

Experimental Design

Lecture 16

I. Objectives

At the end of this series of lectures you should be able to:

- A. Define terms.
- B. Explain why experimental design is necessary and why it is particularly important for researchers in the life sciences.
- C. Describe how the question and hypothesis influence experimental design.
- D. Explain the role of randomization and replication in experimental design.
- E. Define and identify examples of pseudoreplication.
- F. Discuss factors that influence sampling and describe sampling systems.
- G. Discuss the different types of control treatments and the applicability to different problems.
- H. Explain blocking and its uses.
- I. Define the different experimental designs.

II. Key Concepts and Terms

Experimental design	Stratified sampling
Random variation	Temporal variation
Noise	Control treatment
Confounding variables	Procedural control
Question	Temporal control
Hypothesis	Experimental control
Control variables	Statistical control
Falsifiable	Balanced
Alternate hypothesis	Factors
Null hypothesis	Levels
Prediction	Covariate
Experimental study	Blocking
Manipulative study	Paired design
Observational study	Cross-over design
Correlative study	Repeated measures design
Comparative study	Completely randomized design
Third variable problem	Split plot design
Reverse causation	Latin square design
Replication	Main-plot factor
Pseudoreplication	Sub-plot factor
Randomization	