

**Δ -CADINENE SYNTHASE GENES
IN COTTON GENOMIC DNA**

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Abstract

The first committed step in the synthesis of terpenoid compounds that are made in cotton is catalyzed by the enzyme δ -cadinene synthase (CDS). Since these terpenoids include gossypol and its precursors that have antimicrobial and insecticidal properties, CDS is probably the most important enzyme involved in regulating chemical defenses in cotton. As is the case for many genes involved in host defense, a family of cadinene synthase genes is present in the cotton genome. At least five clones with homology to CDS were identified in *G. hirsutum* BAC library by hybridization to a cDNA clone from *G. arboreum*. The CDS inserts in these five BACs have been shown to differ by RFLP analysis. Also, pairs of PCR primers designed to amplify various 5' segments of previously cloned CDS genes differ in the ability to amplify sequences in the 5 BAC clones. Use of a PCR based system (GenomeWalker™) to clone a portion of the promoter sequence from one CDS-containing BAC revealed little homology to the previously cloned promoter from *G. arboreum*. At least one CDS gene is highly induced in steel tissues following exposure to fungal wilt pathogens, but CDS expression shows developmental regulation in other tissues, including seeds. Sequences of the promoters and 5' regions of each of the unique BACs will be useful in deciphering which CDS gene or genes are activated in specific tissues and/or in host defense, and thus for designing constructs for specific sense or antisense expression.