

Dihybrid Crosses

Crossing TWO Traits at the same time!

So far, the punnett squares we have done in class have traced one gene, predicting the outcomes of genetic crossing. (ex: height)

- These would be considered mono-hybrid crosses.

Dihybrid crosses cross two individuals that differ in two traits.
(ex: height and eye color)

		<u>AaBb</u> x <u>AaBb</u>			
		AB	Ab	<u>aB</u>	ab
AB	<u>AABB</u>	<u>AABb</u>	<u>AaBB</u>	<u>AaBb</u>	
Ab	<u>AABb</u>	<u>AAbb</u>	<u>AaBb</u>	<u>Aabb</u>	
<u>aB</u>	<u>AaBB</u>	<u>AaBb</u>	<u>aaBB</u>	<u>aaBb</u>	
ab	<u>AaBb</u>	<u>Aabb</u>	<u>aaBb</u>	<u>aabb</u>	

Dihybrid Cross



P Generation



F₁ Generation

Phenotype:

gametes from heterozygous parent
YR
yR
Yr
yr

gametes from heterozygous parent	YR				
	yR				
	Yr				
	yr				

F₂ Generation

Phenotype: 9 : 3 : 3 : 1 :

The genes are located on separate chromosomes, so the traits themselves don't effect each other.

Example: White fruit color (W) is dominant over yellow fruit color (w), and flat shaped fruit (D) is dominant over round shaped fruit (d).

Parents: White, flat fruit x Yellow, round fruit
 WWDD wwdd

F1 offspring: WwDd

F1 cross: WwDd x WwDd

F1 cross: $WwDd \times WwDd$

First we need to figure out what possible gametes each parent could contribute.

These are what we are going to write on the sides of the square.

WwDd:



1. WD 2. Wd 3. wD 4. wd

(Since both parents have the same genotype, we can use this on BOTH sides of the square, if the parents have different genotypes we would have to do this process for the other parent as well)

F1 cross: $WwDd$ x $WwDd$

Fill in the gametes for each parent on the sides of the Punnett square and fill in the boxes as normal

Possible Gametes:

Analyze the Punnett Square

Example: White fruit color (W) is dominant over yellow fruit color (w), and flat shaped fruit (D) is dominant over round shaped fruit (d).

List the possible Genotypes of the offspring:

List the possible Phenotypes of the offspring:

What is the probability of have a yellow round fruit?

What is the genotypic ratio?

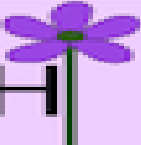

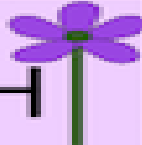
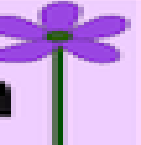
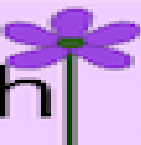

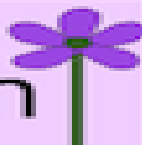
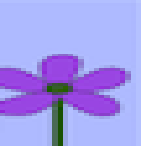
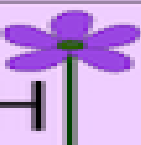

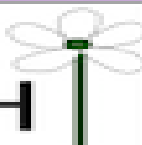
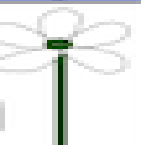
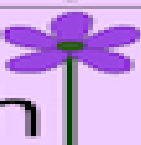

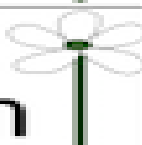
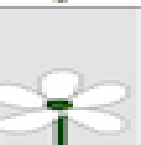
What is the phenotypic ratio?

	WD	Wd	wD	wd
WD	<u>WWDD</u>	<u>WWDd</u>	<u>WwDD</u>	<u>WwDd</u>
Wd	<u>WWDd</u>	●	<u>WwDd</u>	●
wD	<u>WwDD</u>	<u>WwDd</u>	<u>wwDD</u>	<u>wwDd</u>
wd	<u>WwDd</u>	●	<u>wwDd</u>	●

For a Dihybrid
 Cross of two
 heterozygous in
 BOTH traits
 parents, the
 PHENOTYPIC
 RATIO is
 ALWAYS
9:3:3:1

FfHh x **FfHh**



	FH	Fh	fH	fh
FH	FFHH 	FFHh 	FfHH 	FfHh 
Fh	FFHh 	FFhh 	FfHh 	Ffhh 
fH	FfHH 	FfHh 	ffHH 	ffHh 
fh	FfHh 	Ffhh 	ffHh 	ffhh 

9  : 3  : 3  : 1 

Purple, Tall : Purple, Dwarf : White, Tall : White, Dwarf

Dihybrid Practice

Set up a punnett square using the following information:

- Black fur (B) is dominant to white fur (b) in Guinea Pigs. Rough fur (R) is dominant to smooth fur (r)
- Cross a heterozygous parent (BbRr) with a heterozygous parent (BbRr)

List the possible Genotypes of the offspring:

List the possible Phenotypes of the offspring:

What is the probability of have a black-smooth guinea pig?

What is the genotypic ratio?

What is the phenotypic ratio?

Dihybrid Practice

Set up a punnett square using the following information:

Black fur (B) is dominant to white fur (b) in Guinea Pigs. Rough fur (R) is dominant to smooth fur (r)

Cross a heterozygous parent (**BbRr**) with a homozygous parent (**bbrr**)

List the possible gametes for each parent:

Heterozygous:

Homozygous:

List the possible Genotypes of the offspring:

List the possible Phenotypes of the offspring:

What is the probability of have a yellow round fruit?

What is the genotypic ratio?

What is the phenotypic ratio?