

Brassica repetitive elements

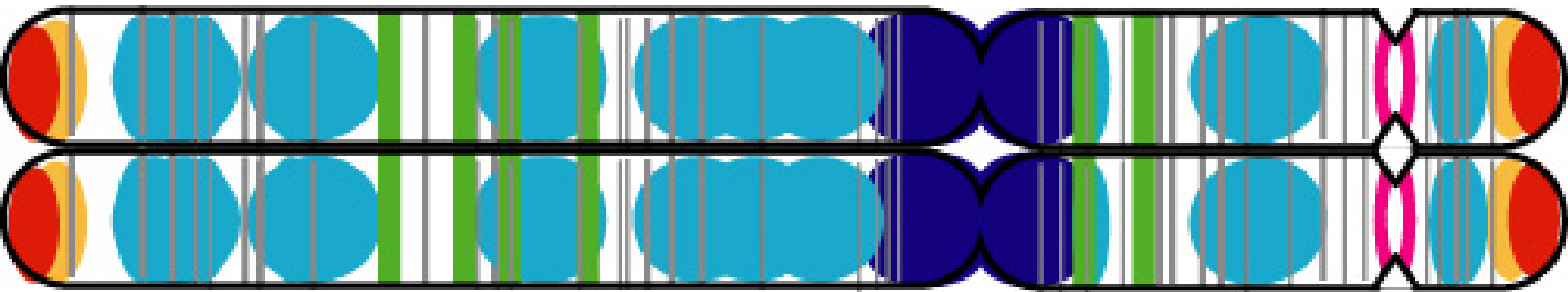
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Graham King – Rothamsted
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Niaz Ali

The Chromosome Model



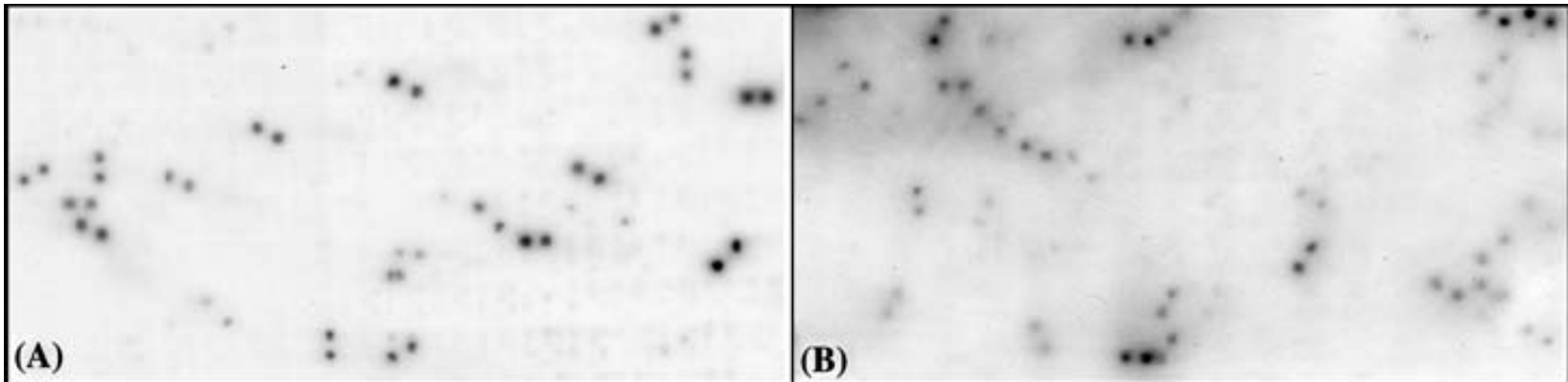
- Tandem repeats with known function
- ● Telomeric
 - Centromeric
 - rDNA
 - ● Intercalary tandem repeat families
 - Dispersed repeats including retroelements and SSRs
 - Genes and regulatory sequences

500 nm

- Schmidt & HH Trends Plant Sci

Brassica retrotransposons

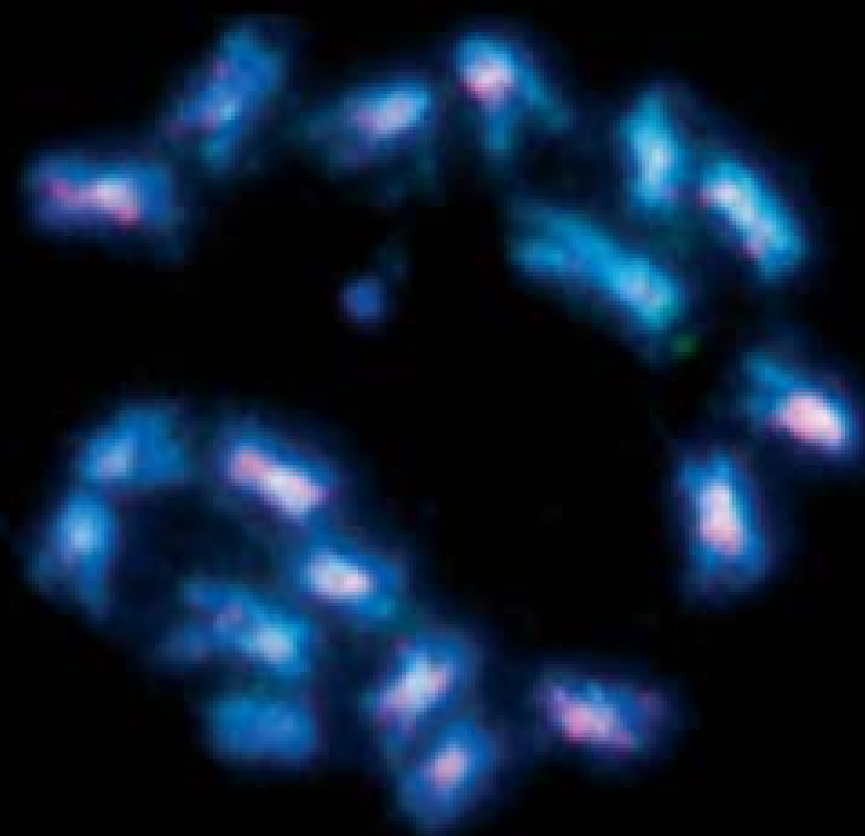
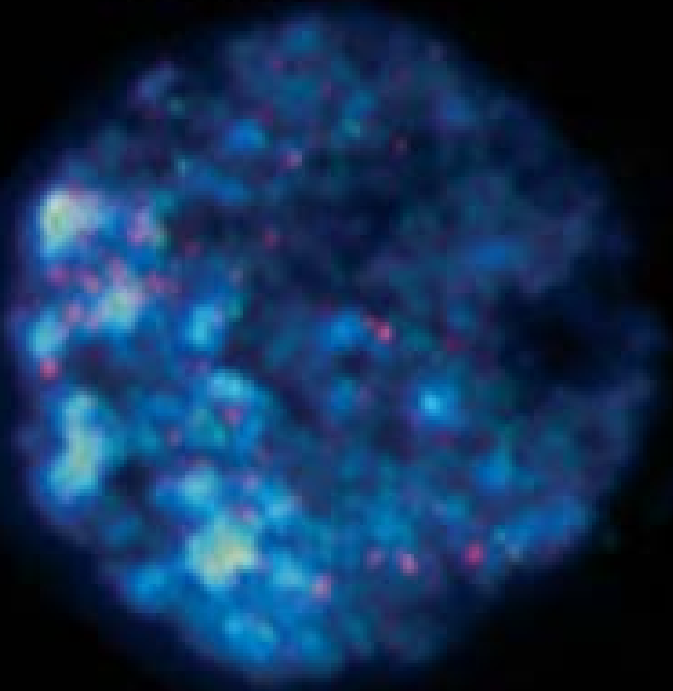
1088 BACs on the same high-density filter
copia RT probe (18) gypsy RT probe (25)



Minimal clustering within BACs, different retroelements have contrasting genomic distributions. Very few LINE elements; Total retroelements c. 15% of genome but diverse families of copia and gypsy each <1%. Analysis by BAC sequences, Genomic Survey Sequence (GSS), Southern and BAC filter hybridization, in situ hybridization

Alix et al. The genomic organization of retrotransposons in *Brassica oleracea*.
Plant Molecular Biology 59: 839

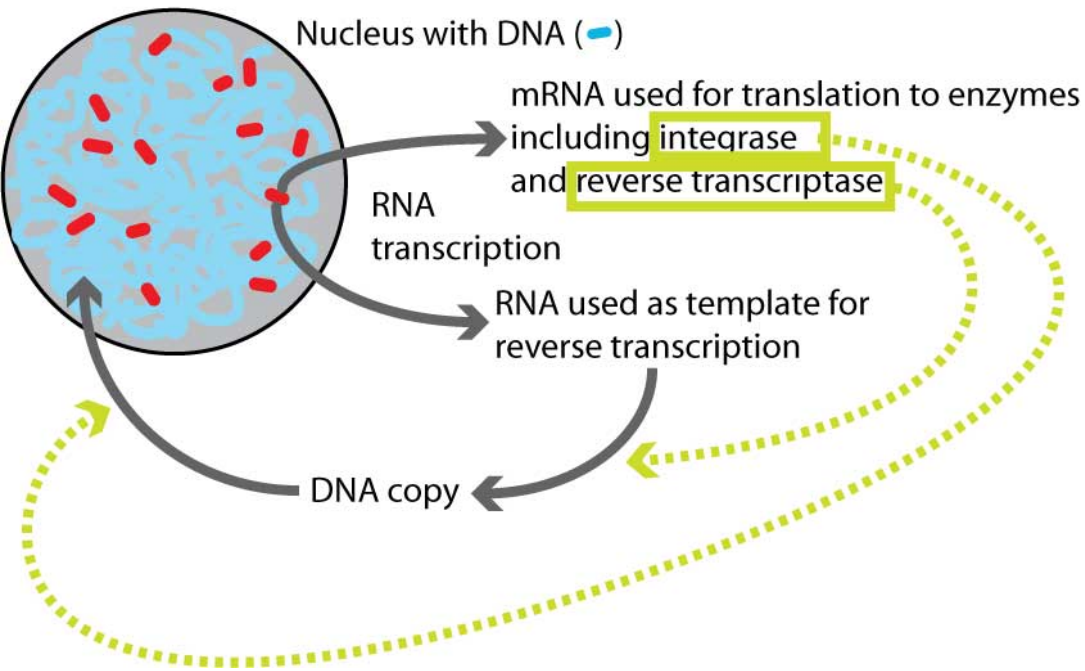
PLANT MOLECULAR BIOLOGY



 International Society for
Plant Molecular Biology
 Springer

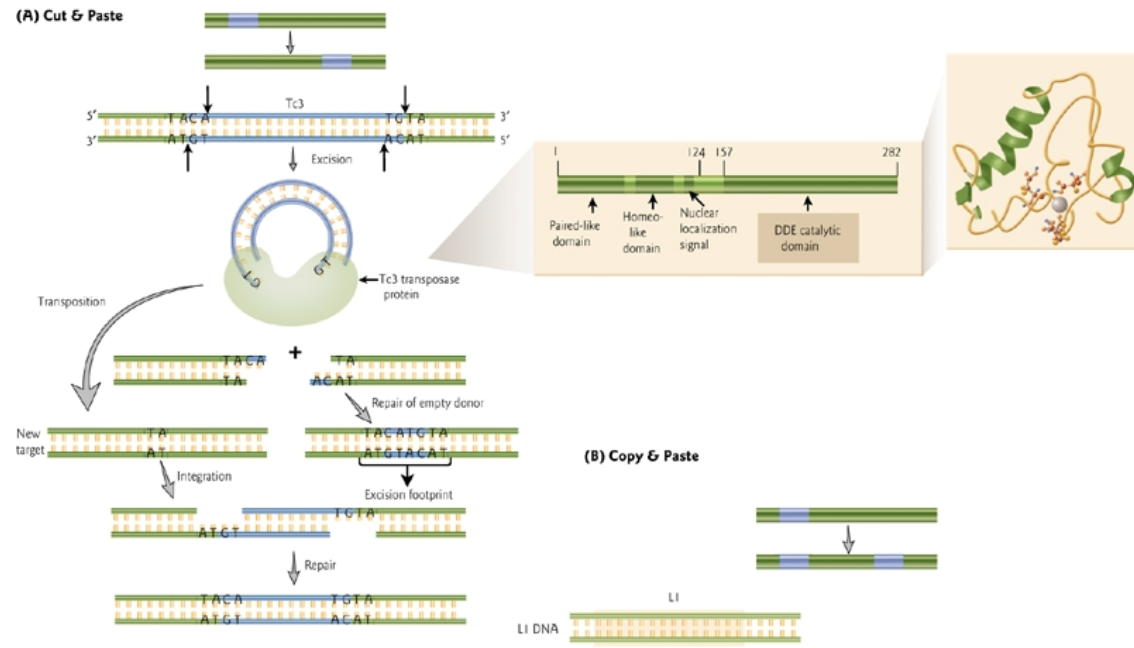
Retroelements in Brassica

Retrotransposons (-): The transposition cycle



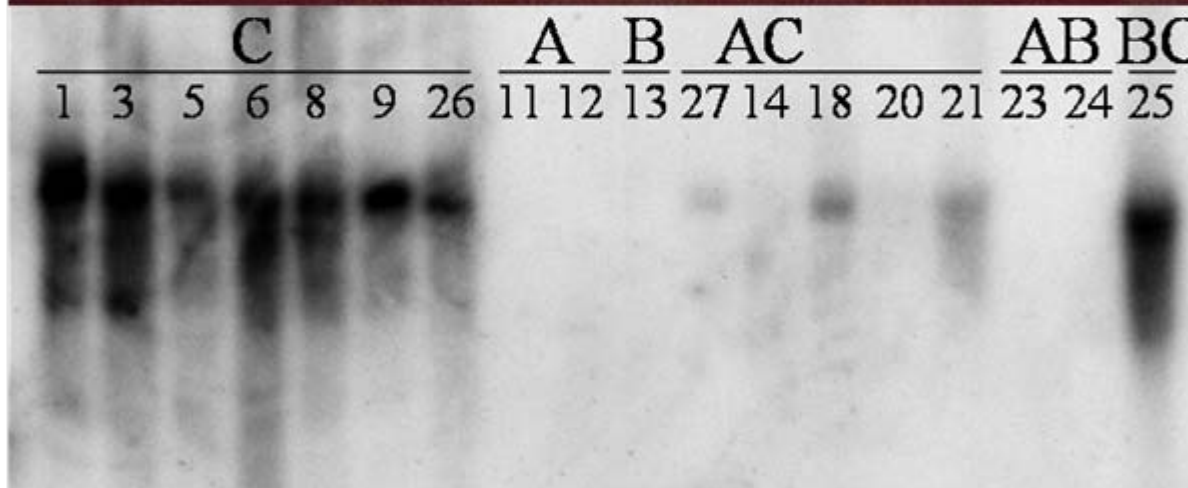
DNA transposons
Class II transposable elements
Cut-and-paste

Retrotransposons
Class I transposable elements
RNA intermediate



Genome Specificity of a CACTA (*En/Spm*) Transposon

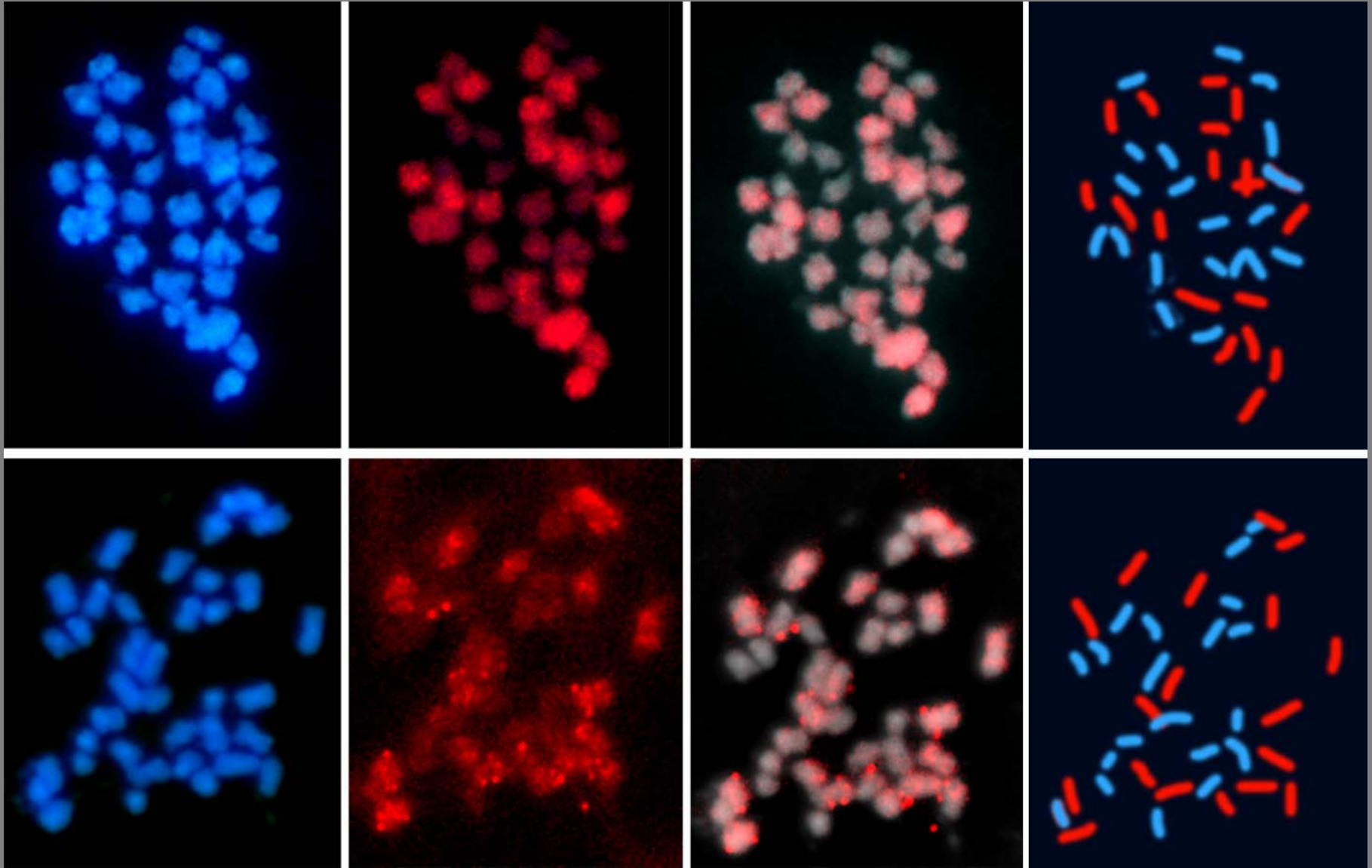
B. napus (AACC, $2n=4x=38$) *B. oleracea* (CC, $2n=2x=18$) *B. rapa* (AA, $2n=2x=20$)



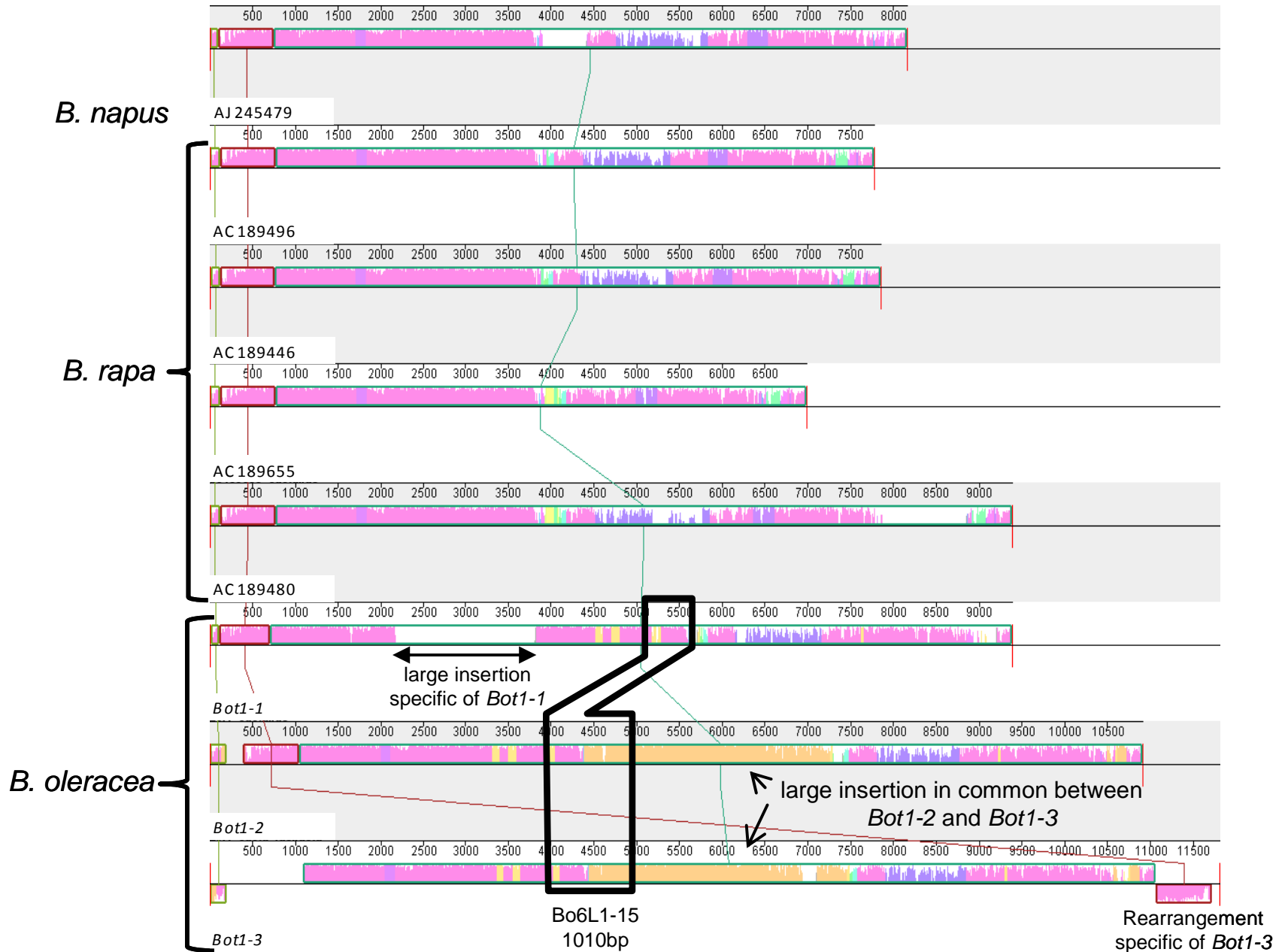
Genome Specificity of a CACTA (*En/Spm*) Transposon

B. napus (AACC, $2n=4x=38$) – hybridized with C-genome CACTA element red

B. oleracea (CC, $2n=2x=18$) *B. rapa* (AA, $2n=2x=20$)



Genome Specificity of a CACTA (En/Spm) Transposon



Genome Specificity of a CACTA (En/Spm) Transposon

- *Bot1* has encountered several rounds of amplification in the C (*B. oleracea*) genome only, playing a major role in the recent *B. rapa* and *B. oleracea* genome divergence
- *Bot1* carries a host S-locus associated *SLL3* gene copy; is the transposon associated with *SLL3* proliferation?

→ Transposons are a driver of genome and genome evolution