



**WELCOME**

# GPB 603 : Principles of Plant Breeding

## BRINJAL

**FLORAL BIOLOGY,  
SELFING AND  
CROSSING**



# INTRODUCTION

- **Family** : Solanaceae
- **Chromosome No.** :  $2n = 2X = 24$
- **Scientific Name** : *Solanum melangena*



# IMPORTANCE

- One of the most common principal vegetable in most parts of the world.
- Potential raw material in pickling & dehydrating industry.
- Contain some medicinal properties, white brinjal is found to be good for diabetic patients.
- Excellent remedy for liver complaints, when taken as fried brinjal fruit with sesame oil.

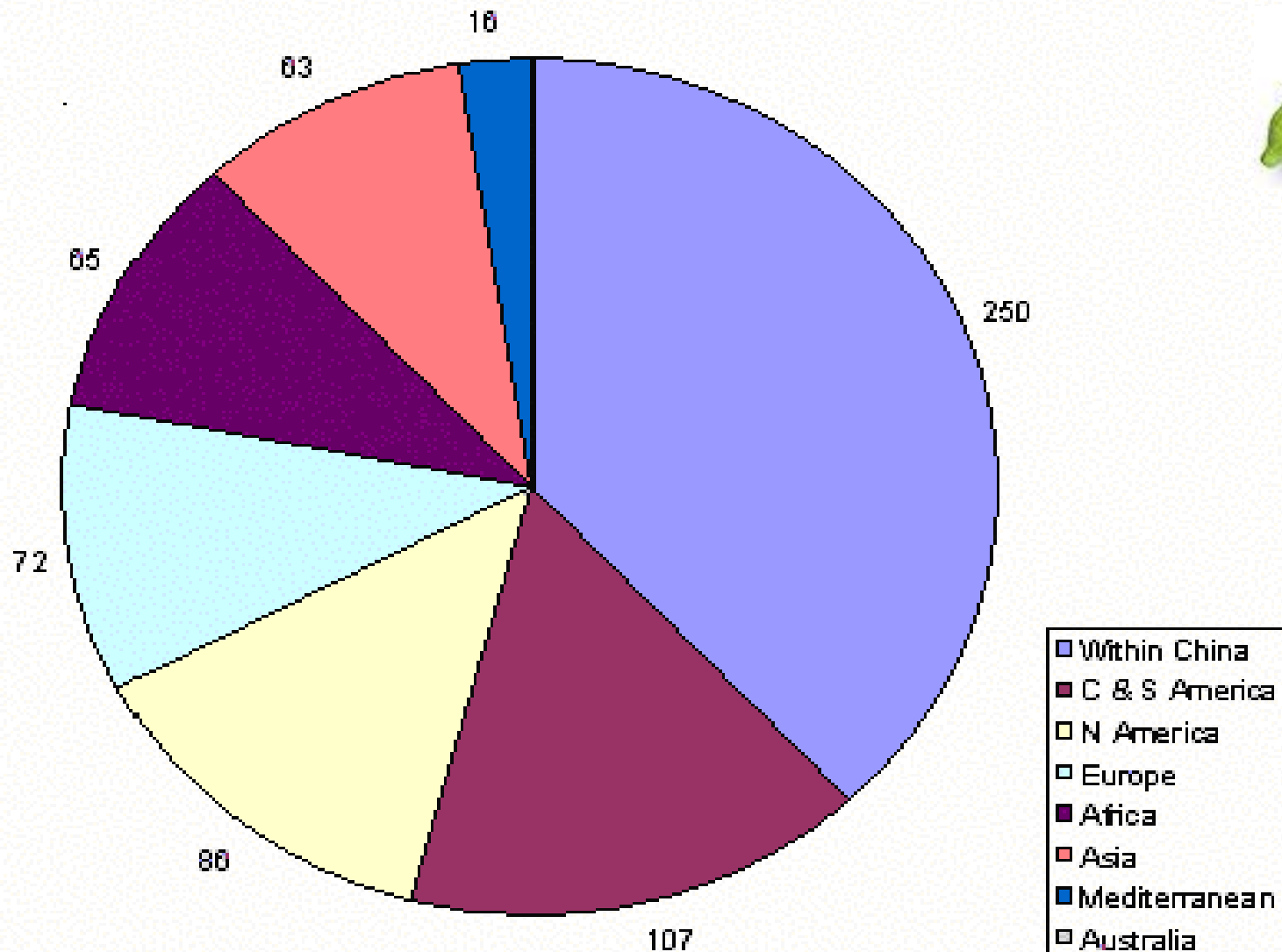


# GEOGRAPHICAL DISTRIBUTION

- Cultivated in most parts of the world
- Area : Exact figure is not known
- Leading countries are USA, China, India, France, bangladesh & philiphines



# GEOGRAPHICAL DISTRIBUTION





# ORIGIN

- **Originated in bengal plains of India** (Martin 1979)
- **Indo-burma region** (Valvilov 1928)
- **Introduced to rest of the world from India.**



# Systematic position

- **Kingdom : Plantae**
- **Order : Solonales**
- **Family : Solanaceae**
- **Genus : Solanum**
- **Species : Melangena**



# Botanical varieties

- Almost all the cultivars belong to the 3 main botanical varieties under the species *melangena* viz,
  - 1. *Solanum melangena var esculentum* (round egg plant)
  - 2. *S. melangena var serpentinum* (long egg plant)
  - 3. *S. melangena var depressum* (dwarf egg plant)

# SPECIES

- *Solanum melangena*
- *S.coagulans*
- *S.xanthocarpum*
- *S.indicum*
- *S.maccani*
- *S.auriculatum* (resistant to leaf curl disease)
- *S.pubescence*
- *S.robustum*



# Successful interspecific hybrids

- 1. *Solanum indicum* X *S.melangena*
- 2. *S.xanthocarpum* X *S.trilobatum*
- 3. *S.melangena* X *S.coagulans*

By Schaff *et al.*



# Botany

- 1. Annual herbaceous plant.
- 2. Erect, compact and well branched plant.
- 3. Leaves are large, simple, lobed & hypopubescent in nature.
- 4. Inflorescence is solitary or cluster of 2-5 flowers.



# INFLORESCENCE



**Infloroscence is solitary  
or cluster of 2-5  
flowers.**



# THE FLOWER



Flowers are actinomorphic, hypogynous, hermaphrodite with pistil surrounded by the stamens. White or pinkish in colour ,depending on the cultivars.



# TYPES OF FLOWERS

There are four types of flowers depending on the length of style & size of the ovary viz,

1. Long styled with big sized ovary.



2. Medium styled with medium sized ovary.

3. Pseudo styled with rudimentary ovary.

4. True short styled with very rudimentary ovary.



# CALYX



- 5 sepals
- United
- pubescent



# COROLLA



- pinkish\White colour
- 5 petals
- Gamopetalous



# ANDROECIUM




- 5-6 stamens

- Small filaments

- Large anthers



-  Stamens surrounding the pistil

- Anther dehiscence is longitudinal

# Gynoecium



# L.S OF FLOWER

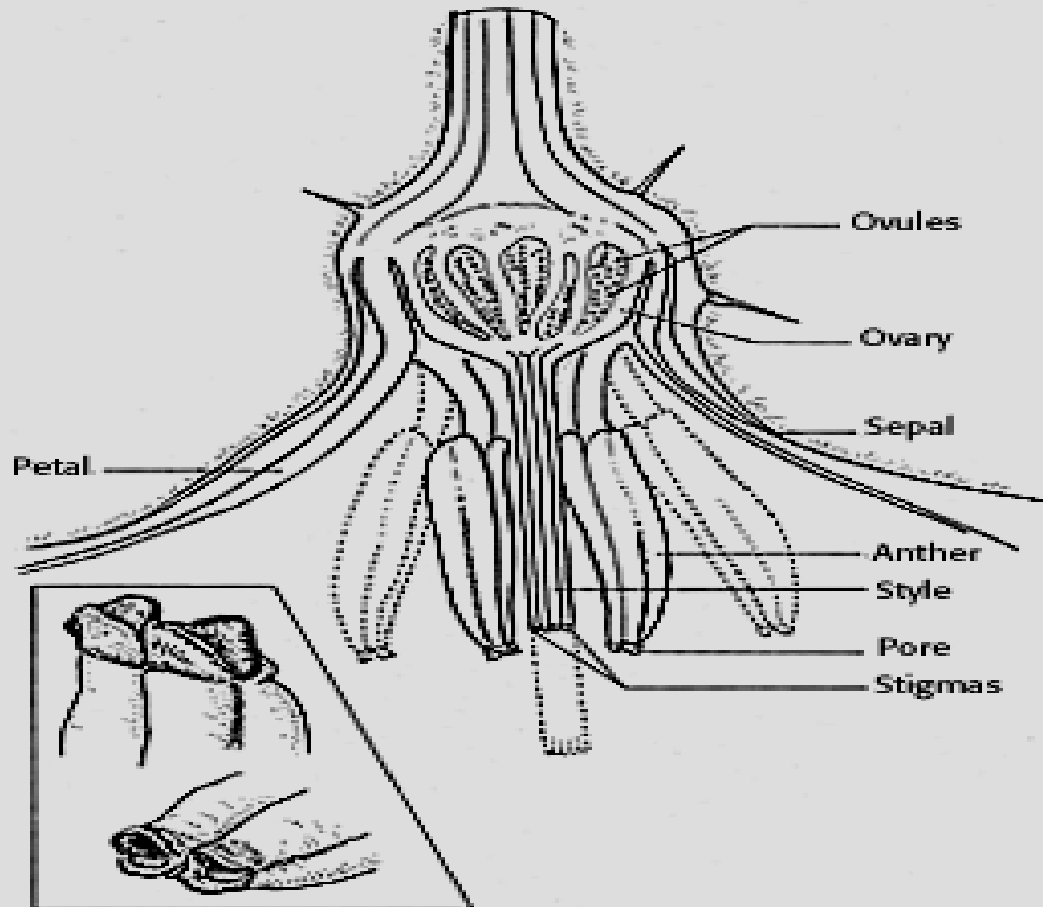


Figure 108. - Longitudinal section of eggplant flower, x6. Dotted areas indicate variation in length of style and in positions of stamens. Insert shows pores of anther tubes enlarged.



# L.S OF FLOWER



# POSITIONS OF STIGMA

There are three positions of stigma are observed viz,

1. Found either above the stamens,
2. Same level as that of stamens,
3. Below the stamens,



Highest fruit set is found when the stigma is above the stamens.



# ANTHESIS

- Starts in morning around 7.30 am and continues till 11 am.
- Peak flower opening – 8.30 to 10.30 am.

It has been observed that anthesis and dehiscence are mainly influenced by the daylight, temp & RH.



# POLLINATION

Essentially a Self Pollinated crop as stamens surrounding the pistil & stamens dehisce at the same time the stigma is receptive.

- Self pollination varies between 80-92%.
- Pollen viability is retained for 8-10 days at 20 -30°C & RH of 50-55%.



# POLLINATION (contd..)

- But 2-22% Natural Cross pollination have been reported depending on
  - 1. Flower type (more in long & medium stilled flowers).
  - 2. position of the stigma in relation to stamen.

Insect activity at flowering time.

- Planting density.
- Wind velocity & direction.



# FERTILIZATION & FRUIT SET

- Maximum if pollination is at the time of anthesis.
- Fertilization occurs 70-80% in long styled flowers.
- Pseudo short & true short styled flowers donot set any fruit.
- Highest fruit set found in flowers having long stigma.
- Repeated pollination with pollen from different plants shows increased fruit set.

Fruit is a berry.

# SELFING TECHNIQUES

- Bagging of young bud.
- Manual transfer of freshly collected pollen on stigma of flowers of the same plant.



# CROSSING TECHNIQUES

- Includes ,
  - Hand emasculation.
  - Pollen collection.
  - Artificial pollination.



# EMASCULATION

- Removal of ♂ organs from flower .
- Use sharp-pointed forceps to force open the selected buds.
- Then split open the anthers & remove them.





# POLLEN COLLECTION & POLLINATION

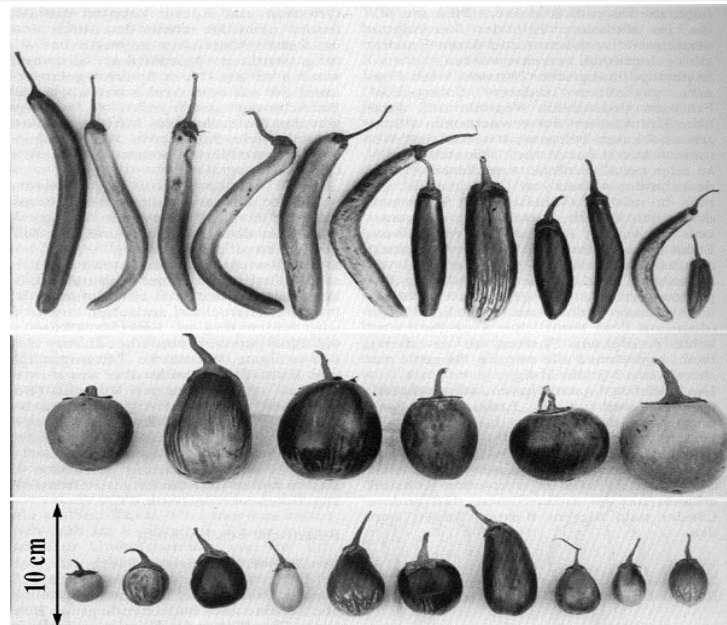
- Collect pollen from the male parent during early morning hours.
- Pollinate on the stigma of emasculated flowers.
- Bag the pollinated flower to prevent out crossing.



# Brinjal \ Egg plant



# DIFFERENT VARITES





**THANK YOU**



**Table : Types and characteristics of the maize kernels.**

<b>Type of endosperm</b>	<b>Type of pericarp</b>	<b>Crown appearance</b>	<b>Texture of endosperm (mature)</b>	<b>Uses and % as of the total</b>	<b>Distribution</b>
<b>Pop</b>	<b>Very thick</b>	<b>Pointed/Rounded</b>	<b>Hard</b>	<b>Confection (&lt;1%)</b>	<b>USA, Eventually all regions</b>
<b>Flint</b>	<b>Thick medium</b>	<b>Rounded</b>	<b>Mostly hard</b>	<b>General (14%)</b>	<b>Argentina, Southern Europe</b>
<b>Dent</b>	<b>Medium</b>	<b>Dented</b>	<b>Hard &amp; Soft</b>	<b>Livestock feed, industrial process, milground meal (73%)</b>	<b>World wide</b>
<b>Floury</b>	<b>Stretched thin</b>	<b>Slight dented</b>	<b>Soft</b>	<b>Direct human uses as flour, direct at milk stage, parched, beverages (12%)</b>	<b>Latin America and South West</b>
<b>Sweet</b>	<b>Thick medium</b>	<b>Wrinkled</b>	<b>Glassy</b>	<b>Direct at milk stage, 70% moisture, frozen, canned, parched and beverage (~1%)</b>	<b>North America (USA &amp; Canada)</b>