Mendelian Genetics II – Dihybrid Crosses

Environmental Impact on Phenotype



* \_\_\_\_\_\_\_\_: of the soil will change the color of hydrangea flowers from blue to pink
* Temperature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Generation “Gap”

* Parental \_\_\_\_\_\_\_\_\_ Generation = the parental generation in a breeding experiment.
* F1 generation = the first-generation offspring in a breeding experiment. (1st filial generation)
	+ From breeding individuals from the P1 generation
* \_\_\_\_\_\_\_\_\_\_generation = the second-generation offspring in a breeding experiment.
(2nd filial generation)
	+ From breeding individuals from the F1 generation

Mendel’s Laws - Laws of Inheritance

* **Law of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: When gametes (sperm egg etc…) are formed each gamete will receive one allele or the other.
* **Law of independent \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: Two or more alleles will separate independently of each other when gametes are formed

Results of Monohybrid Crosses

* Inheritable factors or genes are responsible for all heritable characteristics
* Phenotype is based on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ - Which of these does natural selection act on?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Each trait is based on two genes, one from the mother and the other from the father
	+ True-breeding individuals are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (both alleles) are the same

Law of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* In a cross of parents that are pure for contrasting traits, only one form of the trait will appear in the next generation.
* All the offspring will be heterozygous and express only the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ trait.
* RR x rr yields all Rr (round seeds)

**Law of Segregation**

* During the formation of gametes (eggs or sperm), the two alleles responsible for a trait \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from each other.
* Alleles for a trait are then "\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_" at fertilization, producing the genotype for the traits of the offspring.

**Applying the Law of Segregation**



Use the Foil Method:

First

Outside

Inside

Last

Law of Independent Assortment

* Alleles for *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* traits are distributed to sex cells (& offspring) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of one another.
* This law can be illustrated using *dihybrid crosses*.

Dihybrid Cross

* A breeding experiment that tracks the inheritance of two traits.
* Mendel’s “Law of Independent Assortment”
* Each pair of alleles segregates independently during gamete formation

Dihybrid Cross

Traits: Seed shape & Seed color

Alleles:

R round
 r wrinkled
 Y yellow
 y green

|  |  |
| --- | --- |
| **Dihybrid Cross** | **Summary:** **Phenotypic Ratio****Genotypic Ratio** |
| **Screen shot 2012-03-26 at 12.48.40 PM.pngSummary of Mendel’s laws** |