



## PhD position in plant comparative genomics

Applications are invited for a PhD position in the research group of [prof. Martin Lysak](#) (CEITEC, Masaryk University, Brno, Czech Republic; <http://www.plantcytogenomics.org>) to join project investigating the structure and evolution of *Biscutella* genomes (Brassicaceae). The project aims to establish high-quality chromosome-scale sequence assemblies of several genomes and analyze the process of post-polyploid diploidization and chromosomal rearrangements. This is a collaborative project between the Lysak group and group of [prof. Christian Parisod](#) (University Bern, Switzerland).

**Project outline:** Genome divergence is usually associated with chromosomal changes that mostly results from short indels, gene loss and duplication, chromosome rearrangements (CRs) and activity of transposable elements (TEs). Molecular events such as CRs, promoting the reduction of genome size and chromosome numbers (i.e. descending dysploidy), appear decisive for the evolution of plants undergoing recurrent whole-genome duplications. Genomic underpinnings and evolutionary significance of chromosomal restructuring however remain underexplored. We aim to sequence, analyze and compare genomes of nine *Biscutella* species (Buckler Mustards; Brassicaceae) differing by genome sizes (0.7 to 1.2 Gbp) and chromosome numbers ( $x = 6, 8, 9$ ). We will combine genome sequence data with long-range scaffolding and molecular cytogenetics to obtain accurate chromosome-scale assemblies and annotate them using transcriptomics data. Comparative genomics will then quantify small- vs large-scale restructuring events and how much they affect coding vs non-coding regions of chromosomes. This will not only identify underlying molecular mechanisms, but will further address the impact of gain vs loss of gene and TE sequences on genome size evolution and dysploid CRs during species diversification. Providing an unprecedented structural framework for comparative genomics, this work will offer concrete methodological advances and bring fresh conclusions of general interest for molecular plant breeders and evolutionary biologists regarding mechanisms and processes driving the evolution of chromosome number and genome size in land plants.

### Requirements:

Candidates should have strong theoretical background in comparative genomics, bioinformatics and experience with analyzing next-generation sequence data. We are looking for highly motivated individual open to frequent interactions with other lab members and members of our Czech-Swiss multi-disciplinary team.

**Anticipated start date:** January 2021 or upon agreement

Please send the application (including CV, motivation letter and the contact information of at least two references) by e-mail to [martin.lysak@ceitec.muni.cz](mailto:martin.lysak@ceitec.muni.cz).

### Information about Brno, Czech Republic

- The capital of South Moravian Region and the second largest city in the Czech Republic with a population of almost 400,000 people
- Modern, dynamic and fast-growing centre of industry, trade, science, research and innovation with business incubators and centres of excellence in science

**Masaryk University, CEITEC - Central European Institute of Technology**

- A city of universities with more than 86,000 students
- More than 10,000 researchers; 2,200 IF publications/year; 600+ PhD graduates/year,
- 500 mil. EUR of R&D investment per year, more than 350 companies with in-house R&D,
- City of Gregor Mendel, the founder of genetics; the prestigious Mendel Lectures series takes place in Brno since 2003 (lectures of the world's top scientists, including Nobel Prize winners),
- [Quality of life index in 2016](#)

**For further information about:**

- Lysak group, please visit [www.plantcytogenomics.org](http://www.plantcytogenomics.org)
- Faculty of Science, Masaryk University, please visit <https://www.sci.muni.cz/en>
- CEITEC, Masaryk University, please visit [www.ceitec.eu](http://www.ceitec.eu)
- CEITEC Welcome Office, please visit <https://www.ceitec.eu/welcome-office/t9794>
- Masaryk University, please visit [www.muni.cz](http://www.muni.cz)
- Brno, please visit <http://www2.brno.cz/index.php?lan=en&nav01=20608&nav02=20617>

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