
Special lecture featuring a distinguished guest



André Marques

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Breeding Research**

**"Sex without crossovers produces clonal-like offspring in
Rhynchospora tenuis"**

Meiotic recombination ensures accurate chromosome segregation and promotes genetic diversity by generating crossovers between homologous chromosomes. Although essential in most sexually reproducing organisms, recombination is variably regulated and can be absent in some lineages, a condition known as achiasmy. However, obligate achiasmy in both sexes of a sexual species has not been documented. Here we investigate *Rhynchospora tenuis*, a flowering plant with the lowest known chromosome number and inverted meiosis. Combining genomics with molecular experiments, we show that *R. tenuis* undergoes obligate, genome-wide achiasmy in both male and female meiosis. Despite normal early meiotic axis formation, synapsis fails, crossovers are undetectable cytologically and genetically, and univalents persist at metaphase I. Haplotype-specific accumulation of transposable elements generates segregation distortion favouring the transmission of larger, repeat-rich chromosomes. Sexual reproduction is nevertheless retained: fertilization yields viable seeds only when translocation-compatible gametes meet, indicating strong post-meiotic selection against incompatible homozygous combinations. As a result, all surviving offspring are genetically identical, effectively maintaining heterozygosity by sexual reproduction with parental genotype restitution mimicking clonal reproduction. We propose that recombination loss, a low chromosome number, inverted meiosis and selection for compatible gamete combinations together enable faithful segregation and clonal-like inheritance despite sexual reproduction. These findings blur the boundary between sex and clonality, linking genome architecture, recombination loss and transmission bias.

**The seminar will be held
on Monday 12th October 2026 at 15:00
in the Milan Hašek Auditorium at IMG**

(Institute of Molecular Genetics of the Czech Academy of Sciences, Vídeňská 1083, Prague 4)
