C A B A C B B A C

C A B A C B B A C

B1 B2 B3

Experiment:
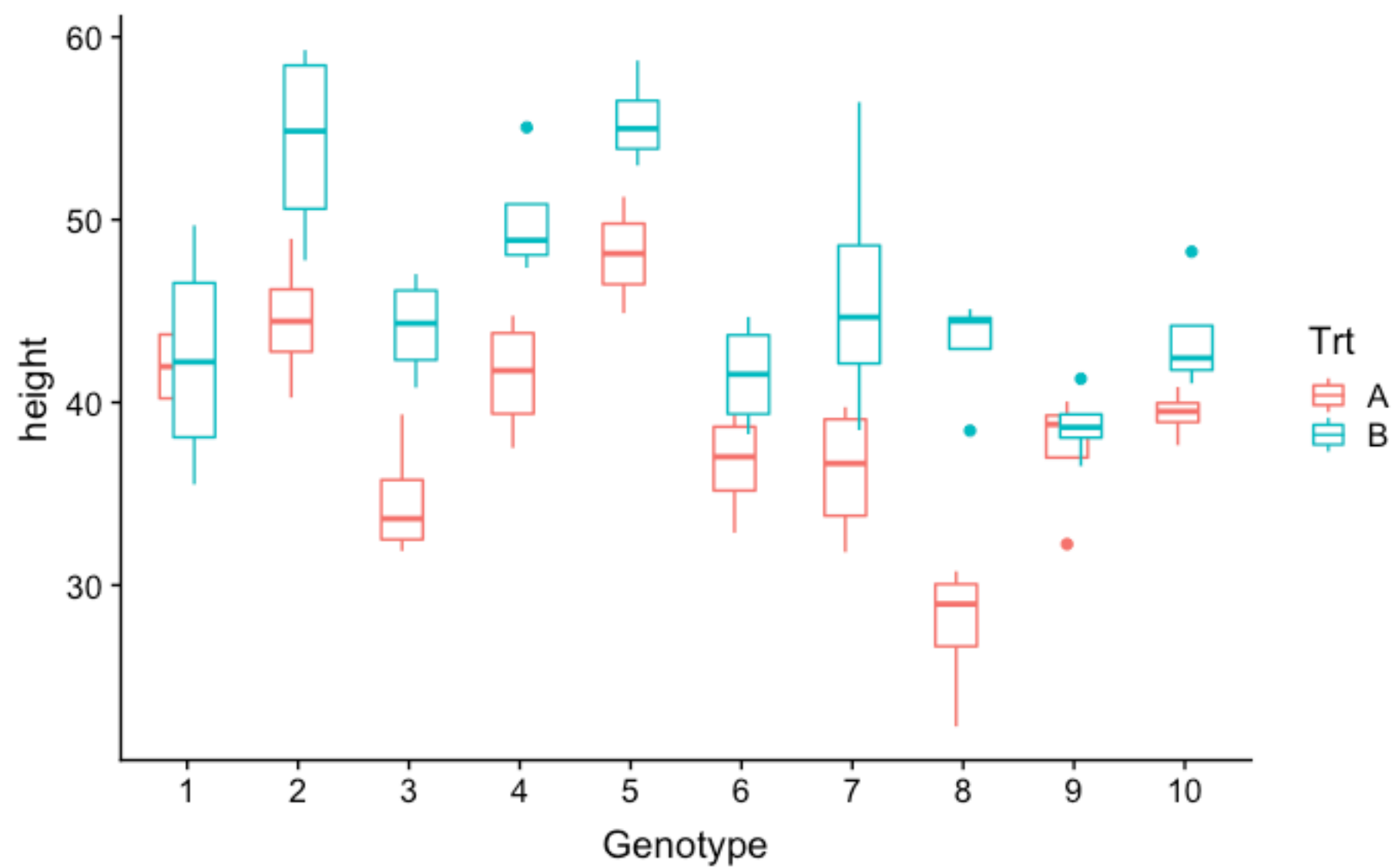
Goal 1: Effect of soils A vs B

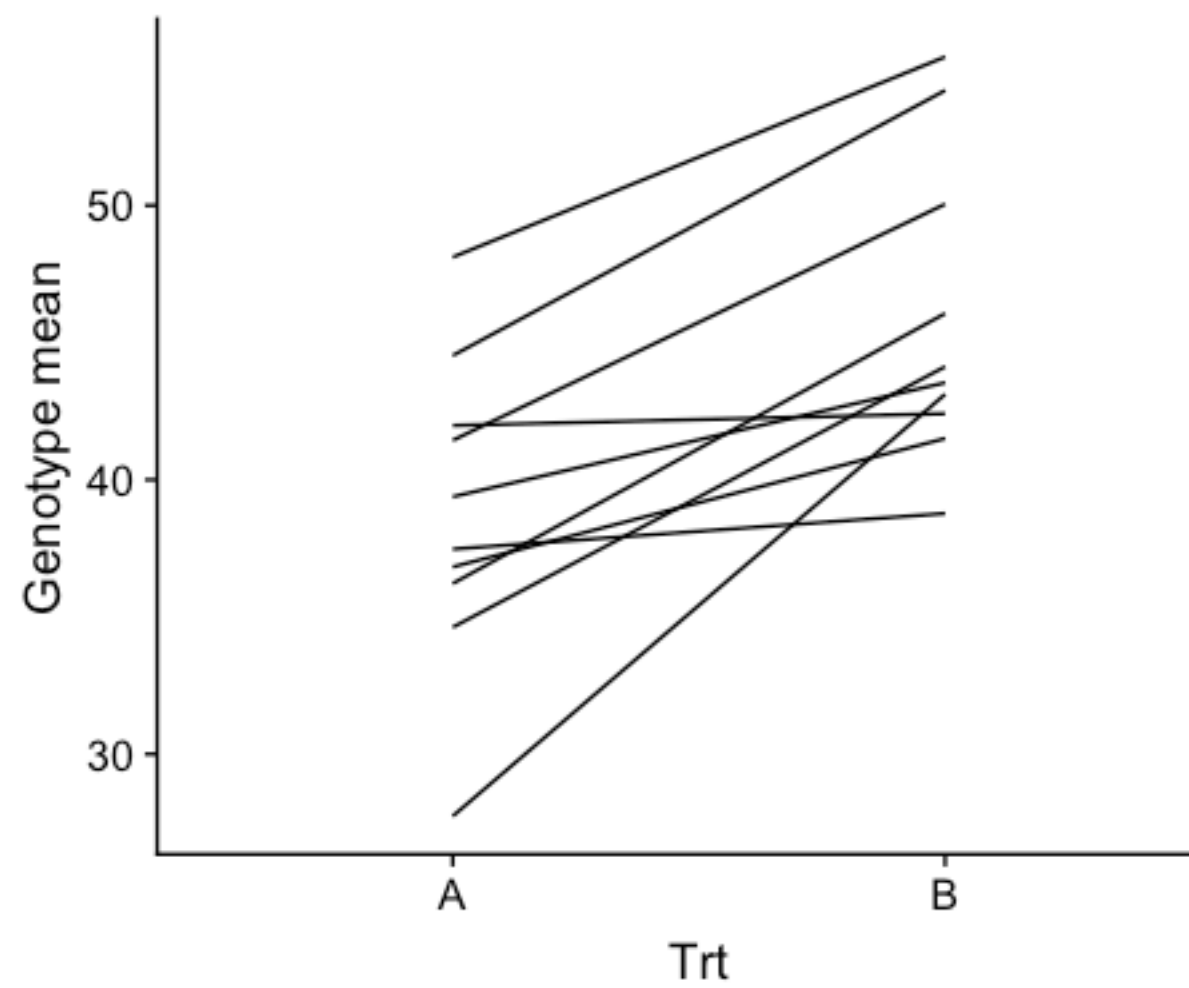**Setting:** 1 species: tomato, but 100 varieties

      We expect the varieties may differ in their response to soil type

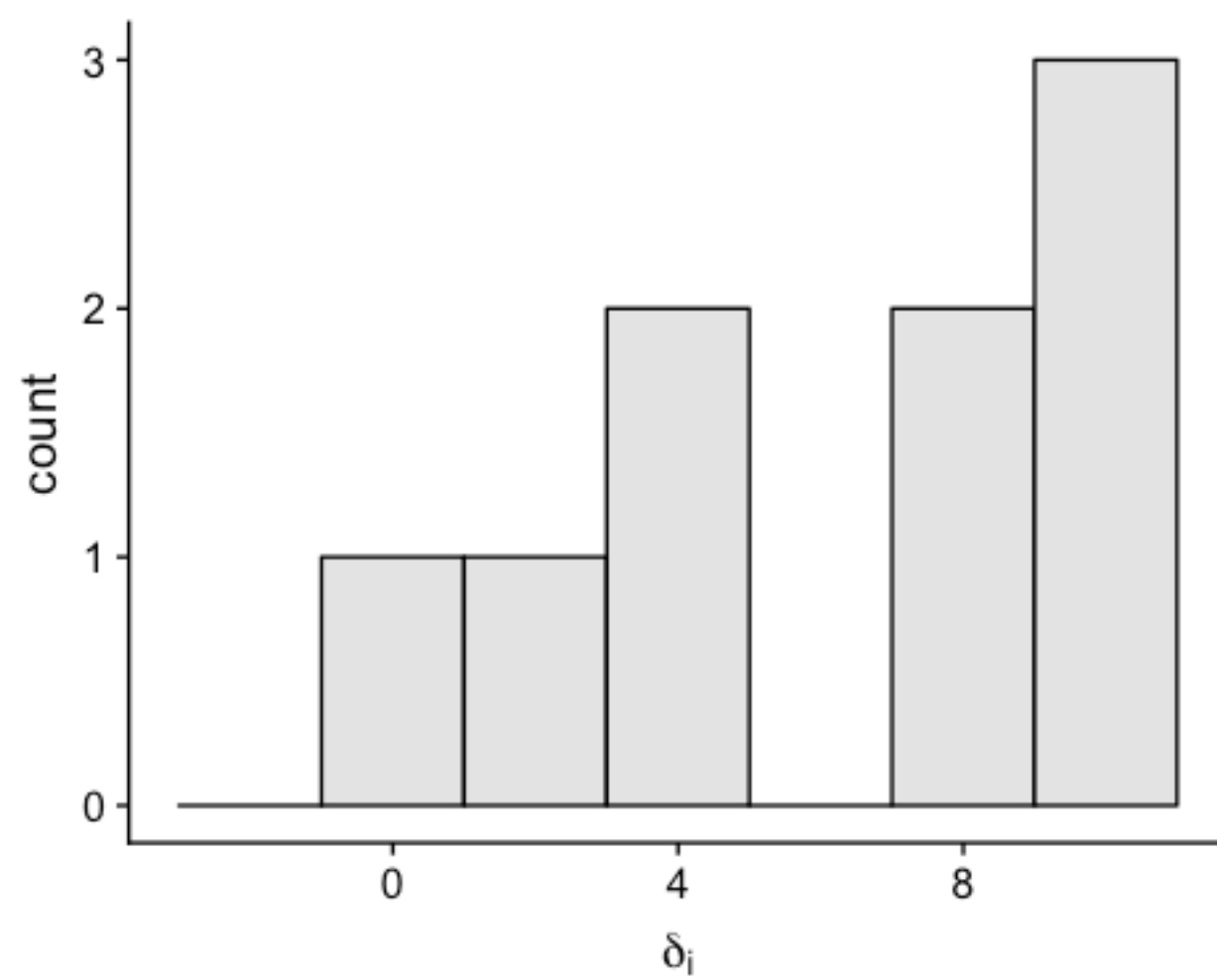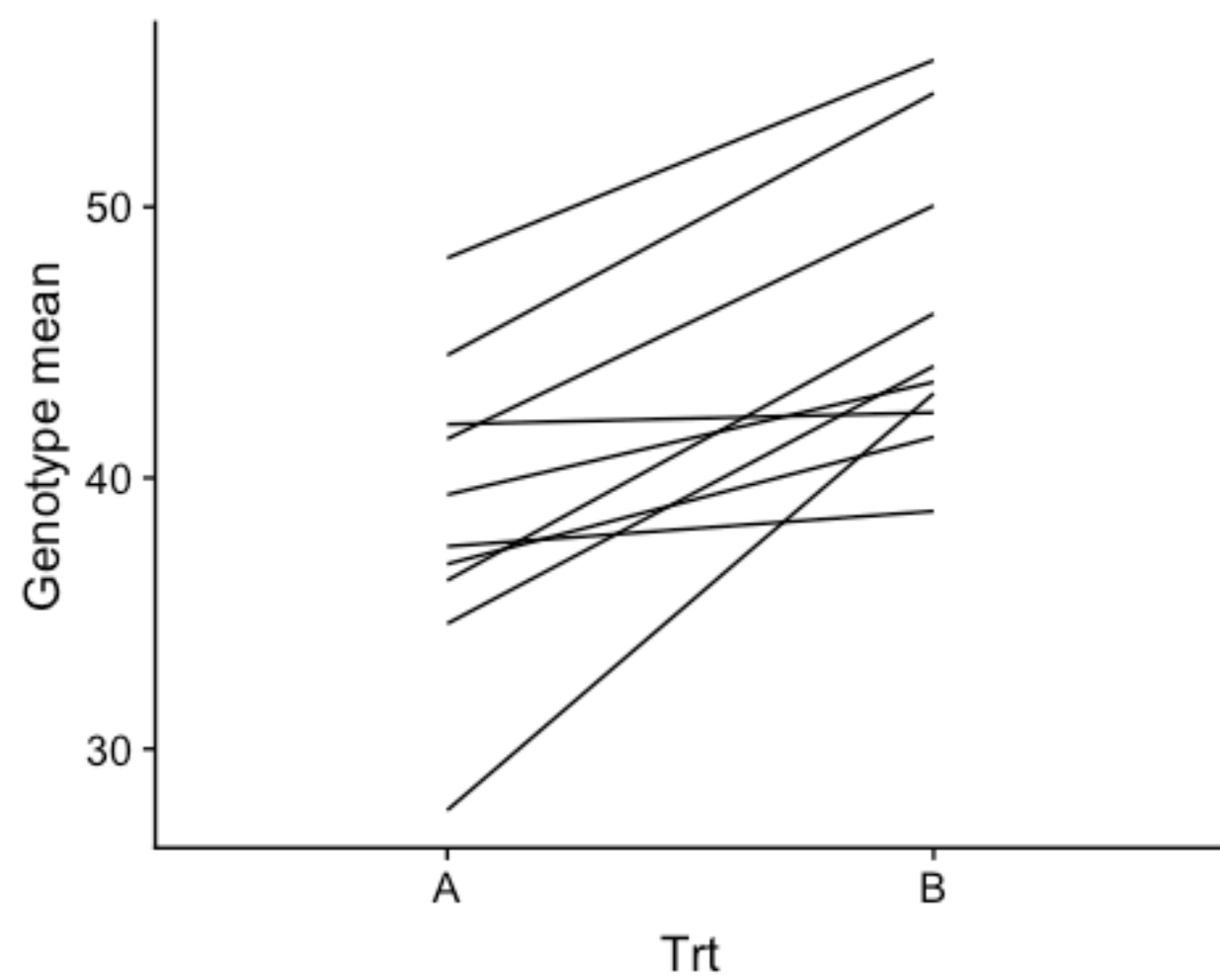**Limitation:** We can only use 40 pots (with 2 plants/pot)

Design: Sample 10 varieties, 2 pots per variety:soil, 2 plants per plot

Variety

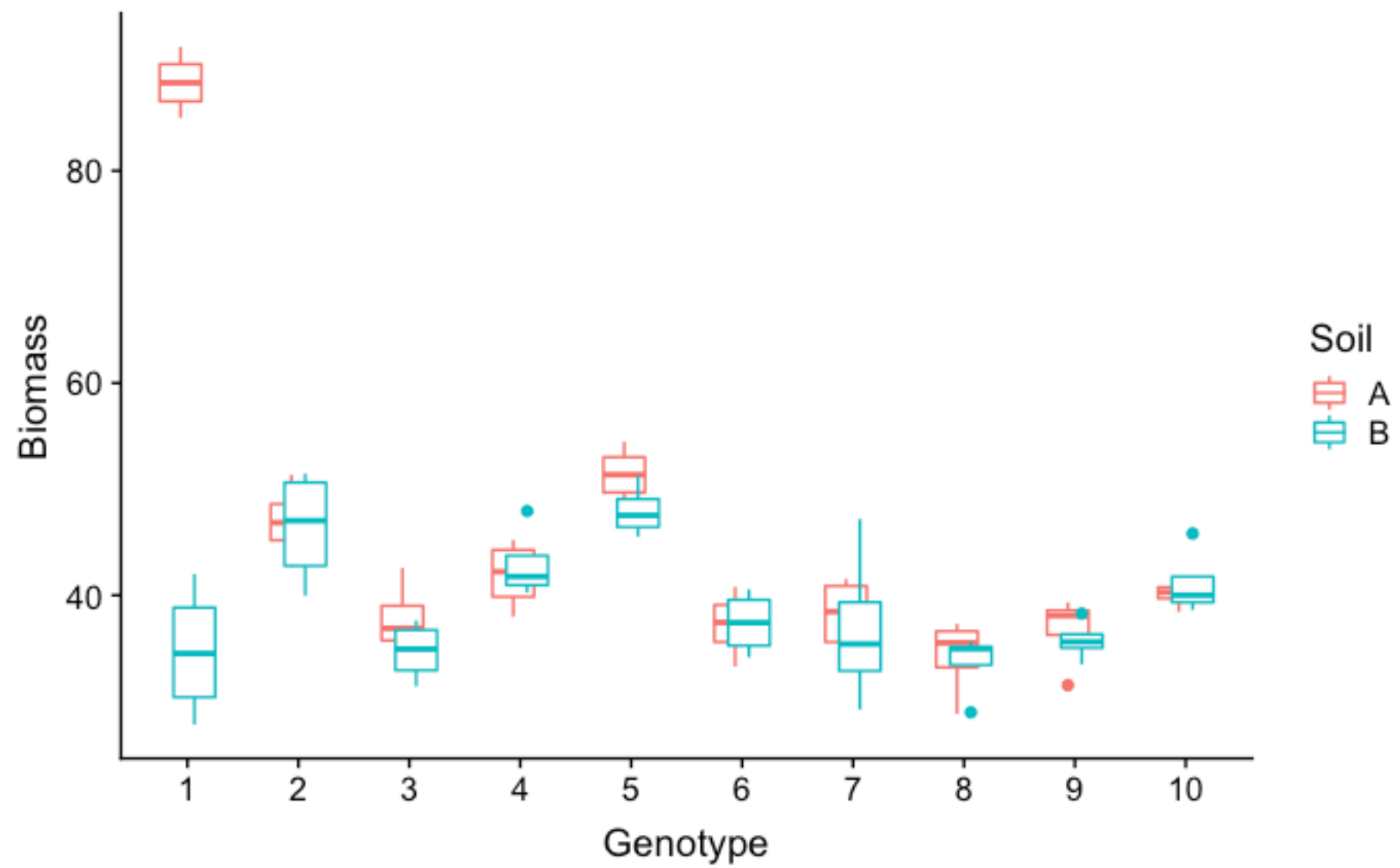| Soil:Pot	1	2	3	4	5	6	7	8	9	10
A-1	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
A-2	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
B-1	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
B-2	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X

Factorial

```
Type III Analysis of Variance Table with Kenward-Roger's method
              Sum Sq Mean Sq NumDF DenDF F value    Pr(>F)
Soil           552.8  552.82     1    20  42.565 2.332e-06 ***
Genotype      3723.8  413.76     9    20  31.858 6.140e-10 ***
Soil:Genotype 3692.3  410.25     9    20  31.588 6.636e-10 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

RCBD

```
Type III Analysis of Variance Table with Kenward-Roger's method
          Sum Sq Mean Sq NumDF DenDF F value Pr(>F)
Genotype 117.894  13.099     9     9  1.0086 0.4950
Soil      17.502  17.502     1     9  1.3476 0.2756
```

Factorial

```
 contrast estimate        SE df t.ratio p.value
 A - B      6.14294 0.941561 20   6.524  <.0001

Results are averaged over the levels of: Genotype
```

RCBD

```
 contrast estimate        SE df t.ratio p.value
 A - B      6.14294 5.291771  9   1.161  0.2756

Results are averaged over the levels of: Genotype
```