

## Cotton (*Gossypium* spp) ( $2n = 2x = 26$ , $2n = 4x = 52$ )

Cotton is grown in tropical and sub-tropical regions of more than 80 countries of world.

**Origin:** Central Africa

**Distribution:** China, USA, India, Pakistan, Egypt. In India Rajasthan, Maharashtra, M.P. Gujarat, A.P. Karnataka and Tamil Nadu.

**Progenitors:** *Gossypium africanum*

*G. raimondii*

*Gossypium africanum* – reached India by traders and travelers and differentiated into two species

*G. herbaceum* and *G. arboreum*

**Cultivated Species:**

### I. Asiatic cottons or old world cotton (Diploid cotton – $2n = 26$ )

1. *G. arboreum* –
2. *G. herbaceum* –

### II. New world cotton (Tetraploid cottons – $2n = 52$ )

3. *G. hirsutum* – American / upland cotton
4. *G. barbadense* – Egyptian / sea island cotton

*G. hirsutum* is predominant species which contributes about 90% to the current world production. Besides cultivated species there are about 46 wild species India is the only country where all the 4 cultivated species are grown for commercial cultivation.

**B reeding objectives:**

1. High yield (more bolls, bigger bolls and high lint percentage)

$$\text{Lint \%} = \frac{\text{weight of fibre}}{\text{weight of cotton}}$$

$$\text{Lint index} = \frac{100 \text{ seed weight} \times \text{lint \%}}{100 - \text{lint \%}}$$

2. Early maturity
3. Superior fibre quality
4. Better plant type
5. Resistance to diseases like fusarium wilt, rots etc.,
6. Resistance to insects like boll worms, Jassids, Thrips etc.,
7. Resistance to abiotic stresses.

**B reeding Procedures:**

**1. Introduction** : **Cambodia cotton** in South India, **MCU- 1**

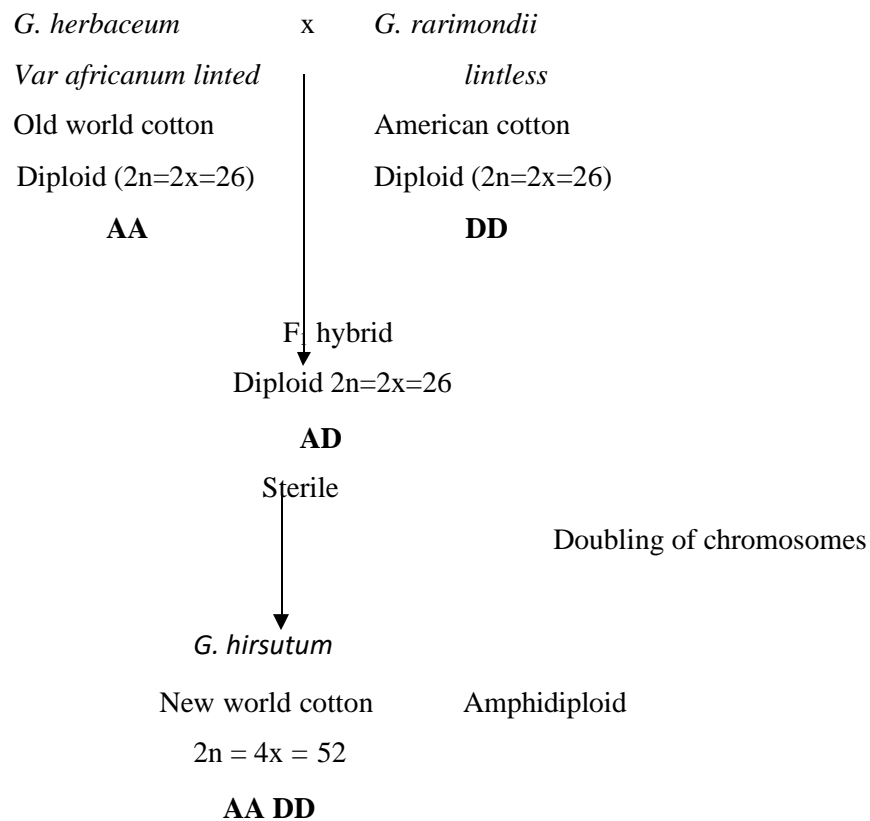
**2. Selection** : **K1** cotton reselection from SRT -1

**3. Hybridization and selection**

- a) Inter varietal : **MCU 5** - Multiple cross derivative  
**MCU 6** - Multiple cross derivative  
**MCU 9** - (MCU 5 x MCU 8)

**b) Inter specific hybridization**

African linted species (*G. africanum*) reached America through pacific ocean and after crossing with American lintless wild diploid species *G. rarimondii* gave birth to tetraploid cotton. The chromosome doubling took place in nature resulting in the development of fertile amphidiploids



**4. Heterosis breeding**

India is the first country in the world to release first commercial hybrid in cotton.

Both intraspecific and interspecific hybrids are evolved in cotton.

- a) Intraspecific : *G.hirsutum* x *G.hirsutum* Shankar (H4) cotton of Surat  
(Gujarat 67 x American nectariless)
- b) Interspecific hybrids : Varalakshmi (Laxmi x SB 289E)  
(*hirsutum*) x (*barbadense*)

#### 4. Mutation breeding

MCU 7- Xray irradiated

mutant of L 1143 MCU 10

- Gamma irradiated mutant

of MCU 4 Indore – 2

MCU – 5

Rasmi

#### 5. Population improvement followed in USA

a) Recurrent selection : Pima S<sub>1</sub> Pima S<sub>4</sub> of *G.barbadense*

b) Synthetic variety : Deltapine 15 developed at konyvllwer USA.

c) Composite : Pima 17 of *G.barbadense*.

**6. Biotechnology** has helped in developing transgenic cotton with resistance to Helicoverpa. The resistant gene has been transferred from bacteria *Bascillus thuringiensis* into cotton plant by Monsanto Seed Company in U.S.A.

#### **B reeding centers:**

- International Cotton Advisory Committee (ICAC)
- Central Institute of Cotton Research (CICR) Nagpur
- All India Coordinated Cotton Improvement Project (AICCIP) Coimbatore

**Varieties:** MCU – 5, MCU – 10, K9, K10

#### **Hybrids:**

Interspecific hybrids - Varalakshmi, HB 224

Intraspecific hybrids - Dhanalaxmi, H4, H6

Desi cotton - DH7, DH9

Male sterility based hybrids - Suguna, PKVHY3, ARDH- 7