EXST7015 : Daily Design Question 21

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

In the paper *Interaction between Clover root weevil and Clover root Type*. D.A. CARE, J.R. CRUSH, S. HARDWICK, S.N. NICHOLS and L. OUYANG. *AgResearch, Ruakura Research Centre, Private Bag 3123, Hamilton)*, the authors describe an experiment where four varieties of white clover were raised with and without weevils to examine weevil damage. Root length was measured twice during the experiment. A modified (simplified) version of the author's description of the experiment is given below and in a modified heading for their Table 1.
Authors description: "Twenty replicates of the four plant genotypes were arranged on slant boards in blocks. After six days the plants were carefully removed from the slant board. The roots were laid out and scanned using an image analysis program (Harvest 1). After scanning, the clovers were put back onto the slant boards. A small amount of water was added to the clovers and the boards were put back in the controlled environment room. Five CRW larvae were weighed and added to half the replicates of each plant treatment (10 replicates / treatment). Five days after the larvae were introduced they were removed from the slant boards. The white clover plants were then removed from the slant boards. Roots were laid out and scanned a second time (Harvest 2)."
Note: I believe that no weevils were added to the treatments prior to Harvest 1, so I would not expect the "with larvae" and "without larvae" to differ at Harvest 1.

TABLE 1: Root length (cm) attached to the shoots of the four genotypes, in minus larvae and plus larvae treatments at Harvest 1 (6 days after the plants were placed on the slant boards) and Harvest 2 (5 days later, after the addition of clover root weevil larvae to the plus larvae treatments). Genotypes are LFR-long, fine roots; STR-short, thick roots; HCR-high carbohydrate roots; LCR low carbohydrate roots.

Genotype	Harvest 1		Harvest 2	
	minus larvae	plus larvae	minus larvae	plus larvae
LFR	341	305	688	366
STR	145	153	305	181
HCR	163	150	398	185
LCR	136	137	323	180

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) variety (b) block (c) slant board (d) scan (e) weevils (f) root length

What is the sampling unit for this experiment?

(a) variety (b) block (c) slant board (d) scan (e) weevils (f) root length

What is the dependent variable for this experiment?

(a) variety (b) block (c) slant board (d) scan (e) weevils (f) root length

If the design is RBD, what are the blocks?

(a) variety (b) block (c) slant board (d) scan (e) weevils (f) root length

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

Enter the correct value here: _____