

CEIPEX MU TOPIC 6A

Položka / Field	Obsah / Content
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CEIPEX RESEARCH TOPIC LEVEL2	Genomics & Proteomics of Plant Systems: Cytogenomics
NAME OF THE RESEARCH GROUP	Plant Cytogenomics
TOPIC	Retrogene Evolution in Brassicaceae: The Roles of Genomic Context and Polyploid History
ABSTRACT	Gene duplication is a major driver of genome evolution. Alongside whole-genome and segmental duplication, new genes can arise through retroposition: a processed mRNA is reverse-transcribed and inserted elsewhere in the genome, creating an intronless copy called a retrogene. While many retrocopies become inactive, others are retained and expressed, preserving ancestral functions or acquiring new ones. Yet retrogene evolution remains poorly understood in plants. BrassRetrogenes will conduct a large-scale comparative analysis of retrogenes across the mustard family (Brassicaceae). Using more than 50 chromosome-scale and telomere-to-telomere genome assemblies spanning diploid, diploidized mesopolyploid, and recent allopolyploid species, the project will develop and validate a retrogene-identification workflow and build a family-wide catalog. It will test how genome architecture, transposable elements, centromeric regions, and polyploid history shape the origin, distribution, and retention of retrogene sequences. BrassRetrogenes brings together comparative genomics, evolutionary genetics, bioinformatics, and transposable element biology. It will combine genome annotation, synteny, phylogenomics, substitution-rate analyses, and expression evidence. Public RNA-seq data, supplemented where needed by targeted sequencing of selected species, will help distinguish expressed retrogenes from inactive retrocopies. The project will produce an open comparative resource and a transferable analytical framework for studying RNA-mediated gene duplication. By integrating computational methods with analyses of genomic regions often overlooked in gene-centered studies, BrassRetrogenes will advance both methodological approaches and understanding of how new genes evolve in plants.
WEBPAGE OF THE RESEARCH GROUP	https://www.plantcytogenomics.org/