Cotton Germplasm Collections: Opportunities and Challenges

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According to an FAO report in 1996, 49000 cotton genotypes are being maintained in germplasm collections worldwide. Of these accessions, approximately 67% reside in the six largest collections. Identification of mutual opportunities and challenges faced by these germplasm banks could result in major benefits to the international research community. A primary goal of all germplasm collections always has been the expansion and improvement of the genetic diversity residing within them. This goal has become more problematic as collecting from native habitat has become more difficult due to habitat loss. International agreements, though created to benefit the signatories, have been cited by some collections as a barrier to collecting in foreign countries. In recent years exchanges between germplasm collections have become increasingly important as a means to increase diversity within collections. However, this activity also has contributed to duplication and redundancy within collections. Adequate characterization can ameliorate the problem of duplication within collections, and molecular techniques offer great promise for characterizing diversity residing in a collection. Currently projects are underway, with varying levels of cooperation between collections, to develop core molecular marker sets for molecular characterization, and several targeted, limited scope characterization studies have occurred. Another activity that is pursued by many collections is the evaluation of germplasm. Germplasm evaluation (as opposed to characterization) is an expensive, labor intensive activity that often requires multiple environments for adequate results. As a result, this activity lags behind in collections. Both the U. S. and China have identified this activity as needing greater emphasis and resources. In a survey conducted by China in 2000, the number one recommendation was the strengthening of characterization and evaluation efforts. This recommendation has been echoed by the Crop Germplasm Committee of the U. S. collection. Great opportunities exist for cooperative efforts between collections through continued germplasm exchange and collaborative molecular characterization studies. Collaborative evaluation efforts and shared information from these efforts could benefit collections. Efforts to link databases of the various germplasm collections could have significant payoffs. Duplication of germplasm, though undesirable within a collection, provides a safety net when it occurs between collections. Planned duplication offers greater safety for all collections.