VARIETY SELECTION - INTERPRETATION OF DATA

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Abstract

In recent years the number of seed companies and entities offering commercial cotton varieties has grown, as has the number of cotton varieties available on the market. These increases are partly due to the advent of transgenic technology and intense competition in the cotton seed business. These increases have resulted in more choices of cotton varieties for producers, and also increased activity in field development and testing of varieties. Therefore, there is no shortage of available cotton variety trial information. In addition to Official Variety Tests (OVTs) conducted by universities, possible sources of information could be research and extension on-farm trials, extension demonstrations, company development trials, germplasm screening tests, farmer and consultant trials, and simply testimonials. These various sources can and will exhibit a wide variation in the number of entries, agronomic management, plot size, replication, seedcotton handling, ginning, and reporting of results. Therefore, a thorough understanding of how variety trial results should be interpreted and assimilated is one of the keys to making an informed variety selection decision.

Replication in any field trial is important for two primary reasons; 1) minimizing the effect of natural field variation, and 2) helping to determine the repeatability of the results. Without some form of replication, individual cotton variety trial results become difficult to interpret. Replication allows for some statistical analysis of an individual trial to determine if observed differences are real and repeatable. This fact does not totally invalidate non-replicated trials, nor make all replicated trails reliable. Non-replicated data should be viewed in light of other surrounding trials and compared with replicate results as much as possible. Conversely, even where replication is employed, variation in the results may be such that few statistically valid differences can be discerned. In the latter case, some valid comparisons may be possible, but caution should be exercised in making all pair-wise comparisons of varieties in the trial.

Cotton OVTs have historically been viewed as very important and valid pieces of variety trial information due in part to their relatively controlled environment and replications. The quality of cotton OVTs, however, can be compromised by the aforementioned tremendous increase in available cotton varieties. As entry numbers increase, precision often decreases if plot sizes and replication are kept constant. Cotton OVTs still have value because they evaluate many varieties, but paired comparisons can often be imprecise. No one data set, therefore is perfect for evaluating varieties and as many sources of information as possible should be considered while taking into account the limitations and attributes of certain trial designs and methods.

In large plot experiments, which are usually conducted on-farm, replication is important, but plot size should be considered as well. Long, narrow plots provide more reliable data than larger, wider, plots. The reason is that long, narrow plots have the advantage of assessing multiple varieties across field variation while providing the least amount of variation in adjacent plots. These trials are often limited in their number of entries, but often provide the most reliable paired comparisons among varieties.

Variety trial results almost always report yield, and most will report lint percent, and some combination of fiber properties. The relative differences within a trial are more important than the absolute numbers. Yield can be high or low depending on the environment. But, the relative differences among varieties for yield and fiber properties are of more interest in determining the suitability of a variety for a given environment. Some trials also report a loan value and gross return per acre for varieties. These data should be approached with caution for a number of reasons. It is virtually impossible to defoliate and harvest a trial at the optimum timing for all the varieties. Therefore the handling of the seedcotton and the ginning process can have a substantial effect on color and leaf grades. Because color and leaf are coupled with staple length on the CCC loan chart, this will greatly affect the overall loan value of a given sample. If loan values are calculated, only the physical fiber properties of micronaire, staple, uniformity, and strength should be used while color and leaf are held constant. Even then, some lack of precision is inevitable. Unfortunately, most results do not indicate what factors are used and not used for calculating a loan value. Therefore, the utility of loan values and gross values for cotton varieties in variety trials is really of limited value.

In summary, analyzing and interpreting cotton variety trials is a complicated process and should be approached with diligence. As a general guide, multiple sources of data should be considered. Moreover, it is important to understand the limitations of each kind of trial and assimilate information with these facts in mind.