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# Deciphering Genetic Diversity in *Spathodea campanulata Beauv*. from South India Based On Randomly Amplified Polymorphic DNA Markers

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***Abstract*—** *The African tulip (Spathodea campanulata) is a monophyletic species native to tropical forests of sub-Saharan Africa belonging to family Bignoniaceae. Although its endemism in sub-Saharan Africa, it is listed as potential alien invasive species in Pacific, Indian and Caribbean, but also Singapore, Papua New Guinea and Australia. The expansion of its range from ornamental to invasive is being observed in South India. In this study, RAPD based DNA markers have been used to determine genetic diversity of the monophyletic species. About 14 populations were studied from 6 states of South India using 41 random decamer primers. The total number of 517 bands were scored which are generated by 41 primers producing 12.6 bands on an average per primer, of these 517 bands produced 379 were polymorphic showing 73% polymorphism revealing higher level of genetic polymorphism in the study population. The similarity coefficient ranged from 0.312 to 0.837 and the dendrogram constructed by the UPGMA based on Jaccard's similarity matrix farmed two clusters. In the present study, results showed the high degree of genetic diversity within the populations of S. campanulata supporting high degree of adaptation and its range expansion from ornamental to possible invasive species in South India.*

***Keywords*— Genetic diversity, Spathodea campanulata, invasion, South India, RAPD.**

## I. INTRODUCTION

The African tulip tree (*Spathodea campanulata*) is a monophyletic species native to tropical forests in a broad area of sub-Saharan Africa belongs to family Bignoniaceae. It's also known as fountain tree, scarlet bell flower tree, squirt tree, syringe tree in English and neerukayi mara or ucche kayi mara in the local Kannada language of Karnataka, India. It is planted as an ornamental tree for its attractive glossy deep green pinnate leaves and glorious orange scarlet flowers. *Spathodea* is endemic in Angola, Ethiopia, Ghana, Kenya, Sudan, Tanzania, Uganda, Zambia and exotic to Colombia, Costa Rica, Cuba, India, Jamaica, Puerto Rico, Sri Lanka, Zanzibar [1].

*S. campanulata* has been introduced pan-tropically for its ornamental value, it was introduced to India in 1800's [2]. The extensive fruiting and the heavy masses of wind-dispersed seeds credited the capacity of being invasive to the species. It is invasive in many countries like Pacific, Indian and Caribbean but also Singapore, Papua New Guinea and Australia. Removal of trees is highly recommended, particularly when they are in close proximity to natural forests and aquatic ecosystems [3].

*S. campanulata* grows naturally in secondary forests and prefers wet areas especially the borders of dynamic water resources. It may also appear as a pioneer species in the native range, such as it being one of the species that naturally colonizes grasslands in Uganda. But, it invades both abandoned agricultural land and closed forest being dominant acquiring the weed status [4,5] and is a weed in coffee plantations in Cuba[6]. It is reported as highly invasive in Tahiti, French Polynesia in cloud forests up to 1300 m [7]. In southern part of India, we have observed the preliminary invasion of *S. campanulata* in barren lands and borders of the forest lines.

Introduced species are generally expected to have low genetic diversity due to population bottlenecking of introduction process and founder effect. Low genetic diversity is expected to limit adaptability to the new environment there by limiting the evolutionary potential of introduced population. This relationship between genetic diversity and population viability, in contrast to the success of invaders over native species, constitutes an apparent paradox in invasion biology [8,9].