

CHARACTERISTICS, YIELD POTENTIAL AND PRODUCTION TECHNOLOGY OF COTTON VARIETIES DEVELOPED AT CCRI MULTAN

Dr. Muhammad Idrees Khan
H^oD/ Senior Scientific Officer, Plant Breeding & Genetics Section Multan

Varietal evolution for the improvement of seed cotton yield, ginning out turn and fibre qualities along with insect-pest and diseases resistance/tolerance is a continuous process. The following commercial varieties have been developed by the cotton Breeders of Central Cotton Research Institute, Multan and approved by Punjab Seed Council for commercial cultivation in core and non-core areas of the Punjab province. Brief about the history of development of these varieties, yield potential and production technology is given below.

1. Bt.CIM-678

This variety was developed by Central Cotton Research Institute, Multan through hybridization of 630-05/09 and *Bt. CIM-599* at the Plant Breeding & Genetic Section of Central Cotton Research Institute Multan. It was approved for general cultivation in 2021. Its plant is medium tall with sympodial branching habit. The boll size is medium. The leaves are dark green It possess yield potential of 50-55mds/acre. It has 40.0% ginning out turn, 28.33mm staple length and 4.1µg/Inch micronaire value.

2. Bt.CIM-785

This variety was developed by Central Cotton Research Institute, Multan through hybridization of Cyto-177 and Cyto-124 at the Breeding & Genetic Section of Central Cotton Research Institute Multan. It was approved for general cultivation in 2021. It is tolerant to cotton leaf curl virus (CLCuV). Its plant having 0-3 monopodial branches with medium sympodial branching habit. The boll size is big. The leaves are dark green and form a dense canopy. It possess yield potential of 50-55mds/acre. It has 40.0% ginning out turn, 28.8mm staple length and 4.7µg/Inch micronaire value.

3. Bt.CIM-663

This variety was developed by Central Cotton Research Institute, Multan through hybridization of MNH-814 and commercial variety *Bt.CIM-598* at the Breeding & Genetic Section of Central Cotton Research Institute Multan. It was approved for general cultivation in 2021. It is tolerant to cotton leaf curl virus (CLCuV). Its plant is medium tall with sympodial branching habit. The boll size is big. The leaves are dark green and form a dense canopy. It possess yield potential of 50-55mds/acre. It has 40.0% ginning out turn, 28.4mm staple length and 4.3µg/Inch micronaire value.

4. Bt.Cyto-535

This variety was developed by Central Cotton Research Institute, Multan through hybridization of CYTO-178 x GH-142 at the Cyto-genetics Section of Central Cotton Research Institute Multan. It was approved for general cultivation in 2021. It is tolerant to cotton leaf curl virus (CLCuV). Its plant is medium tall with sympodial branching habit. The boll size is big. The leaves are dark green and form a dense canopy. It possess yield potential of 50-55mds/acre. It has 41.5% ginning out turn, 28.4mm staple length and 3.97µg/Inch micronaire value.

5. Bt.CIM-632

This variety has been evolved through hybridization of a promising line 630-05/09 and commercial variety *Bt.CIM-599* at the Breeding & Genetic Section of Central Cotton Research Institute Multan. It was approved for general cultivation in 2018. It is tolerant to cotton leaf curl virus (CLCuV). Its plant is medium tall with sympodial branching habit. The boll size is medium. The leaves are dark green and form a dense canopy. It possess yield potential of 45-50mds/acre. It has 42.2% ginning out turn, 28.8mm staple length and 4.5µg/Inch micronaire vale.

- 6. Bt.Cyto-179**
This variety has been developed at the Cytogenetics Section of Central Cotton Research Institute, Multan through hybridization. It was approved for general cultivation in 2017. It has 2-3 monopodia and medium sympodial branches. It has big boll size. It has 40.4 percent ginning out turn and 28.8mm staple length along with 4.2µg/lInch micronaire value.
- 7. Bt.CIM-600**
This variety was also developed through hybridization of CIM-554 and Bt.CIM-598 at the Breeding & Genetic Section of Central Cotton Research Institute Multan during 2016. Its plants are medium tall erect with sympodial branching habit. It has medium boll size with fuzzy white seed. It has relatively maximum tolerance against CLCuV. It has GOT %age of 42.8 and staple length of 29.8mm. it is very variety.
- 13. Bt Cyto-177**
This variety has been developed by the Cyto- Genetic Section of Central Cotton Research Institute, Multan through hybridization of an early maturing local line with an Exotic line having Bt. (Cry-1 AC gene). It was approved for general cultivation in 2015. This variety has 2-3 monopodia. It has 40.0 GOT % and 29.0mm staple length
- 14 Bt CIM-602**
It has been developed through hybridization of a local variety CIM-499 and IR-CIM-448 at the Breeding & Genetics Section of Central Cotton Research Institute Multan. It was approved for general cultivation in 2013. It is tolerant to cotton leaf curl virus (CLCuV). Its plants are medium tall with sympodial branching habit. The boll size is medium. The leaves are dark green and medium size. It has yield potential of 35-40 mds/acre. It has 40.3% ginning out turn and 29.1mm staple length.
- 15. Bt CIM-599**
It has been developed through hybridization of a long staple variety CIM-707 and a Bt. variety i.e. N-121 at the Breeding & Genetics Section of Central Cotton Research Institute Multan. It was approved for general cultivation in 2013. It is highly tolerant to cotton leaf curl virus. This variety has 1-3 mononpodia with medium plant height having short sympodial length with close boll bearing. The boll size is medium with 4-5 locules. The leaves are dark green. It possess yield potential of 40-45 mds/acre. It has 41.4% ginning out turn and 28.7mm staple length.
- 16. Bt CIM-598**
It has been developed through the hybridization of a local variety CIM-446 and IR-CIM-448 at the Breeding & Genetics Section of Central Cotton Research Institute Multan. It was approved for general cultivation in 2012. Its plant growth habit is medium tall with sympodial branching. It is profusely hairy variety due to which less attack of Jassids and thrips are observed. It has good boll size with fluffy opening. It is fairly tolerance to leaf curl virus disease as compared with other commercial varieties. It is also early maturing and suitable for cotton wheat rotation. It possesses yield potential of 40-45 maunds per acre. It has 40.1% ginning out turn and 28.2 mm staple length.

Non-Bt Varieties Developed at CCRI Multan

1. **Cyto-226**

This variety was developed by Central Cotton Research Institute, Multan through hybridization of W-16A and commercial variety CIM-554 at the Breeding & Genetic Section of Central Cotton Research Institute Multan. It was approved for general cultivation in 2021. Its plant is medium tall with sympodial branching habit. The boll size is big. The leaves are green. It possess yield potential of 35-40-55mds/acre. It has 40.3% ginning out turn, 29.6mm staple length and 4.9µg/Inch micronaire value.

2. **CIM-610**

This variety CIM-610 was developed by crossing of CIM-707 of Central Cotton Research Institute, Multan and MNH-6070 of Cotton Research Institute, Multan at the Breeding and Genetic Section of Central Cotton Research Institute, Multan. It was approved for general cultivation in 2018. This variety has tall plant and sympodial growth habit. It has 40.2 GOT % and 28.8mm staple length.

3. **CIM-620**

It has been developed through hybridization of a long staple variety CIM-573 and an exotic genotype i.e. AS-0349 (imported from France) at the Breeding and Genetic Section of Central Cotton Research Institute Multan and was approved for general cultivation in 2016. This variety has long sympodial branches having close boll bearing habit with medium and dark green leaves. The lint color of this variety is light brown. This variety can be grown for organic Cotton production in our country. It has 40.2 GOT % and 28.9mm staple length.

4. **Cyto-124**

This variety, Cyto-124 was developed at the Cytogenetics Section of Central Cotton Research Institute, Multan It was approved for general cultivation in 2015. This variety has tall plant and sympodial growth habit. This variety was developed by Interspecific hybridization (Crossing between *Gossypium hirsutum* L. and *Gossypium anomalum* L.). This the reason that this variety possess maximum tolerance against CLCuV disease. It has 42.8 GOT % and 30.3mm staple length.

5. **CIM-554**

The variety CIM-554 has been developed through crossing technique by hybridization between hybrids i.e. 2579-04/97 x W-11103 [H-1674 (CIM-360xCP-15/2) x H-1677 (CIM-240xCP-15/2)]. It was approved for general cultivation in 2009. This variety has long staple with compact plant habit and dark green leaves. It has 41.5 GOT % and 28.5 mm staple length with 4.7 micronaire value.

PRODUCTION TECHNOLOGY
Bt.CIM-678

1. **Sowing Time** ♦ April 1st- May 15th
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing**
 - Row to row ♦ 30"
- Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 12"
4. **Fertilizer**

Time of application	Dose (kg/acre)	
	N	P
After thinning (25-30AS) :	23-	30
At flowering :	23	-
Peak flowering :	23	-
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 10-12 days Interval
 - Flat sowing : 12-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions.

PRODUCTION TECHNOLOGY
Bt.CIM-785

1. **Sowing Time** ♦ April 1st- May 31st
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing**
 - Row to row ♦ 30"
- Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 12"
4. **Fertilizer**

Time of application	Dose (kg/acre)	
	N	P
After thinning (25-30AS) :	23-	30
At flowering :	23	-
Peak flowering :	23	-
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 08-10 days Interval
 - Flat sowing : 12-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions.

PRODUCTION TECHNOLOGY
Bt.CIM-663

1. **Sowing Time** ♦ April 1st- May 31st
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing**
 - Row to row ♦ 30"
- Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 09-12"
4. **Fertilizer**

Time of application	Dose (kg/acre)	
	N	P
After thinning (25-30AS) :	23-	30
At flowering :	23	-
Peak flowering :	23	-
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 08-10 days Interval
 - Flat sowing : 10-12 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions.

PRODUCTION TECHNOLOGY
Bt.Cyto-535

1. **Sowing Time** ♦ April 1st- May 31st
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing**
 - Row to row ♦ 30"
- Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 12"
4. **Fertilizer**

Time of application	Dose (kg/acre)	
	N	P
After thinning (25-30AS) :	23-	30
At flowering :	23	-
Peak flowering :	23	-
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 08-10 days Interval
 - Flat sowing : 12-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions.

PRODUCTION TECHNOLOGY
Bt. CIM-632

1. **Sowing Time** ♦ April 1st- May 31st
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing**
 - Row to row ♦ 30"
- Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 09-12"
4. **Fertilizer**

Time of application	Dose (kg/acre)	
	N	P
After thinning (25-30AS) :	23-	30
At flowering :	23	-
Peak flowering :	23	-
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 08-10 days Interval
 - Flat sowing : 10-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions.

PRODUCTION TECHNOLOGY
Bt.Cyto-179

1. **Sowing Time** ♦ April 1st- May 15th
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing**
 - Row to row ♦ 30"
- Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 12"
4. **Fertilizer**

Time of application	Dose (kg/acre)	
	N	P
After thinning (25-30AS) :	23-	30
At flowering :	23	-
Peak flowering :	23	-
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 10-12 days Interval
 - Flat sowing : 12-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions.

PRODUCTION TECHNOLOGY
Bt.CIM-600

1. **Sowing Time** ♦ April 1st- May 15th
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing** ♦
 - Row to row ♦ 30"**Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 09-12"
4. **Fertilizer**

Time of application	Dose (kg/acre)	
	N	P
After thinning (25-30AS)	23-	30
At flowering	23	-
Peak flowering	23	-
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 10-12 days Interval
 - Flat sowing : 12-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions.

PRODUCTION TECHNOLOGY
Bt.Cyto-177

1. **Sowing Time** ♦ April 1st- May 15th
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing** ♦
 - Row to row ♦ 30"**Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 09-12"
4. **Fertilizer**

Time of application	Dose (kg/acre)	
	N	P
After thinning (25-30AS)	23-	30
At flowering	23	-
Peak flowering	23	-
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 10-12 days Interval
 - Flat sowing : 12-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions.

PRODUCTION TECHNOLOGY
Bt.CIM-602

1. **Sowing Time** ♦ April 1st- May 15th
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing**
 - Row to row ♦ 30"
- Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 09-12"
4. **Fertilizer**

<u>Time of application</u>		<u>Dose (kg/acre)</u>	
		<u>N</u>	<u>P</u>
After thinning (25-30AS)	:	23-	30
At flowering	:	23	-
Peak flowering	:	23	-
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 08-10 days Interval
 - Flat sowing : 10-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions.

PRODUCTION TECHNOLOGY
Bt.CIM-599

1. **Sowing Time** ♦ April 1st- May 31st
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing**
 - Row to row ♦ 30"
- Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 09-12"
4. **Fertilizer**

<u>Time of application</u>		<u>Dose (kg/acre)</u>	
		<u>N</u>	<u>P</u>
After thinning (25-30AS)	:	23-	30
At flowering	:	23	-
Peak flowering	:	23	-
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 08-10 days Interval
 - Flat sowing : 10-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions.

PRODUCTION TECHNOLOGY OF NON BT COTTON VARIETIES

PRODUCTION TECHNOLOGY

Cyto-226

1. **Sowing Time** ♦ April 15th- May 31st
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing**
 - Row to row ♦ 30"
- Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 12"
4. **Fertilizer**

Time of application	Dose (kg/acre)	
	N	P
After thinning (25-30AS) :	23-	30
At flowering :	23	-
Peak flowering :	23	-
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 08-10 days Interval
 - Flat sowing : 10-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions

PRODUCTION TECHNOLOGY

CIM-610

1. **Sowing Time** ♦ April 1st- May 31st
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing**
 - Row to row ♦ 30"
- Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 12"
4. **Fertilizer**

Time of application	Dose (kg/acre)	
	N	P
After thinning (25-30 DAS) :	23-	30
At flowering :	23	-
Peak flowering :	23	-
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 08-10 days Interval
 - Flat sowing : 10-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions

PRODUCTION TECHNOLOGY OF CIM-620

1. **Sowing Time** ♦ April 1st- May 31st
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing**
 - Row to row ♦ 30"
- Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 12"
4. **Fertilizer**

Time of application	Dose (kg/acre)		
	N	P	
After thinning (25-30 DAS)	:	23-	30
At flowering	:	23	-
Peak flowering	:	23	-
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 08-10 days Interval
 - Flat sowing : 10-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions

PRODUCTION TECHNOLOGY OF Cyto-124

1. **Sowing Time** ♦ April 1st- May 31st
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing**
 - Row to row ♦ 30"
- Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 12"
4. **Fertilizer**

Time of application	Dose (kg/acre)		
	N	P	
After thinning (25-30 DAS)	:	23-	30
At flowering	:	23 -	
Peak flowering	:	23 -	
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 08-10 days Interval
 - Flat sowing : 10-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions

PRODUCTION TECHNOLOGY OF CIM-554

1. **Sowing Time** ♦ April 1st- May 15th
2. **Seed Rate** ♦ 8 to 10 kg acre⁻¹
3. **Spacing**
 - Row to row ♦ 30"
- Plant to plant**
 - (a) Flat sowing ♦ 12"
 - (b) Bed sowing ♦ 12"
4. **Fertilizer**

Time of application	Dose (kg/acre)		
	N	P	
After thinning (25-30 DAS)	:	23-	30
At flowering	:	23 -	
Peak flowering	:	23 -	
5. **Irrigation**
 - First irrigation (Bed & Furrow) : At Sowing
 - " " (Flat sowing) : 30-35days AS)
 - 2nd Irrigation (Bed & Furrow) : 3-4 days
 - Subsequent Irrigation
 - Bed & Furrow : 08-10 days Interval
 - Flat sowing : 10-15 Days Interval

Note: Irrigation and fertilizer will depend upon the soil and climatic conditions