Class 6 9/6/17
Mendelian Genetics

- Announcements
- Class administration
- Check iLearn for suggested problems

- Office hours HH668C:
  - Mon 2 – 4pm
  - THU 9/7 3:30 – 5:30pm

Romberg Tiburon Center Seminar Series

http://rtc.sfsu.edu/seminar/index.htm

Wednesday, 9/6/17
Bay Conference Center, 3:30PM

Cassia Pianca
Romberg Tiburon Center
Coastal Geomorphology
Evolution from Hours to Decades: Lessons from Video Remote Sensing

https://www.researchgate.net/profile/Cassia_Pianca

Biol 871 Colloquium in Microbiology, Cell & Molecular Biology

http://biology.sfsu.edu/content/MCMB

Thursdays, 9/7/17
SCI 210, 2:10 pm

Ben Blackman
UC Berkeley
Evolving timekeepers: the genetics of natural variation in diurnal and seasonal biological rhythms

https://nature.berkeley.edu/blackmanlab/Blackman_Lab/Welcome.html

Biol 572/872 Ecology, Evolution, & Conservation Biology Colloquium

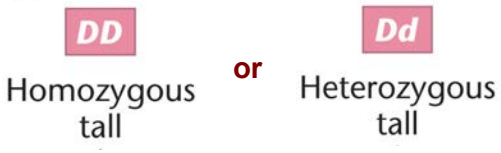
http://biology.sfsu.edu/content/EEC

Tuesday, 9/12/17
HH 543, 2:10pm

Rebecca Albright
California Academy of Sciences
Coral reefs under ocean acidification

https://www.calacademy.org/explore-science/rebecca-albright

Using a testcross - 1



X dd

Cross the unknown genotype plant with a known homozygous recessive individual

You find a tall pea plant…is it homozygous or heterozygous for the plant height trait?

- A testcross is a way to determine whether an individual displaying the dominant phenotype is homozygous or heterozygous for that trait

Figure 3.4

Using a testcross - 2

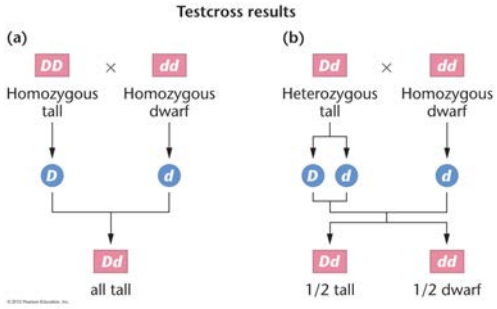


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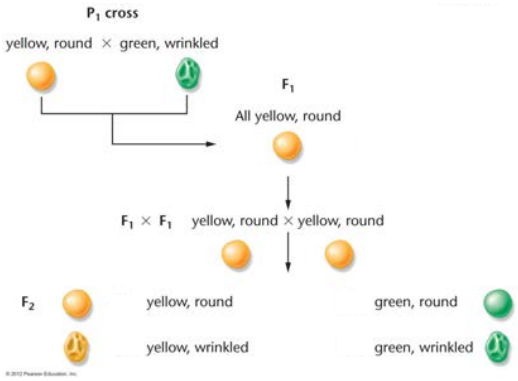
Figure 3.4

Can two traits be inherited independently?

Mendel crossed plants that were true-breeding for two traits: seed color and seed shape/texture



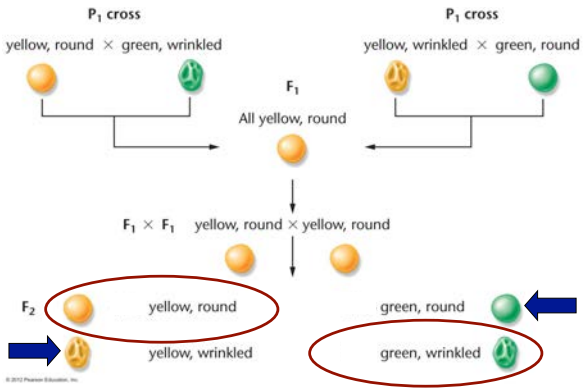
- Parental phenotype:
  - Yellow and round
  - Green and wrinkled
- F1 progeny phenotype:
  - Yellow and round
- Allow F1 to self-fertilize
- Analyzed the F2 progeny
  - Recovered 4 phenotypes

Figure 3.5

Results of dihybrid cross

Mendel crossed plants that were true-breeding for two traits: seed color and seed shape/texture

Reciprocal cross: Same results



- F2 progeny phenotypes
  - Two looked like original parents (P)
    - Yellow, round
    - Green, wrinkled
  - Two looked different from original parents (P)
    - Yellow, wrinkled
    - Green, round

Figure 3.5

Dihybrid Cross - 1

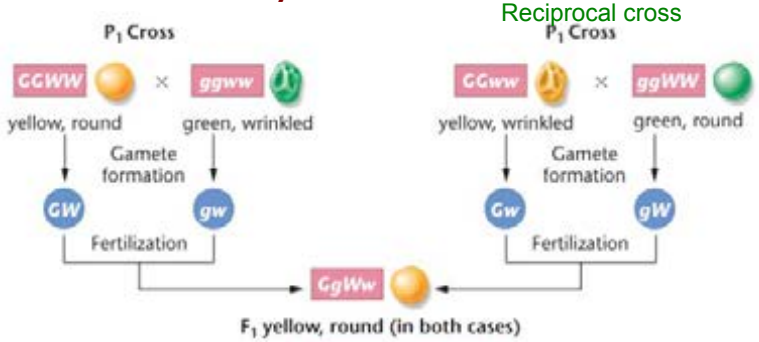
Reciprocal cross

- Each parent is true-breeding for two traits
  - Dominant traits
    - Yellow G, Round W
  - Recessive traits
    - Green g, Wrinkled w
- GG WW x gg ww [or GG ww x gg WW]
- Each parent generates haploid gametes

Figure 3.7

Dihybrid Cross - 2

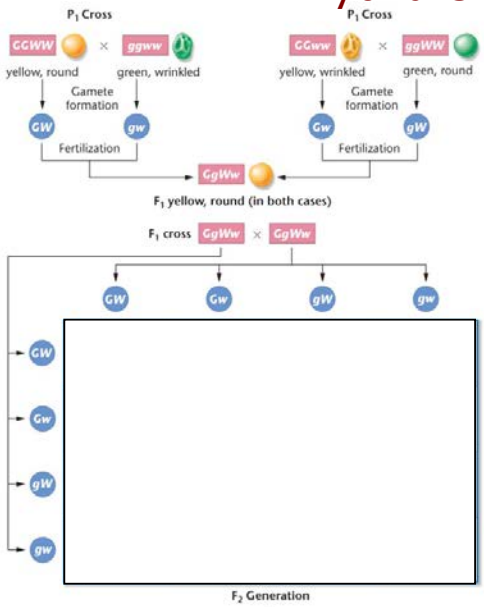
Reciprocal cross



- Each parent generates haploid gametes
  - GG WW --> GW
  - gg ww --> gw
- The first filial generation hybrid cross (F1)
  - genotype Gg Ww
  - phenotype is yellow, round

Figure 3.7

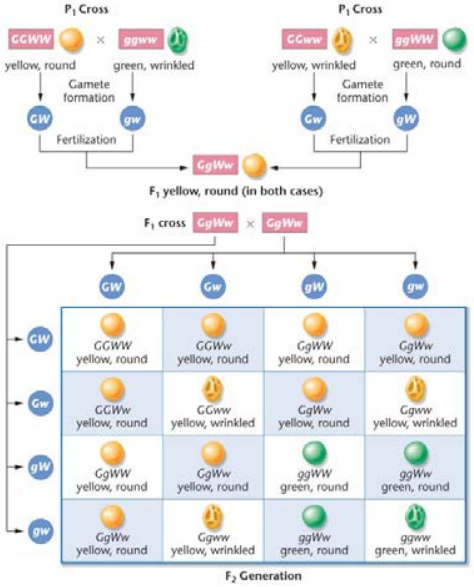
Dihybrid Cross - 3



- Allow the F1 to self-fertilize
- Principle of Independent Assortment predicts 4 different gametes
- If these two different genes sort independently, then expect to get 25% of each
- Gamete genotypes: GW, Gw, gW, gw

Figure 3.7

Dihybrid Cross - 4

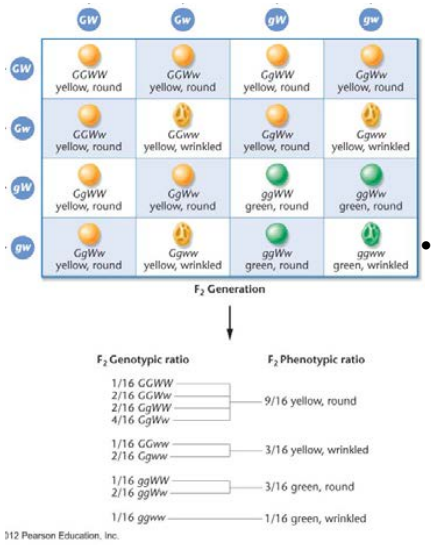


16 possible zygote combinations for F2 progeny

- 9 distinct F2 genotypes

Figure 3.7

Dihybrid Cross F2 phenotypic ratio: 9:3:3:1



Repeat this analysis using the reciprocal cross

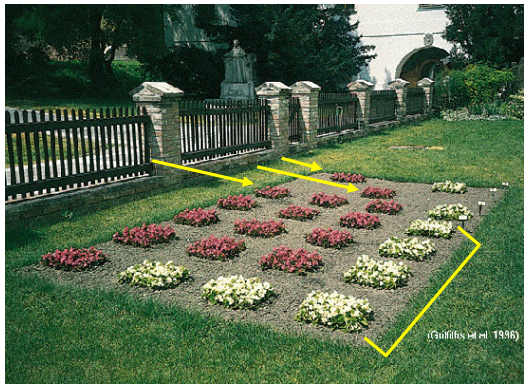
- 4 distinct phenotypic classes (ratio)
  - 9 Yellow, round (G- W-)
  - 3 Green, round (gg W-)
  - 3 Yellow, wrinkled (G- ww)
  - 1 Green, wrinkled (gg ww)

Figure 3.7

Dihybrid cross supports Mendel's fourth postulate

- Mendel's fourth postulate (independent assortment) states that:
  - Traits assort independently during gamete formation
  - All possible combinations of gametes will form with equal frequency

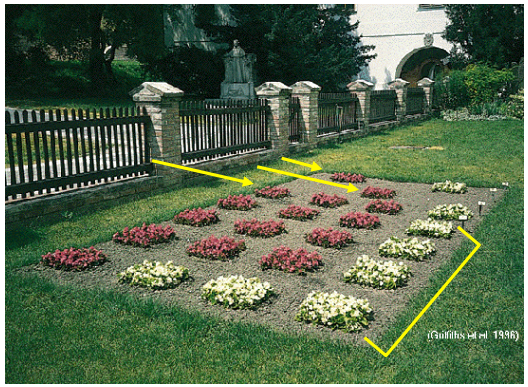
Mendel's garden



- Top row = P1
- 2nd row = F1
- 3rd row = F2
- If the Last 4 rows = result of dihybrid cross
  - What would be wrong with this picture?

http://www.mun.ca/biology/scarr/Mendels_Garden.html

Mendel's garden



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