

Evaluation of Bt Cotton Hybrids 2012-13

Report Submitted to

**Indian Council of Agricultural Research
New Delhi, May 2013**



Submitted by



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www.cicr.org.in



Citation	ICAR Bt Cotton Report (2012-13) All India Coordinated Cotton Improvement Project, Coimbatore – 641 003, Tamil Nadu.
Published by	Dr. A. H. Prakash, Project Coordinator (Cotton Improvement) & Head, Central Institute for Cotton Research, Regional Station, Coimbatore – 641 003.
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EVALUATION OF BT COTTON HYBRIDS

The technical programme for evaluation of the Bt cotton hybrids through ICAR trials during 2012-13 was formulated under the Chairmanship of the Deputy Director General (Crop Sciences), Indian Council of Agricultural Research, New Delhi for the events which have been approved for commercial cultivation by GEAC (Ministry of Environment and Forests, Govt. of India). The programme was discussed at the All India Coordinated Cotton Improvement Project (AICCIP) Annual Group Meeting held at Acharya N.G. Ranga Agricultural University, Hyderabad on 9th April, 2012. Accordingly, Bt cotton hybrids (BG II) entries belonging to private sector R & D firms were evaluated for their yield superiority and quality aspects in North, Central and South zones.

NORTH ZONE

Under North Zone conditions, Intra-hirsutum Bt hybrids (BG II) was evaluated with 7 entries and Bioseed 6488 BG II as check. The details of entries are as given below.

Institution	Hybrid
JK Seeds	JK Tarzan BG II
JK Seeds	JKCH 8935 BG II
Kaveri Seeds	KCH 14 K 59 BG II
Kaveri Seeds	KCH 707 BG II
Tulasi Seeds	Tulasi 216 BG II
Monsanto	DPC 3081 BG II
Monsanto	DPC 3083 BG II
Bioseed	Bioseed 6488 BG II (C)

The data of one entry (JKCH 8935 BG II) was withheld as the company withdrew the entry after the trials were initiated. The data in respect of Tulasi 216 BG II was withheld as the company has paid only 60 % of testing fee and the remaining 40 % is still pending. The data will be released on receipt of the balance amount.

Trial Locations

The trial was conducted at four locations. They are

1. Punjab Agricultural University, Faridkot, Punjab
2. Choudhary Charan Singh Haryana Agricultural University, Hisar, Haryana
3. Central Institute for Cotton Research, Regional Station, Sirsa, Haryana
4. SK Rajasthan Agricultural University, Sriganganagar, Rajasthan

Trial Details

<i>Number of Entries</i>	7 + 1 checks
<i>Number of Rows</i>	Yield trial 1: 6 Rows (Protected)
<i>Row length</i>	6 m
<i>Spacing</i>	67.5 x 75 cm (Punjab); 100 x 60 cm (Haryana)
<i>No. of replications</i>	Three
<i>Design</i>	Randomized Block Design
<i>Fertilizers</i>	As per Recommendations

Weekly observations were recorded from 45 DAS against major sucking Pests and Bollworms. The insecticide sprays were based on the threshold levels of sap sucking pests and Bollworms.

All the entries in the trial were screened against Cotton Leaf Curl Virus (CLCuV) disease (CLCuD).

Observations Recorded

The Biometrical observations recorded were final plant stand, ginning per cent, lint index, seed index, Seed Cotton Yield (kg/ha) and lint yield (kg/ha). The entomological observations on sap sucking pests, Bollworm damage and natural enemies were recorded. The pathological observations on incidence of cotton CLCuV and other foliar diseases were also recorded.

A. BIOMETRICAL EVALUATION

Biometrical observations were recorded and reported here. Germination and correspondingly the final plant stand were satisfactory in all the entries.

Boll Weight

Mean boll weight ranged from 3.9 g (DPC 3081 BG II) to 4.3 g (DPC 3083 BG II and KCH 14 K 59 BG II) (Table 1).

Table 1: Mean boll weight (g)

Hybrid	Faridkot	Hisar	Sirsa	Sriganganagar	Mean
JKCH 8935 BG II	3.8	4.9	4.0	4.1	4.2
KCH 14 K 59 BG II	4.4	5.4	4.1	3.1	4.3
KCH 707 BG II	4.0	4.9	4.5	3.2	4.2
Tulasi 216 BG II					
DPC 3081 BG II	4.2	4.4	3.7	3.2	3.9
DPC 3083 BG II	4.2	4.9	4.7	3.5	4.3
Bioseed 6488 BG II (C)	4.1	4.8	4.3	3.4	4.2

Ginning Out turn (%)

Ginning Outturn varied from 33.0 to 36.6 per cent (Table 2).

Table 2:Mean Ginning Out Turn (%)

Hybrid	Faridkot	Hisar	Sirsa	Sriganganagar	Mean
JKCH 8935 BG II	36.0	32.4	36.0	36.8	35.3
KCH 14 K 59 BG II	36.0	32.2	34.0	38.1	35.1
KCH 707 BG II	32.5	30.7	31.1	37.8	33.0
Tulasi 216 BG II					
DPC 3081 BG II	38.4	35.0	37.7	35.3	36.6
DPC 3083 BG II	35.9	33.5	31.7	36.9	34.5
Bioseed 6488 BG II (C)	35.4	32.3	36.1	35.3	34.8

Lint Index and Seed Index

Noticeable variation was observed among the entries (Tables 3 & 4).

Table 3: Lint index (g)

Hybrid	Faridkot	Hisar	Sirsa	Mean
JKCH 8935 BG II	4.8	4.1	4.6	4.5
KCH 14 K 59 BG II	5.1	4.8	4.8	4.9
KCH 707 BG II	4.7	4.6	4.6	4.6
Tulasi 216 BG II				
DPC 3081 BG II	4.8	4.5	4.5	4.6
DPC 3083 BG II	5.1	4.4	4.1	4.5
Bioseed 6488 BG II (C)	4.9	4.7	5.0	4.9

Table 4: Seed index (g)

Hybrid	Faridkot	Hisar	Sirsa	Mean
JKCH 8935 BG II	8.5	8.5	8.1	8.4
KCH 14 K 59 BG II	9.1	10.0	9.4	9.5
KCH 707 BG II	9.8	10.4	10.2	10.1
Tulasi 216 BG II				
DPC 3081 BG II	7.7	8.4	7.4	7.8
DPC 3083 BG II	9.1	8.8	8.6	8.8
Bioseed 6488 BG II (C)	9.0	9.8	9.0	9.3

Seed Cotton Yield

Seed cotton yield data recorded in four different centres are furnished in Table 5.

None of the test entries was found superior over the Check hybrid (Bioseed 6488 BG II).

Table 5: Seed cotton yield (kg/ha)

Hybrid	Faridkot	Hisar	Sirsa	Sriganganagar	Mean	% Increase over check
JKCH 8935 BG II	2750	2940	2441	1886	2504	-0.2
KCH 14 K 59 BG II	2334	1751	2927	644	1914	-23.7
KCH 707 BG II	2354	953	2124	902	1583	-36.9
Tulasi 216 BG II						
DPC 3081 BG II	2459	3631	2420	1337	2462	-1.9
DPC 3083 BG II	2205	2959	2812	1561	2384	-5.0
Bioseed 6488 BG II (C)	2700	2673	2781	1886	2510	
CD @ 5 %	270	335	416	348		
CV %	7.7	9.1	11.3	17.9		

Lint yield

The lint yield also followed more or less the same trend (Table 6).

Table 6: Lint yield (kg/ha)

Hybrid	Faridkot	Hisar	Sirsa	Sriganganagar	Mean	% Increase over check
JKCH 8935 BG II	989	950	879	694	878	0.8
KCH 14 K 59 BG II	840	565	994	245	661	-24.1
KCH 707 BG II	764	292	661	341	515	-40.9
Tulasi 216 BG II						
DPC 3081 BG II	944	1271	911	472	900	3.3
DPC 3083 BG II	791	990	886	576	811	-6.9
Bioseed 6488 BG II (C)	953	861	1003	666	871	

B. FIBRE QUALITY EVALUATION

Table 7: Mean Fibre quality attributes

2.5% span length (mm)

Hybrid	Faridkot	Hisar	Sirsa	Sriganganagar	Mean
JKCH 8935 BG II	29.1	26.4	29.9	31.4	29.2
KCH 14 K 59 BG II	29.4	28.2	31.2	28.7	29.4
KCH 707 BG II	30.6	28.7	31.2	31.5	30.5
Tulasi 216 BG II					
DPC 3081 BG II	26.4	29.8	26.8	26.9	27.5
DPC 3083 BG II	28.6	29.6	28.8	29.1	29.0
Bioseed 6488 BG II (C)	29.7	31.6	29.6	30.5	30.4

Micronaire value ($\mu\text{g/inch}$)

Hybrid	Faridkot	Hisar	Sirsa	Sriganganagar	Mean
JKCH 8935 BG II	4.7	5.1	4.7	4.5	4.8
KCH 14 K 59 BG II	5.2	4.8	5.4	4.8	5.1
KCH 707 BG II	4.8	4.8	4.8	4.6	4.8
Tulasi 216 BG II					
DPC 3081 BG II	5.1	4.1	5.0	5.0	4.8
DPC 3083 BG II	4.5	4.7	4.4	4.6	4.6
Bioseed 6488 BG II (C)	4.8	4.3	4.6	4.5	4.6

Bundle strength (g/tex)

Hybrid	Faridkot	Hisar	Sirsa	Sriganganagar	Mean
JKCH 8935 BG II	23.3	21.3	23.9	25.2	23.4
KCH 14 K 59 BG II	24.2	21.3	23.1	23.3	23.0
KCH 707 BG II	25.0	22.6	24.0	25.7	24.3
Tulasi 216 BG II					
DPC 3081 BG II	21.6	20.4	20.9	20.9	21.0
DPC 3083 BG II	22.6	21.6	22.3	23.4	22.5
Bioseed 6488 BG II (C)	23.9	24.3	22.7	24.7	23.9

C. ENTOMOLOGICAL OBSERVATIONS

Sucking Pests

Data on Jassid population (Table 8), Whitefly population (Table 9), Thrips (Table 10) is given below.

Table 8: Jassids (No./3 leaves) and Injury Grade

Hybrid	Faridkot	Hisar	Sirsa	Mean
JKCH 8935 BG II	2.5 (3)	0.5 (1)	4.6 (2)	2.5 (2)
KCH 14 K 59 BG II	2.2 (3)	0.8 (1)	4.3 (2)	2.4 (2)
KCH 707 BG II	2.6 (3)	0.6 (1)	4.0 (1)	2.4 (1.7)
Tulasi 216 BG II				
DPC 3081 BG II	1.9 (3)	1.3 (1)	4.2 (1)	2.5 (1.7)
DPC 3083 BG II	3.3 (3)	0.7 (1)	5.4 (1)	3.1 (2)
Bioseed 6488 BG II (C)	2.7 (3)	0.8 (1)	4.2 (1)	2.6 (1.7)

Injury Grade is presented in the Parenthesis

Table 9: Whiteflies (No./3 leaves)

Hybrid	Faridkot	Hisar	Sirsa	Mean
JKCH 8935 BG II	4.8	3.7	6.5	5.0
KCH 14 K 59 BG II	4.5	6.8	7.3	6.2
KCH 707 BG II	7.4	2.1	5.6	5.0
Tulasi 216 BG II				
DPC 3081 BG II	8.3	5.8	5.6	6.6
DPC 3083 BG II	7.1	4.5	5.3	5.6
Bioseed 6488 BG II (C)	6.4	5.1	5.1	5.5

Table 10:Thrips (No./3 leaves)

Hybrid	Faridkot	Hisar	Sirsa	Mean
JKCH 8935 BG II	14.6	1.4	18.8	11.6
KCH 14 K 59 BG II	16.5	1.4	18.6	12.2
KCH 707 BG II	9.1	0.8	15.3	8.4
Tulasi 216 BG II				
DPC 3081 BG II	18.3	1.0	19.3	12.9
DPC 3083 BG II	19.7	1.7	22.0	14.5
Bioseed 6488 BG II (C)	12.6	1.2	19.7	11.2

Square Damage

All the entries tested indicated tolerance to bollworm with zero per cent square damage (Table 11).

Table 11:Square damage by Bollworms (%)

Hybrid	Hisar	Sirsa	Mean
JKCH 8935 BG II	0.0	0.0	0.0
KCH 14 K 59 BG II	0.0	0.0	0.0
KCH 707 BG II	0.0	0.0	0.0
Tulasi 216 BG II			
DPC 3081 BG II	0.0	0.0	0.0
DPC 3083 BG II	0.0	0.0	0.0
Bioseed 6488 BG II (C)	0.0	0.0	0.0

There was no Spodoptera, American and Pink boll worm incidence during the cropping season in all the entries and similarly there was no green boll damage by American Boll worm.

D. PLANT PATHOLOGY

Of the seven entries tested, JKCH 8935 BG II was found to be Moderately Resistant to CLCUD and all other entries were susceptible.

CLCUD – PDI and Reaction

Hybrid	CLCUD – PDI				CLCUD –Reaction
	Faridkot	Hisar	Sirsa	Mean	
JKCH 8935 BG II	60.3	12.2	87.8	53.4	MR
KCH 14 K 59 BG II	102.7	35.3	93.7	77.2	S
KCH 707 BG II	99.8	22.6	139.5	87.3	S
Tulasi 216 BG II					
DPC 3081 BG II	76.4	25.6	71.6	57.9	S
DPC 3083 BG II	97.5	21.8	65.2	61.5	S
Bioseed 6488 BG II (C)	95.9	13.2	75.1	61.4	MR

E. OVERALL ASSESSMENT

None of the entry were found to be superior over the check hybrid either in yield or in fibre quality under irrigated conditions of North zone (Table 13). The entries were on par for biotic factors like insect pest tolerance (Table 14). Only JKCH 8935 BG II was found to be Moderately Resistant to CLCUD and all other entries were susceptible to CLCUD(Table 14).

Table 13: Mean Performance of Bt cotton Hybrids for various traits

Hybrid	Seed Cotton Yield (Kg/ha)	% Increase over check	Lint Yield (kg/ha)	% Increase over check	Ginning outturn (%)	Boll weight (g)	2.5% span length (mm)	Micronaire value (µg/inch)	Bundle strength (g/tex)
JKCH 8935 BG II	2504	-0.2	878	0.8	35.3	4.2	29.2	4.8	23.4
KCH 14 K 59 BG II	1914	-23.7	661	-24.1	35.1	4.3	29.4	5.1	23.0
KCH 707 BG II	1583	-36.9	515	-40.9	33.0	4.2	30.5	4.8	24.3
Tulasi 216 BG II									
DPC 3081 BG II	2462	-1.9	900	3.3	36.6	3.9	27.5	4.8	21.0
DPC 3083 BG II	2384	-5.0	811	-6.9	34.5	4.3	29.0	4.6	22.5
Bioseed 6488 BG II (C)	2510	0.0	871	0.0	34.8	4.2	30.4	4.6	23.9

Table 14:Mean Performance of Bt cotton Hybrids for various Pest and Disease Observation

Hybrid	Jassids (No./3 leaves)	Jassid injury grade	Thrips (No./3 leaves)	Whiteflies (No./3 leaves)	Open boll damage (%)	Open locule damage (%)	Locule damage by PBW (%)	CLCuD (PDI)	CLCuD – Reaction
JKCH 8935 BG II	2.5	2.0	11.6	5.0	0.4	0.1	0.0	53.4	MR
KCH 14 K 59 BG II	2.4	2.0	12.2	6.2	0.2	0.1	0.1	77.2	S
KCH 707 BG II	2.4	1.7	8.4	5.0	0.0	0.0	0.0	87.3	S
Tulasi 216 BG II									
DPC 3081 BG II	2.5	1.7	12.9	6.6	0.3	0.1	0.1	57.9	S
DPC 3083 BG II	3.1	2.0	14.5	5.6	0.0	0.0	0.2	61.5	S
Bioseed 6488 BG II (C)	2.6	1.7	11.2	5.5	0.0	0.0	0.1	61.4	MR

CENTRAL ZONE

In Central Zone conditions, Intra-hirsutum Bt hybrids (BG II) were evaluated under irrigated condition with 15 entries and under Rainfed conditions with 12 entries during the year 2012-13.

Irrigated Conditions

The trial was conducted in three locations with 15 entries and RCH 2 BG II as check.

The name of the entries along with sponsoring company is given below.

Institution	Hybrid
Prabhat Agri Biotech Ltd.	PCH 888 Bt2
Tulasi Seeds Pvt. Ltd.	Tulasi 234 BG II
JK Agri Genetics Ltd.	JKCH 8665 BG II
Check Hybrid	RCH 2 BG II
Prabhat Agri Biotech Ltd.	PCH 2171 Bt2
Kirtiman Agro Genetics Ltd.	KCHH 2725
Kaveri Seed Company Ltd.	KCH 15 K 39 BG II
Tulasi Seeds Pvt. Ltd.	Tulasi 216 BG II
Pravardhan Seeds Pvt. Ltd.	PRCH 737 Bt2
JK Agri Genetics Ltd.	JKCH 8907 BG II
Monsanto Holdings Pvt. Ltd.	DPC 9109 BG II
Green Gold Seeds Pvt. Ltd.	GBCH 85 BG II (Kuber BG II)
Nuziveedu Seeds Pvt. Ltd.	NCS 860 Bt2
Pravardhan Seeds Pvt. Ltd.	PRCH 739 Bt2
Kirtiman Agro Genetics Ltd.	KCHH 2735
Nuziveedu Seeds Pvt. Ltd.	NCS 909 Bt2

The data of one entry (JKCH 8907 BG II) was withheld as the company withdrew the entry after the trials were initiated. The data in respect of Tulasi 234 BG II and Tulasi 216 BG II was withheld as the company has paid only 60 % of testing fee and the remaining 40 % is still pending. The data will be released on receipt of the balance amount.

Trial Locations

The trial was conducted at three locations.

1. MPKV, Rahuri, Maharashtra
2. Navsari Agricultural University, Surat, Gujarat
3. JNKVV, Khandwa, Madhya Pradesh

Trial Details

<i>Number of Entries</i>	15 + 1 checks
<i>Number of Rows</i>	Yield trial 1: 6 Rows (Protected)
<i>Row length</i>	6 m
<i>Spacing</i>	Recommended spacing
<i>No. of replications</i>	Three
<i>Design</i>	Randomized Block Design
<i>Fertilizers</i>	As per Recommendations

Observations Recorded

The Biometrical observations recorded were final plant stand, ginning per cent, lint index, seed index, Seed Cotton Yield (kg/ha) and lint yield (kg/ha). The entomological observations on sap sucking pests, Bollworm damage and natural enemies were recorded under ETL based plant protection trial. The pathological observation on incidence of cotton Bacterial blight was also recorded.

A. BIOMETRICAL EVALUATION

Germination and correspondingly, the final plant stand was satisfactory in all the entries (Table 15).

Table 15: Germination (%)

Hybrid	Surat	Rahuri	Khandwa	Mean
PCH 888 Bt2	39.0	59.0	46.7	48.2
Tulasi 234 BG II				
JKCH 8665 BG II	39.0	59.0	41.3	46.4
RCH 2 BG II	39.0	58.0	47.0	48.0
PCH 2171 Bt2	39.0	57.0	46.7	47.6
KCHH 2725	39.0	60.0	47.3	48.8
KCH 15 K 39 BG II	39.0	59.0	46.3	48.1
Tulasi 216 BG II				
PRCH 737 Bt2	39.0	59.0	43.3	47.1
DPC 9109 BG II	39.0	60.0	46.0	48.3
GBCH 85 BG II (Kuber BG II)	39.0	60.0	48.7	49.2
NCS 860 Bt2	39.0	60.0	45.3	48.1
PRCH 739 Bt2	39.0	56.0	43.0	46.0
KCHH 2735	39.0	59.0	46.7	48.2
NCS 909 Bt2	39.0	60.0	48.0	49.0

Data on boll weight (Table 16), Ginning out turn (Table 17), Lint Index (Table 18), and Seed Index (Table 19) are given below.

Table 16: Mean boll weight (g)

Hybrid	Surat	Rahuri	Khandwa	Mean
PCH 888 Bt2	5.7	5.4	4.4	5.2
Tulasi 234 BG II				
JKCH 8665 BG II	5.5	5.0	4.0	4.8
RCH 2 BG II	4.1	5.1	3.3	4.2
PCH 2171 Bt2	4.6	5.3	3.6	4.5
KCHH 2725	5.4	5.5	4.3	5.1
KCH 15 K 39 BG II	5.7	5.4	3.6	4.9
Tulasi 216 BG II				
PRCH 737 Bt2	4.5	5.3	3.9	4.6
DPC 9109 BG II	5.3	5.2	3.9	4.8
GBCH 85 BG II (Kuber BG II)	4.9	5.3	4.0	4.7
NCS 860 Bt2	4.5	5.7	3.6	4.6
PRCH 739 Bt2	3.3	5.0	3.6	4.0
KCHH 2735	6.1	5.2	3.9	5.1
NCS 909 Bt2	5.6	5.1	4.0	4.9

Table 17: Mean Ginning Out Turn (%)

Hybrid	Surat	Rahuri	Khandwa	Mean
PCH 888 Bt2	33.1	37.2	35.2	35.2
Tulasi 234 BG II				
JKCH 8665 BG II	32.4	31.9	34.9	33.1
RCH 2 BG II	35.3	32.7	34.3	34.1
PCH 2171 Bt2	30.2	35.2	33.8	33.1
KCHH 2725	31.0	36.2	33.2	33.5
KCH 15 K 39 BG II	30.0	36.0	33.9	33.3
Tulasi 216 BG II				
PRCH 737 Bt2	32.9	34.3	35.1	34.1
DPC 9109 BG II	33.0	36.4	34.7	34.7
GBCH 85 BG II (Kuber BG II)	37.1	37.9	35.4	36.8
NCS 860 Bt2	33.2	37.9	32.2	34.4
PRCH 739 Bt2	31.6	35.5	32.3	33.1
KCHH 2735	29.6	33.8	33.8	32.4
NCS 909 Bt2	32.3	37.9	35.3	35.2

Table 18: Lint index (g)

Hybrid	Surat	Rahuri	Khandwa	Mean
PCH 888 Bt2	5.3	4.9	4.0	4.7
Tulasi 234 BG II				
JKCH 8665 BG II	5.0	3.7	4.0	4.2
RCH 2 BG II	4.5	4.0	4.0	4.2
PCH 2171 Bt2	5.2	4.2	4.0	4.5
KCHH 2725	4.3	4.5	4.0	4.3
KCH 15 K 39 BG II	4.9	4.4	5.0	4.8
Tulasi 216 BG II				
PRCH 737 Bt2	4.4	3.9	4.0	4.1
DPC 9109 BG II	4.5	3.7	5.0	4.4
GBCH 85 BG II (Kuber BG II)	4.7	4.7	4.0	4.5
NCS 860 Bt2	5.3	5.5	3.0	4.6
PRCH 739 Bt2	4.2	3.3	4.0	3.8
KCHH 2735	4.7	4.3	3.0	4.0
NCS 909 Bt2	5.3	5.3	4.0	4.9

Table 19: Seed index (g)

Hybrid	Surat	Rahuri	Khandwa	Mean
PCH 888 Bt2	10.7	8.2	8.0	9.0
Tulasi 234 BG II				
JKCH 8665 BG II	10.4	7.8	8.0	8.7
RCH 2 BG II	8.3	8.2	8.0	8.2
PCH 2171 Bt2	11.9	7.7	8.0	9.2
KCHH 2725	9.5	7.9	8.0	8.5
KCH 15 K 39 BG II	11.5	7.8	9.0	9.4
Tulasi 216 BG II				
PRCH 737 Bt2	9.0	7.5	9.0	8.5
DPC 9109 BG II	9.2	6.5	8.0	7.9
GBCH 85 BG II (Kuber BG II)	7.9	7.8	9.0	8.2
NCS 860 Bt2	10.7	9.0	9.0	9.6
PRCH 739 Bt2	9.1	6.0	9.0	8.0
KCHH 2735	11.1	8.5	8.0	9.2
NCS 909 Bt2	11.2	8.8	8.0	9.3

Seed Cotton Yield

Seed cotton yield recorded in three different centres are furnished in Table 20. All the test hybrids recorded higher seed cotton yield over the Bt check hybrid. The highest mean seed cotton yield of 2291 kg/ha was recorded in PCH 888Bt BG II.

Table 20: Seed cotton yield (kg/ha)

Hybrid	Surat	Rahuri	Khandwa	Mean	% Increase over check
PCH 888 Bt2	3082	2279	1513	2291	40.0
Tulasi 234 BG II					
JKCH 8665 BG II	2828	2035	1581	2148	31.2
RCH 2 BG II	1866	1594	1451	1637	0.0
PCH 2171 Bt2	1869	1806	1329	1668	1.9
KCHH 2725	2811	2050	1581	2147	31.2
KCH 15 K 39 BG II	1819	1935	1239	1664	1.6
Tulasi 216 BG II					
PRCH 737 Bt2	2033	2711	1350	2031	24.1
DPC 9109 BG II	2565	2179	1430	2058	25.7
GBCH 85 BG II (Kuber BG II)	2400	2442	2018	2287	39.7
NCS 860 Bt2	1863	1861	1256	1660	1.4
PRCH 739 Bt2	1993	1606	1627	1742	6.4
KCHH 2735	2176	1957	1512	1882	15.0
NCS 909 Bt2	1976	1817	1193	1662	1.5
CD @ 5 %	437	371	199		
CV %	11.5	10.9	8.5		

Lint yield

The lint yield also followed the same trend as that of seed cotton yield (Table 21).

Table 21: Lint yield (kg/ha)

Hybrid	Surat	Rahuri	Khandwa	Mean	% Increase over check
PCH 888 Bt2	1021	848	532	800	43.2
Tulasi 234 BG II					
JKCH 8665 BG II	917	648	551	705	26.2
RCH 2 BG II	658	521	499	559	0.1
PCH 2171 Bt2	566	635	449	550	-1.6
KCHH 2725	871	741	525	712	27.4
KCH 15 K 39 BG II	546	696	420	554	-0.9
Tulasi 216 BG II					
PRCH 737 Bt2	669	930	474	691	23.6
DPC 9109 BG II	847	792	497	712	27.4
GBCH 85 BG II (Kuber BG II)	892	926	714	844	51.0
NCS 860 Bt2	618	705	405	576	3.0
PRCH 739 Bt2	629	571	525	575	2.9
KCHH 2735	644	661	512	606	8.4
NCS 909 Bt2	638	688	421	582	4.2

B. FIBRE QUALITY EVALUATION

2.5% span length (mm)

Hybrid	Surat	Rahuri	Mean
PCH 888 Bt2	28.6	27.2	27.9
Tulasi 234 BG II			
JKCH 8665 BG II	30.7	32.2	31.5
RCH 2 BG II	30.7	29.2	30.0
PCH 2171 Bt2	32.3	29.4	30.9
KCHH 2725	29.7	29.5	29.6
KCH 15 K 39 BG II	33.2	29.4	31.3
Tulasi 216 BG II			
PRCH 737 Bt2	30.5	30.8	30.7
DPC 9109 BG II	31.7	32.7	32.2
GBCH 85 BG II (Kuber BG II)	28.7	27.7	28.2
NCS 860 Bt2	28.1	27.5	27.8
PRCH 739 Bt2	30.4	30.3	30.4
KCHH 2735	31.3	32.5	31.9
NCS 909 Bt2	32.0	30.8	31.4

Micronaire value ($\mu\text{g/inch}$)

Hybrid	Surat	Rahuri	Mean
PCH 888 Bt2	4.6	3.2	3.9
Tulasi 234 BG II			
JKCH 8665 BG II	4.0	2.9	3.5
RCH 2 BG II	4.6	3.5	4.1
PCH 2171 Bt2	4.7	3.1	3.9
KCHH 2725	4.6	3.6	4.1
KCH 15 K 39 BG II	4.5	3.5	4.0
Tulasi 216 BG II			
PRCH 737 Bt2	4.3	3.3	3.8
DPC 9109 BG II	4.6	3.5	4.1
GBCH 85 BG II (Kuber BG II)	4.4	3.3	3.9
NCS 860 Bt2	5.2	4.4	4.8
PRCH 739 Bt2	4.5	3.5	4.0
KCHH 2735	4.8	3.1	4.0
NCS 909 Bt2	4.8	3.6	4.2

Bundle strength (g/tex)

Hybrid	Surat	Rahuri	Mean
PCH 888 Bt2	23.3	23.2	23.3
Tulasi 234 BG II			
JKCH 8665 BG II	23.5	24.4	24.0
RCH 2 BG II	22.1	22.4	22.3
PCH 2171 Bt2	22.4	23.4	22.9
KCHH 2725	23.1	23.1	23.1
KCH 15 K 39 BG II	24.8	23.1	24.0
Tulasi 216 BG II			
PRCH 737 Bt2	24.7	24.0	24.4
DPC 9109 BG II	21.3	23.1	22.2
GBCH 85 BG II (Kuber BG II)	23.8	22.3	23.1
NCS 860 Bt2	21.5	21.8	21.7
PRCH 739 Bt2	23.9	22.2	23.1
KCHH 2735	21.4	24.3	22.9
NCS 909 Bt2	22.8	21.9	22.4

C. ENTOMOLOGICAL OBSERVATIONS

Data on Jassid population (Table 23), Whitefly population (Table 24), Thrips (Table 25), Aphids (Table 26), Mirid bugs (Table 27), Square damage (Table 28), green boll damage by American Bollworms (Table 29), Number of American Bollworms (Table 30), number of Spodoptera (Table 31), number of Pink Bollworm (Table 32), locule damage by Pink bollworm (Table 33) and number of Spotted bollworm (Table 34) is given below.

Table 23:Jassids (No./3 leaves) and Injury Grade

Hybrid	Surat	Rahuri	Khandwa	Mean
PCH 888 Bt2	1.1	10.7 (2)	4.1 (1)	5.3 (1.5)
Tulasi 234 BG II				
JKCH 8665 BG II	0.7	9.2 (1)	4.9 (1)	4.9 (1.0)
RCH 2 BG II	0.9	10.4 (2)	5.1 (1)	5.5 (1.5)
PCH 2171 Bt2	0.5	9.9 (2)	5.3 (2)	5.2 (2.0)
KCHH 2725	0.9	9.6 (1)	5.3 (2)	5.3 (1.5)
KCH 15 K 39 BG II	0.5	9.5 (1)	4.0 (1)	4.7 (1.0)
Tulasi 216 BG II				
PRCH 737 Bt2	0.7	10.2 (2)	4.5 (1)	5.1 (1.5)
DPC 9109 BG II	2.1	9.8 (2)	5.6 (2)	5.8 (2.)
GBCH 85 BG II (Kuber BG II)	0.7	9.7 (2)	5.5 (2)	5.3 (2.0)
NCS 860 Bt2	0.7	10.3 (2)	4.5 (1)	5.2 (1.5)
PRCH 739 Bt2	0.6	9.7 (1)	6.8 (3)	5.7 (2.)
KCHH 2735	0.7	10.3 (2)	4.9 (1)	5.3 (1.5)
NCS 909 Bt2	0.4	9.9 (2)	4.9 (1)	5.1 (1.5)

Injury Grade presented in parenthesis

Table 24: Whiteflies (No./3 leaves)

Hybrid	Surat	Rahuri	Khandwa	Mean
PCH 888 Bt2	13.8	4.9	5.9	8.2
Tulasi 234 BG II				
JKCH 8665 BG II	6.1	4.9	7.1	6.0
RCH 2 BG II	7.7	4.1	6.9	6.2
PCH 2171 Bt2	13.3	4.2	7.1	8.2
KCHH 2725	12.1	4.9	7.7	8.2
KCH 15 K 39 BG II	6.1	4.0	6.7	5.6
Tulasi 216 BG II				
PRCH 737 Bt2	8.9	3.9	6.2	6.3
DPC 9109 BG II	7.8	4.0	6.9	6.2
GBCH 85 BG II (Kuber BG II)	20.7	4.5	7.6	10.9
NCS 860 Bt2	18.4	4.2	6.2	9.6
PRCH 739 Bt2	19.3	3.8	8.7	10.6
KCHH 2735	8.3	4.6	6.9	6.6
NCS 909 Bt2	10.1	4.1	7.4	7.2

Table 25: Thrips (No./3 leaves)

Hybrid	Surat	Rahuri	Mean
PCH 888 Bt2	16.3	15.2	15.8
Tulasi 234 BG II			
JKCH 8665 BG II	21.1	17.9	19.5
RCH 2 BG II	30.5	16.3	23.4
PCH 2171 Bt2	17.9	14.8	16.4
KCHH 2725	20.9	17.4	19.2
KCH 15 K 39 BG II	25.5	15.7	20.6
Tulasi 216 BG II			
PRCH 737 Bt2	19.7	15.4	17.6
DPC 9109 BG II	28.5	17.4	23.0
GBCH 85 BG II (Kuber BG II)	30.2	16.5	23.4
NCS 860 Bt2	21.8	13.0	17.4
PRCH 739 Bt2	34.9	18.6	26.8
KCHH 2735	33.8	17.4	25.6
NCS 909 Bt2	32.4	14.2	23.3

Table 26: Aphids (No./3 leaves)

Hybrid	Surat	Rahuri	Khandwa	Mean
PCH 888 Bt2	0.0	8.3	11.9	6.7
Tulasi 234 BG II				
JKCH 8665 BG II	0.0	6.5	12.4	6.3
RCH 2 BG II	0.0	5.0	13.6	6.2
PCH 2171 Bt2	0.0	7.8	13.4	7.1
KCHH 2725	0.0	7.3	14.3	7.2
KCH 15 K 39 BG II	0.0	7.1	12.3	6.5
Tulasi 216 BG II				
PRCH 737 Bt2	0.0	5.6	12.5	6.0
DPC 9109 BG II	0.0	5.3	12.2	5.8
GBCH 85 BG II (Kuber BG II)	0.0	5.9	14.0	6.6
NCS 860 Bt2	0.0	5.2	12.2	5.8
PRCH 739 Bt2	0.0	5.5	15.0	6.8
KCHH 2735	0.0	6.7	12.2	6.3
NCS 909 Bt2	0.0	6.4	13.7	6.7

Table 27: Mirid bugs (No./3 leaves)

Hybrid	Surat	Rahuri	Mean
PCH 888 Bt2	0.0	0.0	0.0
Tulasi 234 BG II			
JKCH 8665 BG II	0.0	0.0	0.0
RCH 2 BG II	0.0	0.0	0.0
PCH 2171 Bt2	0.0	0.0	0.0
KCHH 2725	0.0	0.0	0.0
KCH 15 K 39 BG II	0.0	0.0	0.0
Tulasi 216 BG II			
PRCH 737 Bt2	0.0	0.0	0.0
DPC 9109 BG II	0.0	0.0	0.0
GBCH 85 BG II (Kuber BG II)	0.0	0.0	0.0
NCS 860 Bt2	0.0	0.0	0.0
PRCH 739 Bt2	0.0	0.0	0.0
KCHH 2735	0.0	0.0	0.0
NCS 909 Bt2	0.0	0.0	0.0

Table 28: Square damage (%)

Hybrid	Surat	Rahuri	Khandwa	Mean
PCH 888 Bt2	0.0	0.0	3.7	1.2
Tulasi 234 BG II				
JKCH 8665 BG II	0.0	0.0	4.4	1.5
RCH 2 BG II	0.0	0.0	4.9	1.6
PCH 2171 Bt2	0.0	0.0	4.3	1.4
KCHH 2725	0.0	0.0	4.8	1.6
KCH 15 K 39 BG II	0.0	0.0	4.0	1.3
Tulasi 216 BG II				
PRCH 737 Bt2	0.5	0.0	4.2	1.6
DPC 9109 BG II	0.0	0.0	4.8	1.6
GBCH 85 BG II (Kuber BG II)	0.0	0.0	4.9	1.6
NCS 860 Bt2	0.0	0.0	4.0	1.3
PRCH 739 Bt2	0.0	0.0	5.3	1.8
KCHH 2735	0.0	0.0	4.5	1.5
NCS 909 Bt2	0.5	0.0	4.7	1.7

Table 29: Green boll damage by ABW (%)

Hybrid	Surat	Rahuri	Mean
PCH 888 Bt2	0.0	0.0	0.0
Tulasi 234 BG II			
JKCH 8665 BG II	0.0	0.0	0.0
RCH 2 BG II	0.0	0.0	0.0
PCH 2171 Bt2	0.0	0.0	0.0
KCHH 2725	0.0	0.0	0.0
KCH 15 K 39 BG II	0.0	0.0	0.0
Tulasi 216 BG II			
PRCH 737 Bt2	0.4	0.0	0.2
DPC 9109 BG II	0.0	0.0	0.0
GBCH 85 BG II (Kuber BG II)	0.0	0.0	0.0
NCS 860 Bt2	0.0	0.0	0.0
PRCH 739 Bt2	0.0	0.0	0.0
KCHH 2735	0.0	0.0	0.0
NCS 909 Bt2	0.0	0.0	0.0

Table 30: ABW (No./5 plants)

Hybrid	Surat	Rahuri	Mean
PCH 888 Bt2	0.0	0.0	0.0
Tulasi 234 BG II			
JKCH 8665 BG II	0.0	0.0	0.0
RCH 2 BG II	0.0	0.0	0.0
PCH 2171 Bt2	0.0	0.0	0.0
KCHH 2725	0.0	0.0	0.0
KCH 15 K 39 BG II	0.0	0.0	0.0
Tulasi 216 BG II			
PRCH 737 Bt2	0.7	0.0	0.4
DPC 9109 BG II	0.0	0.0	0.0
GBCH 85 BG II (Kuber BG II)	0.0	0.0	0.0
NCS 860 Bt2	0.0	0.0	0.0
PRCH 739 Bt2	0.0	0.0	0.0
KCHH 2735	0.0	0.0	0.0
NCS 909 Bt2	0.0	0.0	0.0

Table 31: Spodoptera (No./5 plants)

Hybrid	Surat	Rahuri	Mean
PCH 888 Bt2	0.0	0.0	0.0
Tulasi 234 BG II			
JKCH 8665 BG II	0.0	0.0	0.0
RCH 2 BG II	0.0	0.0	0.0
PCH 2171 Bt2	0.0	0.0	0.0
KCHH 2725	0.0	0.0	0.0
KCH 15 K 39 BG II	0.0	0.0	0.0
Tulasi 216 BG II			
PRCH 737 Bt2	0.0	0.0	0.0
DPC 9109 BG II	0.0	0.0	0.0
GBCH 85 BG II (Kuber BG II)	0.0	0.0	0.0
NCS 860 Bt2	0.0	0.0	0.0
PRCH 739 Bt2	0.0	0.0	0.0
KCHH 2735	0.0	0.0	0.0
NCS 909 Bt2	0.0	0.0	0.0

Table 32: PBW larvae (No./5 plants)

Hybrid	Surat	Rahuri	Khandwa	Mean
PCH 888 Bt2	0.0	0.0	1.1	0.4
Tulasi 234 BG II				
JKCH 8665 BG II	0.0	7.3	1.1	2.8
RCH 2 BG II	0.0	0.0	1.1	0.4
PCH 2171 Bt2	0.0	0.0	0.9	0.3
KCHH 2725	0.0	0.0	0.9	0.3
KCH 15 K 39 BG II	0.0	0.0	1.1	0.4
Tulasi 216 BG II				
PRCH 737 Bt2	0.0	0.0	1.0	0.3
DPC 9109 BG II	0.0	0.0	0.9	0.3
GBCH 85 BG II (Kuber BG II)	0.0	0.0	1.1	0.4
NCS 860 Bt2	0.0	0.0	1.0	0.3
PRCH 739 Bt2	0.0	0.0	1.1	0.4
KCHH 2735	0.0	0.0	1.0	0.3
NCS 909 Bt2	0.0	0.0	1.1	0.4

Table 33: Locule damage by PBW (%)

Hybrid	Surat	Rahuri	Mean
PCH 888 Bt2	2.5	0.0	1.3
Tulasi 234 BG II			
JKCH 8665 BG II	5.2	0.7	3.0
RCH 2 BG II	0.2	0.0	0.1
PCH 2171 Bt2	5.0	0.0	2.5
KCHH 2725	1.6	0.0	0.8
KCH 15 K 39 BG II	0.6	0.0	0.3
Tulasi 216 BG II			
PRCH 737 Bt2	1.1	0.0	0.6
DPC 9109 BG II	0.0	0.0	0.0
GBCH 85 BG II (Kuber BG II)	1.8	0.0	0.9
NCS 860 Bt2	0.5	0.0	0.3
PRCH 739 Bt2	0.1	0.0	0.1
KCHH 2735	1.9	0.0	1.0
NCS 909 Bt2	0.2	0.0	0.1

Table 34: Spotted bollworm (No./5 plants)

Hybrid	Surat	Rahuri	Khandwa	Mean
PCH 888 Bt2	0.0	0.0	0.3	0.1
Tulasi 234 BG II				
JKCH 8665 BG II	0.0	0.0	0.4	0.1
RCH 2 BG II	0.0	0.0	0.4	0.1
PCH 2171 Bt2	0.0	0.0	0.5	0.2
KCHH 2725	0.0	0.0	0.4	0.1
KCH 15 K 39 BG II	0.0	0.0	0.4	0.1
Tulasi 216 BG II				
PRCH 737 Bt2	0.0	0.0	0.3	0.1
DPC 9109 BG II	0.0	0.0	0.5	0.2
GBCH 85 BG II (Kuber BG II)	0.0	0.0	0.5	0.2
NCS 860 Bt2	0.0	0.0	0.4	0.1
PRCH 739 Bt2	0.0	0.0	0.5	0.2
KCHH 2735	0.0	0.0	0.4	0.1
NCS 909 Bt2	0.0	0.0	0.4	0.1

Table 35: Mean Performance of Bt cotton Hybrids for various traits

Hybrid	Seed Cotton Yield (Kg/ha)	% Increase over check	Lint Yield (kg/ha)	% Increase over check	Ginning outturn (%)	Boll weight (g)	2.5% span length (mm)	Micronaire value ($\mu\text{g/inch}$)	Bundle strength (g/tex)
PCH 888 Bt2	2291	40.0	800	43.2	35.2	5.2	27.9	3.9	23.3
Tulasi 234 BG II									
JKCH 8665 BG II	2148	31.2	705	26.2	33.1	4.8	31.5	3.5	24.0
RCH 2 BG II	1637	0.0	559	0.1	34.1	4.2	30.0	4.1	22.3
PCH 2171 Bt2	1668	1.9	550	-1.6	33.1	4.5	30.9	3.9	22.9
KCHH 2725	2147	31.2	712	27.4	33.5	5.1	29.6	4.1	23.1
KCH 15 K 39 BG II	1664	1.6	554	-0.9	33.3	4.9	31.3	4.0	24.0
Tulasi 216 BG II									
PRCH 737 Bt2	2031	24.1	691	23.6	34.1	4.6	30.7	3.8	24.4
DPC 9109 BG II	2058	25.7	712	27.4	34.7	4.8	32.2	4.1	22.2
GBCH 85 BG II (Kuber BG II)	2287	39.7	844	51.0	36.8	4.7	28.2	3.9	23.1
NCS 860 Bt2	1660	1.4	576	3.0	34.4	4.6	27.8	4.8	21.7
PRCH 739 Bt2	1742	6.4	575	2.9	33.1	4.0	30.4	4.0	23.1
KCHH 2735	1882	15.0	606	8.4	32.4	5.1	31.9	4.0	22.9
NCS 909 Bt2	1662	1.5	582	4.2	35.2	4.9	31.4	4.2	22.4

Table 36: Mean Performance of Bt cotton Hybrids for various Pest and Disease Observation

Hybrid	Jassids (No./3 leaves)	Jassid injury grade	Thrips (No./3 leaves)	White flies (No./3 leaves)	Open boll damage (%)	Aphids (No./3 leaves)	Square damage (%)	ABW (No./5 plants)	PBW larvae (No./5 plants)	Locule damage by PBW (%)	Spotted bollworm (No./5 plants)	Green boll damage by PBW (%)	Alternaria Blight (PDI)
PCH 888 Bt2	5.3	1.5	15.8	8.2	1.0	6.7	1.2	0.0	0.4	1.3	0.1	0.9	6.9
Tulasi 234 BG II													
JKCH 8665 BG II	4.9	1.0	19.5	6.0	1.1	6.3	1.5	0.0	2.8	3.0	0.1	0.9	7.7
RCH 2 BG II	5.5	1.5	23.4	6.2	1.1	6.2	1.6	0.0	0.4	0.1	0.1	0.9	17.4
PCH 2171 Bt2	5.2	2.0	16.4	8.2	0.9	7.1	1.4	0.0	0.3	2.5	0.2	0.7	9.3
KCHH 2725	5.3	1.5	19.2	8.2	0.9	7.2	1.6	0.0	0.3	0.8	0.1	0.7	8.0
KCH 15 K 39 BG II	4.7	1.0	20.6	5.6	1.0	6.5	1.3	0.0	0.4	0.3	0.1	0.9	8.9
Tulasi 216 BG II													
PRCH 737 Bt2	5.1	1.5	17.6	6.3	1.0	6.0	1.6	0.4	0.3	0.6	0.1	0.7	4.8
DPC 9109 BG II	5.8	2.0	23.0	6.2	1.0	5.8	1.6	0.0	0.3	0.0	0.2	0.8	14.7
GBCH 85 BG II (Kuber BG II)	5.3	2.0	23.4	10.9	1.1	6.6	1.6	0.0	0.4	0.9	0.2	0.9	7.5
NCS 860 Bt2	5.2	1.5	17.4	9.6	1.1	5.8	1.3	0.0	0.3	0.3	0.1	0.8	13.5
PRCH 739 Bt2	5.7	2.0	26.8	10.6	1.0	6.8	1.8	0.0	0.4	0.1	0.2	0.9	16.2
KCHH 2735	5.3	1.5	25.6	6.6	1.0	6.3	1.5	0.0	0.3	1.0	0.1	0.9	10.1
NCS 909 Bt2	5.1	1.5	23.3	7.2	1.1	6.7	1.7	0.0	0.4	0.1	0.1	0.9	15.7

Rainfed Conditions

The trial was conducted with 12 entries and RCH 2 BG II as check. The details of entries and sponsoring company are given below.

Institution	Hybrid
Pravardhan Seeds Pvt. Ltd.	PRCH 737 Bt2
JK Agri Genetics Ltd.	JKCH 8905 BG II
Prabhat Agri Biotech Ltd.	PCH 2171 Bt2
Rasi Seeds Pvt. Ltd.	RCH 665 BG II
Nuziveedu Seeds Pvt. Ltd.	NCS 909 Bt2
Check Hybrid	Bunny BG II
JK Agri Genetics Ltd.	JKCH 8906 BG II
Pravardhan Seeds Pvt. Ltd.	PRCH 739 Bt2
Tulasi Seeds Pvt. Ltd.	Tulasi 243 BG II
Prabhat Agri Biotech Ltd.	PCH 888 Bt2
Rasi Seeds Pvt. Ltd.	RCH 797 BG II
Nuziveedu Seeds Pvt. Ltd.	NCS 860 Bt2
Kaveri Seed Company Ltd.	KCH 14 K 59 BG II

The data of one entry (JKCH 8906 BG II) was withheld as the company withdrew the entry after the trials were initiated. The data in respect of Tulasi 243 BG II was withheld as the company has paid only 60 % of testing fee and the remaining 40 % is still pending. The data will be released on receipt of the balance amount.

Trial Locations

The trial was conducted at four locations as detailed below:

1. CICR, Nagpur, Maharashtra
2. PDKV, Akola, Maharashtra
3. Navsari Agricultural University, Bharuch, Gujarat
4. College of Agriculture, RMSKVV, Indore, Madhya Pradesh

Trial Details

Number of Entries 12 + 1 checks

Number of Rows Yield trial 1: 6 Rows (Protected)

Row length 6 m

Spacing Recommended spacing

No. of replications Three

Design Randomized Block Design

Fertilizers As per Recommendations

Observations Recorded

The Biometrical observations recorded were final plant stand, ginning per cent, lint index, seed index, Seed Cotton Yield (kg/ha) and lint yield (kg/ha). The entomological observations on sap sucking pests, Bollworm damage and natural enemies were recorded.

A. BIOMETRICAL EVALUATION

Data on germination (Table 37), boll weight (Table 38), Ginning Outturn (Table 39), Lint index (Table 40) and seed index (Table 41) are given below.

Table 37: Germination (%)

Hybrid	Bharuch	Nagpur (CICR)	Indore	Mean
PRCH 737 Bt2	97.0	82.0	75.3	84.8
JKCH 8905 BG II	100.0	94.0	76.0	90.0
PCH 2171 Bt2	93.0	92.0	72.0	85.7
RCH 665 BG II	100.0	90.7	75.3	88.7
NCS 909 Bt2	97.0	80.7	88.7	88.8
Bunny BG II	96.0	94.7	79.3	90.0
PRCH 739 Bt2	100.0	88.0	72.7	86.9
Tulasi 243 BG II				
PCH 888 Bt2	100.0	90.0	77.3	89.1
RCH 797 BG II	97.0	87.3	78.7	87.7
NCS 860 Bt2	93.0	91.3	76.0	86.8
KCH 14 K 59 BG II	100.0	94.0	71.3	88.4

Table 38: Mean boll weight (g)

Hybrid	Bharuch	Akola	Nagpur (CICR)	Indore	Mean
PRCH 737 Bt2	3.9	3.9	4.1	3.0	3.7
JKCH 8905 BG II	4.2	3.8	4.0	2.7	3.7
PCH 2171 Bt2	4.2	3.9	4.6	3.9	4.2
RCH 665 BG II	4.1	4.1	4.0	3.4	3.9
NCS 909 Bt2	4.1	4.0	4.9	3.3	4.1
Bunny BG II	3.7	3.3	4.7	3.0	3.7
PRCH 739 Bt2	3.5	3.4	4.4	3.3	3.7
Tulasi 243 BG II					
PCH 888 Bt2	3.8	4.0	5.0	3.2	4.0
RCH 797 BG II	4.1	3.5	4.8	3.5	4.0
NCS 860 Bt2	3.4	3.0	4.0	2.9	3.3
KCH 14 K 59 BG II	4.0	4.3	5.1	3.4	4.2

Table 39: Mean Ginning Out Turn (%)

Hybrid	Bharuch	Akola	Nagpur (CICR)	Indore	Mean
PRCH 737 Bt2	32.6	41.8	34.0	33.6	35.5
JKCH 8905 BG II	31.0	40.7	35.0	32.9	34.9
PCH 2171 Bt2	34.4	41.3	34.0	31.3	35.3
RCH 665 BG II	32.3	38.0	32.0	31.6	33.5
NCS 909 Bt2	33.1	38.3	35.0	33.8	35.1
Bunny BG II	32.8	41.2	35.0	32.3	35.3
PRCH 739 Bt2	31.8	40.5	34.0	33.7	35.0
Tulasi 243 BG II					
PCH 888 Bt2	32.9	40.8	35.0	34.4	35.8
RCH 797 BG II	32.2	39.0	35.0	33.7	35.0
NCS 860 Bt2	33.6	42.7	35.0	33.3	36.2
KCH 14 K 59 BG II	31.0	40.2	35.0	34.8	35.3

Table 40: Lint index (g)

Hybrid	Bharuch	Akola	Indore	Mean
PRCH 737 Bt2	4.8	5.6	4.3	4.9
JKCH 8905 BG II	4.9	4.8	3.7	4.5
PCH 2171 Bt2	5.8	5.4	4.7	5.3
RCH 665 BG II	4.8	4.8	4.0	4.5
NCS 909 Bt2	5.4	5.1	5.5	5.3
Bunny BG II	5.9	4.9	4.5	5.1
PRCH 739 Bt2	4.7	4.9	5.1	4.9
Tulasi 243 BG II				
PCH 888 Bt2	4.9	5.8	4.9	5.2
RCH 797 BG II	5.7	5.2	5.1	5.3
NCS 860 Bt2	5.6	4.7	3.8	4.7
KCH 14 K 59 BG II	4.9	5.6	5.1	5.2

Table 41: Seed index (g)

Hybrid	Bharuch	Akola	Indore	Mean
PRCH 737 Bt2	10.0	7.8	8.5	8.8
JKCH 8905 BG II	11.0	6.9	7.5	8.5
PCH 2171 Bt2	11.0	7.6	10.2	9.6
RCH 665 BG II	10.0	7.9	8.8	8.9
NCS 909 Bt2	11.0	8.2	10.9	10.0
Bunny BG II	12.0	7.0	9.5	9.5
PRCH 739 Bt2	10.0	7.2	10.1	9.1
Tulasi 243 BG II				
PCH 888 Bt2	10.0	8.3	9.2	9.2
RCH 797 BG II	12.0	8.1	10.0	10.0
NCS 860 Bt2	11.0	6.3	7.7	8.3
KCH 14 K 59 BG II	11.0	8.3	9.6	9.6

Seed Cotton Yield

Data on seed cotton yield is furnished in Table 42 and lint yield in Table 43. Except one hybrid all other hybrids recorded higher yield than check hybrid.

Table 42: Seed cotton yield (kg/ha)

Hybrid	Bharuch	Akola	Indore	Mean	% Increase over check
PRCH 737 Bt2	2275	845	1392	1504	29.5
JKCH 8905 BG II	2173	1038	1369	1527	31.5
PCH 2171 Bt2	2164	960	1213	1446	24.5
RCH 665 BG II	2376	791	1498	1555	33.9
NCS 909 Bt2	1984	668	1348	1333	14.8
Bunny BG II	1691	709	1084	1161	0.0
PRCH 739 Bt2	2478	949	1459	1629	40.3
Tulasi 243 BG II					
PCH 888 Bt2	2677	1094	1965	1912	64.7
RCH 797 BG II	2571	668	1711	1650	42.1
NCS 860 Bt2	1847	628	1288	1254	8.0
KCH 14 K 59 BG II	3419	1027	2667	2371	104.2
CD @ 5 %	618	414	432		
CV %	15.9	13.0	17.2		

Table 43: Lint yield (kg/ha)

Hybrid	Bharuch	Akola	Indore	Mean	% Increase over check
PRCH 737 Bt2	726	354	467	516	33.9
JKCH 8905 BG II	698	422	449	523	35.8
PCH 2171 Bt2	695	396	379	490	27.3
RCH 665 BG II	702	300	473	492	27.7
NCS 909 Bt2	608	256	456	440	14.3
Bunny BG II	512	292	350	385	-0.1
PRCH 739 Bt2	816	384	491	564	46.4
Tulasi 243 BG II					
PCH 888 Bt2	885	447	678	670	74.0
RCH 797 BG II	852	260	577	563	46.2
NCS 860 Bt2	599	268	433	433	12.5
KCH 14 K 59 BG II	1026	413	927	789	104.9

B. FIBRE QUALITY EVALUATION

Table 44: 2.5% span length (mm)

Hybrid	Bharuch	Akola	Nagpur (CICR)	Mean
PRCH 737 Bt2	31.0	28.7	28.1	29.3
JKCH 8905 BG II	31.1	30.9	31.5	31.2
PCH 2171 Bt2	30.1	28.8	29.9	29.6
RCH 665 BG II	30.6	29.8	28.2	29.5
NCS 909 Bt2	30.8	28.3	29.5	29.5
Bunny BG II	30.9	28.8	31.1	30.3
PRCH 739 Bt2	29.1	28.3	27.5	28.3
Tulasi 243 BG II				
PCH 888 Bt2	27.5	27.9	27.5	27.6
RCH 797 BG II	27.9	29.1	27.3	28.1
NCS 860 Bt2	26.9	31.2	26.3	28.1
KCH 14 K 59 BG II	32.3	27.4	28.2	29.3

Table 45a: Micronaire value ($\mu\text{g/inch}$)

Hybrid	Bharuch	Akola	Nagpur (CICR)	Mean
PRCH 737 Bt2	4.4	3.3	3.9	3.9
JKCH 8905 BG II	3.8	3.3	3.6	3.6
PCH 2171 Bt2	4.6	4.5	4.4	4.5
RCH 665 BG II	3.9	3.4	3.5	3.6
NCS 909 Bt2	4.6	3.7	4.1	4.1
Bunny BG II	4.3	2.6	4.0	3.6
PRCH 739 Bt2	4.8	3.7	3.9	4.1
Tulasi 243 BG II				
PCH 888 Bt2	4.4	3.9	3.5	3.9
RCH 797 BG II	4.6	3.0	3.8	3.8
NCS 860 Bt2	4.4	3.2	4.5	4.0
KCH 14 K 59 BG II	4.7	3.9	4.2	4.3

Table 45b: Bundle strength (g/tex)

Hybrid	Bharuch	Akola	Nagpur (CICR)	Mean
PRCH 737 Bt2	24.8	22.0	23.5	23.4
JKCH 8905 BG II	24.7	24.0	23.7	24.1
PCH 2171 Bt2	23.6	19.6	21.6	21.6
RCH 665 BG II	25.5	25.2	22.1	24.3
NCS 909 Bt2	22.4	22.9	22.2	22.5
Bunny BG II	23.5	22.7	22.7	23.0
PRCH 739 Bt2	22.4	20.8	22.2	21.8
Tulasi 243 BG II				
PCH 888 Bt2	23.3	21.2	21.6	22.0
RCH 797 BG II	23.9	23.3	21.8	23.0
NCS 860 Bt2	23.0	23.9	19.7	22.2
KCH 14 K 59 BG II	24.9	20.9	21.8	22.5

C. ENTOMOLOGICAL OBSERVATIONS

Data on Jassids (Table 46), Thrips (Table 47), White flies (Table 48), predators (Table 49), Aphids (Table 50), Mirid bugs (Table 51), square damage (Table 52), green boll damage by American Boll worms (Table 53), Number of American Boll worms (Table 54), Number of Spodoptera (Table 55), Number of Pink Boll worms (Table 56), Locule damage by Pink Boll worms (Table 57) and Number of spotted boll worms (Table 58) are given below.

Table 46: Jassids (No./3 leaves)

Hybrid	Bharuch	Akola	Indore	Mean
PRCH 737 Bt2	6.6 (2)	11.7 (2)	9.4 (3)	9.2 (2.3)
JKCH 8905 BG II	6.9 (2)	11.6 (2)	10.2 (3)	9.6 (2.3)
PCH 2171 Bt2	7.6 (3)	11.8 (2)	8.5 (2)	9.3 (2.3)
RCH 665 BG II	6.0 (2)	11.0 (2)	10.7 (3)	9.2 (2.3)
NCS 909 Bt2	6.3 (2)	14.8 (3)	10.1 (3)	10.4 (2.7)
Bunny BG II	7.3 (2)	11.7 (2)	10.0 (3)	9.7 (2.3)
PRCH 739 Bt2	6.7 (2)	12.9 (3)	8.2 (4)	9.3 (3.0)
Tulasi 243 BG II				
PCH 888 Bt2	6.1 (2)	11.1 (2)	8.8 (4)	8.7 (2.7)
RCH 797 BG II	6.3 (2)	12.2 (2)	10.6 (2)	9.7 (2.0)
NCS 860 Bt2	8.0 (3)	13.1 (3)	11.1 (3)	10.7 (3.0)
KCH 14 K 59 BG II	6.5 (2)	11.7 (2)	7.1 (2)	8.4 (2.0)

Injury Grade presented in parenthesis

Table 47: Thrips (No./3 leaves)

Hybrid	Bharuch	Akola	Indore	Mean
PRCH 737 Bt2	5.5	12.2	28.5	15.4
JKCH 8905 BG II	4.9	9.3	29.8	14.7
PCH 2171 Bt2	7.1	11.0	27.8	15.3
RCH 665 BG II	4.7	11.3	32.6	16.2
NCS 909 Bt2	7.6	10.3	32.9	16.9
Bunny BG II	5.9	12.0	33.1	17.0
PRCH 739 Bt2	5.1	11.6	32.7	16.5
Tulasi 243 BG II				
PCH 888 Bt2	5.7	11.6	32.8	16.7
RCH 797 BG II	6.5	10.6	33.1	16.7
NCS 860 Bt2	8.3	11.7	26.8	15.6
KCH 14 K 59 BG II	7.7	13.3	23.5	14.8

Table 48: Whiteflies (No./3 leaves)

Hybrid	Bharuch	Akola	Indore	Mean
PRCH 737 Bt2	14.9	18.7	9.5	14.4
JKCH 8905 BG II	13.9	16.6	10.5	13.7
PCH 2171 Bt2	20.7	22.8	15.6	19.7
RCH 665 BG II	14.4	19.9	12.6	15.6
NCS 909 Bt2	16.3	11.3	11.8	13.1
Bunny BG II	19.4	13.1	12.4	15.0
PRCH 739 Bt2	21.5	17.9	12.7	17.4
Tulasi 243 BG II				
PCH 888 Bt2	23.7	18.8	12.8	18.4
RCH 797 BG II	18.3	16.9	10.9	15.4
NCS 860 Bt2	20.3	16.0	10.0	15.4
KCH 14 K 59 BG II	14.6	17.7	12.9	15.1

Table 49: Predators (No./3 leaves)

Hybrid	Bharuch	Akola	Mean
PRCH 737 Bt2	3.1	3.7	3.4
JKCH 8905 BG II	3.9	3.8	3.9
PCH 2171 Bt2	2.0	3.7	2.9
RCH 665 BG II	3.8	3.7	3.8
NCS 909 Bt2	2.5	3.0	2.8
Bunny BG II	3.5	3.9	3.7
PRCH 739 Bt2	4.9	2.8	3.9
Tulasi 243 BG II			
PCH 888 Bt2	4.5	4.0	4.3
RCH 797 BG II	4.2	3.3	3.8
NCS 860 Bt2	1.7	8.1	4.9
KCH 14 K 59 BG II	1.6	3.4	2.5

Table 50: Aphids (No./3 leaves)

Hybrid	Bharuch	Akola	Indore	Mean
PRCH 737 Bt2	38.9	13.7	30.5	27.7
JKCH 8905 BG II	25.7	10.9	25.2	20.6
PCH 2171 Bt2	22.3	11.4	28.7	20.8
RCH 665 BG II	28.8	10.6	26.9	22.1
NCS 909 Bt2	33.5	11.2	29.0	24.6
Bunny BG II	26.1	11.6	28.8	22.2
PRCH 739 Bt2	42.7	11.0	14.9	22.9
Tulasi 243 BG II				
PCH 888 Bt2	32.2	11.9	29.1	24.4
RCH 797 BG II	23.6	12.8	28.9	21.8
NCS 860 Bt2	26.5	13.1	26.4	22.0
KCH 14 K 59 BG II	19.3	11.0	24.7	18.3

Table 51: Mirid bugs (No./3 leaves)

Hybrid	Bharuch	Indore	Mean
PRCH 737 Bt2	1.5	0.0	0.8
JKCH 8905 BG II	2.1	0.0	1.1
PCH 2171 Bt2	2.3	0.0	1.2
RCH 665 BG II	2.4	0.0	1.2
NCS 909 Bt2	3.5	0.0	1.8
Bunny BG II	2.5	0.0	1.3
PRCH 739 Bt2	2.9	0.0	1.5
Tulasi 243 BG II			
PCH 888 Bt2	2.5	0.0	1.3
RCH 797 BG II	2.1	0.0	1.1
NCS 860 Bt2	2.5	0.0	1.3
KCH 14 K 59 BG II	2.7	0.0	1.4

Table 52: Square damage (%)

Hybrid	Bharuch	Indore	Mean
PRCH 737 Bt2	8.8	10.0	9.4
JKCH 8905 BG II	0.9	11.0	6.0
PCH 2171 Bt2	8.0	12.0	10.0
RCH 665 BG II	1.5	9.0	5.3
NCS 909 Bt2	7.2	10.0	8.6
Bunny BG II	1.7	12.0	6.9
PRCH 739 Bt2	1.2	11.0	6.1
Tulasi 243 BG II			
PCH 888 Bt2	0.8	10.0	5.4
RCH 797 BG II	0.7	9.0	4.9
NCS 860 Bt2	10.3	11.0	10.7
KCH 14 K 59 BG II	9.7	8.0	8.9

Table 53: Green boll damage by ABW (%)

Hybrid	Bharuch	Indore	Mean
PRCH 737 Bt2	4.6	8.7	6.7
JKCH 8905 BG II	1.6	10.8	6.2
PCH 2171 Bt2	4.2	9.9	7.1
RCH 665 BG II	1.2	11.5	6.4
NCS 909 Bt2	3.8	9.0	6.4
Bunny BG II	2.0	10.5	6.3
PRCH 739 Bt2	1.4	9.4	5.4
Tulasi 243 BG II			
PCH 888 Bt2	0.6	8.8	4.7
RCH 797 BG II	0.6	9.7	5.2
NCS 860 Bt2	6.4	10.1	8.3
KCH 14 K 59 BG II	6.8	7.5	7.2

Table 54: ABW (No./5 plants)

Hybrid	Bharuch	Akola	Indore	Mean
PRCH 737 Bt2	4.7	0.0	1.1	1.9
JKCH 8905 BG II	1.0	0.0	2.9	1.3
PCH 2171 Bt2	3.7	0.0	2.8	2.2
RCH 665 BG II	0.7	0.0	2.9	1.2
NCS 909 Bt2	4.0	0.0	3.0	2.3
Bunny BG II	1.0	0.0	3.1	1.4
PRCH 739 Bt2	1.0	0.0	2.6	1.2
Tulasi 243 BG II				
PCH 888 Bt2	0.3	0.0	2.8	1.0
RCH 797 BG II	0.3	0.0	2.0	0.8
NCS 860 Bt2	5.0	0.0	2.9	2.6
KCH 14 K 59 BG II	5.7	0.0	1.8	2.5

Table 55: Spodoptera (No./5 plants)

Hybrid	Bharuch	Indore	Mean
PRCH 737 Bt2	0.0	1.0	0.5
JKCH 8905 BG II	0.0	0.2	0.1
PCH 2171 Bt2	0.0	0.3	0.2
RCH 665 BG II	0.0	0.4	0.2
NCS 909 Bt2	0.0	1.0	0.5
Bunny BG II	0.0	7.8	3.9
PRCH 739 Bt2	0.0	0.5	0.3
Tulasi 243 BG II			
PCH 888 Bt2	0.0	0.6	0.3
RCH 797 BG II	0.0	0.2	0.1
NCS 860 Bt2	0.0	0.2	0.1
KCH 14 K 59 BG II	0.0	0.2	0.1

Table 56: PBW larvae (No./5 plants)

Hybrid	Bharuch	Indore	Mean
PRCH 737 Bt2	2.0	1.0	1.5
JKCH 8905 BG II	0.3	0.5	0.4
PCH 2171 Bt2	1.0	0.1	0.6
RCH 665 BG II	0.3	2.0	1.2
NCS 909 Bt2	1.3	1.0	1.2
Bunny BG II	0.3	0.9	0.6
PRCH 739 Bt2	0.3	1.0	0.7
Tulasi 243 BG II			
PCH 888 Bt2	0.0	0.9	0.5
RCH 797 BG II	0.0	0.0	0.0
NCS 860 Bt2	2.0	0.8	1.4
KCH 14 K 59 BG II	2.7	0.5	1.6

Table 57: Locule damage by PBW (%)

Hybrid	Bharuch	Akola	Indore	Mean
PRCH 737 Bt2	10.9	0.0	7.5	6.1
JKCH 8905 BG II	1.9	0.0	6.4	2.8
PCH 2171 Bt2	4.6	0.0	8.0	4.2
RCH 665 BG II	2.2	0.0	3.5	1.9
NCS 909 Bt2	5.7	0.0	8.7	4.8
Bunny BG II	3.5	0.0	8.5	4.0
PRCH 739 Bt2	2.9	0.0	6.5	3.1
Tulasi 243 BG II				
PCH 888 Bt2	1.2	0.0	3.0	1.4
RCH 797 BG II	1.0	0.0	3.5	1.5
NCS 860 Bt2	10.6	0.0	6.5	5.7
KCH 14 K 59 BG II	12.9	0.0	3.0	5.3

Table 58: Spotted bollworm (No./5 plants)

Hybrid	Bharuch	Indore	Mean
PRCH 737 Bt2	6.0	1.0	3.5
JKCH 8905 BG II	1.0	0.2	0.6
PCH 2171 Bt2	5.3	0.3	2.8
RCH 665 BG II	1.3	1.0	1.2
NCS 909 Bt2	5.0	0.8	2.9
Bunny BG II	1.3	0.7	1.0
PRCH 739 Bt2	1.7	0.3	1.0
Tulasi 243 BG II			
PCH 888 Bt2	1.0	0.1	0.6
RCH 797 BG II	0.7	0.2	0.5
NCS 860 Bt2	6.3	0.2	3.3
KCH 14 K 59 BG II	6.7	0.3	3.5

Table 59: Mean Performance of Bt cotton Hybrids for various traits

Hybrid	Seed Cotton Yield (Kg/ha)	% Increase over check	Lint Yield (kg/ha)	% Increase over check	Ginning outturn (%)	Boll weight (g)	2.5% span length (mm)	Micronaire value ($\mu\text{g/inch}$)	Bundle strength (g/tex)
PRCH 737 Bt2	1504	29.5	516	33.9	35.5	3.7	29.3	3.9	23.4
JKCH 8905 BG II	1527	31.5	523	35.8	34.9	3.7	31.2	3.6	24.1
PCH 2171 Bt2	1446	24.5	490	27.3	35.3	4.2	29.6	4.5	21.6
RCH 665 BG II	1555	33.9	492	27.7	33.5	3.9	29.5	3.6	24.3
NCS 909 Bt2	1333	14.8	440	14.3	35.1	4.1	29.5	4.1	22.5
Bunny BG II	1161	0.0	385	-0.1	35.3	3.7	30.3	3.6	23.0
PRCH 739 Bt2	1629	40.3	564	46.4	35.0	3.7	28.3	4.1	21.8
Tulasi 243 BG II									
PCH 888 Bt2	1912	64.7	670	74.0	35.8	4.0	27.6	3.9	22.0
RCH 797 BG II	1650	42.1	563	46.2	35.0	4.0	28.1	3.8	23.0
NCS 860 Bt2	1254	8.0	433	12.5	36.2	3.3	28.1	4.0	22.2
KCH 14 K 59 BG II	2371	104.2	789	104.9	35.3	4.2	29.3	4.3	22.5

Table 60: Mean Performance of Bt cotton Hybrids for various Pest and Disease Observation

Hybrid	Jassids (No./3 leaves)	Jassid injury grade	Thrips (No./3 leaves)	Whiteflies (No./3 leaves)	Aphids (No./3 leaves)	Square damage (%)	Green boll damage by ABW (%)	ABW (No./5 plants)	Spodoptera (No./5 plants)	PBW larvae (No./5 plants)	Locule damage by PBW (%)	Spotted bollworm (No./5 plants)
PRCH 737 Bt2	9.2	2.3	15.4	14.4	27.7	9.4	6.7	1.9	0.5	1.5	6.1	3.5
JKCH 8905 BG II	9.6	2.3	14.7	13.7	20.6	6.0	6.2	1.3	0.1	0.4	2.8	0.6
PCH 2171 Bt2	9.3	2.3	15.3	19.7	20.8	10.0	7.1	2.2	0.2	0.6	4.2	2.8
RCH 665 BG II	9.2	2.3	16.2	15.6	22.1	5.3	6.4	1.2	0.2	1.2	1.9	1.2
NCS 909 Bt2	10.4	2.7	16.9	13.1	24.6	8.6	6.4	2.3	0.5	1.2	4.8	2.9
Bunny BG II	9.7	2.3	17.0	15.0	22.2	6.9	6.3	1.4	3.9	0.6	4.0	1.0
PRCH 739 Bt2	9.3	3.0	16.5	17.4	22.9	6.1	5.4	1.2	0.3	0.7	3.1	1.0
Tulasi 243 BG II												
PCH 888 Bt2	8.7	2.7	16.7	18.4	24.4	5.4	4.7	1.0	0.3	0.5	1.4	0.6
RCH 797 BG II	9.7	2.0	16.7	15.4	21.8	4.9	5.2	0.8	0.1	0.0	1.5	0.5
NCS 860 Bt2	10.7	3.0	15.6	15.4	22.0	10.7	8.3	2.6	0.1	1.4	5.7	3.3
KCH 14 K 59 BG II	8.4	2.0	14.8	15.1	18.3	8.9	7.2	2.5	0.1	1.6	5.3	3.5

SOUTH ZONE

In South Zone, Intra-hirsutum Bt hybrids (BG II) were evaluated under irrigated situation with 12 entries and under rainfed condition with 11 entries and Interspecific (H x B) hybrids with 5 entries during the year 2012-13.

Irrigated Conditions

The name of the entries and their sponsoring company are given below:

Institution	Hybrid
Pravardhan Seeds Pvt. Ltd.	PRCH 737 Bt2
Prabhat Agri Biotech Ltd.	PCH 2171 Bt2
Monsanto Holdings Pvt. Ltd.	DPC 9109 BG II
Pravardhan Seeds Pvt. Ltd.	PRCH 739 Bt2
Kaveri Seed Company Ltd.	KCH 15 K 39 BG II
Rasi Seeds Pvt. Ltd.	RCH 386 BG II
Check Hybrid	RCH 2 BG II
JK Agri Genetics Ltd.	JKCH 8665 BG II
Prabhat Agri Biotech Ltd.	PCH 888 Bt2
Nuziveedu Seeds Pvt. Ltd.	NCS 909 Bt2
JK Agri Genetics Ltd.	JKCH 8907 BG II
Nuziveedu Seeds Pvt. Ltd.	NCS 860 Bt2
Kirtiman Agro Genetics Ltd.	KCHH 2904

The data of one entry (JKCH 8865 BG II) was withheld as the company withdrew the entry after the trials were initiated.

Trial Locations

The trial was conducted at three locations. They are

1. UAS, Raichur, Karnataka
2. ANGRAU, Guntur, Andhra Pradesh
3. TNAU, Coimbatore, Tamilnadu

Trial Details

<i>Number of Entries</i>	12 + 1 checks
<i>Number of Rows</i>	Yield trial 1: 6 Rows (Protected)
<i>Row length</i>	6 m
<i>Spacing</i>	Recommended spacing
<i>No. of replications</i>	Three
<i>Design</i>	Randomized Block Design
<i>Fertilizers</i>	As per Recommendations

Observations Recorded

The Biometrical observations recorded were final plant stand, ginning per cent, lint index, seed index, Seed Cotton Yield (kg/ha) and lint yield (kg/ha). The entomological observations on sap sucking pests and Bollworm damage were recorded.

A. BIOMETRICAL EVALUATION

Data on Germination percentage (Table 61), Boll weight (Table 62), Ginning Outturn (Table 63), Lint index varied (Table 64) and seed index (Table 65).

Table 61: Germination (%)

Hybrid	Raichur	Coimbatore	Mean
PRCH 737 Bt2	95.8	97.0	96.4
PCH 2171 Bt2	95.8	95.0	95.4
DPC 9109 BG II	98.8	98.0	98.4
PRCH 739 Bt2	95.2	98.0	96.6
KCH 15 K 39 BG II	100.0	96.0	98.0
RCH 386 BG II	95.2	96.0	95.6
RCH 2 BG II	97.0	97.0	97.0
PCH 888 Bt2	98.8	99.0	98.9
NCS 909 Bt2	98.2	98.0	98.1
JKCH 8907 BG II	89.7	99.0	94.4
NCS 860 Bt2	90.3	99.0	94.7
KCHH 2904	97.6	99.0	98.3

Table 62: Boll weight (g)

Hybrid	Lam	Raichur	Coimbatore	Mean
PRCH 737 Bt2	5.5	4.4	3.8	4.6
PCH 2171 Bt2	5.6	6.1	4.7	5.5
DPC 9109 BG II	5.3	5.1	4.0	4.8
PRCH 739 Bt2	5.7	4.5	3.7	4.6
KCH 15 K 39 BG II	5.8	5.2	4.3	5.1
RCH 386 BG II	5.3	5.4	4.8	5.2
RCH 2 BG II	4.7	4.2	3.9	4.3
PCH 888 Bt2	5.9	5.8	3.8	5.2
NCS 909 Bt2	5.1	5.2	3.9	4.7
JKCH 8907 BG II	5.2	5.7	4.2	5.0
NCS 860 Bt2	4.8	4.5	4.1	4.5
KCHH 2904	4.8	4.5	3.7	4.3

Table 63. Ginning Out turn (%)

Hybrid	Lam	Raichur	Coimbatore	Mean
PRCH 737 Bt2	35.5	32.1	32.8	33.5
PCH 2171 Bt2	35.0	33.9	34.0	34.3
DPC 9109 BG II	33.3	34.8	32.3	33.5
PRCH 739 Bt2	33.1	32.9	33.5	33.2
KCH 15 K 39 BG II	35.7	35.1	34.6	35.1
RCH 386 BG II	34.6	34.1	34.7	34.5
RCH 2 BG II	35.6	34.6	33.2	34.5
PCH 888 Bt2	34.0	35.0	36.3	35.1
NCS 909 Bt2	35.1	34.2	35.7	35.0
JKCH 8907 BG II	34.1	33.6	35.0	34.2
NCS 860 Bt2	33.9	35.8	35.6	35.1
KCHH 2904	32.9	32.4	33.4	32.9

Table 64. Lint index (g)

Hybrid	Lam	Raichur	Coimbatore	Mean
PRCH 737 Bt2	5.9	4.5	5.3	5.2
PCH 2171 Bt2	5.7	5.2	5.5	5.5
DPC 9109 BG II	5.6	5.6	4.4	5.2
PRCH 739 Bt2	6.0	5.2	5.0	5.4
KCH 15 K 39 BG II	6.5	6.0	6.1	6.2
RCH 386 BG II	6.0	6.2	6.4	6.2
RCH 2 BG II	5.7	5.5	5.2	5.5
PCH 888 Bt2	5.8	5.7	5.9	5.8
NCS 909 Bt2	5.5	5.4	4.6	5.2
JKCH 8907 BG II	5.7	5.6	5.4	5.6
NCS 860 Bt2	5.3	5.6	5.2	5.4
KCHH 2904	4.5	5.1	4.0	4.5

Table 65: Seed index (g)

Hybrid	Lam	Raichur	Coimbatore	Mean
PRCH 737 Bt2	10.8	9.6	10.8	10.4
PCH 2171 Bt2	10.6	10.1	10.6	10.4
DPC 9109 BG II	11.2	10.5	9.3	10.3
PRCH 739 Bt2	12.2	10.6	10.0	10.9
KCH 15 K 39 BG II	11.7	11.1	10.5	11.1
RCH 386 BG II	11.3	11.9	12.0	11.7
RCH 2 BG II	10.3	10.3	10.4	10.3
PCH 888 Bt2	11.3	10.5	10.3	10.7
NCS 909 Bt2	10.2	10.4	8.3	9.6
JKCH 8907 BG II	10.9	11.1	9.9	10.6
NCS 860 Bt2	10.3	9.9	9.3	9.8
KCHH 2904	9.3	10.6	8.0	9.3

Seed Cotton Yield

Data on seed cotton yield (Table 66) indicated that all the test hybrids are better than check hybrid except KCHH 2904. The highest mean seed cotton yield of 2173 kg/ha was recorded in PCH 888 Bt BG II.

Table 66: Seed cotton yield (kg/ha)

Hybrid	Lam	Raichur	Coimbatore	Mean	% Increase over check
PRCH 737 Bt2	2849	1581	1691	2040	28.5
PCH 2171 Bt2	2427	2086	1611	2041	28.6
DPC 9109 BG II	2471	1651	1486	1869	17.8
PRCH 739 Bt2	3300	1523	1173	1999	26.0
KCH 15 K 39 BG II	2784	1207	1309	1767	11.3
RCH 386 BG II	2726	1719	1778	2074	30.7
RCH 2 BG II	2147	1051	1562	1587	0.0
PCH 888 Bt2	2974	2101	1444	2173	36.9
NCS 909 Bt2	2294	1281	1414	1663	4.8
JKCH 8907 BG II	2542	1522	1327	1797	13.2
NCS 860 Bt2	2149	1405	1379	1644	3.6
KCHH 2904	2294	1274	938	1502	-5.4
CD @ 5 %	476	216	236		
CV %	11.0	8.0	10.2		

Lint yield

Similar trend was noted for lint yield (Table 67).

Table 67: Lint yield (kg/ha)

Hybrid	Lam	Raichur	Coimbatore	Mean	% Increase over check
PRCH 737 Bt2	1013	508	555	692	26.0
PCH 2171 Bt2	851	706	549	702	27.9
DPC 9109 BG II	822	573	480	625	13.8
PRCH 739 Bt2	1092	502	393	662	20.6
KCH 15 K 39 BG II	994	423	455	624	13.7
RCH 386 BG II	942	586	616	715	30.2
RCH 2 BG II	765	363	518	549	0.0
PCH 888 Bt2	1012	736	525	758	38.1
NCS 909 Bt2	806	437	505	583	6.2
JKCH 8907 BG II	869	512	465	615	12.0
NCS 860 Bt2	729	503	490	574	4.6
KCHH 2904	754	414	314	494	-10.0

B. FIBRE QUALITY EVALUATION

The fibre quality parameters recorded in the hybrids over the locations is furnished in Table 68.

Table 68: Fibre quality attributes

2.5% span length (mm)

Hybrid	Lam	Raichur	Coimbatore	Mean
PRCH 737 Bt2	31.3	31.4	31.7	31.5
PCH 2171 Bt2	30.9	32.1	32.1	31.7
DPC 9109 BG II	31.4	31.1	31.2	31.2
PRCH 739 Bt2	31.5	31.1	28.1	30.2
KCH 15 K 39 BG II	32.3	33.3	33.3	33.0
RCH 386 BG II	31.8	32.7	33.7	32.7
RCH 2 BG II	29.4	30.7	31.2	30.4
PCH 888 Bt2	30.5	29.0	28.9	29.5
NCS 909 Bt2	30.0	31.5	30.6	30.7
JKCH 8907 BG II	31.3	30.6	29.7	30.5
NCS 860 Bt2	29.6	29.2	28.7	29.2
KCHH 2904	29.9	31.0	27.9	29.6

Micronaire value ($\mu\text{g/inch}$)

Hybrid	Lam	Raichur	Coimbatore	Mean
PRCH 737 Bt2	3.8	4.3	3.5	3.9
PCH 2171 Bt2	3.8	4.4	3.6	3.9
DPC 9109 BG II	3.8	4.5	3.9	4.1
PRCH 739 Bt2	4.2	5.2	4.0	4.5
KCH 15 K 39 BG II	3.7	4.6	3.8	4.0
RCH 386 BG II	3.5	4.2	4.2	4.0
RCH 2 BG II	4.1	4.7	4.7	4.5
PCH 888 Bt2	3.5	4.4	3.8	3.9
NCS 909 Bt2	3.5	4.2	3.6	3.8
JKCH 8907 BG II	3.6	4.4	3.6	3.9
NCS 860 Bt2	3.7	4.9	4.1	4.2
KCHH 2904	3.5	4.5	3.5	3.8

Bundle strength (g/tex)

Hybrid	Lam	Raichur	Coimbatore	Mean
PRCH 737 Bt2	23.8	22.9	24.5	23.7
PCH 2171 Bt2	23.4	22.4	24.2	23.3
DPC 9109 BG II	24.1	21.8	21.2	22.4
PRCH 739 Bt2	23.5	21.9	21.7	22.4
KCH 15 K 39 BG II	24.3	22.7	22.8	23.3
RCH 386 BG II	23.4	21.1	19.5	21.3
RCH 2 BG II	22.3	20.3	21.1	21.2
PCH 888 Bt2	23.6	20.6	20.0	21.4
NCS 909 Bt2	22.6	21.6	21.2	21.8
JKCH 8907 BG II	24.6	21.0	21.0	22.2
NCS 860 Bt2	23.3	19.0	20.0	20.8
KCHH 2904	23.8	21.7	22.8	22.8

C. ENTOMOLOGICAL OBSERVATIONS
Table 69: Jassids (No./3 leaves)

Hybrid	Lam	Raichur	Coimbatore	Mean
PRCH 737 Bt2	1.4	11.3	5.7	6.1
PCH 2171 Bt2	0.5	15.3	3.7	6.5
DPC 9109 BG II	1.4	20.0	3.3	8.2
PRCH 739 Bt2	0.3	14.0	3.7	6.0
KCH 15 K 39 BG II	0.9	15.0	5.7	7.2
RCH 386 BG II	0.4	14.0	4.3	6.2
RCH 2 BG II	0.5	18.7	5.3	8.2
PCH 888 Bt2	0.1	13.7	7.3	7.0
NCS 909 Bt2	1.3	19.0	13.0	11.1
JKCH 8907 BG II	1.7	23.3	11.3	12.1
NCS 860 Bt2	1.2	23.3	4.7	9.7
KCHH 2904	0.0	18.0	3.7	7.2

Table 70: Thrips (No./3 leaves)

Hybrid	Lam	Raichur	Coimbatore	Mean
PRCH 737 Bt2	0.2	20.0	6.3	8.8
PCH 2171 Bt2	0.2	33.3	10.7	14.7
DPC 9109 BG II	0.2	19.3	0.0	6.5
PRCH 739 Bt2	0.0	33.0	3.0	12.0
KCH 15 K 39 BG II	0.2	24.7	4.0	9.6
RCH 386 BG II	0.2	22.3	4.0	8.8
RCH 2 BG II	10.3	24.7	3.0	12.7
PCH 888 Bt2	0.3	31.3	2.7	11.4
NCS 909 Bt2	0.1	26.3	6.3	10.9
JKCH 8907 BG II	0.5	32.3	3.3	12.0
NCS 860 Bt2	1.1	30.0	5.0	12.0
KCHH 2904	0.6	29.7	3.3	11.2

Table 71: Whiteflies (No./3 leaves)

Hybrid	Lam	Coimbatore	Mean
PRCH 737 Bt2	5.4	6.7	6.1
PCH 2171 Bt2	5.6	5.0	5.3
DPC 9109 BG II	1.5	7.7	4.6
PRCH 739 Bt2	5.7	0.0	2.9
KCH 15 K 39 BG II	3.6	7.0	5.3
RCH 386 BG II	5.0	7.3	6.2
RCH 2 BG II	3.5	6.3	4.9
PCH 888 Bt2	4.3	6.3	5.3
NCS 909 Bt2	2.3	6.3	4.3
JKCH 8907 BG II	4.8	7.7	6.3
NCS 860 Bt2	2.7	6.7	4.7
KCHH 2904	4.0	6.3	5.2

Table 72: Predators (No./3 leaves)

Hybrid	Lam	Coimbatore	Mean
PRCH 737 Bt2	0.1	2.0	1.1
PCH 2171 Bt2	0.2	4.0	2.1
DPC 9109 BG II	0.1	0.7	0.4
PRCH 739 Bt2	0.2	2.3	1.3
KCH 15 K 39 BG II	0.5	2.0	1.3
RCH 386 BG II	0.5	0.7	0.6
RCH 2 BG II	0.5	1.3	0.9
PCH 888 Bt2	0.7	1.7	1.2
NCS 909 Bt2	0.2	1.7	1.0
JKCH 8907 BG II	0.2	1.3	0.8
NCS 860 Bt2	0.9	3.3	2.1
KCHH 2904	0.3	3.3	1.8

Table 73: Aphids (No./3 leaves)

Hybrid	Lam	Coimbatore	Mean
PRCH 737 Bt2	6.6	6.3	6.5
PCH 2171 Bt2	7.1	3.0	5.1
DPC 9109 BG II	4.6	6.3	5.5
PRCH 739 Bt2	4.1	5.3	4.7
KCH 15 K 39 BG II	4.1	11.3	7.7
RCH 386 BG II	2.1	4.7	3.4
RCH 2 BG II	1.4	9.7	5.6
PCH 888 Bt2	5.0	8.3	6.7
NCS 909 Bt2	6.1	6.0	6.1
JKCH 8907 BG II	7.0	5.3	6.2
NCS 860 Bt2	9.8	7.0	8.4
KCHH 2904	1.8	2.3	2.1

No incidence of American Boll worm, Pink boll worm or Spodoptera as well as both boll and locule damage was noted in any of the entry in any of the centre.

Table 74: Mean Performance of Bt cotton Hybrids for various traits

Hybrid	Seed Cotton yield (Kg/ha)	% Increase over check	Lint Yield (kg/ha)	% Increase over check	Ginning outturn (%)	Boll weight (g)	2.5% span length (mm)	Micronaire value ($\mu\text{g/inch}$)	Bundle strength (g/tex)
PRCH 737 Bt2	2040	28.5	692	26.0	33.5	4.6	31.5	3.9	23.7
PCH 2171 Bt2	2041	28.6	702	27.9	34.3	5.5	31.7	3.9	23.3
DPC 9109 BG II	1869	17.8	625	13.8	33.5	4.8	31.2	4.1	22.4
PRCH 739 Bt2	1999	26.0	662	20.6	33.2	4.6	30.2	4.5	22.4
KCH 15 K 39 BG II	1767	11.3	624	13.7	35.1	5.1	33.0	4.0	23.3
RCH 386 BG II	2074	30.7	715	30.2	34.5	5.2	32.7	4.0	21.3
RCH 2 BG II	1587	0.0	549	0.0	34.5	4.3	30.4	4.5	21.2
PCH 888 Bt2	2173	36.9	758	38.1	35.1	5.2	29.5	3.9	21.4
NCS 909 Bt2	1663	4.8	583	6.2	35.0	4.7	30.7	3.8	21.8
JKCH 8907 BG II	1797	13.2	615	12.0	34.2	5.0	30.5	3.9	22.2
NCS 860 Bt2	1644	3.6	574	4.6	35.1	4.5	29.2	4.2	20.8
KCHH 2904	1502	-5.4	494	-10.0	32.9	4.3	29.6	3.8	22.8

Table 75: Mean Performance of Bt cotton Hybrids for various Pest Observation

Hybrid	Jassids (No./3 leaves)	Thrips (No./3 leaves)	Whiteflies (No./3 leaves)	Predators (No./3 leaves)	Aphids (No./3 leaves)	Square damage (%)	ABW (No./5 plants)	Spodoptera (No./5 plants)	PBW larvae (No./5 plants)	Locule damage by PBW (%)
PRCH 737 Bt2	6.1	8.8	6.1	1.1	6.5	2.7	0.0	0.0	0.0	0.0
PCH 2171 Bt2	6.5	14.7	5.3	2.1	5.1	1.9	0.0	0.0	0.0	0.0
DPC 9109 BG II	8.2	6.5	4.6	0.4	5.5	3.2	0.0	0.0	0.0	0.0
PRCH 739 Bt2	6.0	12.0	2.9	1.3	4.7	2.5	0.0	0.0	0.0	0.0
KCH 15 K 39 BG II	7.2	9.6	5.3	1.3	7.7	2.7	0.0	0.0	0.0	0.0
RCH 386 BG II	6.2	8.8	6.2	0.6	3.4	4.2	0.0	0.0	0.0	0.0
RCH 2 BG II	8.2	12.7	4.9	0.9	5.6	3.5	0.0	0.0	0.0	0.0
PCH 888 Bt2	7.0	11.4	5.3	1.2	6.7	2.7	0.0	0.0	0.0	0.0
NCS 909 Bt2	11.1	10.9	4.3	1.0	6.1	2.5	0.0	0.0	0.0	0.0
JKCH 8907 BG II	12.1	12.0	6.3	0.8	6.2	3.1	0.0	0.0	0.0	0.0
NCS 860 Bt2	9.7	12.0	4.7	2.1	8.4	2.8	0.0	0.0	0.0	0.0
KCHH 2904	7.2	11.2	5.2	1.8	2.1	2.7	0.0	0.0	0.0	0.0

Rainfed Conditions

The trial was conducted with 11 entries as detailed below with Bunny BG II as check.

Institution	Hybrid
Pravardhan Seeds Pvt. Ltd.	PRCH 737 Bt2
JK Agri Genetics Ltd.	JKCH 8906 BG II
Rasi Seeds Pvt. Ltd.	RCH 779 BG II
Pravardhan Seeds Pvt. Ltd.	PRCH 739 Bt2
Prabhat Agri Biotech Ltd.	PCH 2171 Bt2
Check Hybrid	Bunny BG II
JK Agri Genetics Ltd.	JKCH 8905 BG II
Prabhat Agri Biotech Ltd.	PCH 888 Bt2
Nuziveedu Seeds Pvt. Ltd.	NCS 860 Bt2
Kaveri Seed Company Ltd.	KCH 14 K 59 BG II
Nuziveedu Seeds Pvt. Ltd.	NCS 909 Bt2
Rasi Seeds Pvt. Ltd.	RCH 797 BG II

The data of one entry (JKCH 8906 BG II) was withheld as the company withdrew the entry after the trials were initiated.

Trial Locations

The trial was conducted at three locations. They are

1. ANGRAU, Nandyal, Andhra Pradesh
2. UAS, Dharwad, Karnataka
3. TNAU, Aruppukottai, Tamil Nadu

Trial Details

<i>Number of Entries</i>	11 + 1 checks
<i>Number of Rows</i>	Yield trial 1: 6 Rows (Protected)
<i>Row length</i>	6 m
<i>Spacing</i>	Recommended spacing
<i>No. of replications</i>	Three
<i>Design</i>	Randomized Block Design
<i>Fertilizers</i>	As per Recommendations

Observations Recorded

The Biometrical observations recorded were final plant stand, ginning per cent, lint index, seed index, Seed Cotton Yield (kg/ha) and lint yield (kg/ha). The entomological observations on sap sucking pests, Bollworm damage and natural enemies were recorded.

A. BIOMETRICAL EVALUATION.

Data on boll weight (Table 76), Ginning Out Turn (Table 77), Lint index (Table 78) and Seed index (Table 79) are given below.

Table 76: Boll weight (g)

Hybrid	Nandyal	Dharwad	Aruppukottai	Mean
PRCH 737 Bt2	3.2	5.1	6.1	4.8
RCH 779 BG II	4.1	6.2	7.4	5.9
PRCH 739 Bt2	3.5	5.9	6.4	5.3
PCH 2171 Bt2	4.4	5.8	5.1	5.1
Bunny BG II	3.9	6.0	5.6	5.2
JKCH 8905 BG II	4.7	6.1	7.3	6.0
PCH 888 Bt2	4.7	5.6	6.4	5.6
NCS 860 Bt2	3.6	5.9	6.6	5.4
KCH 14 K 59 BG II	4.3	5.7	6.5	5.5
NCS 909 Bt2	4.7	6.5	7.3	6.2
RCH 797 BG II	4.3	5.8	5.9	5.3

Table 77: Mean Ginning Out Turn (%)

Hybrid	Nandyal	Dharwad	Aruppukottai	Mean
PRCH 737 Bt2	32.0	35.8	36.6	34.8
RCH 779 BG II	32.0	35.0	38.7	35.2
PRCH 739 Bt2	30.0	37.3	37.5	34.9
PCH 2171 Bt2	31.0	35.3	36.3	34.2
Bunny BG II	32.0	38.3	37.9	36.1
JKCH 8905 BG II	32.0	37.3	38.6	36.0
PCH 888 Bt2	34.0	37.5	37.8	36.4
NCS 860 Bt2	32.0	38.1	37.4	35.8
KCH 14 K 59 BG II	31.0	37.0	39.3	35.8
NCS 909 Bt2	32.0	39.1	37.3	36.1
RCH 797 BG II	32.0	36.8	35.1	34.6

Table 78: Lint index (g)

Hybrid	Nandyal	Dharwad	Aruppukottai	Mean	% Increase over check
PRCH 737 Bt2	562	297	352	404	-12.6
RCH 779 BG II	438	301	474	404	-12.6
PRCH 739 Bt2	578	422	421	474	2.6
PCH 2171 Bt2	451	422	323	399	-13.6
Bunny BG II	480	455	450	462	0.0
JKCH 8905 BG II	595	330	647	524	13.4
PCH 888 Bt2	708	414	320	481	4.1
NCS 860 Bt2	327	362	299	329	-28.8
KCH 14 K 59 BG II	710	452	681	614	32.9
NCS 909 Bt2	396	357	430	394	-14.7
RCH 797 BG II	406	301	284	330	-28.6

Table 79: Seed index (g)

Hybrid	Dharwad	Aruppukottai	Mean
PRCH 737 Bt2	10.7	9.3	10.0
RCH 779 BG II	12.1	10.5	11.3
PRCH 739 Bt2	11.3	10.0	10.7
PCH 2171 Bt2	11.1	10.4	10.8
Bunny BG II	12.2	10.3	11.3
JKCH 8905 BG II	10.8	10.6	10.7
PCH 888 Bt2	9.7	10.9	10.3
NCS 860 Bt2	11.5	11.5	11.5
KCH 14 K 59 BG II	11.3	11.3	11.3
NCS 909 Bt2	11.6	9.9	10.8
RCH 797 BG II	11.8	10.2	11.0

Seed Cotton Yield

Data on Seed cotton yield is furnished in Table 80. Of the hybrids evaluated, four hybrids recorded higher seed cotton yield over the check hybrid and the highest yield was recorded in KCH 14 K 59 BG II (1750 kg/ha). Lint yield (Table 81) also followed similar pattern.

Table 80: Seed Cotton yield

Hybrid	Nandyal	Dharwad	Aruppukottai	Mean	% Increase over check
PRCH 737 Bt2	1756	829	961	1182	-8.5
RCH 779 BG II	1367	860	1227	1151	-10.9
PRCH 739 Bt2	1927	1132	1123	1394	7.9
PCH 2171 Bt2	1455	1194	891	1180	-8.7
Bunny BG II	1500	1189	1186	1292	0.0
JKCH 8905 BG II	1860	884	1678	1474	14.1
PCH 888 Bt2	2081	1104	845	1343	3.9
NCS 860 Bt2	1022	951	800	924	-28.5
KCH 14 K 59 BG II	2292	1222	1736	1750	35.4
NCS 909 Bt2	1237	912	1157	1102	-14.7
RCH 797 BG II	1270	817	810	966	-25.2
CD @ 5 %	355	119	205		
CV %	11.7	15.5	11.0		

Table 81: Lint yield

Hybrid	Nandyal	Dharwad	Aruppukottai	Mean	% Increase over check
PRCH 737 Bt2	562	297	352	404	-12.6
RCH 779 BG II	438	301	474	404	-12.6
PRCH 739 Bt2	578	422	421	474	2.6
PCH 2171 Bt2	451	422	323	399	-13.6
Bunny BG II	480	455	450	462	0.0
JKCH 8905 BG II	595	330	647	524	13.4
PCH 888 Bt2	708	414	320	481	4.1
NCS 860 Bt2	327	362	299	329	-28.8
KCH 14 K 59 BG II	710	452	681	614	32.9
NCS 909 Bt2	396	357	430	394	-14.7
RCH 797 BG II	406	301	284	330	-28.6

B. FIBRE QUALITY EVALUATION

The fibre quality parameters recorded in the hybrids is furnished in Table 82.

Table 82: Mean Fibre quality attributes

2.5% span length (mm)

Hybrid	Nandyal	Dharwad	Mean
PRCH 737 Bt2	19.5	32.6	26.1
RCH 779 BG II	30.7	32.2	31.5
PRCH 739 Bt2	28.1	32.0	30.1
PCH 2171 Bt2	30.8	30.4	30.6
Bunny BG II	31.1	32.9	32.0
JKCH 8905 BG II	31.2	32.6	31.9
PCH 888 Bt2	27.9	28.1	28.0
NCS 860 Bt2	27.0	29.4	28.2
KCH 14 K 59 BG II	30.8	33.3	32.1
NCS 909 Bt2	31.2	32.0	31.6
RCH 797 BG II	28.7	29.6	29.2

Micronaire value ($\mu\text{g/inch}$)

Hybrid	Nandyal	Dharwad	Mean
PRCH 737 Bt2	6.0	4.2	5.1
RCH 779 BG II	3.3	4.3	3.8
PRCH 739 Bt2	4.7	4.0	4.4
PCH 2171 Bt2	4.2	5.0	4.6
Bunny BG II	4.4	4.2	4.3
JKCH 8905 BG II	4.2	4.1	4.2
PCH 888 Bt2	4.3	3.6	4.0
NCS 860 Bt2	4.3	4.7	4.5
KCH 14 K 59 BG II	4.2	4.9	4.6
NCS 909 Bt2	4.0	3.9	4.0
RCH 797 BG II	3.8	4.3	4.1

Bundle strength (g/tex)

Hybrid	Nandyal	Dharwad	Mean
PRCH 737 Bt2	16.8	20.9	18.9
RCH 779 BG II	24.5	21.0	22.8
PRCH 739 Bt2	20.5	21.0	20.8
PCH 2171 Bt2	24.4	19.8	22.1
Bunny BG II	21.5	20.8	21.2
JKCH 8905 BG II	23.9	21.4	22.7
PCH 888 Bt2	21.6	21.0	21.3
NCS 860 Bt2	20.1	18.9	19.5
KCH 14 K 59 BG II	23.6	21.0	22.3
NCS 909 Bt2	22.9	20.1	21.5
RCH 797 BG II	22.6	20.0	21.3

C. ENTOMOLOGICAL OBSERVATIONS

Table 83: Pest reaction in Dharwad

Hybrid	Aphids (Mean No./3 leaves)	Jassids (Mean No./3 leaves)	Jassid Injury Grade
PRCH 737 Bt2	13.3	2.3	II
RCH 779 BG II	16.3	3.8	III
PRCH 739 Bt2	14.2	3.2	III
PCH 2171 Bt2	21.7	2.2	II
Bunny BG II	22.1	2.1	II
JKCH 8905 BG II	14.5	3.2	III
PCH 888 Bt2	14.6	2.1	II
NCS 860 Bt2	15.2	3.6	III
KCH 14 K 59 BG II	18.2	3.8	III
NCS 909 Bt2	21.4	2.1	II
RCH 797 BG II	22.6	3.8	III

Table 84: Pest reaction in Dharwad

Hybrid	Thrips (Mean No./3 leaves)	Mirid bug (Mean No./3 leaves)	Predators (Mean No./3 leaves)
PRCH 737 Bt2	24.6	15.1	0.7
RCH 779 BG II	27.5	9.3	0.9
PRCH 739 Bt2	25.5	20.7	1.1
PCH 2171 Bt2	21.9	16.3	0.9
Bunny BG II	22.2	18.3	0.7
JKCH 8905 BG II	31.9	17.7	1.1
PCH 888 Bt2	32.3	11.9	0.8
NCS 860 Bt2	29.0	7.9	1.0
KCH 14 K 59 BG II	29.3	8.3	1.0
NCS 909 Bt2	28.7	14.6	0.6
RCH 797 BG II	31.9	15.6	0.9

Table 85: Pest reaction in Dharwad

Hybrid	Square damage (%)	Spotted bollworm (No./5 plants)	Green boll damage by ABW (%)
PRCH 737 Bt2	0.0	-	-
RCH 779 BG II	0.0	-	-
PRCH 739 Bt2	0.0	-	-
PCH 2171 Bt2	0.1	-	-
Bunny BG II	0.0	-	-
JKCH 8905 BG II	5.9	2.3	3.6
PCH 888 Bt2	0.0	-	-
NCS 860 Bt2	0.1	-	-
KCH 14 K 59 BG II	0.1	-	-
NCS 909 Bt2	1.3	0.2	1.6
RCH 797 BG II	0.0	-	-

Table 86: Pest reaction in Dharwad

Hybrid	American bollworm (No./5 plants)	Spodoptera (No./5 plants)	PBW Larvae (No./5 plants)	Locule damage by PBW (%)
PRCH 737 Bt2	-	-	-	-
RCH 779 BG II	-	-	-	-
PRCH 739 Bt2	-	-	-	-
PCH 2171 Bt2	-	-	-	-
Bunny BG II	-	-	-	-
JKCH 8905 BG II	0.7	-	-	-
PCH 888 Bt2	-	-	-	-
NCS 860 Bt2	-	-	-	-
KCH 14 K 59 BG II	-	-	-	-
NCS 909 Bt2	0.8	-	-	-
RCH 797 BG II	-	-	-	-

Table 87: Disease reaction in Dharwad

Hybrid	Alternaria blight (PDI)	Bacterial blight (PDI)	Grey mildew (PDI)
PRCH 737 Bt2	38.3	17.1	34.7
RCH 779 BG II	60.0	16.5	38.0
PRCH 739 Bt2	57.8	18.2	41.8
PCH 2171 Bt2	52.8	15.4	44.6
Bunny BG II	53.9	23.7	30.3
JKCH 8905 BG II	52.3	16.5	28.5
PCH 888 Bt2	42.4	19.8	38.5
NCS 860 Bt2	57.2	17.1	53.9
KCH 14 K 59 BG II	58.3	14.3	57.2
NCS 909 Bt2	52.8	16.5	47.3
RCH 797 BG II	51.7	18.7	43.5

Table 88: Mean Performance of Bt cotton Hybrids for various traits

Hybrid	Seed Cotton Yield (Kg/ha)	% Increase over check	Lint Yield (kg/ha)	% Increase over check	Ginning outturn (%)	Boll weight (g)	2.5% span length (mm)	Micronaire value ($\mu\text{g/inch}$)	Bundle strength (g/tex)
PRCH 737 Bt2	1182	-8.5	404	-12.6	34.8	4.8	26.1	5.1	18.9
RCH 779 BG II	1151	-10.9	404	-12.6	35.2	5.9	31.5	3.8	22.8
PRCH 739 Bt2	1394	7.9	474	2.6	34.9	5.3	30.1	4.4	20.8
PCH 2171 Bt2	1180	-8.7	399	-13.6	34.2	5.1	30.6	4.6	22.1
Bunny BG II	1292	0.0	462	0.0	36.1	5.2	32.0	4.3	21.2
JKCH 8905 BG II	1474	14.1	524	13.4	36.0	6.0	31.9	4.2	22.7
PCH 888 Bt2	1343	3.9	481	4.1	36.4	5.6	28.0	4.0	21.3
NCS 860 Bt2	924	-28.5	329	-28.8	35.8	5.4	28.2	4.5	19.5
KCH 14 K 59 BG II	1750	35.4	614	32.9	35.8	5.5	32.1	4.6	22.3
NCS 909 Bt2	1102	-14.7	394	-14.7	36.1	6.2	31.6	4.0	21.5
RCH 797 BG II	966	-25.2	330	-28.6	34.6	5.3	29.2	4.1	21.3

Table 89: Mean Performance of Bt cotton Hybrids for various Pest and Disease Observation

Hybrid	Jassids (No./3 leaves)	Jassid injury grade	Thrips (No./3 leaves)	Whiteflies (No./3 leaves)	Aphids (No./3 leaves)	Mirid bugs (No./3 leaves)	Square damage (%)	Green boll damage by ABW (%)	ABW (No./5 plants)	Spodoptera (No./5 plants)	PBW larvae (No./5 plants)	Locule damage by PBW (%)	Spotted bollworm (No./5 plants)
PRCH 737 Bt2	2.3	2.0	24.6	0.0	13.3	15.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RCH 779 BG II	3.8	3.0	27.5	0.0	16.3	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRCH 739 Bt2	3.2	3.0	25.5	0.0	14.2	20.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PCH 2171 Bt2	2.2	2.0	21.9	0.0	21.7	16.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Bunny BG II	2.1	2.0	22.2	0.0	22.1	18.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
JKCH 8905 BG II	3.2	3.0	31.9	0.0	14.5	17.7	5.9	3.6	0.7	0.0	0.0	0.0	2.2
PCH 888 Bt2	2.1	2.0	32.3	0.0	14.6	11.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NCS 860 Bt2	3.6	3.0	29.0	0.0	15.2	7.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0
KCH 14 K 59 BG II	3.8	3.0	29.3	0.0	18.2	8.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0
NCS 909 Bt2	2.1	2.0	28.7	0.0	21.4	14.6	1.3	1.6	0.8	0.0	0.0	0.0	0.2
RCH 797 BG II	3.8	3.0	31.9	0.0	22.6	15.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Interspecific hybrids (H x B) in South Zone (Irrigated Conditions)

The trial was conducted with 5 entries and RCHB 708 BG II as check. The entries are as detailed below

Institution	Hybrid
Nuziveedu Seeds Pvt. Ltd.	NCHB 9905 Bt2
JK Agri Genetics Ltd.	JKCHB 3103 BG II
Check Hybrid	RCHB 708 BG II
Prabhat Agri Biotech Ltd.	PCHB 9969 Bt2
JK Agri Genetics Ltd.	JK Chamundi BG II
Kirtiman Agro Genetics Ltd.	KCHB 3355

The data of one entry (JKCHB 3103 BG II) was withheld as the company withdrew the entry after the trials were initiated.

Trial Locations

The trial was conducted at three locations. They are

1. ANGRAU, Lam, Guntur, Andhra Pradesh
2. UAS, Raichur, Karnataka
3. TNAU, Coimbatore, Tamil Nadu

Trial Details

<i>Number of Entries</i>	5 + 1 checks
<i>Number of Rows</i>	Yield trial 1: 6 Rows (Protected)
<i>Row length</i>	6 m
<i>Spacing</i>	Recommended spacing
<i>No. of replications</i>	Three
<i>Design</i>	Randomized Block Design
<i>Fertilizers</i>	As per Recommendations

Observations Recorded

The Biometrical observations recorded were final plant stand, ginning per cent, lint index, seed index, Seed Cotton Yield (kg/ha) and lint yield (kg/ha). The entomological observations on sap sucking pests, Bollworm damage and natural enemies were recorded.

A. BIOMETRICAL EVALUATION

Table 90: Germination (%)

Hybrid	Dharwad	Coimbatore	Mean
NCHB 9905 Bt2	68.0	97.0	82.5
RCHB 708 BG II	86.0	98.0	92.0
PCHB 9969 Bt2	93.0	98.0	95.5
JK Chamundi BG II	98.0	98.0	98.0
KCHB 3355	96.0	98.0	97.0

Table 91: Boll Weight (g)

Hybrid	Lam	Dharwad	Coimbatore	Mean
NCHB 9905 Bt2	3.2	4.0	2.8	3.3
RCHB 708 BG II	3.4	4.5	2.5	3.5
PCHB 9969 Bt2	3.3	4.1	3.0	3.5
JK Chamundi BG II	4.0	4.7	3.0	3.9
KCHB 3355	3.7	4.4	3.5	3.9

Table 92: Ginning Out turn (%)

Hybrid	Lam	Dharwad	Coimbatore	Mean
NCHB 9905 Bt2	29.2	30.3	28.1	29.2
RCHB 708 BG II	31.0	31.3	28.5	30.3
PCHB 9969 Bt2	28.8	30.0	26.9	28.6
JK Chamundi BG II	32.8	34.6	29.8	32.4
KCHB 3355	31.5	31.3	27.8	30.2

Table 93: Lint Index (g)

Hybrid	Lam	Dharwad	Coimbatore	Mean
NCHB 9905 Bt2	4.9	5.7	4.6	5.1
RCHB 708 BG II	5.0	6.6	3.8	5.1
PCHB 9969 Bt2	3.9	5.6	3.5	4.3
JK Chamundi BG II	6.0	6.8	5.1	6.0
KCHB 3355	5.5	6.3	5.0	5.6

Table 94: Seed Index (g)

Hybrid	Lam	Dharwad	Coimbatore	Mean
NCHB 9905 Bt2	11.8	12.7	11.8	12.1
RCHB 708 BG II	11.1	14.0	9.6	11.6
PCHB 9969 Bt2	9.6	12.3	9.5	10.5
JK Chamundi BG II	12.2	12.3	12.1	12.2
KCHB 3355	11.9	13.5	13.2	12.9

Seed Cotton Yield

Seed cotton yield data recorded in three different centres are furnished in Table 95. Of the five test hybrids evaluated, two hybrids viz., JK Chamundi BH II and KCHB 3355- recorded higher seed cotton yield over the Bt check hybrid by over 30 per cent yield increase.

Table 95: Seed Cotton Yield (Kg/ha)

Hybrid	Lam	Dharwad	Coimbatore	Mean	% Increase over check
NCHB 9905 Bt2	1773	952	1628	1451	-6.9
RCHB 708 BG II	1913	1525	1236	1558	0.0
PCHB 9969 Bt2	1778	1314	1259	1450	-6.9
JK Chamundi BG II	2668	1695	2003	2122	36.2
KCHB 3355	2575	1408	2094	2026	30.0
CD @ 5 %	330	320	315		
CV %	10.0	15.1	13.7		

Lint yield

Similar trend was noted for lint yield also (Table 96).

Table 96: Lint Yield (kg/ha)

Hybrid	Lam	Dharwad	Coimbatore	Mean	% Increase over check
NCHB 9905 Bt2	517	289	456	421	-11.2
RCHB 708 BG II	593	477	351	474	0.0
PCHB 9969 Bt2	513	394	340	416	-12.2
JK Chamundi BG II	877	587	598	687	44.9
KCHB 3355	810	441	582	611	28.9

B. FIBRE QUALITY EVALUATION

The fibre quality parameters recorded in the hybrids is furnished in Table 97.

Table 97: Mean Fibre quality attributes

2.5% span length (mm)

Hybrid	Lam	Dharwad	Coimbatore	Mean
NCHB 9905 Bt2	36.2	34.1	38.4	36.2
RCHB 708 BG II	35.8	35.5	35.0	35.4
PCHB 9969 Bt2	34.9	34.8	36.1	35.3
JK Chamundi BG II	35.4	33.1	35.4	34.6
KCHB 3355	36.7	34.3	37.8	36.3

Micronaire value ($\mu\text{g/inch}$)

Hybrid	Lam	Dharwad	Coimbatore	Mean
NCHB 9905 Bt2	2.9	3.2	3.1	3.1
RCHB 708 BG II	3.1	3.4	2.5	3.0
PCHB 9969 Bt2	2.6	3.2	2.8	2.9
JK Chamundi BG II	3.2	3.7	3.3	3.4
KCHB 3355	3.0	3.0	2.9	3.0

Bundle strength (g/tex)

Hybrid	Lam	Dharwad	Coimbatore	Mean
NCHB 9905 Bt2	29.6	24.9	26.9	27.1
RCHB 708 BG II	29.3	24.7	26.2	26.7
PCHB 9969 Bt2	29.5	23.9	27.1	26.8
JK Chamundi BG II	30.1	28.0	26.8	28.3
KCHB 3355	30.5	28.5	26.7	28.6

C. ENTOMOLOGICAL OBSERVATIONS
Table 98: Jassids (No./3 leaves)

Hybrid	Lam	Dharwad	Coimbatore	Mean
NCHB 9905 Bt2	3.5	3.7	11.5	6.2
RCHB 708 BG II	2.6	3.2	11.3	5.7
PCHB 9969 Bt2	2.2	3.4	8.8	4.8
JK Chamundi BG II	0.4	3.2	13.0	5.5
KCHB 3355	0.7	2.8	8.3	3.9

Table 99: Thrips (No./3 leaves)

Hybrid	Lam	Dharwad	Coimbatore	Mean
NCHB 9905 Bt2	0.2	34.8	3.3	12.8
RCHB 708 BG II	0.0	31.9	9.0	13.6
PCHB 9969 Bt2	0.0	31.7	4.3	12.0
JK Chamundi BG II	0.2	27.7	6.8	11.6
KCHB 3355	0.3	31.2	6.0	12.5

Table 100: Whiteflies (No./3 leaves)

Hybrid	Lam	Dharwad	Coimbatore	Mean
NCHB 9905 Bt2	5.8	0.0	8.3	4.7
RCHB 708 BG II	1.6	0.0	5.5	2.4
PCHB 9969 Bt2	2.3	0.0	5.5	2.6
JK Chamundi BG II	3.1	0.0	4.3	2.5
KCHB 3355	1.5	0.0	4.3	1.9

Table 101: Predators (No./3 leaves)

Hybrid	Lam	Dharwad	Coimbatore	Mean
NCHB 9905 Bt2	0.3	1.3	0.5	0.7
RCHB 708 BG II	0.5	1.3	3.0	1.6
PCHB 9969 Bt2	0.3	1.2	2.8	1.4
JK Chamundi BG II	0.4	1.2	1.5	1.0
KCHB 3355	0.3	0.9	1.8	1.0

Table 102: Aphids (No./3 leaves)

Hybrid	Lam	Dharwad	Coimbatore	Mean
NCHB 9905 Bt2	1.1	17.8	3.8	7.6
RCHB 708 BG II	19.3	17.2	6.3	14.3
PCHB 9969 Bt2	6.8	17.3	4.3	9.5
JK Chamundi BG II	1.8	21.4	6.0	9.7
KCHB 3355	7.5	20.6	5.0	11.0

Table 103: Pest reaction in Dharwad

Hybrid	Square damage (%)	Green boll damage by ABW (%)
NCHB 9905 Bt2	0.7	0.0
RCHB 708 BG II	2.1	0.0
PCHB 9969 Bt2	0.0	0.0
JK Chamundi BG II	0.1	0.0
KCHB 3355	0.1	0.0

There were no incidences of American Bollworm, Spodoptera, Pink bollworm or any boll or locule damage noted in any of the entries in any of the location.

Table 108: Mean Performance of Bt cotton Hybrids for various traits

Hybrid	Seed Cotton Yield (Kg/ha)	% Increase over check	Lint Yield (kg/ha)	% Increase over check	Ginning outturn (%)	Boll weight (g)	2.5% span length (mm)	Micronaire value (µg/inch)	Bundle strength (g/tex)
NCHB 9905 Bt2	1451	-6.9	421	-11.2	29.2	3.3	36.2	3.1	27.1
RCHB 708 BG II	1558	0.0	474	0.0	30.3	3.5	35.4	3.0	26.7
PCHB 9969 Bt2	1450	-6.9	416	-12.2	28.6	3.5	35.3	2.9	26.8
JK Chamundi BG II	2122	36.2	687	44.9	32.4	3.9	34.6	3.4	28.3
KCHB 3355	2026	30.0	611	28.9	30.2	3.9	36.3	3.0	28.6

Table 109: Mean Performance of Bt cotton Hybrids for various Pest Observation

Hybrid	Jassids (No./3 leaves)	Jassid injury grade	Thrips (No./3 leaves)	White flies (No./3 leaves)	Aphids (No./3 leaves)	Mirid bugs (No./3 leaves)	Square damage (%)	Green boll damage by ABW (%)	ABW (No./5 plants)	Spodoptera (No./5 plants)	PBW larvae (No./5 plants)	Locule damage by PBW (%)	Spotted bollworm (No./5 plants)
NCHB 9905 Bt2	6.2	4.0	12.8	4.7	7.6	7.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0
RCHB 708 BG II	5.7	4.0	13.6	2.4	14.3	9.2	2.1	0.0	0.0	0.0	0.0	0.0	0.0
PCHB 9969 Bt2	4.8	4.0	12.0	2.6	9.5	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
JK Chamundi BG II	5.5	3.0	11.6	2.5	9.7	9.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
KCHB 3355	3.9	2.0	12.5	1.9	11.0	8.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0