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Novel genome editing technology aids faster improvement of agricultural crops

Genome editing continues to develop rapidly along with its myriad applications in animal, plant and human biology. CRISPR systems for genome editing simplify and accelerate plant breeding through introduction of heritable, multi-loci alterations in the plant genome, indistinguishable from the natural mutations. A significant bottleneck for widely applying genome editing in agriculture is unavailability of a universal transformation system which could be used across different crops and diverse germplasms. Many important crop species are recalcitrant to biolistic or agrobacterium mediated transformation of the CRISPR-tools. In species where transformation is possible, this can often be limited to specific germplasm pools making the application of CRISPR tools to elite breeding material the full utilization of genome editing in breeding challenging. Syngenta is a world leading Agriculture Company, and significantly supports research in different areas of genome

editing; including development of efficient CRISPR delivery systems for crops. To overcome the technical challenges related to crop transformation, Syngenta has developed a ground breaking technology known as HI-EDIT™ which enables simultaneous editing and haploid induction (HI) in diverse germplasm by a single cross. In HI-EDIT™ technology, pollen from a maize haploid inducer line containing CRISPR tool is used to cross a recalcitrant elite-line to generate haploids of the elite-line in the next generation. As a core process of HI technology, male genetic material doesn't get transferred to the offspring and causes removal of CRISPR tool along with the male genome and thus generates a possibility of faster and simplified regulatory approval of the HI-EDIT™ crops as an added advantage. This presentation introduces HI-EDIT™ technology in detail and also covers Syngenta's overall activity in the arena of applying genome editing for crop improvement.

Biography

Anindya Bandyopadhyay leads Genome editing (GE) program of Syngenta and his activities span from strategizing research activities for GE program, reviewing research proposals, supervising technology integration, collaborations and coordination with expert functions such as regulatory, stewardship and IP.

Previously Dr. Bandyopadhyay was a Group Leader and Scientist at International Rice Research Institute (IRRI), Philippines, where he led genome editing research and also worked as Deputy-coordinator for International C4 Rice Consortium funded by Bill and Melinda Gates foundation. At IRRI, Dr. Bandyopadhyay's lab was one of the early publishers of application of CRISPR-Cpf1 in plants.

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