

NUCLEAR DNA CONTENT OF *GOSSYPIUM* SPECIES

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Abstract

The nuclear DNA content of the species within the *Gossypium* genus is poorly described. Existing estimates for members of the genus are inconsistent or non-existent. This information is useful in establishing phylogenetic relationships, and it is essential in genome mapping to serve as an estimation of percentage of genome coverage by the maps. To resolve the ambiguity we obtained estimates of nuclear DNA content *Gossypium* based on comparisons with known reference species. Seeds of 52 *Gossypium* species/accessions were germinated in the dark and intact nuclei isolated from the young etiolated seedlings. The nuclei were stained with propidium iodide and passed through a flow cytometer that provided a measure of UV induced fluorescence of the dye intercalated into the DNA of each nucleus. The nuclear DNA content was estimated by comparison with the fluorescence of nuclei isolated from rice, maize and barley, standards for which the DNA content is known. Nuclear DNA content values obtained for the *Gossypium* species support current genome delineations with the genus. The mean DNA content for six *G. hirsutum* accessions was 4.8 pg (2C). The mean DNA content for nine K-genome species, for which no data were previously available, was 5.3 pg (2C). Genome size for the AD genome is closely additive of the genome sizes of the two species most closely related to the ancestral progenitors (*G. herbaceum* and *G. raimondii*). However, advanced generation synthetic allotetraploids [2(A₂D₈), 2(A₂D₃), 2(F₁AD₁)] did not exhibit the same degree of additivity as the natural allotetraploid. Instead, synthetic allotetraploids had approximately 10% more DNA than their constituent genomes measured separately.