THE CV: A STATISTICAL PARADIGM

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Abstract

The coefficient of variation or CV was devised as a measure of population variability. Thus it can be used in uniformity trials to choose the best plot size or to compare variability among different genetic populations. It was not designed to examine experimental trial validity, i.e. level of precision. Snedecor and Cochran, however, included two pages in their book on the use of the CV as an indicator of level of precision, inferring that trials (corn) with CVs > 15% were questionable. They also stated that hay trials were similar to corn trials in the use of the CV. Thus the CV has been promulgated as the universal indicator of precision level in all sorts of experiments. The CV assumes an increasing variance with an increasing mean that results in a regression value of 2.0 between the natural log of the error variance and the natural log of the mean. If this relationship (B=2.0) does not exist, then the use of the CV as a measure of validity is itself invalid. Examination of 22 sets of data showed no relationship approaching B=2.0. The CV should not be used to examine validity in most agronomic crops. If one wishes to weight trials by level of precision when combining data over environments, then one should weight the individual environment-entry means by the inverse of the error variance for that environment. In reality, the size of the individual mean has more impact on the overall mean than the size of the error variance. When one does find a high error variance in a particular trial then that trial should be discarded before averaging with other environments; error variances more than two times greater than the average indicate a questionable trial (experiment). For breeders, it is not even necessary to analyze the data since normally only those lines that beat the checks are brought forward in the breeding program.

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