

## GENETIC IMPROVEMENT OF *HEVEA BRASILIENSIS*: SIXTY YEARS OF BREEDING EFFORTS IN INDIA

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The history of rubber cultivation and breeding in India that led to the country becoming a secondary centre of diversity of *Hevea brasiliensis* is reviewed. The starting of rubber cultivation in India dates back to 1878. This makes the base populations of rubber in India close to the original shipment of seeds brought from Brazil to South East Asia. *Hevea* breeding in India, initiated in 1954 has evolved over the years in technique and outcome. The impact of genetic improvement in this strategically important commercial crop of India has brought the country to the forefront in rubber productivity worldwide. The well planned and systematic conventional crop improvement programmes played the single most pivotal role in this process of creating large breeding populations and harnessing desired recombinants. The RRII clones evolved by the Rubber Research Institute of India enjoy almost 100 per cent adoption across the traditional and non traditional rubber growing environments of the country; thanks to their local adaptability and high yields. Early tappability has been achieved in the latest hybrids of the RRII 400 series, some of which are promising in timber characteristics too. Location-specific breeding, especially for the non- traditional rubber growing regions is now being addressed in the most appropriate manner by utilizing sources of resistance to biotic and abiotic stress from domesticated as well as wild germplasm. A multidisciplinary approach to breeding with farmer participatory research is the strategy followed. Divergent crosses of Wickham clones x Amazonian wild accessions have helped realize higher estimates of heterosis compared to that in the hybrids from earlier crosses. Biotechnological interventions like molecular breeding and genetic transformation are employed for specific purposes to support crop improvement programmes. Achievements in this area include development of the first transgenic rubber plant and a large repository of molecular markers to enable marker assisted selection for further shortening the breeding cycle in this perennial species. This review chronicles the developments in genetic improvement research in India over the sixty years and provides future perspectives as well.

**Keywords:** Clones, Conventional breeding, Divergent crosses, Molecular markers, Rubber yield, Stress tolerance, Transgenics, Wild germplasm.

### INTRODUCTION

Plant breeding had its inception in man selecting food plants with desirable traits and employing these as progenitors of subsequent generations which in turn resulted in the accumulation of valuable

traits over time. Modern plant breeding is the culmination of application of the principles of genetics and related disciplines through specifically developed modern technology towards achieving set objectives. The breeding of semi dwarf, high fertilizer