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*Shaping Lives...
Empowering Communities...*



COTTON



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INTRODUCTION

- S.N: *Gossypium* sp.
- Chromosome no. : $2n=2x=26, 2n=4x=52$
- Origin: Central Africa
- Distribution : china, USA, India

In India : Rajasthan, Maharastra , M.P, A.P..etc

BREEDING CENTERS:

- Central Institute Of Cotton Research (CICR), Nagpur
- All India coordinated cotton improvement project (AICCIP), Coimbatore



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Progenitors

A. *Gossypium africanum*: having two species *G. herbaceum*, *G. arboreum*

B. *Gossypium raimondii*

• Cultivated species :

1. Asiatic cotton or old world cotton (diploid cotton $2n=26$):

- *G. arboreum* and *G. herbaceum*

2. New world cotton (tetraploid cotton $2n=52$):

- *G. hirsutum*: American or upland cotton
- *G. barbadense*: Egyptian cotton or sea island cotton



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BREEDING OBJECTIVE

- High yield : lint % = $\frac{\text{weight of fibre}}{\text{weight of cotton}} \times 100$
- Lint index = $100 \text{ seed wt.} \times \frac{\text{lint\%}}{100 - \text{lint\%}}$
- Early maturity
- Superior fibre quality
- Better plant type
- Resistant to disease
- Resistance to insect
- Resistance to abiotic stress



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BREEDING PROCEDURE

- **Introduction:** Cambodia cotton in south india ; MCU 1
- **Selection:** K1 cotton selection from SRT 1
- **Hybridisation and selection:**
- **Intervarietal:**

MCU 5- multiple cross derivative

MCU 6- multiple cross derivative

MCU 9- (MCU 5 x MCU 8)



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• Interspecific hybridisation:

G. herbaceum

Linted

old world cotton

$2n=2x=26$

x



G. raimondii

lintless

American cotton

$2n=2x=26$

F1 Hybrid

Diploid $2n=26$

AD

sterile



Doubling of chromosome

G. hirsutum

new world cotton Amphidiploid

AADD($2n=4x=52$)



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- **Heterosis breeding:**
- India is the first country in the world to release first commercial hybrid in cotton.

a. Intraspecific hybrids:

G. hirsutum x *G. hirsutum*

Shanker (H4)cotton of Surat (Gujarat 67 x American nectariless)

b. Interspecific hybrids:

Varalakshmi (Laxmi x SB 289E)

hirsutum x *barbadense*



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Mutation breeding

- MCU 7-Xray irradiated mutant of L 1143
- MCU 10-Gamma irradiated mutant of MCU 4
Indore-2
Rasmi
- **Population improvement followed in USA**
 - a. Recurrent selection: Pima S1, Pima S4 of *G. barbadense*
 - b. Synthetic variety: Deltapine 15 developed at Konyvllwer USA
 - c. Composite : Pima 17 of *G. barbadense*



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- **Biotechnology** has helped in developing transgenic cotton with resistance to *Helicoverpa*.
- The resistant gene has been transferred from bacteria *Bacillus thuringiensis* into cotton plant by Monsanto seed company in USA.
- **HYBRIDS:**
 - Interspecific hybrids – Varalakshmi , HB 224
 - Intraspecific hybrids - Dhanalaxmi , H4,H6
 - Desi cotton - DH 7 , DH 9
 - Male sterility based hybrids – Suguna, PKVHY3, ARDH-7

