

研究论文

利用AFLP进行“甘蔗属复合体”系统演化和亲缘关系研究

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摘要 采用AFLP分子标记技术, 对“甘蔗属复合体”中4个属16个种的69份来自中国和澳大利亚的甘蔗种质资源材料进行系统演化和亲缘关系分析。2对AFLP引物共检测到173个标记, 其中172个为多态标记, 多态率达99.4%; 通过计算Jaccard相似性系数, 用UPGMA和PCA法构建了分子系统树和效应图。结果表明: (1)属间亲缘关系中, 甘蔗属与芒属较近, 与河八王属和蔗茅属较远, 而河八王属与蔗茅属较近; (2)甘蔗属内, 细茎野生种与其他种关系较远, 其中, 栽培品种与热带种关系较近, 中国种和印度种关系较近, 而大茎野生种自聚为1族, 与上述4种分离; (3)蔗茅属内, 除蔗茅种和滇蔗茅种外, 无论是中国斑茅(云南、海南)还是印度尼西亚斑茅, 都与蔗茅属其他种聚在一起, 其中与E. procerus的关系最近, 与E. bengalense和E. sarpet种次之; 由斑茅与这3个种构成的群体与由E. elephantinus和E. ravennae构成的群体相对分离, 形成了明显的2个组群。再次表明斑茅应列入蔗茅属, 建议我国甘蔗学者采纳国外分类命名(E. arundinaceus), 以能更好地开展斑茅的研究和杂交育种利用并与国际接轨; (4)蔗茅和滇蔗茅均没有聚类到蔗茅属类群中, 而分别独立位于系统树2大枝系上。蔗茅与甘蔗属亲缘关系较近, 与芒属亲缘关系次之, 与蔗茅属和河八王属关系较远; 滇蔗茅与河八王属亲缘关系较近, 与蔗茅属关系次之, 与甘蔗属和芒属关系较远。表明滇蔗茅(rockii)可能应该归入河八王属, 蔗茅(fulvus)可能应该归入甘蔗属。

关键词 [甘蔗属复合体](#) [系统演化](#) [AFLP](#)

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Assessment of the Phylogenetic Relationships within the “Saccharum Complex” Using AFLP Markers

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Abstract Amplified Fragment Length Polymorphisms (AFLP) markers were used to assess the phylogenetic relationships within the “Saccharum Complex”. Sixty-nine genotypes from China and Australia, representing sixteen species from 4 genera in the “Saccharum complex” were evaluated (Table 1). Two AFLP primer combinations were used to generate a total of 173 bands, of which 172 were polymorphic between all species (Fig.1); the frequency of polymorphism was 99.4%. Principal Component Analysis (PCA) and UPGMA clustering were undertaken using Jaccard similarity coefficient (Fig.2 and Fig.3). The results showed that, (1) among the 4 genera studied, Saccharum has the closed relationship with Miscanthus, followed by Narenga and Erianthus, while the two latter has the closed relationship comparatively; (2) in the Saccharum genus, S.spontaneum is the most diverse and different species, followed by S. robustum and then two branches, one containing cultivars and S.officinatum, and the other containing S.sinense clustered with S. barberi; (3) in the Erianthus genus, both arundinaceus from China and Indonesia clustered with the other Erianthus species, with the exception of E. fulvus and E. rockii. In this cluster, two branches were divided from six species, one containing arundinaceus clustered prior to E. procerus, followed by E. bengalense and E. sarpet, the other containing E. elephantinus and E. ravennae. From the result we also advise sugarcane researchers in China that the arundinaceus should be classified as Erianthus species to conform with overseas classification, and also for better utilization of this species; (4) both E. fulvus and E. rockii were not clustered with Erianthus but clustered loosely with Saccharum and Narenga species. Comparatively, E. fulvus has the closed relationship with Saccharum, followed by Miscanthus, but is distant from Erianthus and Narenga, while E. rockii is closed to Narenga and Erianthus, but is the most distant from Saccharum and Miscanthus. This study also infer that rockii could be classified as Narenga while fulvus to be as Saccharum.

Key words [Saccharum Complex](#) [Phylogenetic Relationships](#) [AFLP](#)

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