育水稻花粉育性与抽穗性状的相关性研究

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摘要 雄性不育水稻包颈是影响杂交种子生产的重要因素。隐性长穗颈(eui)基因具有减轻或完全解除雄性不育水稻包颈的作用。但不同播期的具隐性长穗颈基因的光温敏核不育水稻包颈程度变化较大,为了揭示影响这类不育系包颈程度变化的原因,本文以隐性长穗颈光温敏核不育水稻为材料,分析了花粉育性与穗颈节伸出剑叶叶鞘长度的关系。结果表明:在长日、高温不育条件下,长穗颈光温敏核不育水稻穗颈节伸出剑叶叶鞘的长度与花药中不育花粉总量呈显著正相关;在短日、低温可育条件下,当花粉可染率为0.01%~10.00%时,穗颈节伸出剑叶叶鞘的长度与花粉可染率呈极显著正相关,当花粉可染率大于10.00%以后,穗颈节伸出长度与花粉可染率正相关的显著性逐渐降低。穗颈伸出长度的增加主要由第1节节间伸长所致。在28~20℃人工梯度温度条件下,长穗颈光温敏核不育水稻和光温敏核不育水稻矮64S花粉可染率和花粉量变化规律相似,但长穗颈光温敏核不育水稻第1节节间长度增加的幅度明显大于矮64S。

关键词 [光温敏核不育水稻](#) [隐性长穗颈\(eui\)基因](#) [花粉育性](#) [穗颈伸出长度](#)

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Correlation Analysis between Pollen Fertility and Panicle Exsertion in P(T)GMS Rice with eui Gene

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Abstract Panicle enclosure is a typical phenotype of almost all male-sterile lines, which greatly reduces seed production of hybrid rice due to its blocking of normal pollination. Therefore, large amount of exogenous GA has to be used for inducing panicle exsertion. However, GA application not only increases the cost of seed production but also greatly increases the rate of seed germination on the panicle, resulting in decreased quality and shortened storage life of hybrid seeds. Elongated uppermost internode(eui) gene can promote elongation of the uppermost internode, which is a very useful genetical factor for eliminating panicle enclosure. However, the panicle enclosure in P(T)GMS (photo or thermo-sensitive genic male sterile) rice with eui gene shows substantial variation at different heading stages. In this paper, P(T)GMS rice was used to analyze the relationship between pollen fertility and panicle exsertion. The results were as follows: (1) Under condition of natural long day-length and high temperature, P(T)GMS rice with eui gene was male-sterile and the panicle exsertion increased with increasing of total sterile pollens in per anther (Table 1). Sheathed panicle was exserted when the number of total sterile pollens in per anther was more than 700. Regarding to length of each internode, the length of first internode increased as the same with the length of panicle exsertion. Little variation was recorded in length of other internodes and flag leaf sheath. Therefore, panicle exsertion is due to the elongation of first internode. (2) The pollen became stainable and panicle exsertion increased under condition of natural short day-length and low temperature (Table 2). When the ratio of stained pollen was 0.01% - 10.00%, significant correlation was found between stained pollen and panicle exsertion. As the ratio of stained pollen was higher than 10.00%, the correlation was decreased gradually (Fig.1). The length of first internode had the similar correlation with the ratio of stained pollen (Fig.2). (3) Similar correlation between pollen fertility and length of first internode in P(T)GMS rice with eui gene and Pei'ai 64S (PTGMS rice without eui gene) were recorded under temperature from 28℃ to 20℃ (Table 3). The panicle exsertion in P(T)GMS rice with eui gene at 20℃ was 24.7 cm longer than that at 28℃, while that in Pei'ai 64S only 12.3 cm. The length of first internode in P(T)GMS rice with eui gene showed more variation than in Pei'ai 64S.

Key words [P\(T\)GMS \(photo or thermo-sensitive genic male sterile\)](#) [Elongated uppermost internode \(eui\) gene](#) [pollen fertility](#) [panicle exsertion](#)

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