Week 10 Thursday notes

Comparing Designs

CRD
RCBD
Repeated Measures

RCBD vs. CRD.
On a farm, wish to compare 2 seed varieties, 3 concentrations of weed killer, 07, 27, 47.

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<td>VCijk</td>
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<td>e(ijk)</td>
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Tests

Variety

\[ F_{i,j} = \frac{MS_{V}}{MS_{VC}} \]

Concentration

\[ F_{j,k} = \frac{MS_{C}}{MS_{VC}} \]

V x C

\[ F_{j,k} = \frac{MS_{VC}}{MS_{VC}} \]

Fixed effects tested by their interaction with our block term.

Response variables - Yield

7% dry matter of weeds.
Suppose we ran expt. as CRD with same # observations.

\[ y_{2\times3} = 24 \text{ plots randomly assigned to tvt. combinations}. \]

Expt. 1

- \( F_{1,10} = \frac{MS_v}{MS_e} \)
- \( F_{2,10} = \frac{MS_c}{MS_e} \)
- \( F_{1,10} = \frac{MS_{VC}}{MS_{e}} \)

Which has smaller critical value, \( F_{0.05} \)

Expt. 2

- \( F_{1,10} = \frac{MS_v}{MS_e} \)
- \( F_{2,10} = \frac{MS_c}{MS_e} \)
- \( F_{1,10} = \frac{MS_{VC}}{MS_{e}} \)

\[ F \text{ distn} \]

Which has \( F_{2,10} \) or \( F_{1,10} \) better?

Look at what our error terms mean.

- Expt 1
  - Plots crossed with our factors so error term for VC controls for Plt to Plt variation
  - Our plots are nested within tvt. combinations so MS e includes plot to plot variation.

- Expt 2
  - Plots are not crossed with our factors so error term for VC controls for Plt to Plt variation

\[ \text{Source df EMS} \]

\[ \begin{array}{cccc}
V & 1 & \sigma_v^2 + 12 \rho_v \\
C & 2 & \sigma_c^2 + 2 \phi_c \\
VC & 2 & \sigma_{VC}^2 + 4 \rho_{VC} \\
E & 18 & \sigma_e^2 \\
\hline & 24-1 & \end{array} \]
Crossing plots is better than nesting plots with regard to factor combinations.

Experiment 3: Joe Blow looked at 1st design and completely randomized the subplots to treatment combinations.

24 random to 6 treatment combinations

What will this effect?

1. If compare Means of trts, we do not "control" for Plots. Have to use LSMeans.
2. Need to use Type III SS. Usually numerator MS is adjusted down.