1 Relatives of the Split-plot

Here are listed three of the most common designs that are related to the split-plot design.

1.1 The Split-Split Plot

In this design, after performing a second randomization of the split-plot levels, you again split each split-plot unit in order to randomize another treatment. In our previous example concerning mosquito bites, suppose we take each forearm that has been randomized to an insect repellent, then split it into 3 parts which we randomize to 3 amounts of time of exposure. This would then be a split-split-plot design and the exposure time would be the split-split-plot factor. Refer to the additional web handout and the SAS code for more details.

1.2 The Split-Block (also called a Strip-plot)

Here we apply one treatment across one dimension of the sample while applying a second treatment across a second dimension of the sample. In this design we obtain a three separate sizes of experimental units: one for treatment A, one for treatment B, and a third (smaller) unit for the AB interaction. Refer to the additional web handout and the SAS code for more details.

1.3 Repeated measures designs

As in the split-plot design, treatments are randomly assigned to a subject. In this design, subjects are then followed over time, so time is similar to the split-plot factor in the split-plot design. One big difference is that time is not randomized, and we often see correlation over time in the responses from each subject. The type of analysis that we perform for repeated measures designs depends on the apparent correlation structure among responses over time. For some correlation patterns such as independence, compound symmetry, or more generally the Huynh-Feldt conditions, the ordinary split-plot analysis is appropriate. However, for other correlation patterns such as autoregressive correlation, we must correct for the correlation by lowering the F values or degrees of freedom for the tests of repeated measures factors. The approach to analyzing repeated measures data in Proc MIXED proceeds by performing several analyses, in each case specifying a different underlying correlation pattern. We then choose among the different models of correlation structure by choosing the model with the minimum AIC (Akaike's Information Criterion) value. The tests of the fixed effects (A, Time, and A x Time interaction) from this best-fitting correlation structure are then used. Refer to our SAS program for repeated measures for an illustration of this procedure.