

## Comparative Transmission Genetics of Introgressed Chromatin in *Gossypium* Species

WAGHMARE Vijay N<sup>1</sup>, RONG Jun-kang<sup>2</sup>, ROGERS Carl J<sup>2</sup>,

BOWERS John E<sup>2</sup>, PATERSON Andrew H<sup>2</sup>

(1. *Division of Crop Improvement, CICR, Nagpur, India*; 2. *University of Georgia, Athens, Georgia, USA*)

Wild relatives and un-adapted germplasm of crop species harbors several adaptive traits. Introgression of genes for economic and adaptive traits brings in novel genetic variation into the gene pools of many crops including cotton. We compared patterns of introgression into polyploid *Gossypium hirsutum* from its sister *G. tomentosum*, and from *G. barbadense* representing a different clade tracing to the same polyploidization. Advanced-generation populations, resulting from recurrent backcrossing to *G. hirsutum*, show a paucity of *G. tomentosum* alleles and severe deficiencies of homozygotes. Multi-locus interactions tend to preserve *G. tomentosum* haplotypes at groups of unlinked loci, however an unusual region that is preferentially introgressed occurs largely in recombinant haplotypes. Some determinants of skewed *G. tomentosum* chromatin transmission are polymorphic among different *G. hirsutum* genotypes. Data indicates somewhat stronger resistance of *G. hirsutum* to introgression from closely-related *G. tomentosum* than from more distantly-related *G. barbadense*, with only limited correspondence between *G. hirsutum* chromosomal regions that are resistant to introgression from the two species. Resistance to introgression from both donors occurs in chromosomal regions where short terminal inversions appear to differentiate among the three tetraploids. *G. tomentosum* showed roughly equal introgression into the two polyploid subgenomes but a preponderance of multi-locus interactions within the Dt subgenome; while *G. barbadense* introgression was enriched in the At subgenome and involved predominantly intergenomic interactions. Complex transmission of introgressed chromatin has implications for both evolutionary biology and crop improvement.