CHARACTERIZATION OF SEED STORAGE PROTEINS IN COTTON

Aslam Tawhid
Louisiana State University
Baton Rouge, LA
Michael Pillay
IITA
Ibadan, NIGERIA
Gerald O. Myers
Louisiana State University
Baton Rouge, LA

Abstract

Protein migration in SDS-PAGE is primarily a function of molecular weight (MW=s) of their reduced, dissociated peptide chains. The objective of the present study was to compare the seed storage protein-banding patterns of 10 different tetraploid and 2 different diploid species of *Gossypium.*

Seeds were soaked overnight in distilled water. Seed coats of individual degermed seeds were then removed, freeze dried, ground and defatted with hexane. Seed storage proteins were prepared by diluting the protein solution with a 2X SDS sample buffer solution (Sigma Chemical Co., St. Louis, MO). 20 µl samples were loaded into wells on a Protean II vertical gel apparatus (Bio-Rad, Hercules, CA). SDS-PAGE electrophoresis was run for 5 hours at a current of 35mA. After electrophoresis, the gel was placed into a fixative solution of Methanol and Glacial acetic acid for 4 hours. Staining was done overnight followed by destaining using several changes of the fixative solution. Destaining was terminated when bands on the gel become clear.

Comparative electrophoretic investigation of buffer soluble seed storage proteins revealed numerous common features in the banding patterns of all *Gossypium* species though qualitative and quantitative differences that distinguish one species from another were evident. Unique qualitative variations were apparent in cultivar A1-50 (*Gossypium herbaceum*) and cultivar A2-85 (*Gossypium arboreum*) as compared with other *Gossypium* species studied. In A1-50, an intense band with *Rf* 0.684 was lacking (as seen in species of *Gossypium hirsutum* and *Gossypium barbadense*); however, a thin band with a *Rf* 0.669 was observed. Further, an additional intense band with *Rf* 0.869 was seen only in seeds from A1-50 (*Gossypium herbaceum*). In the cultivar A2-85 (*Gossypium arboreum*), the band with *Rf* 0.684 was absent as in cultivar A1-50 (*Gossypium herbaceum*), whereas, a band with *Rf* 0.661 was relatively more intense than in other species of *Gossypium* tested in this study. Finally, a band with *Rf* 0.454 in GB 505 (Gossypium *barbadense*) is relatively more intense than that of other cultivars/species analyzed. The observed variations in protein banding patterns among different species of cottonseed could provide a basis for analyzing relationships between diploid and polyploid species. This study suggests that rapid electrophoretic characterization of cotton seed storage protein could be useful tool in such applications as seed production, selection in breeding programs and species fingerprinting.

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 2:1475-1475 (1998)
National Cotton Council, Memphis TN