I’ve conducted an experiment with the goal of determining the effect of tillage (2 treatments) and row cover (2 treatments) on plant production. I’m looking for help in determining what type of model I should fit.

I have four different fields. I split each field into two separate plots and applied the tillage treatments randomly to the two plots of each field. I then split the plots into two and applied the two row cover treatments to those randomly. My outcome is the plant production (bushels/acre). So in total I have 16 observations.

Which model should I use to determine which tillage and cover will produce the most bushels/acre? I am open to using any software that you think would be best.

**Daljeet**

Our understanding of the problem:

The client is conducting an experiment where we have an application of the split-plot in CRD. Each of the four fields are divided into two giving us 8 total areas. These areas are randomly applied tillage treatments (consider T1 and T2). Each of the tilled areas (8 in total) is further split into two sub-plots giving us 16 units for applying the row covers (consider R1 and R2).

This design can now be viewed as 4 replications of the CRD with the split-plot sequence of randomization of the factors.

We will have a dataset with structure as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Tillage | Cover | Bushels/Acre |
| F1 | T1 | R1 |  |
| F1 | T1 | R2 |  |
| F1 | T2 | R1 |  |
| F1 | T2 | R2 |  |
| F2 | T1 | R1 |  |
| F2 | T1 | R2 |  |
| F2 | T2 | R1 |  |
| F2 | T2 | R2 |  |
| F3 | T1 | R1 |  |
| F3 | T1 | R2 |  |
| F3 | T2 | R1 |  |
| F3 | T2 | R2 |  |
| F4 | T1 | R1 |  |
| F4 | T1 | R2 |  |
| F4 | T2 | R1 |  |
| F4 | T2 | R2 |  |

Questions and clarifications:

* Describe the objective of the study and explain the hypothesis that you will like to test
* Describe how the plots were selected for random application of the treatments
* Describe the precautions taken to avoid spillover of the treatments
* Describe how the bushels / acre were measured? Was their consistency of these measurements across the experimental units?

Recommendations

* Talk about the applicability of the split-plot design and its complexities.
* Discuss how the split-plot model can be setup – response, factors etc.
* Provide some input on how to decipher the output provided from such models.
* Provide input on how to use SAS to perform such analysis. Maybe provide a sample script to help set the study.