

EXST7015 : Daily Design Question 11

Carefully read the description of the experiment below. Be prepared to answer the questions that follow the design description as a class quiz.

A researcher in horticulture is experimenting with new tissue culture techniques. This process involves placing a piece of plant tissue in a test tube with a suite of chemical nutrients and growth hormones. The piece of plant then reproduces a clone of the parent plant. In this experiment the researcher is interested in developing a faster-growth medium, a medium that will produce a larger plant tissue mass in a shorter period of time. The researcher includes a number of different parental plant strains to insure a representative result even though he knows that the different parental strains will add unwanted variation to the study.

The researcher uses 20 parent plants and prepares 24 tissue samples from each parent plant (480 test tube samples in all). The treatments of interest are three levels (low, medium and high) of nitrogen (N), two levels (low and high) of phosphorus (P) and two levels (low and high) of potassium (K) for a total of 12 combinations of nutrients. Two replicates from each parent are prepared for each nutrient combination in the test tubes. All plant tissue samples start at the same size, so the variable of interest is the final biomass of the plant tissue sample at the end of 3 weeks.

Questions:

What is the treatment arrangement for this experiment?

- (a) single factor (b) factorial (c) nested

What is the experimental design for this experiment?

- (a) CRD (b) RBD (c) LSD (e) Split-plot (d) Repeated Measures

Does it seem to you that the treatments are fixed or random?

- (a) fixed (b) random

What is the experimental unit for this experiment?

- (a) parent plant (b) nutrients (c) biomass (d) test tube (e) replicates

What is the sampling unit for this experiment?

- (a) parent plant (b) nutrients (c) biomass (d) test tube (e) replicates

What is the dependent variable for this experiment?

- (a) parent plant (b) nutrients (c) biomass (d) test tube (e) replicates

If the design is RBD, what are the blocks?

- (a) parent plant (b) nutrients (c) biomass (d) test tube (e) replicates

How many degrees of freedom are available for testing the treatments?

Enter the correct value here: _____