Uniqueness of the *Gossypium mustelinum* Genome Revealed by GISH and 45S rDNA FISH

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Gossypium mustelinum [$(AD)_4$] is one of five tetraploid species in *Gossypium*. Three pairs of nucleolar organizer regions (NOR) in $(AD)_4$ were detected by FISH with 45S rDNA as a probe, they also were observed with genomic DNA (gDNA) from *Gossypium* D genome species as probes. Of the three NORs or GISH-NORs, one was super-major and other two were minor, which was distinctly different from other tetraploid cottons. The super-major rDNA locus accounted for about one half of its chromosome at metaphase, and its middle region was absent or greatly diminished. Flanking by brightly fluorescing segments, this middle region of the NOR or GISH-NOR was similar in appearance, at least superficially, to a centromere. The other unique nature of $(AD)_4$ FISH was that all GISH-NORs were located in A sub-genome, which was different greatly from remaining AD cottons, in which there was one in A and two in D sub-genomes. The greatly abnormal sizes and sites of $(AD)_4$ NORs or GISH-NORs indicates a specially possible mechanism for 45S rDNA diversification following $(AD)_4$ speciation, which interlocus converted evolution or even the evolution between inter-sub-genomic loci takes advantage among many explanations. Comparisons of GISH intensities and GISH-NOR productions with gDNA probes between A and D genome shows that, the better relationships of $(AD)_4$ with A genome is based on the sense of agronomy and economy importance, whereas its better relationships with D genome is based on its natural characteristics, or evolution, the natural history.

Key words: *Gossypium mustelinum*; cotton; *in situ* hybridization; nucleolar organizer region; chromosomes; genome