CHAPTER OVERVIEW

8: Randomization Design Part II

Objectives

Upon completion of this chapter, you should be able to:

1. Recognize multiple experimental units in an experimental design.
2. Understand the structure of split-plot ANOVA.
3. Utilize split-plots administered in RCBD experiments.
4. Utilize split-plots administered in CRD experiments.
5. Extend the split-plot concept to analyze split-split-plot designs.

Sometimes multi-factor experiments use multiple (different) experimental units for the different factors in the experiment. To visualize this, think of applying multiple treatments in a sequence. The levels of the first factor are applied to experimental units using specific randomization and then the levels of a second factor are applied to sub-units within the application of the first factor. In other words, the experimental unit used for the application of the first factor has been split, forming the experimental units for the application of the second-factor levels.

Split-plot designs accommodate the above scheme in assigning two factors appropriately to their experimental units. They are extremely common and typically result from logistical restrictions, practicality, or efficiency. Though sometimes split-plots and their experimental unit set up are difficult to recognize, understanding the correct structure is necessary for the implementation of ANOVA.

Split-plots occur most commonly in two experimental designs applied for the first factor: the CRD and RCBD. The ANOVA differs between these two, and this chapter focuses on both types. Split-plots can be extended to accommodate multiple splits by sub-unit subdivision. For example, a split-split-plot experimental design can be achieved with three stages of randomization for three treatments when there are three types of experimental units with two sub-divisions.