

## Breaking seed dormancy and genderwise dimorphic differentiation in *Garcinia gummi-gutta* var. *gummigutta* (L.) Rob.

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*Garcinia gummi-gutta* var. *gummigutta* (L.) Rob. is a polygamodioecious tree indigenous to India remained neglected even though they are highly valued in South Indian cuisine and in traditional systems of medicine. Poor seed germination and breaking the prolonged seed dormancy could achieve within 7 days by *in vitro* inoculation of  $\frac{3}{4}$  mature seed on to  $\frac{1}{2}$  MS basal medium. Genetic basis for sex specificities in sexually dimorphic plant species could identify by isozyme analysis of esterase using PAGE and DNA finger prints using RAPD-PCR techniques. RAPD screening using 35 random primers has identified the female specific KIT-C 14 and KIT-C 15 oligonucleotide decamer primers. Enhanced germination per cent with breaking seed dormancy and gender dimorphism at juvenile stage would bring about a revolutionary gallop for the extensive cultivation of Malabar tamarind or kodampuli under the homestead cropping system and massive afforestation programme.

**Key words :** Malabar tamarind, Sex determination, Seed dormancy, *In vitro* germination, Gel electrophoresis, Isozyme banding, RAPD analysis, *Garcinia gummi-gutta* var. *gummigutta* (L.)Rob.

### INTRODUCTION

**G***Garcinia gummi-gutta* var. *gummigutta* (L.) Rob. known in vernacular as Kudampuli or Malabar Tamarind is a handsome evergreen tree species confined to backyards. This perennial under exploited tree belonging to the family Clusiaceae (Lewis and Neelakandan, 1965) thrives best in the evergreen forests of Konkan, coastal and southern parts of Kerala and Western Ghats upto 180m in the Nilgiris (Varghese, 1996). It is commonly grown as miscellaneous stray spice tree in the homesteads of coastal saline belt of Kerala, Karnataka and Sri Lanka. Though the tree is much adapted to hill tops and plains its best performance is shown in river banks, valleys and coastal saline belts. The vast stretches of coastal saline belts of Indian sub-continent and the entire South East countries may be utilized for its commercial cultivation in future so as to support the indigenous pharmaceutical industry. The fleshy fruit rind of the tree has excited the scientific community as the richest natural source of potential anti-obesity plant metabolite (-) hydroxyCitric acid (HCA). It has the property to lower the blood lipid such as cholesterol and triglycerides. HCA inhibits the conversion of carbohydrates to fat without affecting Krebs' cycle through an enzyme, ATP citrate lyase (Watson *et al.*, 1965). In Ayurveda, it finds use in the treatment of rheumatism, bowel complaints, rickets and uterine contraction after delivery. High economic value of this therapeutically important perennial spices tree has

hindered the extensive cultivation due to prolonged seed dormancy, low germination percentage and polygamodioecious nature of the crop. The sprouted seedling yield 50-60 per cent males after 7-8 months of dormancy. The remaining 40 per cent of productive female trees may be inefficient proportion to revolutionise its cultivation in extensive scale due to want of its own seedlings for conventional soft-wood grafting. In the case of dioecious species, sex identification at the juvenile plants is of considerable importance to cultivation practices, since female plants are usually valued for commercial production of fruits and seeds. Growers never have a control over the manipulation of sex ratio of saplings to eliminate unproductive male trees at juvenile stage, thus causing a substantial lose of resources and productivity.

The last decade has witnessed an increasing number of research efforts directed at identifying and characterizing molecular markers and genes involved in plant dioecy (Paranis *et al.*, 2000; Kafkas *et al.*, 2001; Rajendran *et al.*, 2004; Rajendran *et al.*, 2005; Xu *et al.*, 2004; and Yakubov *et al.*, 2005). Modern DNA technology provides a variety of techniques to produce molecular markers. The RAPD assay is rapid, inexpensive, simple and used for identification of genderwise dimorphic differentiation. Of the estimated 25.0 lakhs angiosperm species, only about 6% (14,620 species) are dioecious (Kumar and Singh, 2008). Hence, the present study initiated for developing biotechnological tools to enhance