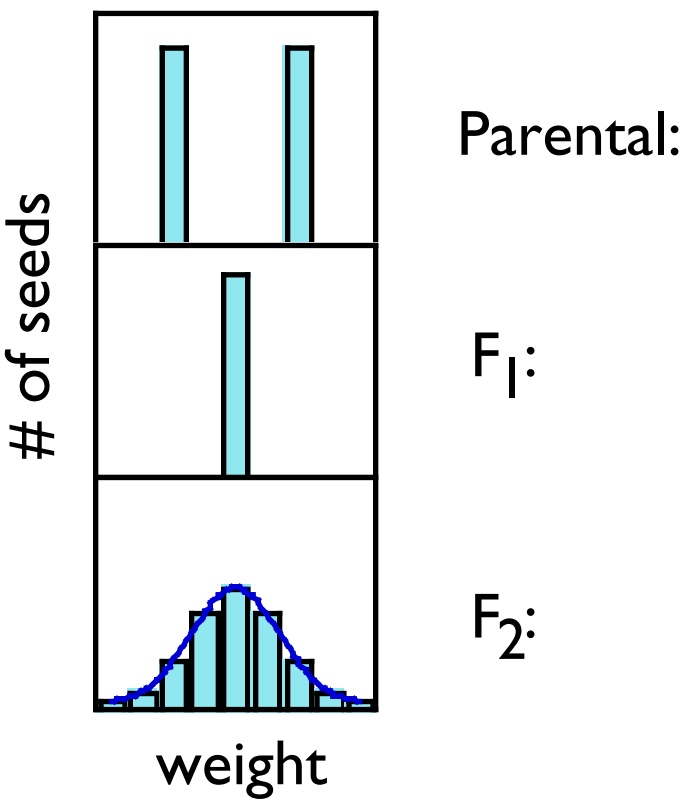
# Quantitative genetics

Genetics 371B Lecture 32 30 Nov. 1999

Many traits don't behave in a simple Mendelian fashion

e.g., seed weight




## Explanation:

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

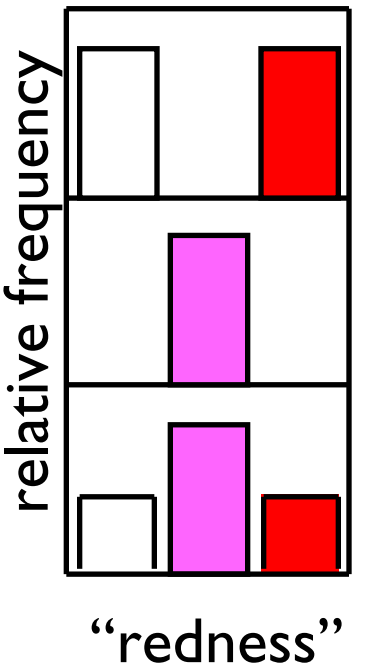
White x Red

↓

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 x fully red

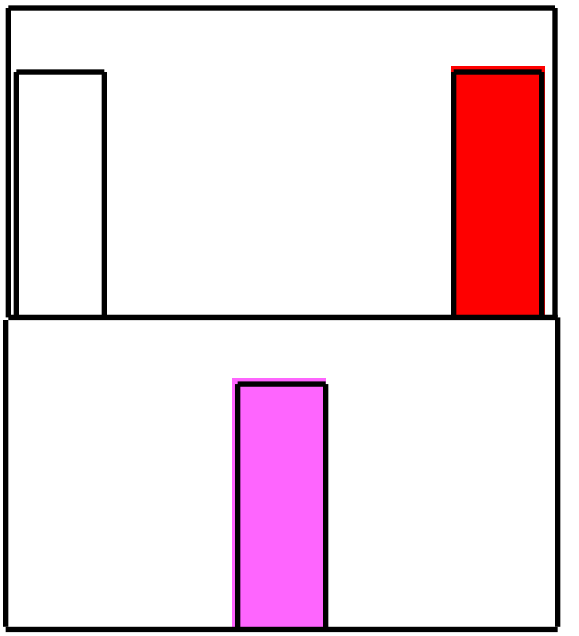
aabb x AABB

↓

AaBb Pink

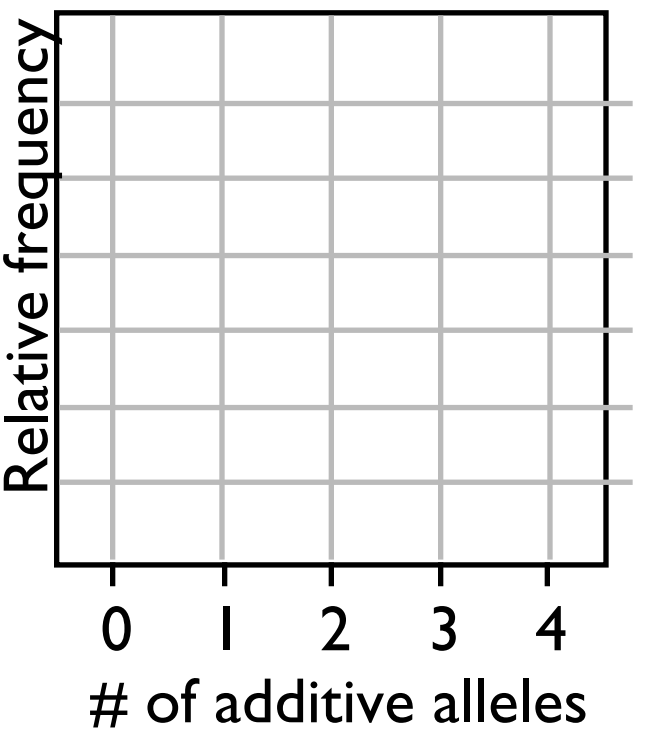
$F_1$ x $F_1$

↓



Plot the number of additive alleles

| | AB | Ab | aB | ab |
|---|---|---|---|---|
| AB | | | | |
| Ab | | | | |
| aB | | | | |
| ab | | | | |




# 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