The chloroplast genome exists in multimeric forms
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Xing-Wang Deng,* Rod A. Wing,† and Wilhelm Gruissem*


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*Department of Botany, University of California, Berkeley, CA 94720
†University of California, Berkeley-United States Department of Agriculture Plant Gene
Expression Center, 800 Buchanan Street, Albany, CA 94710

Abstract
Chloroplast DNA conformation was analyzed by pulse-field gel electrophoresis. We found that
spinach leaf chloroplast DNA molecules exist in at least four distinct forms with the apparent
molecular weights of monomer, dimer, trimer, and tetramer. Two-dimensional gel analysis of
DNA after UV nicking and in the presence of ethidium bromide indicates that they are not
isomers that differ in superhelical density. DNA gyrase decatenation analysis demonstrates that
the majority of the DNA molecules are oligomers rather than catenanes. The relative amounts of
monomer, dimer, trimer, and tetramer forms, quantitated by molecular hybridization, are 1, 1/3,
1/9, and 1/27, respectively, and do not change during leaf maturation. The possible
mechanisms of chloroplast DNA oligomer formation are discussed.