

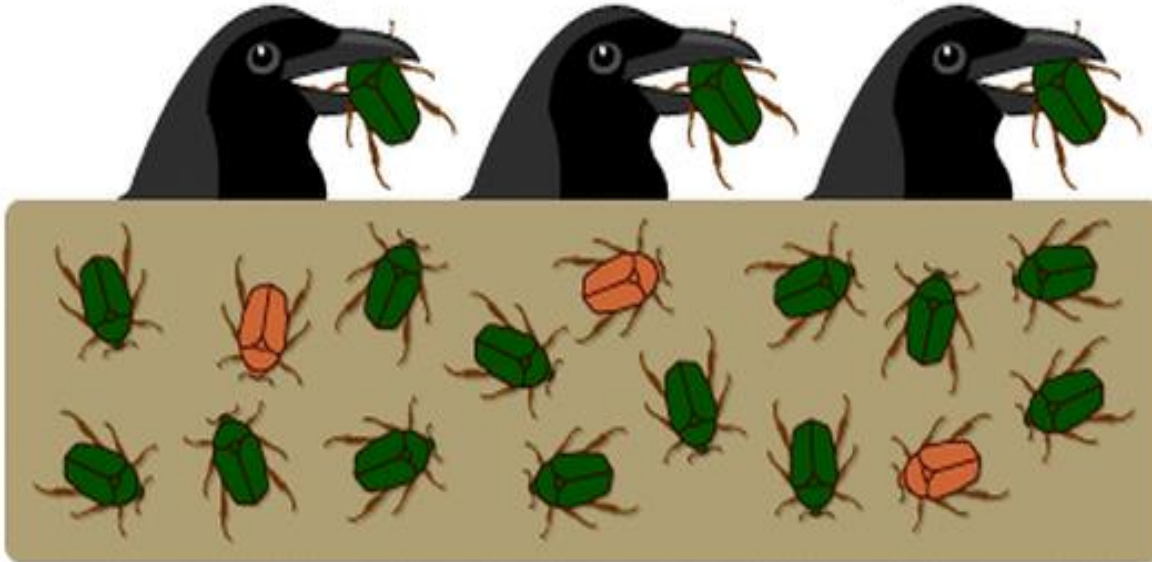
# CHAPTER 3 :

# SELECTION & SPECIATION



Yum! Green beetles! Our favorite!

## 3.1 : SELECTION



## 3.2 : SPECIATION



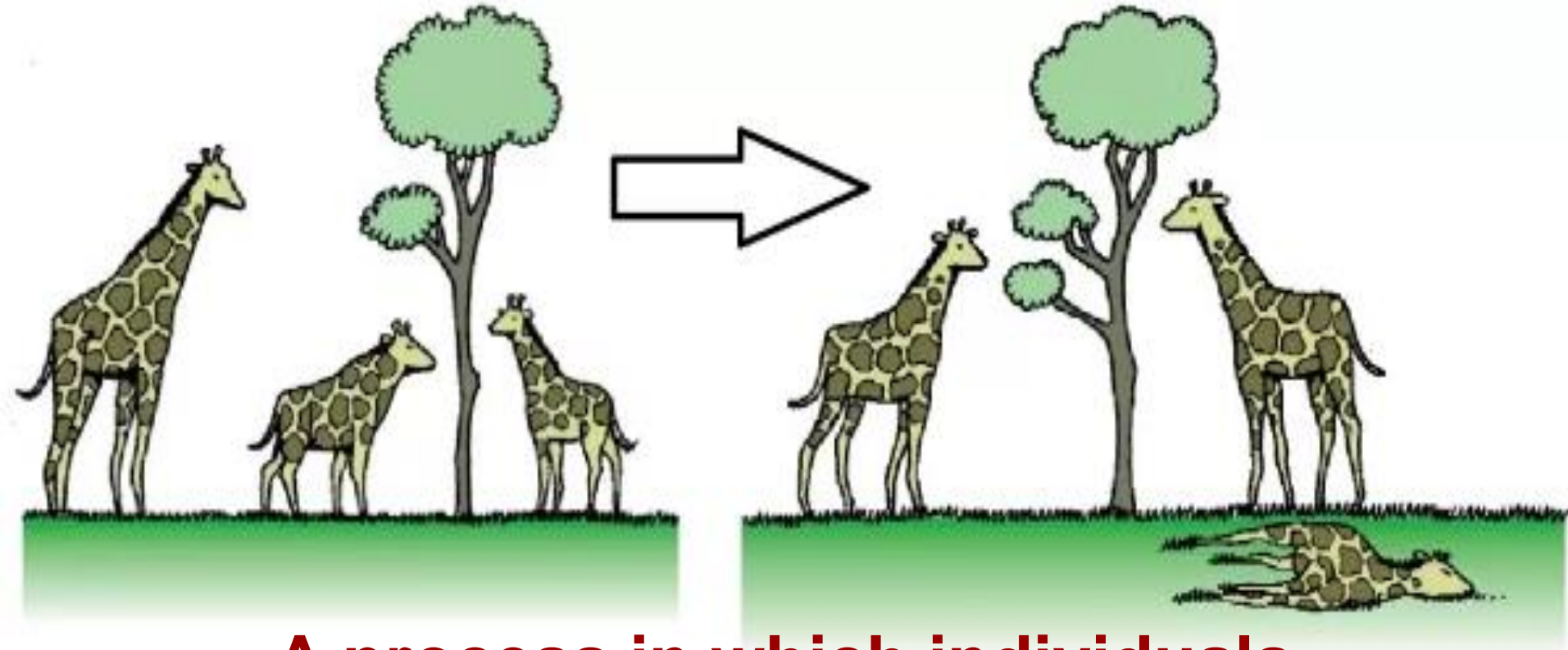
# LEARNING OUTCOMES :

## 3.1 SELECTION

At the end of the lesson students should be able to :

- a) **Define** natural selection.
- b) **State** three types of natural selection.
- c) **Analyse** stabilizing, disruptive and directional selection with examples.
- d) **Define** artificial selection.
- e) **Describe** inbreeding and outbreeding.

# Definition of NATURAL SELECTION



**A process in which individuals with certain inherited traits survive and reproduce at higher rates than other individuals because of those traits**

# Types of Natural Selection

**1**

**Stabilizing selection**

**2**

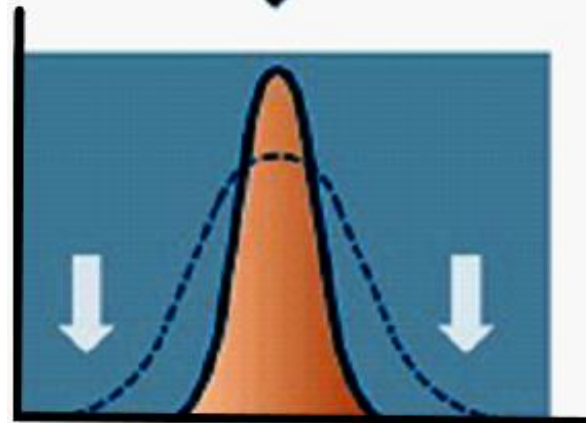
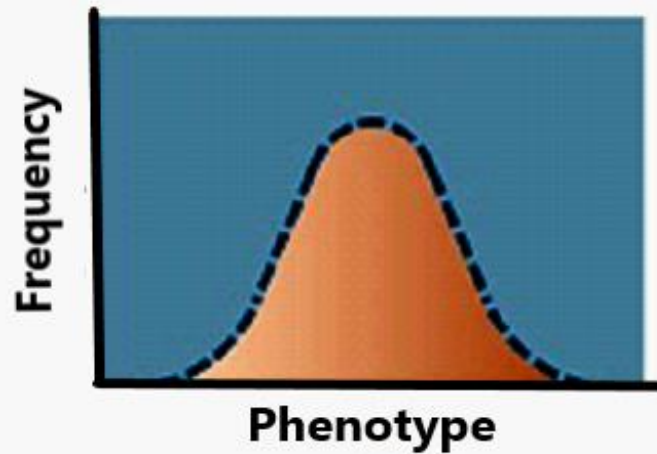
**Directional selection**

**3**

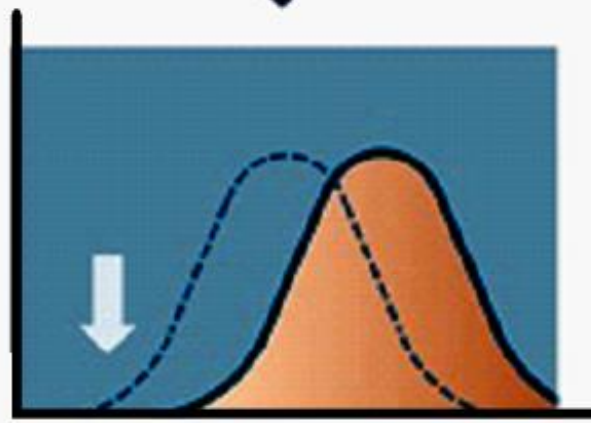
**Disruptive selection**



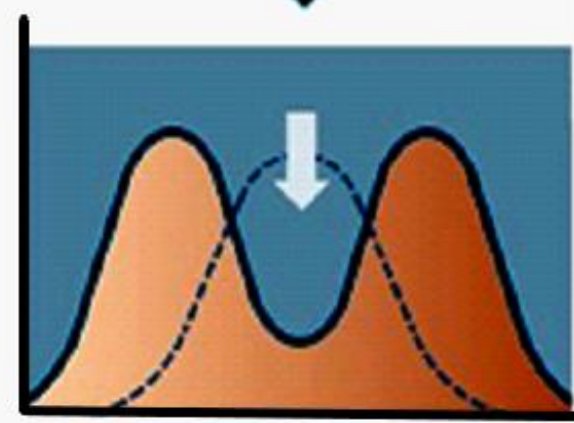
# 3 Types of Natural Selection :



**Stabilizing selection**



**Directional selection**



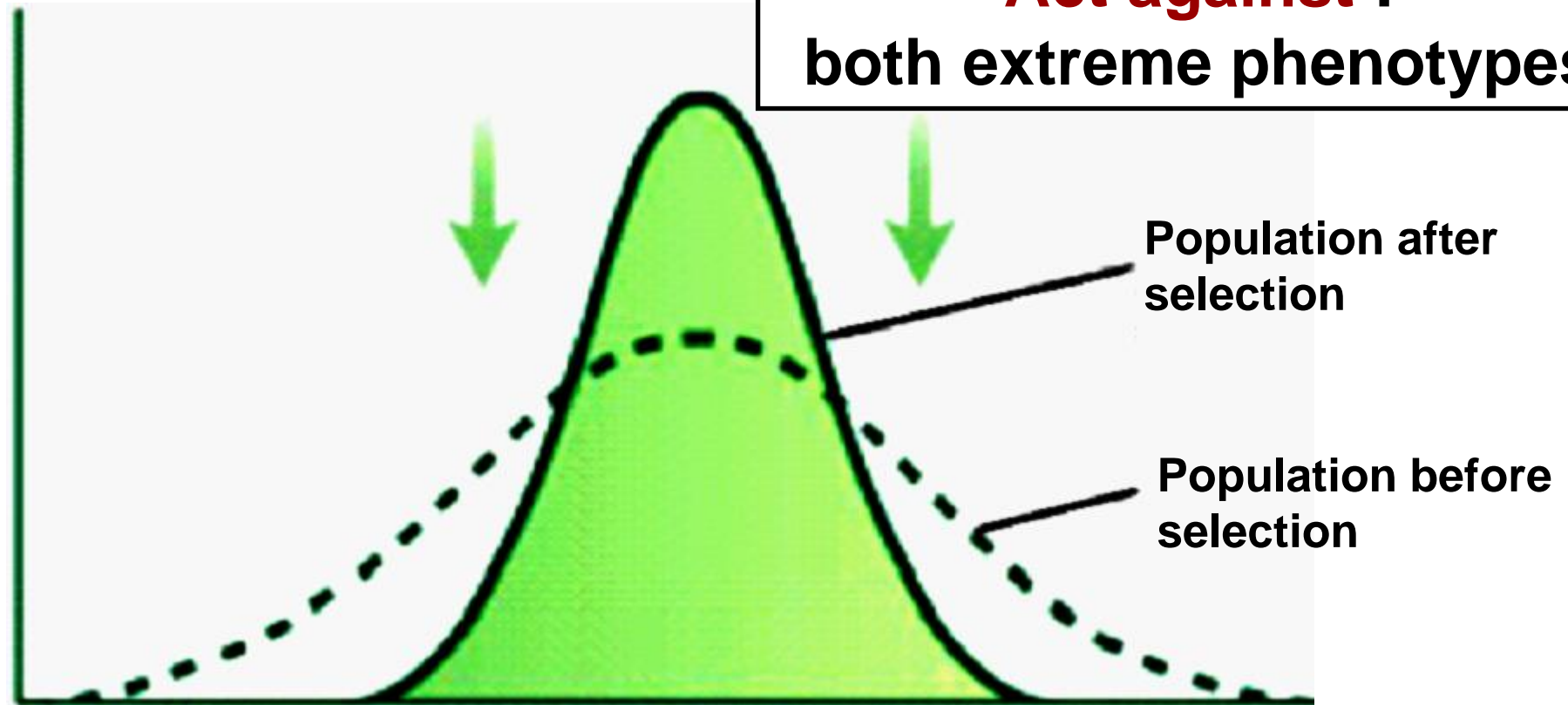
**Disruptive selection**

# Types of Natural Selection :

## 1 Stabilizing selection

**Favour :**  
intermediate phenotype

**Act against :**  
both extreme phenotypes



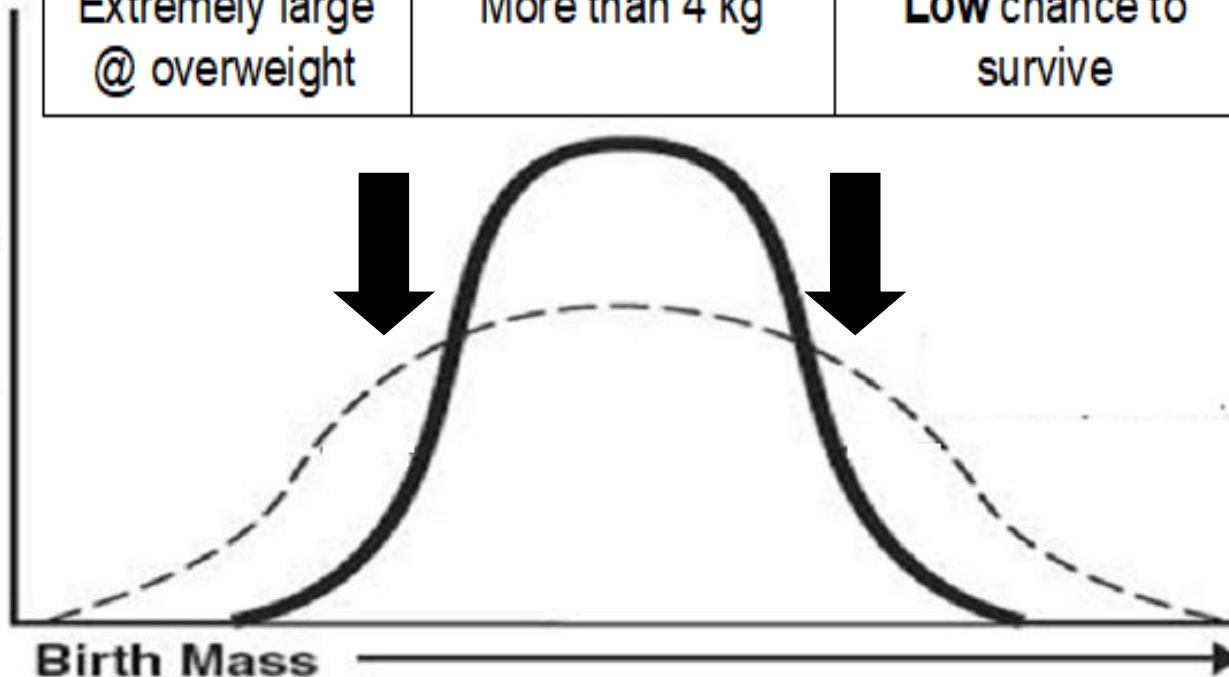
# Example of **Stabilizing Selection** :

## *Birth mass of human baby*

Phenotype	Weight	Survival chances
Extremely small @ underweight	Less than 2 kg	Low chance to survive
Intermediate	2 – 4 kg	High chance to survive
Extremely large @ overweight	More than 4 kg	Low chance to survive



Percentage of Population





# Types of Natural Selection :

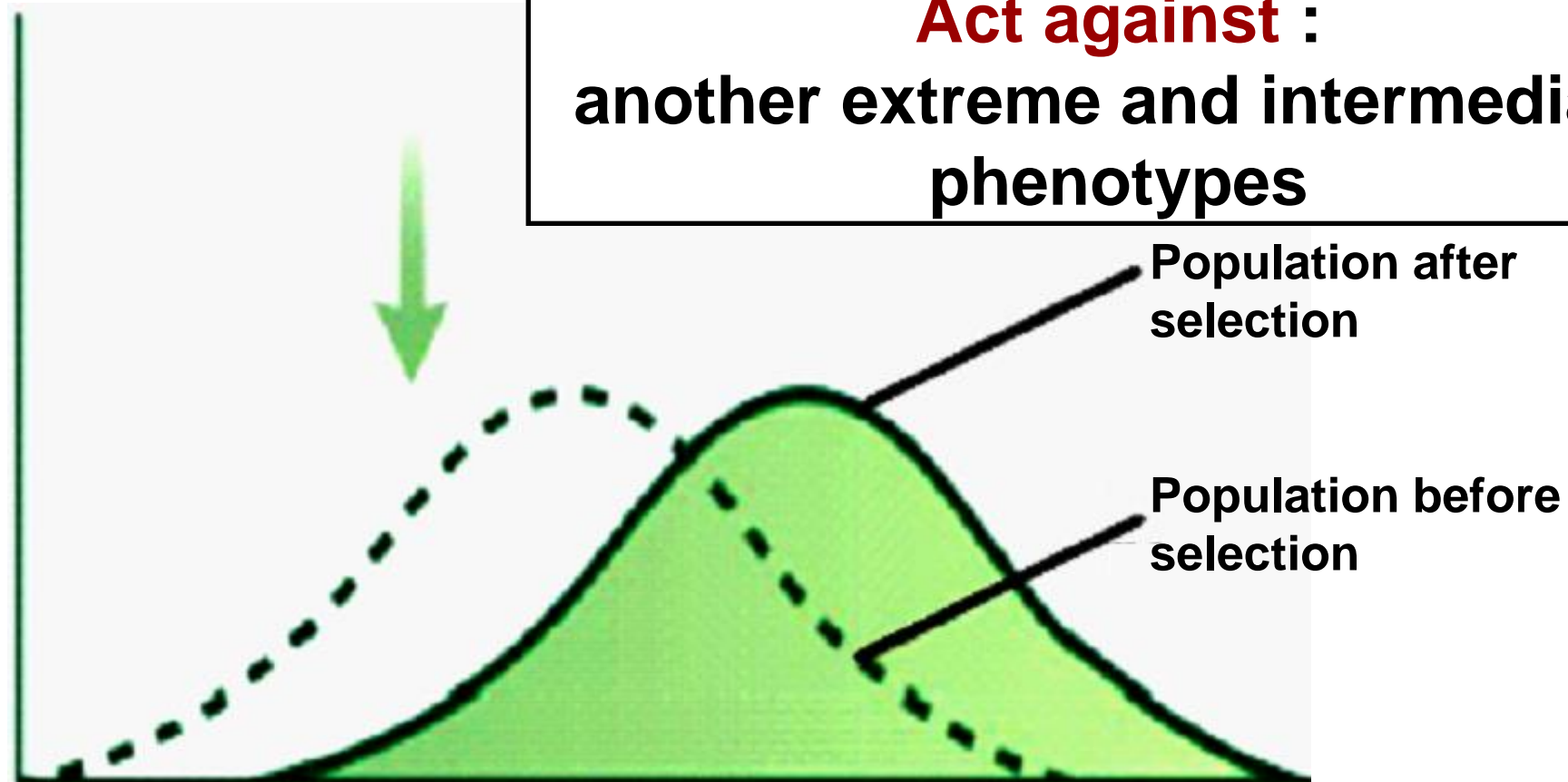
## 2 Directional selection

**Favour :**

one extreme phenotype

**Act against :**

another extreme and intermediate phenotypes

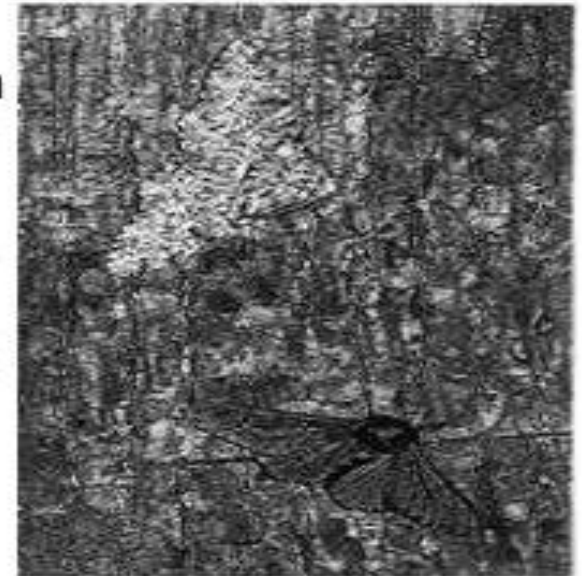


# Example of **Directional Selection** : *Color of peppered moths*

Originally, light colored peppered moth hid on light colored trees. As Industrial Revolution progress in 19<sup>th</sup> century, the color of peppered moth shifted from light color to dark color.



**Industrial Revolution**



# Types of Natural Selection :

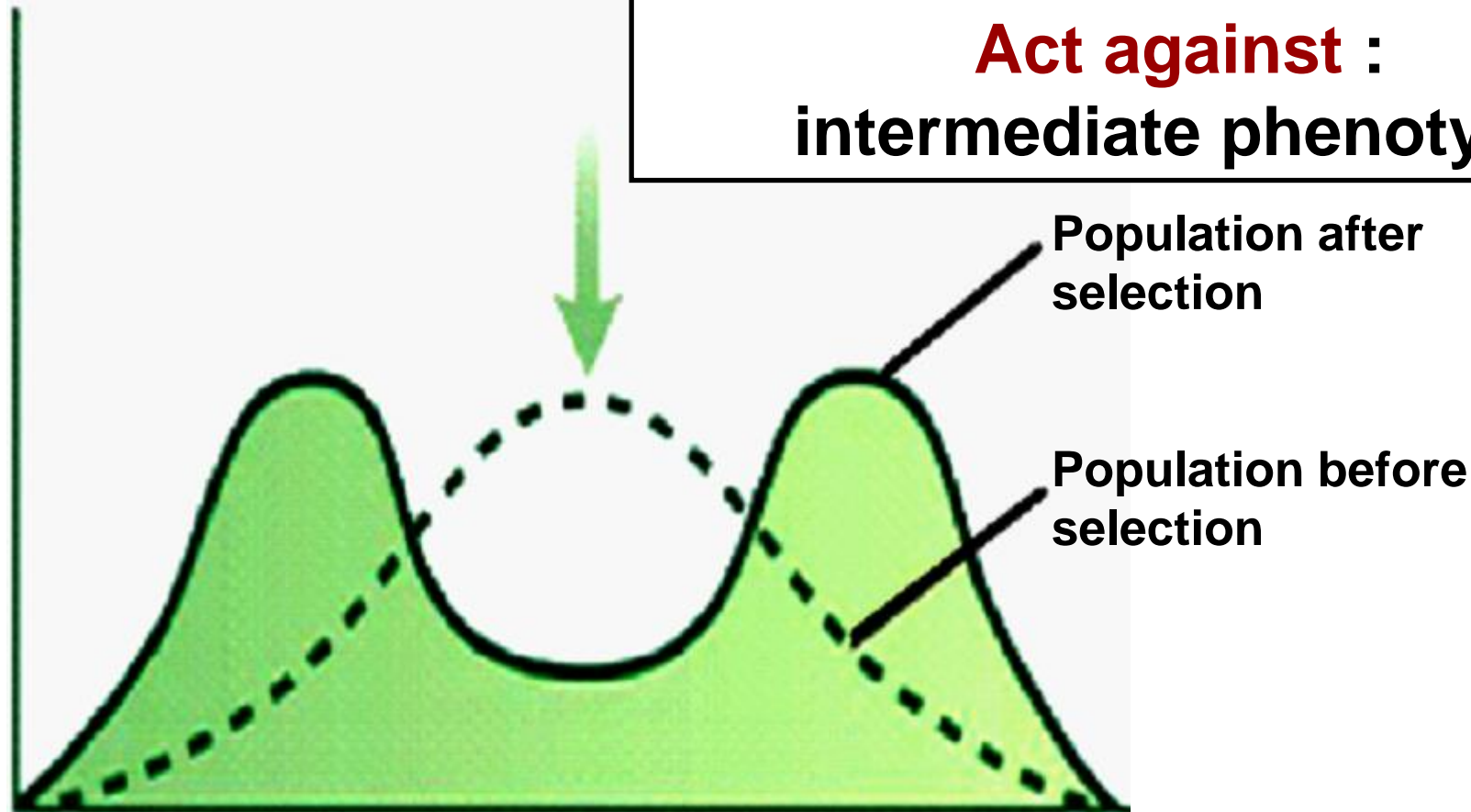
## 3 Disruptive selection

**Favour :**

both extreme phenotypes

**Act against :**

intermediate phenotype



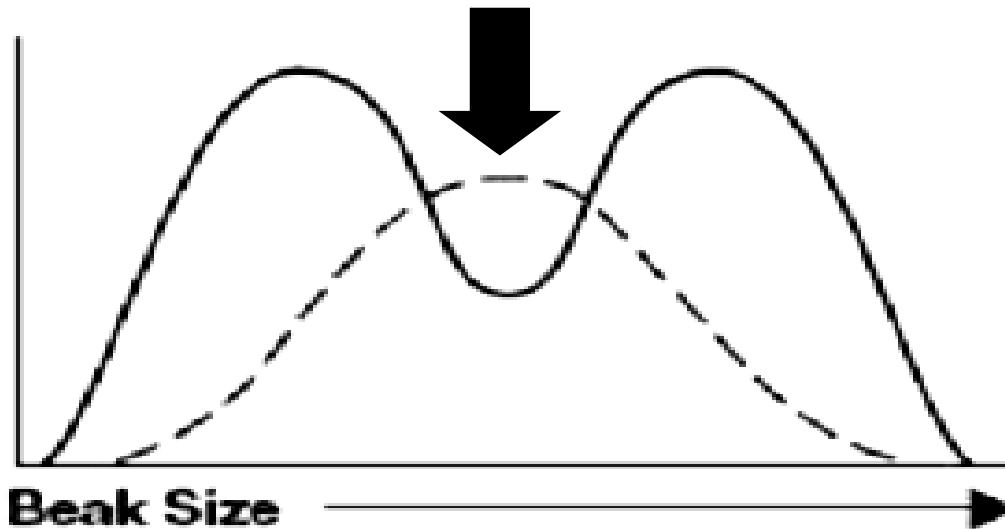
# Example of **Disruptive Selection** :

## *Beak size of birds in Galapagos Island*

PHENOTYPE	BEAK SIZE	EFFECT	SURVIVAL CHANCES
Extreme	Small beak size	Can feed on small size seeds	<b>High</b> chance to survive
Intermediate	Medium beak size	Cannot feed on both small and large seeds	<b>Low</b> chance to survive
Extreme	Large beak size	Can feed on large size seeds	<b>High</b> chance to survive



Number of Birds  
in Population



# SUMMARY

## 3 Types of Natural Selection :

BEFORE SELECTION

DURING SELECTION

AFTER SELECTION

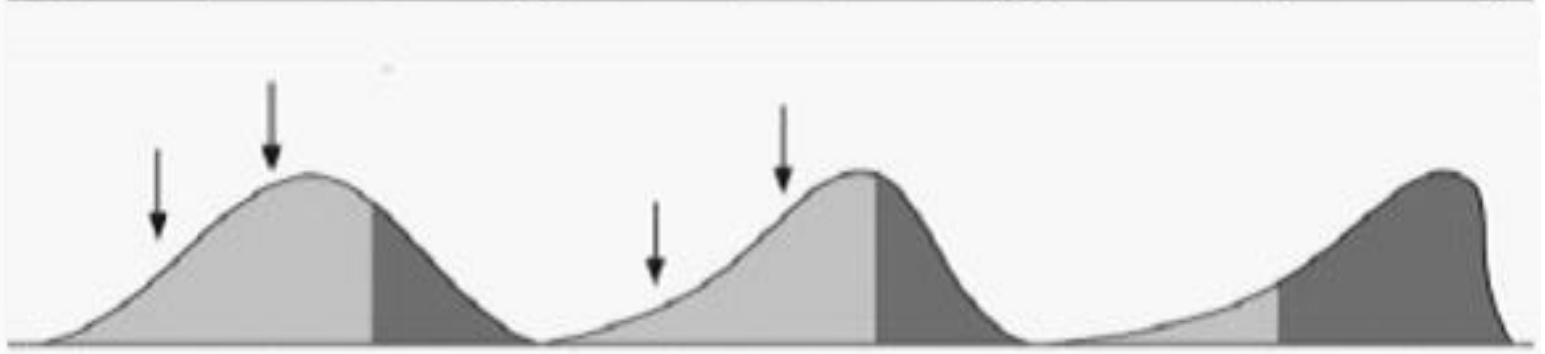
Stabilizing selection



Disruptive selection



Directional selection





# Definition of ARTIFICIAL SELECTION

DAIRY COW



BEEF COW



**A process in which human altering the genotype of an organism by choosing favored characteristics for breeding thus producing new strain of organism for specific purpose**

# Example of ARTIFICIAL SELECTION



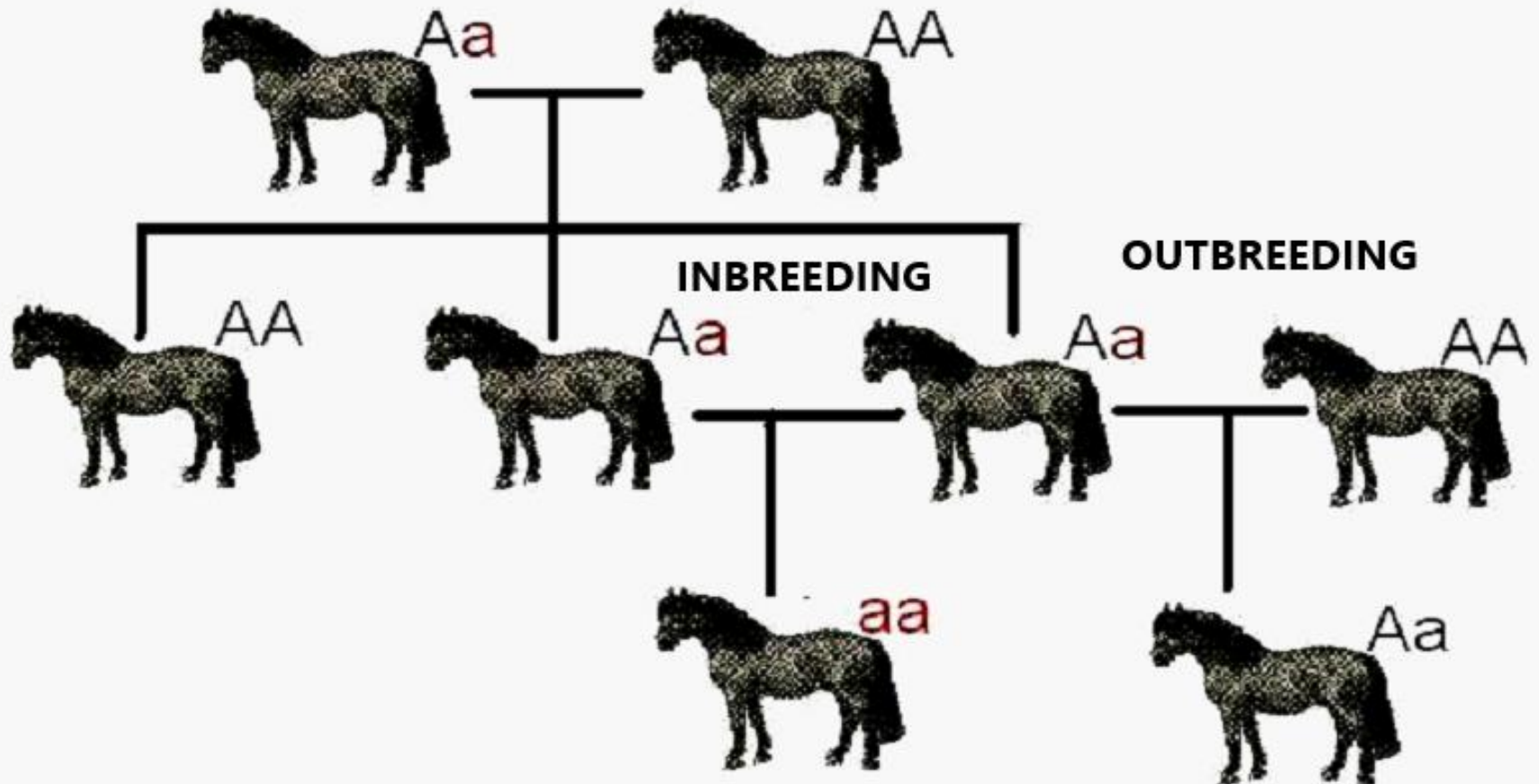
***Brahman cattle is crossed with English shorthorn cattle thus producing Santa Gertrudis cattle***

# TWO Types of Artificial Selection

## ❖ Inbreeding      ❖ Outbreeding

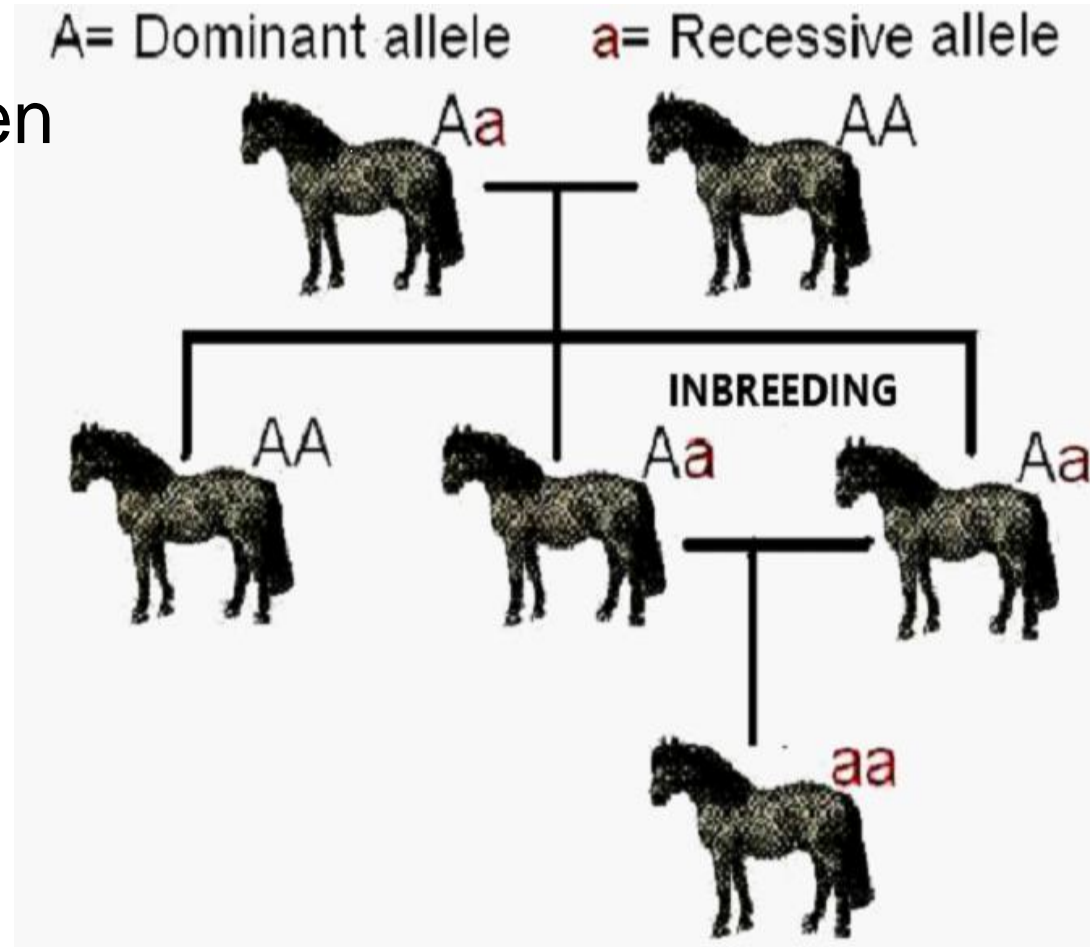
A= Dominant allele

a= Recessive allele



# What is INBREEDING ?

- Selective reproduction between individuals having similar genotype or closely related
- Breeding between siblings or offspring with one of the parents or marriage between cousins in humans



# What is OUTBREEDING ?

- Mating between distantly related individuals of a species
- e.g. crossing between oil palm *Pisifera* with oil palm *Dura* producing hybrid *Tenera*

