Many traits don’t behave in a simple Mendelian fashion

e.g., seed weight

Explanation:
**Reminder:** Snapdragon flower color inheritance (lecture 3)

White \( \times \) Red

\[ \text{Pink} \]

1 red: 2 pink : 1 white

Basal level:
One increment of color:
Two increments:

**Additive** or **contributing** allele:

**Non-additive** or **non-contributing** allele:
Suppose there are two genes contributing to color? Locus $A/a$ and locus $B/b$

How many possible genotypes?

Non-additive alleles: $a, b$

- Basal level = no additive alleles =
- One additive allele:
- Two additive alleles:
- Three additive alleles:
- Four additive alleles:
Looking at a cross…

white × fully red

aabb × AABB

AaBb Pink

$F_1 × F_1$

Plot the number of additive alleles

# of genes = 2
# of alleles = 4
# of phenotypes =

distribution of additive allele frequencies:

fraction exhibiting extreme phenotype =
In general:

- # of genes:
- # of alleles
- # of phenotypes:
- distribution of additive allele frequencies:
- fraction exhibiting extreme phenotype:

Some assumptions:
Determining the number of polygenes (n):
1. Obtain true-breeders
2. Make $F_1$. Phenotype:
3. Cross $F_1$ to generate $F_2$. Phenotype:
4. Fraction of $F_2$ showing either extreme phenotype =

Why study quantitative genetics?

- Agriculture
- Human biology and health
- Studying evolution