TALKING ABOUT DESIGN OF EXPERIMENTS

Revision for designs for field experiments

REVISION FOR DESIGNS

- Setting an experiment to answer specific research question
- Importance of random sampling
- Planning an experiment

1) Treatments
2) Replications
3) Reducing experimental error
4) Measurements
5) Experimental units
6) Analysis and compare treatments
7) Is the design correct, assumptions for the test correct

DESIGNS

- Designs can be dependent or independent
- Designs can be:

(1) simple random sample design,

(2) before-after design,

(3) matched-pair design,

(4) completely randomized design,

(5) randomized complete block design

Scenario A Question 1

A survey was conducted in an area around town A to estimate the average income of farmers. Thirty farmers were selected at random. Right Click on the most appropriate answer.

1. Explain how you might randomly sample a town's farmers in practice?
   - number all farmers by location then choose every 4th;
   - all the farmers names into a hat and pull out 30 farmers' names;
   - pick 2 farmers from each type of farming;
   - chose all the farmers from one side of the town

Scenario A Question 2

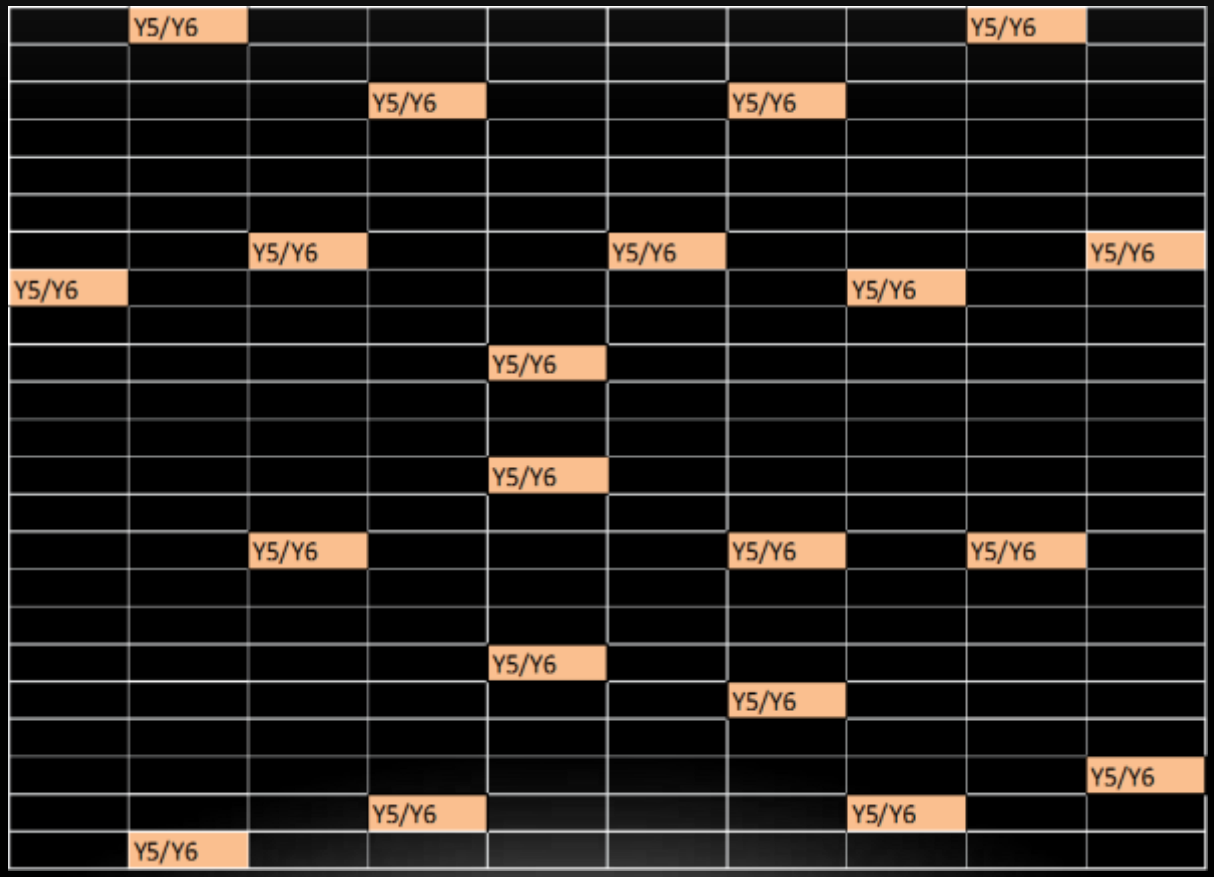
4. What is the design structure of this experiment? Click on the correct answer

- matching
- blocking
- paired
- single sample

Scenario B (Forestry)

- A survey was conducted on a forestry plantation in Laos to estimate the average annual growth of teak. Five years after the planation's establishment twenty trees were selected at random and their heights (H) and diameters (D) were measured. A year later (year 6) the same trees were measured again. For each tree, the height and diameter were converted into the stem volume (V) by using the simple formula $V = D^2H$. The calculations were done for both years for each tree.

Scenario B Forestry Layout



Scenario B Question 1

2. What the structure of Forestry design?

- Paired/matched
- Before/after
- Single sample
- Two samples
- More than two samples

Scenario D

- A trial was carried out to investigate if a new variety of wheat (Variety A) had a similar yield to (Variety B) which was the recommended variety. The Varieties were randomly allocated to plots in a paddock. The design is below

Variety A	Variety B	Variety A
Variety B	Variety A	Variety B
Variety A	Variety B	Variety A
Variety A	Variety B	Variety B

Scenario D Question 1

A. Research question: Does a new Variety of wheat (A) have a similar yield to the recommend variety of wheat (B)?

- Left click on appropriate design

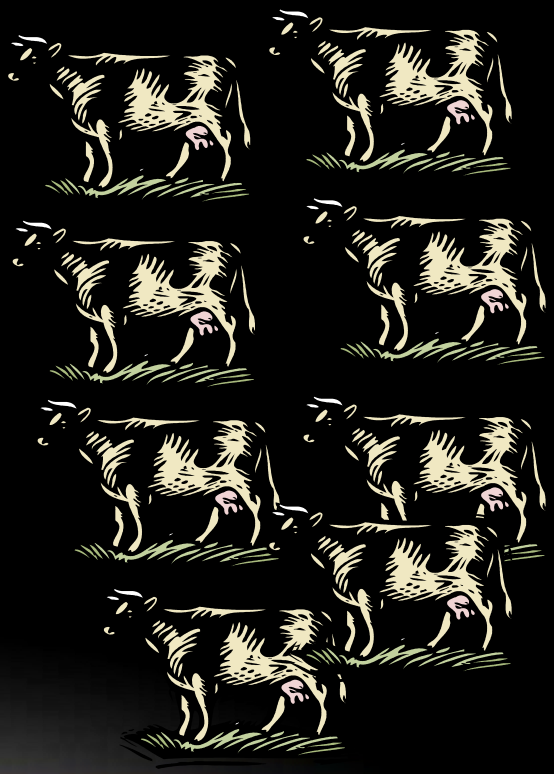
1. (Independent design)
2. (Dependent design)

Scenario E

It is believed that a vaccine will increase the milk yield of dairy cows.

Group of vaccinated cows

Group of non vaccinated cows



Scenario E Question 1

From previous slide of cows

- Research Question: Does the vaccination increase milk yield?

Left click on appropriate design

1. (Dependent design)
2. (Independent design)

Scenario F

Each Cow Has One Measurement (B) Taken Then They Were Vaccinated With Vaccine R. Two Weeks After Vaccination Another Measurement (A) Was Taken

- Cow 1

Cow 2

Cow 3

- Cow 4

Cow 5

Cow 6

Scenario F Question 1

A Each cow has one measurement (B) taken then they were vaccinated with vaccine R. Two weeks after vaccination another measurement (A) was taken

Left click on appropriate design

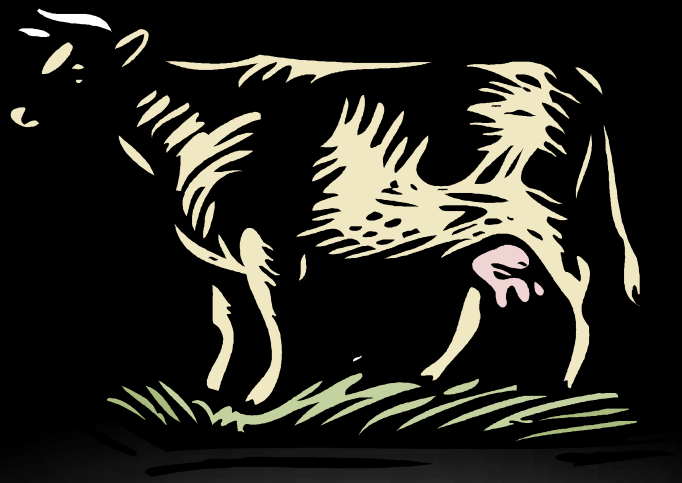
1. (Dependent design)
2. (Independent design)

SCENARIO F QUESTION 1

Alternative Hypothesis is

Click the appropriate

- The milk yield of the cows does not change after the vaccine R
- The milk yield of the cows does change after the vaccine R



SCENARIO G QUESTION 1

- Eight dogs with the same eye infections in both eyes received eye drop C in the left eye and eye drop E in the right eye

- Dog 1

Dog 2

Dog 3

Dog 4

- Dog 5

Dog 6

Dog 7

Dog 8

SCENARIO G QUESTION 2

The research question: Does eye drop C clear eye infections better than eye drop E

Left click on appropriate design

1. Matched/paired
2. Single sample
3. 2 sample