

From R. A. Fisher to Microarrays: Why 70 year old theory is relevant today

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The theory and practice of design of experiments has its roots in agriculture (pun intended), with the major developments at Rothamsted by people such as Fisher and Yates. They developed the theory of blocking, components of variance (split plot designs) and incomplete block designs, among other things. Most all of this theory is still relevant today, and translates almost seamlessly to modern applications such as microarray experiments.

We review these designs and their applications today, pointing out how the 70-year old theory guides us to good microarray designs. The easy availability of computer packages, and their default analyses, can often result in incorrect test statistics and confidence intervals. We show how to recognize and avoid this, and look at a number of examples of both good and bad experiments. We also look at some of the designs that have arisen as a result of microarrays (reference and loops) and see what the 70-year old theory has to say.

There is nothing new in this talk, and probably nothing that you have not seen before. However, I hope to remind you of some things that you may have forgotten.