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Collinearity analysis of allotetraploid *Gossypium tomentosum* and *Gossypium darwinii*

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ABSTRACT. *Gossypium tomentosum* and *G. darwinii* are wild allotetraploid cotton species, characterized by many excellent traits, including fiber fineness, drought tolerance, and *Fusarium* and *Verticillium* wilt resistance. Based on the construction of F_2 linkage groups of *G. hirsutum* x *G. tomentosum* and *G. hirsutum* x *G. darwinii*, two genetic linkage maps were compared. As a result, we found a total of seven inverted fragments on chr02, chr05, chr08, chr12, chr14, chr16, and chr25, and three translocated fragments on chr05, chr14, and chr26. In addition, comparison of the inverted and translocated fragments revealed that the orientation of four of seven markers in *G. tomentosum* were consistent with *G. hirsutum* or *G. raimondii*. The orientation of one of seven inverted markers of *G. darwinii* was consistent with *G. hirsutum*, and the orientation of one of three translocated markers of *G. tomentosum* was consistent with *G. raimondii.* These results

indicate that, in comparison to *G. darwinii*, *G. tomentosum* has a closer genetic relationship to *G. hirsutum*. These findings will be important for our understanding on the genome structure of *G. tomentosum* and *G. darwinii*, and set the scene for further in-depth genome research such as fine mapping, tagging genes of interest from wild relatives, and evolutionary study.

Key words: Cotton germplasm resource; Allotetraploid cotton; *Gossypium tomentosum*; *Gossypium darwinii*; Linearity relationship