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GIC 2025 witnesses launch of India's first T2T Telomere to Telomere plant genome for Basmati rice and India's first T2T human genome

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T2T genome assembly closes previous sequencing gaps and includes near-complete assemblies for all the chromosomes

India’s first T2T plant genome Indian Punjab Basmati Rice project, which was taken up in collaboration with Central University of Tamil Nadu (CUTN), Thiruvarur was released at the 5th Genomics India Conference, (GIC) 2025, held between August 12 and 14 in Bengaluru.

Releasing the project details at the GIC 2025, organised by Genotypic Technology and the Indian Institute of Science (IISc), and co-organised by Dhitiomics Technologies and QTLomics Technologies on the theme “The Indian Genomics Journey” at the J.N. Tata Auditorium, IISc, Bengaluru on August 12, 2025, Dr Sudha Rao, Co-Founder, Genotypic Technology and Founder of Dhiti Omics Technology, pointed out that India's first T2T (Telomere-to-Telomere) plant genome for Basmati rice was developed in collaboration with Dr S Srivignesh, Assistant Professor of Horticulture at the School of Life Sciences, CUTN, Thiruvarur.

The sequenced Indian rice line is Punjab Basmati-3 (PB-3) which holds a historical and agricultural significance as a bacterial blight-resistant dwarf version of the traditional Basmati 386 variety and is now being used for marker assisted breeding programs.

Dr Sudha Rao further explained that the developed rice varieties are designed to be more resilient to climate change impacts, including drought and salinity. They also aim to improve resource efficiency, such as nitrogen use, and reduce methane emissions. This development is a major step for Indian agriculture, potentially leading to increased food production, reduced environmental impact, and enhanced farmer livelihoods.

Unveiling the details about India’s First Telomere-to-Telomere Human Genome of Sample 008, Dr Sudha Rao said that the T2T genome assembly closes previous sequencing gaps and includes near-complete assemblies for all the chromosomes, capturing highly repetitive regions and structural variants unique to Indian and South Asian populations. While tens of thousands of indian human genomes were sequenced by short reads and long reads, this is the first genome to be sequenced T2T and exclusively using Nanopore sequencing technology. In her address, she said that the research offers a

precise map for population genetics, customised medicine, and structural variation analysis in the Indian setting.

Dr Raja Mugasimangalam, CEO and founder of Genotypic Technology, added that this initiative provides fresh perspectives on the distinctive genetic makeup of the long-standing Kongu Vellala Gounder clan, an agricultural and land-owning group with centuries-old roots in the Kongu nadu area of Tamil Nadu. "This community's ethnogenesis ties them to migration and agricultural advancements in South India, with ties to the Ganges River, historic dynasties, and distinct clan structures," he added.