

Queen Mary, University of London

The Theory of Designed Experiments

TOMATO: An Experiment Game

You say “tomato”, I say “tomato”

[Adapted from Pollock, K. H., Ross-Parker, H. M. and Mead, R. (1979)
A sequence of games useful in teaching experimental design to agriculture
students. *The American Statistician*, **33**, 70-76.]

Two farmers, Adams and Bloggs, grow tomatoes in greenhouses in southern England. Bloggs gets higher yields than Adams, but it is not clear why. Adams uses standard heating, standard lighting and a variety called Coward. Bloggs uses supplementary heating, supplementary lighting and a variety called Doger.

You have to design an experiment to be able to recommend which variety, which level of heating and which level of lighting the farmers should use.

The experiment will be carried out in a small greenhouse on an experimental research station. The greenhouse has six north-facing compartments and six south-facing compartments and previous experience tells us to expect a considerable north-south difference. Initially, we have funding to experiment for only one growing season. A follow-up might be possible, but funding is not guaranteed, so we need to be able to make a recommendation on the basis of one experiment.

Design the experiment, i.e. for each compartment decide which variety should be grown, which level of heating should be used and which level of lighting should be used.

When you have settled on a design, you can obtain simulated yields from my GenStat program.