WWU MÜNSTER

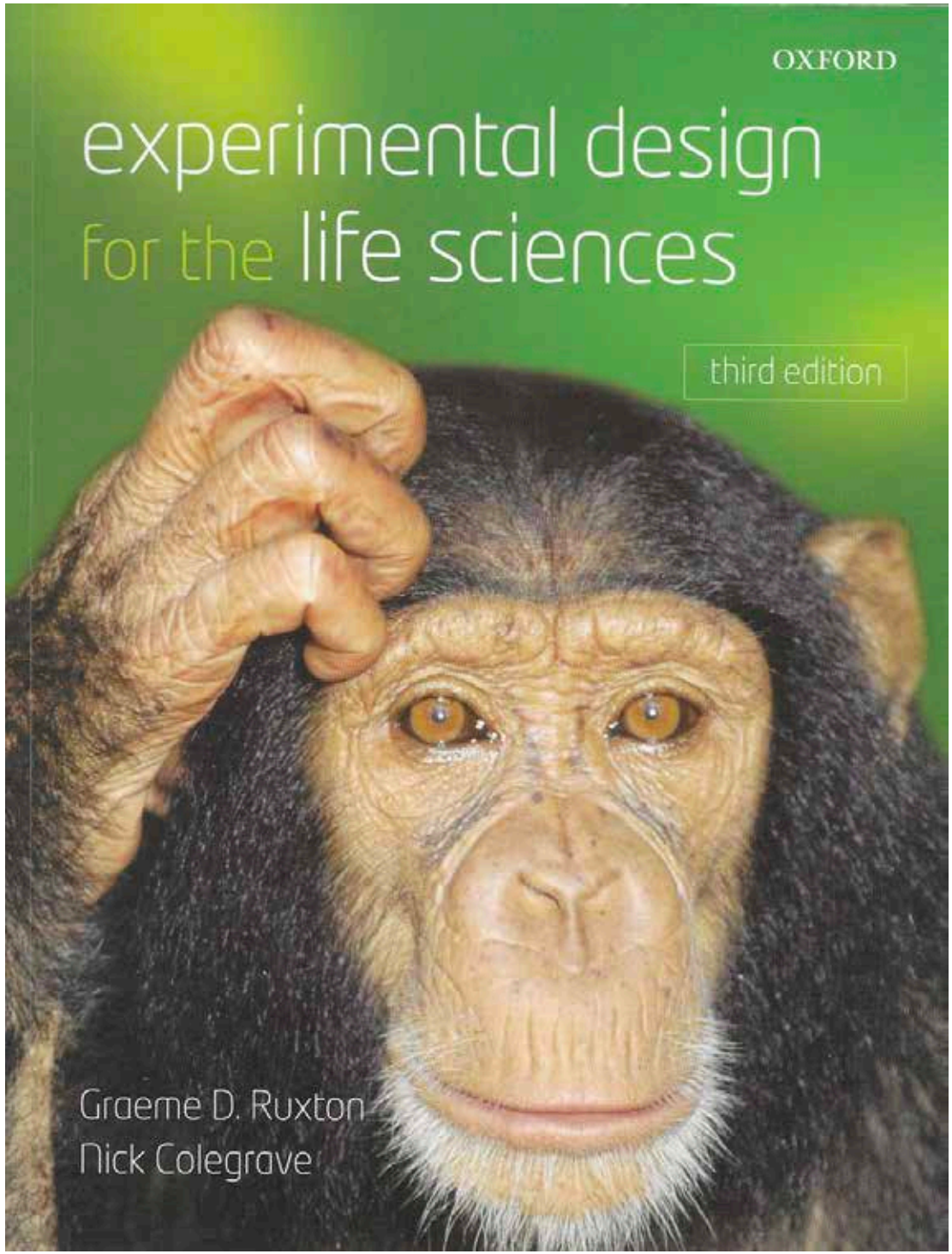
DFG Deutsche Forschungsgemeinschaft

RTG 2220

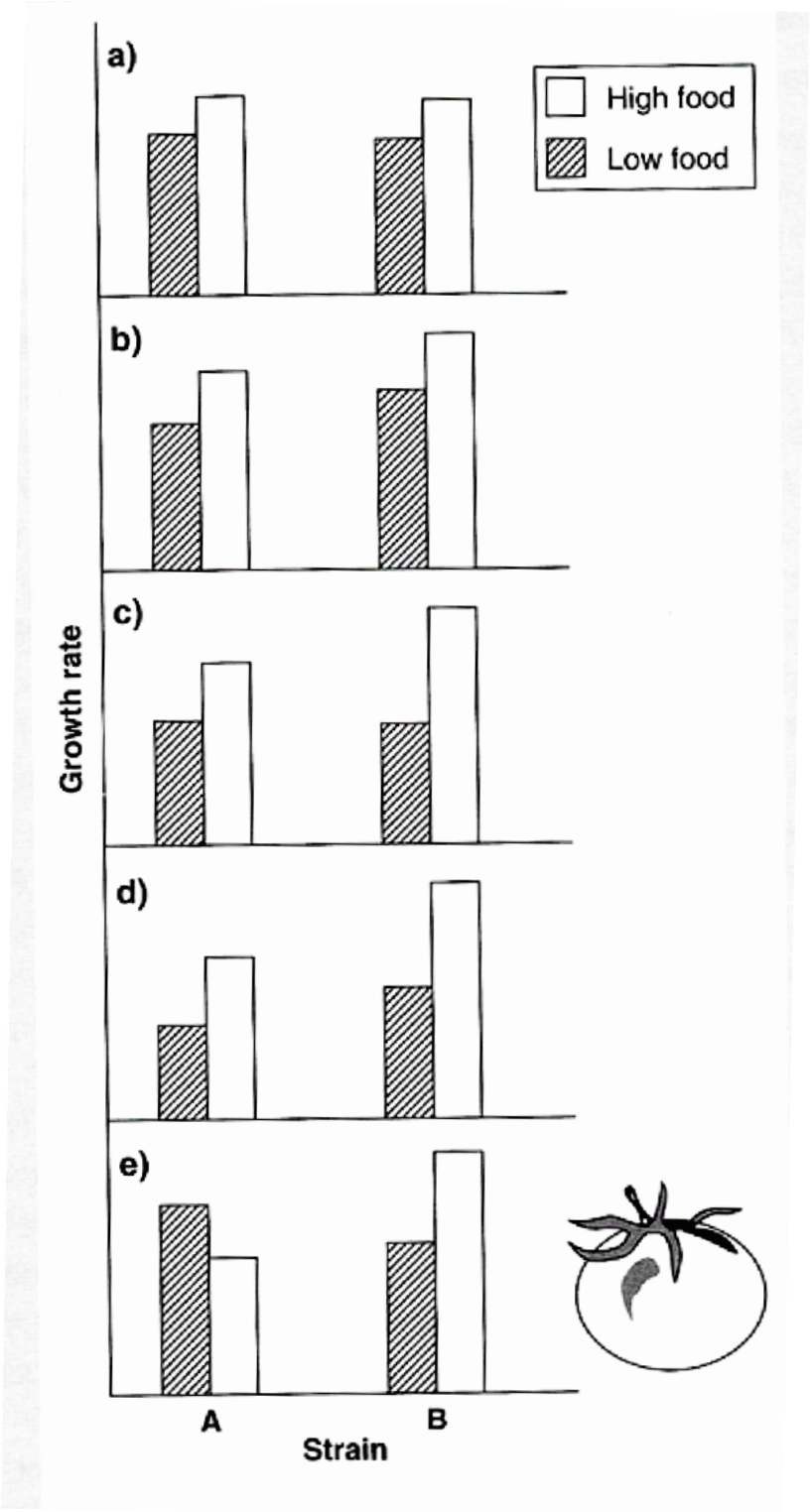
EvoPAD

From Idea to Publishing

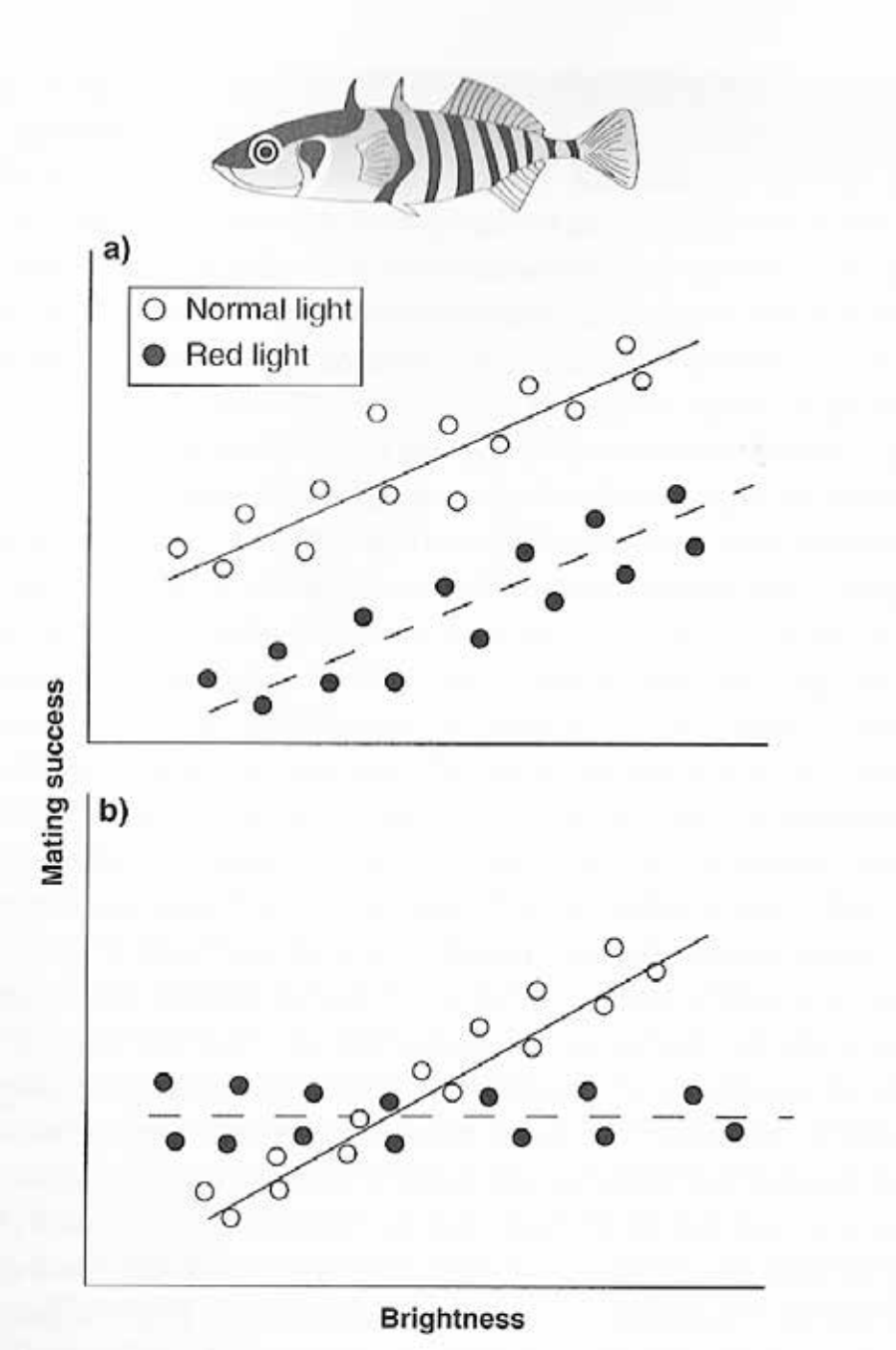
Course
1.-4. July 2019


OXFORD
experimental design
for the life sciences
third edition
Graeme D. Ruxton
Nick Colegrave

Interactions



Interaction with a covariate



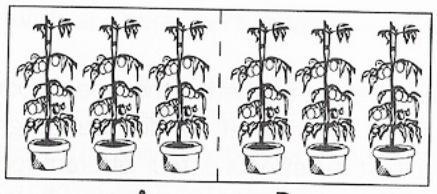
Factorial experiments

Don't confuse **levels** and **factors**!

E.g., here fertilizer is a factor, with 2 levels (fertilizer type A and B).

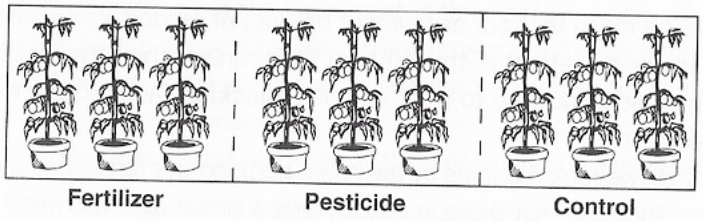
Fully-crossed design:
All combinations of factors are implemented.

1.



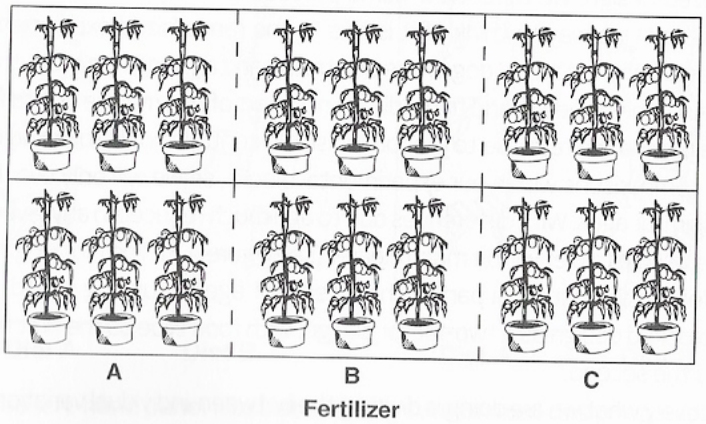
Replicated 1-factor design with 2 levels of the factor (fertilizer type).
This can answer the question:
a) Do the fertilizers differ in their effect?

2.



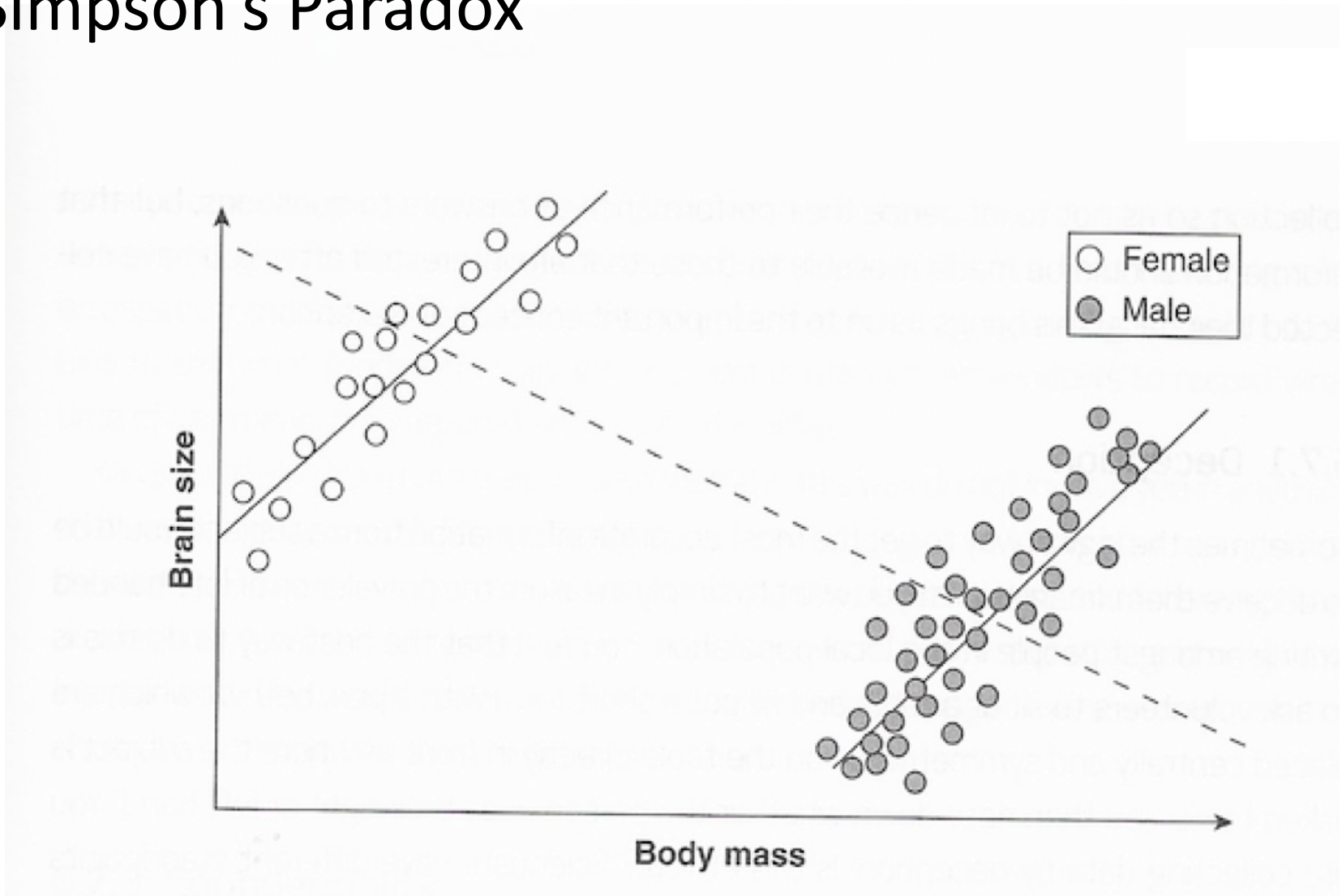
1-factor design with 3 levels of the factor (type of cultivation).
This can answer the questions:
a) Does fertilizer affect plant growth?
b) Does pesticide affect plant growth?
c) Do fertilizer and pesticide differ in their effect on plant growth?

3.

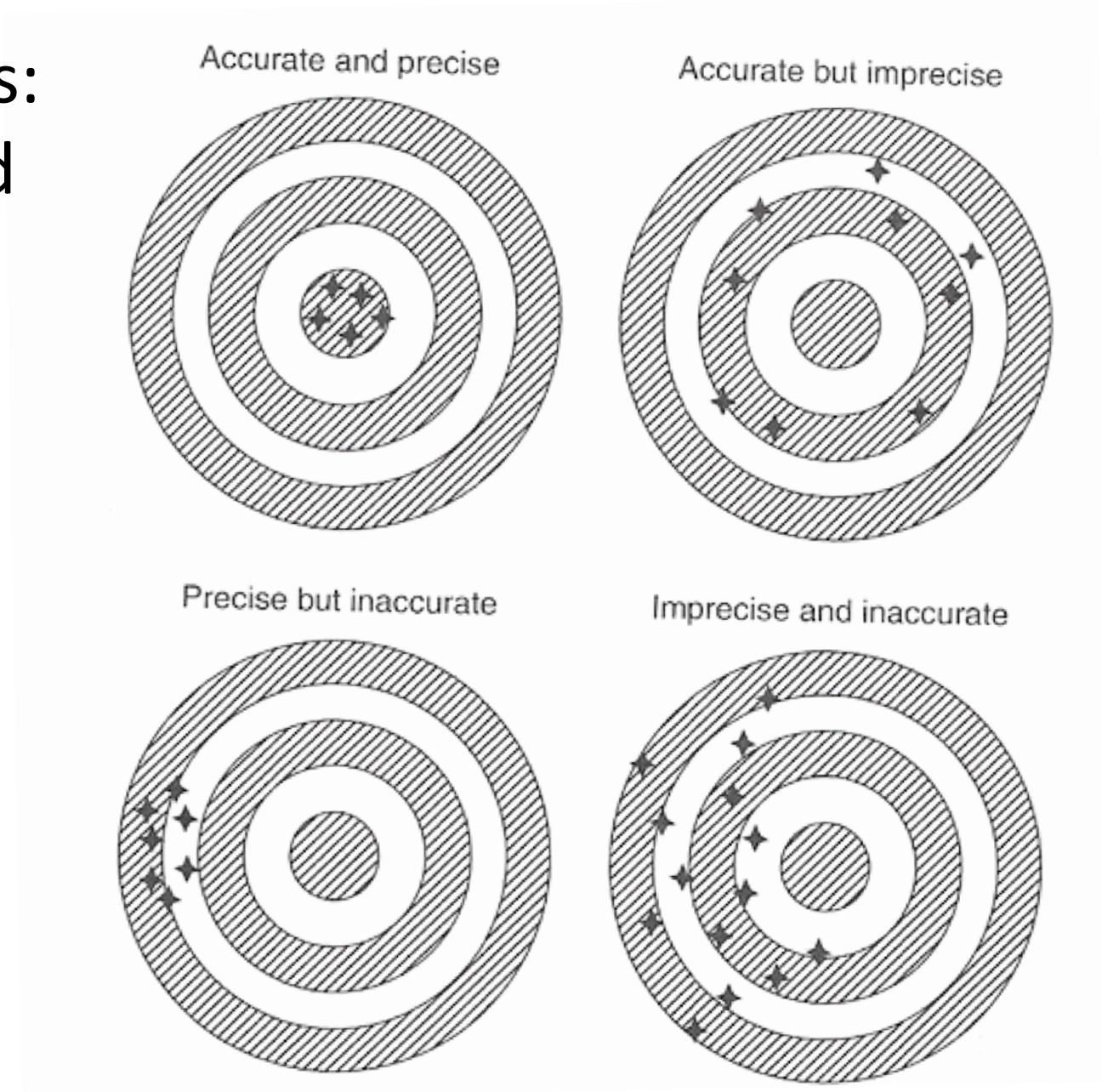


2-factor design with 3 levels of the 1st factor (fertilizer type) and 2 of the 2nd factor (pesticide use).
This can answer the questions:
a) Do the fertilizers differ in their effect on plant growth?
b) Does pesticide affect growth rate?
c) Does the effect of pesticides depend on the type of fertilizer?

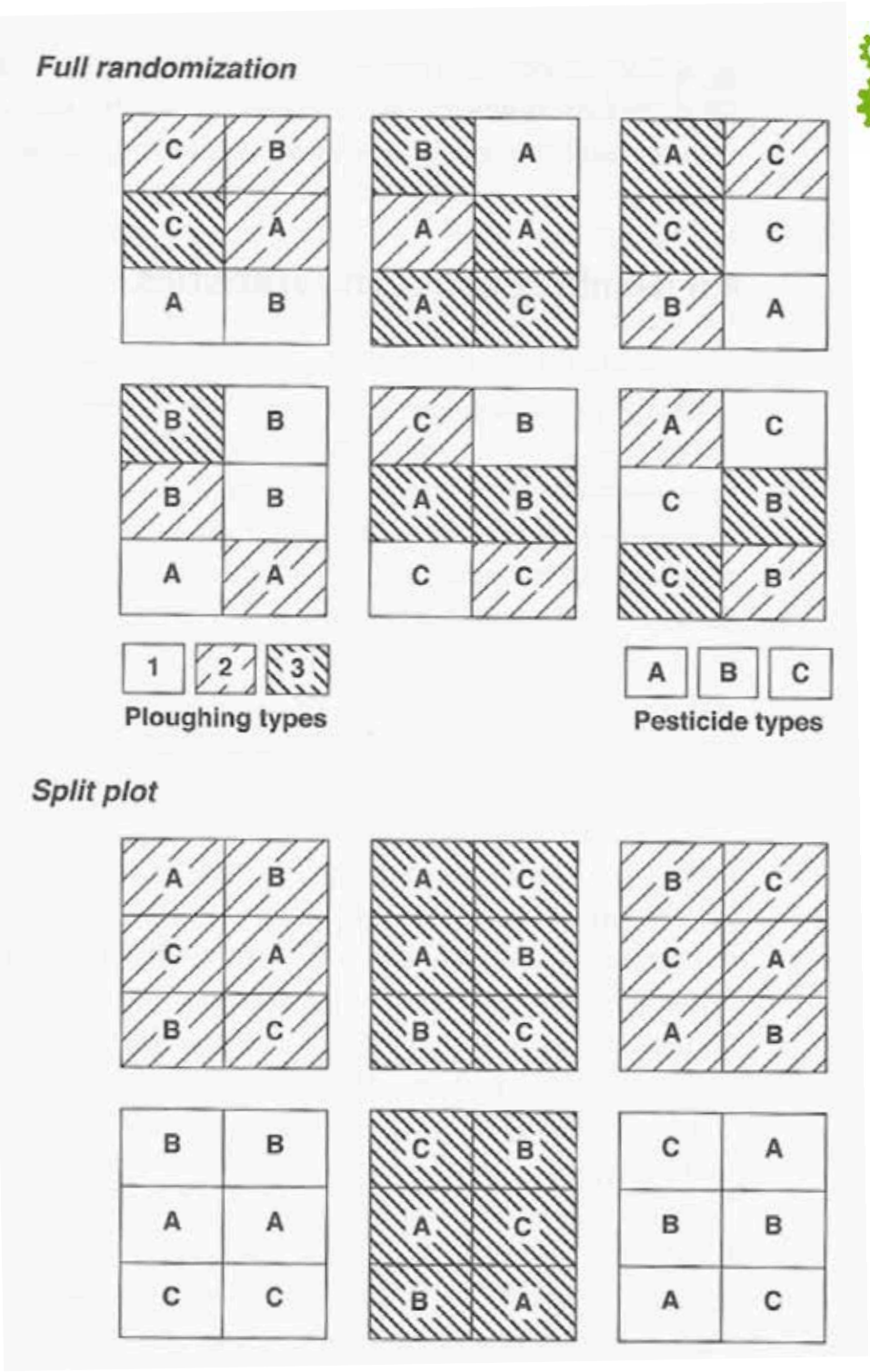
Simpson's Paradox



Measurements: Inaccuracy and imprecision



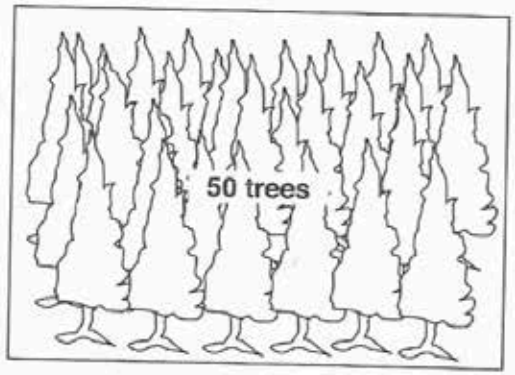
Randomization and Split-plot designs



Subsampling

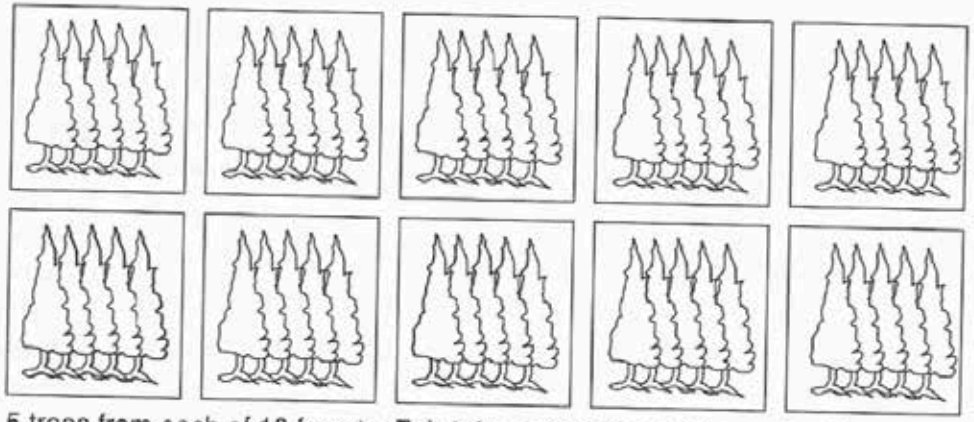
Three designs for sampling 50 conifer trees

a)



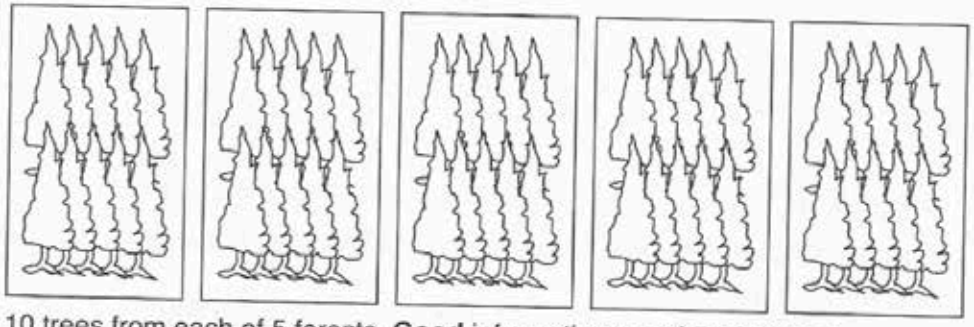
50 trees all from the same forest. **Excellent** information about that forest but no information on other conifer forests.

b)



5 trees from each of 10 forests. **Fair** information of a good sample of different conifer forests.

c)



10 trees from each of 5 forests. **Good** information on a fair sample of different conifer forests.