

India unveils genetic blueprint of bread wheat genome

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Genetic blueprint of bread wheat genome unveiled, last step before full genome sequence



Scientists from ICAR's National Research Center on Plant Biotechnology (NRCPB), New Delhi, Punjab Agricultural University (PAU), Ludhiana, and Delhi University South Campus (DU) in collaboration with International Wheat Genome Sequencing Consortium (IWGSC) have published a chromosome based draft sequence of the bread wheat genome in top international journal *Science* (18 July 2014). This is a moment of pride for the country, as it is a part of an international effort to decode one of the world's most important food crops.

India is entrusted with the responsibility of decoding wheat chromosome '2A', which alone has a genomic DNA code of about 900 million base pairs (or letters), that is about two and a half times the size of whole rice genome, and about one third of the size of the human genome. The full wheat genome is about six times the size of human genome. The Indian initiative was financially supported by the Department of Biotechnology, ministry of science and technology, government of India at a total cost of Rs 35 crore. Earlier, Indian scientists had helped crack the genetic code of rice and tomato as part of the international consortia and also succeeded in decoding the pigeon pea (Arhar) and chickpea (Chana) genomes entirely on their own.

Wheat was considered one of the hardest crop plants to decode due to its huge genome size of 17000 million base pairs, and the presence of three sets of highly similar chromosomes in the genome. However, technological advances made in recent years and availability of specialized genetic stocks developed during 1950s in wheat variety 'Chinese Spring' made it possible to isolate individual wheat chromosomes for sequencing. The chromosome-based draft sequence provides new insight into the structure, organization and evolution of the large complex genome of the world's most widely grown cereal crop. The decoding of wheat genome has identified more than 125,000 genes assigned to the individual wheat chromosomes.