

Comparative Genetics of Floral Morphology in Diploid and Allotetraploid *Gossypium*

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The cultivated *Gossypium* A genome diploid species *G. arboreum* and *G. herbaceum* and the allotetraploid species *G. hirsutum* and *G. barbadense* share common morphology for various floral traits, which offers an ideal system in which to investigate genetic mechanisms that differentiate diploid and tetraploid genomes. For example, knowing how a single phenotype behaves in the diploids, and comparing the same trait with different dosage effects in the tetraploids, may provide a means to study inter- and intra-genomic interactions in the polyploid genome. We performed genetic mapping of eight floral morphological characters that segregated in interspecific diploid (*G. arboreum* × *G. herbaceum*) and tetraploid (*G. hirsutum* × *G. barbadense*) F₂ populations. Most floral traits were governed by QTLs that explained less than 27% of the phenotypic variance. Phenotypic correlations among some traits and clustering of associated QTLs at specific chromosomal regions indicated pleiotropy or close genetic linkage. While some QTLs mapping to the diploid A genome showed putative orthologs in the tetraploid At and Dt subgenomes, others revealed interesting differences between ploidy levels that suggested possible subfunctionalization of homoeologous floral QTLs in the tetraploid.