

# **POLLEN VARIABILITY STUDIES, INTERSPECIFIC HYBRIDIZATION AND MOLECULAR CHARACTERIZATION IN *VANILLA* SPECIES**

## **Executive Summary of Project Report**

UGC Minor Project

MRP(S)-0217/12-13/ KLCA034/UGC-SWRO

*Vanilla* is the only orchid to provide a fruit edible to humans and in doing so consistently provides its grower a wealth of challenges. *Vanilla planifolia*, which yields the vanilla of commerce, is native to Mexico and parts of Central America and the history of origin of cultivated vanilla suggests that the entire stock outside Mexico may be from a single genetic source. For the last 400 years, humans have been playing important role in the dispersal and spread of vanilla in the New World. Studies of divergence among species of agronomic importance have been receiving greater attention. The British introduced *Vanilla planifolia* into India about 200 years ago where five other species are native viz, *V. pilifera* Holt., *V. andamanica* Rolfe., *V. aphylla* Blume., *V. walkeriae* Wight. and *V. wightiana* Lindl. The objective of the project was to study the pollen variability among the species, produce interspecific hybrids between the species, and to characterize the variability among the species studied. Variations in the related species of cultivated vanilla were assessed. The species were cross-compatible and interspecific hybridization was successful between the different species studied. Preliminary molecular profiles led to demarcation of the species into 3 major groups. The presence of fragrance which attracts insects, coupled with signs of fruit set without hand pollination, holds *V. pilifera* as a potential candidate for breeding programmes, to overcome the problem of lack of natural seed set in vanilla. *V. aphylla* which was tolerant to *Fusarium oxysporum* and its crossability to cultivated vanilla can be utilized as a bridging species and to help wipe out diseases arising out of monoculture. Thus the present study reveals the presence of important agronomic characters for introgression into cultivated vanilla and which can be utilized to overcome major bottlenecks in vanilla breeding.

Genetic interrelationships studies, using RAPD profiles, among different species revealed that the leafless forms of vanilla, *V. aphylla* and *V. pilifera* formed a separate sub-cluster. All the other leafy vanilla types formed a separate sub-cluster. Interspecific hybridization has been reported and hence transfer of these desirable traits into cultivated vanilla, *V. planifolia*, may not be hindered. The advent of biotechnological tools, offers techniques for transfer of these characters into *V. planifolia*, thus making the dream of transforming vanilla into a fragrant, natural seed setting, disease tolerant commercially important orchid can be turned into a reality. Variations were assessed, however the species were cross-compatible and interspecific hybridization was successful.

## **PUBLICATIONS**

Minoo Divakaran, K. Nirmal Babu, P.N. Ravindran and K.V. Peter (2015) Biotechnology for micropropagation and enhancing variations in *Vanilla*. Asian Journal of Plant Science and Research, 5(2):52-62.

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