Day One

8:00  Registration

8:30  1. Objectives of Workshop
   a. Steps in conducting a research experiment

9:00  2. Review of Basic Statistical Concepts
   a. Distributions
   b. Descriptive statistics
   c. T-test and confidence limits

9:45  3. Basic Experimental Design Concepts
   a. Basic experimental designs
      1. Experimental unit
      2. Completely randomized design
      3. Randomization
      4. Randomized complete block design
      5. Blocking
      6. Latin square

10:45 Break

11:00  b. Hypothesis testing
       1. Defining the question
       2. Defining the objective(s)
       3. Choosing a treatment design

12:00  c. Sampling considerations
       1. Number of samples

12:15 Lunch

1:15  4. Installing Experiments

1:45  5. Basic Data Management Concepts
   a. Data collection, entry and management
   b. Avoiding bias, double-blind studies
   c. Checking for normality, scatter plots, outliers

2:15  6. Basic Statistical Analysis Methods
   a. F test
   b. Analysis of variance

2:45  Break
3:00  
   c. Replication  
      1. Number of replicates

3:30  
   d. Mean separation procedures

4:30  Evaluation

Day Two

Morning (teaching room)

8:30  
   1. Review; Questions and Answers; Collect Homework Assignments

8:45  
   2. Correlation and Regression

9:45  Break

10:00  
   3. Split Plots / Other Designs

11:00  
   4. Report Writing and Data Presentation
   a. Mean ± standard error
   b. Mean comparisons
   c. Charts and graphs

12:00 Lunch

Afternoon (computer lab)

1:00  
   5. Software for Data Analysis:
       SAS demonstration/participation

2:30  Break

2:45  
   6. Breakout Groups: SPSS, SAS, STATSITIX
   a. Run sample data sets
   b. Q/A period
   c. Other topics? (i.e., spatial data analysis, covariance?)

4:00  
   7. Roundup, Review
       Q/A
       Homework assignment

4:30  Evaluation
Learning Outcomes

1. Objectives
   Able to list the steps in conducting an experiment

2. Review of Basic Statistical Concepts
   Able to sketch a normal distribution
   Able to calculate descriptive statistics
   Able to perform t-tests and calculate confidence limits
   Able to correctly use basic statistical terminology

3. Basic Experimental Design Concepts
   Able to correctly select/identify an experimental unit
   Able to design and install a CRD
   Able to design and install an RCBD
   Aware of other designs (LS, SP)
   Able to formulate an hypothesis
   Able to design treatments to test:
   - discrete variables (eg varieties)
   - dose response
   - factorials and interactions
   Able to select and follow a sampling design
   Able to determine number of samples needed

4. Installing experiments
   Able to install an experiment in the field
   Able to install an experiment in animal pens

5. Basic Data Management Concepts
   Aware of bias and ways to limit it
   Able to test data for normality and outliers
   Able to prepare a data collection form (including environmental measurements)

6. Basic Statistical Analysis Methods
   Know how F test relates to t-test
   Able to write out sources of variation and formula for degrees of freedom for CRD, RCBD and LS
   Able to calculate the number of replicates needed
   Able to divide treatment SS into single degree of freedom comparisons
   Able to use a multiple range test

7. Correlation and Regression
   Aware of assumptions in ANOVA and regression
   Know difference between correlation and regression

8. Split Plots and Other Designs
Able to design and install a split plot
Able to write out sources of variation and formula for degrees of freedom for split plot
Aware of other designs

9. Data Presentation and Interpretation
Able to check for normality of data
Able to assign superscripts to means
Able to present data means, SEs and tests of significance in tables and graphs
Able to check for outliers and have criteria for whether to include them in analysis

10. Software for Data Analysis
Able to import data into SAS
Able to translate sources of variation from ANOVA into a model statement
Able to analyze a CRD, RCBD, LS or split plot using SAS
Able to perform a regression using SAS