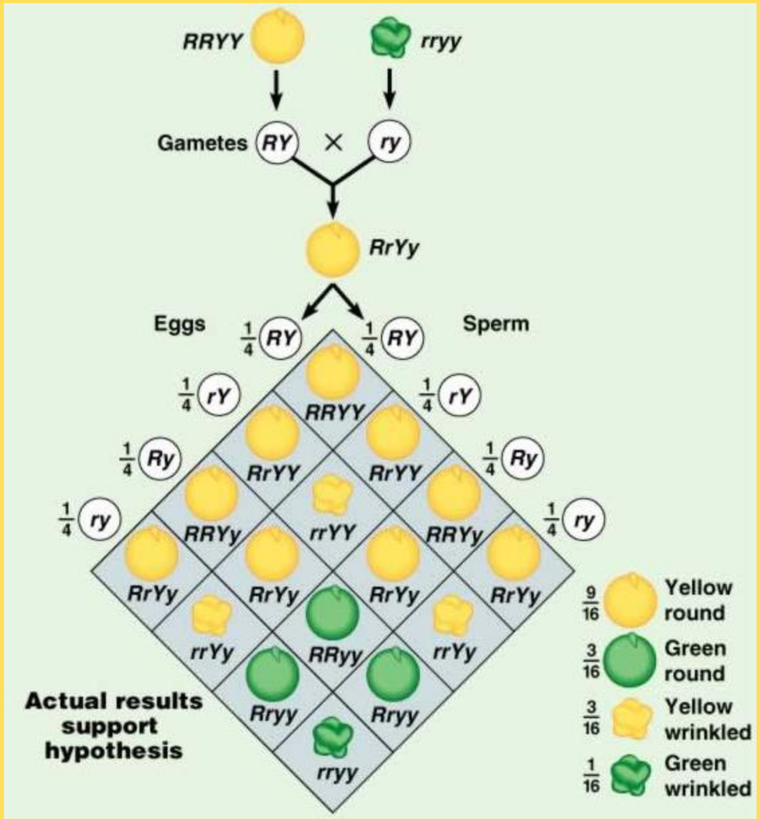
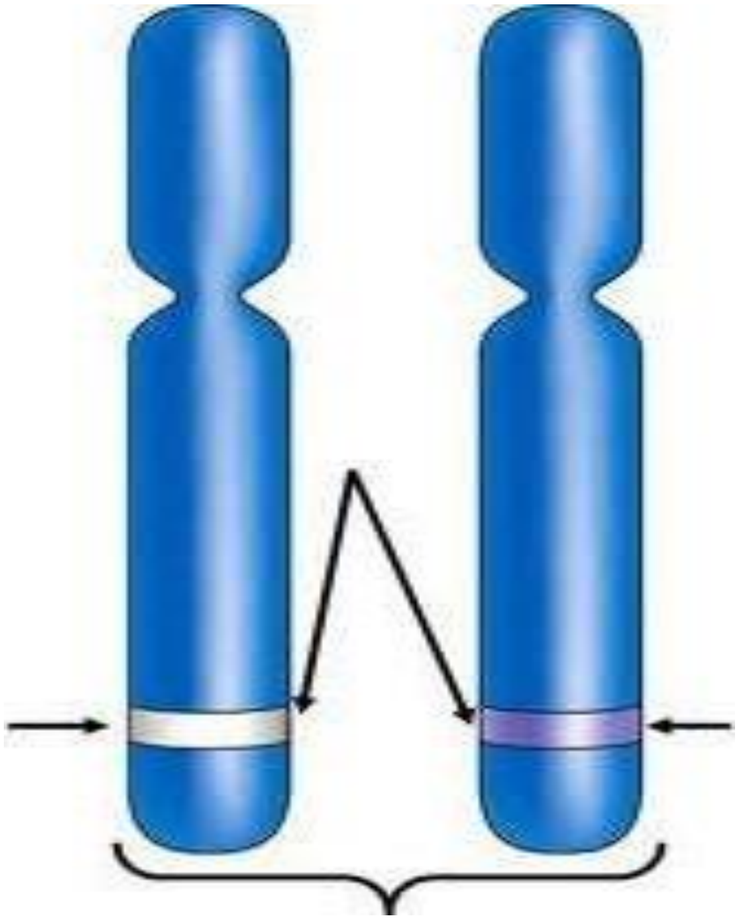
# CHAPTER - 5




## PRINCIPLES OF INHERITANCE AND VARIATION – DIHYBRID CROSS, TEST CROSS

# *Terminologies in Genetics:*

- ***Factor or Gene:*** Functional unit of heredity responsible for the expression of character in the progeny.
- ***Locus:*** The position of the gene on the chromosomes.
- **Allele:** The alternative form of a gene for a contrasting character present on identical locus of homologous chromosomes.

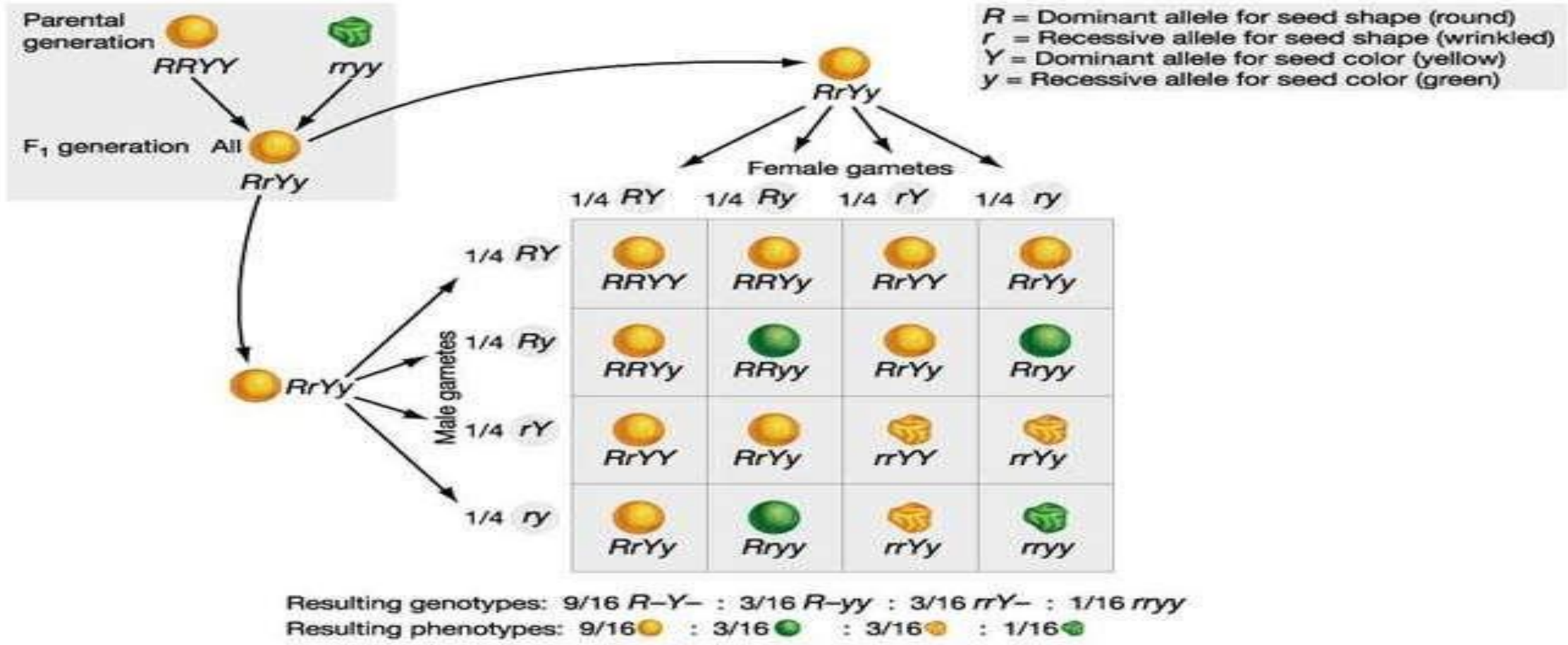


# *Inheritance of two gene:*

- ***Mendel's 2nd law or Law of independent assortment:***
- It states that, 'factors for different pairs of contrasting characters in a hybrid assorted (distributed) independently during gamete formation.
- Dihybrid cross: The cross between two parents, which differs in two pairs of contrasting characters.

# Dihybrid cross:

| Parents | Round Yellow | Wrinkled Green |
| --- | --- | --- |
| phenotype | | |
| genotype | RRYY | rryy |
| gametes | RY | ry |
| F1 generation | RrYy | |
| | Round Yellow | |




# Phenotypic ratio : 9 : 3 : 3 : 1

# *Dihybrid test cross.*

- F1 hybrid is crossed with recessive green wrinkled pea plant.
- Recessive green wrinkled – rryy, Gamet ry
- F1 hybrid : round yellow- RrYy, Gamets: RY, Ry, rY, ry.

| Gam ets | RY | Ry | rY | ry |
|---|---|---|---|---|
| ry | RrYy | Rryy | rryY | rryy |

Phenotypic ratio – 1 : 1 : 1 :1

# TRI HYBRID CROSS

| | ABC | ABc | AbC | Abc | aBC | aBc | abC | abc |
|---|---|---|---|---|---|---|---|---|
| ABC | AABBCC | AABBcC | AAbBCC | AAbBcC | aABBCC | aABBcC | aAbBCC | aAbBcC |
| ABc | AABBCc | AABBcc | AAbBCc | AAbBcc | aABBCc | aABBcc | aAbBCc | aAbBcc |
| AbC | AABbCC | AABbcC | AAbbCC | AAbbcC | aABbCC | aABbcC | aAbbCC | aAbbcC |
| Abc | AABbCc | AABbcc | AAbbCc | AAbbcc | aABbCc | aABbcc | aAbbCc | aAbbcc |
| aBC | AaBBCC | AaBBcC | AabBCC | AabBcC | aaBBCC | aaBBcC | aabBCC | aabBcC |
| aBc | AaBBCc | AaBBcc | AabBCc | AabBcc | aaBBCc | aaBBcc | aabBCc | aabBcc |
| abC | AaBbCC | AaBbcC | AabbCC | AabbcC | aaBbCC | aaBbcC | aabbCC | aabbcC |
| abc | AaBbCc | AaBbcc | AabbCc | Aabbcc | aaBbCc | aaBbcc | aabbCc | aabbcc |

# TEST CROSS

- **Crossing** of F1 individual having dominant phenotype with its homozygous recessive parent is called **test cross**.

- The **test cross** is used to determine whether the individuals exhibiting dominant character are homozygous or heterozygous.

# TEST CROSS

- 4:0 ratio
- Unknown is homozygous dominant
- TT X tt

| | T | T |
|---|---|---|
| t | Tt | Tt |
| t | Tt | Tt |

# Test cross

- 2:2 ration
- Unknown is heterozygous
- Tt X tt

| | T | t |
|---|---|---|
| t | Tt | tt |
| t | Tt | tt |

# . BACK CROSS


THANK
YOU