

BT COTTON HYBRIDS EVALUATION REPORT

SOUTH ZONE: 2010-11

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Report by

**Project Coordinator (Cotton Improvement)
All India Coordinated Cotton Improvement Project
(ICAR), CICR, Regional Station, Coimbatore**

BT COTTON HYBRIDS EVALUATION REPORT (SOUTH ZONE)

The Indian Council of Agriculture has assigned the task of evaluating the Private sector Bt cotton hybrids belonging to the approved events to the All India Coordinated Cotton Improvement Project (AICCIP) in the Central Zone vide ICAR letter No. 2-3/2010-CCI Dt. 17.05.2010. The details of the trial conducted are as follows:

Test Entries

There were two sets of trials, one under irrigated conditions and the other under rainfed situation. Under irrigated condition, both intra-hirsutum hybrids as well as interspecific (hirsutum x barbadense) hybrids were evaluated. In the intra-hirsutum hybrids trials, both BG I and BG II check hybrids were included apart from test entries, whereas in interspecific (hirsutum x barbadense) hybrids trial, only BG I check hybrid was included. The hybrids evaluated were given below.

I. Irrigated trial intra-hirsutum hybrid entries:

Name of the Company	Name of the Hybrid
Mahyco	MRC 7388 BG II, MRC 7391 BG II
Monsanto	DPC 9066 BG II, Sudarshan BG II
Namdhari Seeds Pvt. Ltd.	Namcot 605 BG II, Namcot 614 BG II
Nuziveedu Seeds Pvt. Ltd.	NCS 567 Bt 2, NCS 9012 Bt 2
Prabhat Agri Biotech Ltd.	PCH 789 Bt 2, PCH 9605 Bt 2
Pravardhan	PRCH 731 Bt 2
Rasi	RCH 668 BG II
Tulasi Seeds Pvt. Ltd.	Tulasi 135 BG II, Tulasi 171 BG II
Vibha	VBCH 1539 BG II
Xylem Seeds Pvt. Ltd.	NSPL 252 BG II
Check I	RCH 2 BG I
Check II	RCH 2 BG II

II. Irrigated trial interspecific (hirsutum x barbadense) hybrid entries:

Name of the Company	Name of the Hybrid
Mahyco	MRC 6918 BG II
Namdhari Seeds Pvt. Ltd.	Namcot 803 BG II
Tulasi Seeds Pvt. Ltd.	Tulasi 333 BG II
Check I	MRC 6918 BG I

III. Rainfed trial entries

Name of the Company	Name of the Hybrid
Monsanto	DPC 5061 BG II, DPC 7065 BG II
Namdhari Seeds Pvt. Ltd.	Namcot 615 BG II
Nuziveedu Seeds Pvt. Ltd.	NCS 567 BG II, NCS 9012 BG II
Prabhat Agri Biotech Ltd.	PCH 789 BG II, PCH 9605 BG II
Pravardhan	PRCH 731 BG II
Rasi	RCH 665 BG II
Tulasi Seeds Pvt. Ltd.	Tulasi 144 BG II, Tulasi 162 BG II
Vibha	VBCH 1503 BG II
Check I	Bunny BG I
Check II	Bunny BG II

The trial locations

The irrigated and rainfed trials were conducted in the following locations.

Irrigated trials – Intra – hirsutum hybrids

1. Agricultural Research Station, Warangal, ANGRAU, Andhra Pradesh.
2. Agricultural Research Station, Siruguppa, UAS, Raichur, Karnataka.
3. University of Agricultural Sciences, Raichur, Karnataka.
4. Cotton Breeding Station, TNAU, Coimbatore, Tamil Nadu and
5. Cotton Research Station, TNAU, Srivilliputtur, Tamil Nadu

Irrigated trials – interspecific (hirsutum x barbadense) hybrids

1. Regional Agricultural Research Station, Lam farm, Guntur, Andhra Pradesh.
2. Agricultural Research Station, Dharwad, Karnataka.
3. Agricultural Research Station, Siruguppa, UAS, Raichur, Karnataka.
4. Cotton Breeding Station, TNAU, Coimbatore, Tamil Nadu

Rainfed trials – Intra – hirsutum hybrids

1. Regional Agricultural Research Station, Lam farm, Guntur, Andhra Pradesh.
2. Regional Agricultural Research Station, Nandyal, Andhra Pradesh.
3. Regional Agricultural Research Station, Adilabad, Andhra Pradesh.
4. Agricultural Research Station, Dharwad, Karnataka.
5. Agricultural Research Station, Aruppukottai, Tamil Nadu.

The trial details:**Irrigated Trial - Intra – hirsutum hybrids**

Number of Entries	16 + 2 checks
Number of rows	Six
Row length	6 M
Spacing	90 x 60 Cm
Number of replications	Three
Design	Randomised Block Design
Fertilizers	As per local recommendation

Irrigated Trial - interspecific (hirsutum x barbadense) hybrids

Number of Entries	3 + 1 check
Number of rows	Six
Row length	6 M
Spacing	90 x 60 Cm
Number of replications	Five
Design	Randomised Block Design
Fertilizers	As per local recommendation

Rainfed Trial – Intra – hirsutum hybrids

Number of Entries	12 + 2 checks
Number of rows	Three
Row length	6 M
Spacing	90 x 60 Cm
Number of replications	Three
Design	Randomised Block Design
Fertilizers	As per local recommendation

Method of evaluation

Weekly observations were recorded from 45 DAS against major sucking pests and bollworms. The insecticidal sprayings were given based on the economic threshold levels of the sap sucking pests and bollworms. The sprayings were undertaken in all the replication of an entry, even if the threshold level of infestation had exceeded only in one of the replications.

Observations recorded

The biometrical observations like germination percentage, final plant stand, mean boll weight, ginning percentage, lint and seed index and seed cotton yield were recorded in the ETL based plant protection trial. Important fibre quality attributes like 2.5% span length, micronaire and fibre strength were also determined through the High Volume Instrument. The entomological observations on sap sucking pests, bollworms, green boll damage, open boll damage and locule damage were also recorded in ETL based trial. Under unprotected conditions, boll and locule damage and seed cotton yield were assessed.

The trials have been reported in three parts. In the first part, irrigated trials of intra-hirsutum hybrids have been reported. In the second part, rainfed trial results of intra-hirsutum hybrids were reported and in third part the irrigated trials of inter specific hybrids were reported.

IRRIGATED TRIALS – INTRA HIRSUTUM HYBRIDS

In this trial, 16 test hybrids were evaluated with two Bt check hybrids viz., RCH 2 BG I and RCH 2 BGII. The sowings were completed timely.

A. BIOMETRICAL EVALUATION

Biometrical observations recorded in the ETL based plant protection trial are reported below.

Germination and final plant stand

The germination of all the entries at all the locations was very good with corresponding plant stand maintained at harvest.

Boll weight, Ginning Outturn, Lint Index and Seed Index:

The data recorded on boll weight (g/boll), ginning outturn (%), lint index (g) and seed index (g) in various locations are furnished in Tables 1-3.

Table 1. Boll weight (g)

Hybrid	Warangal	Siruguppa	Raichur	Coimbatore	Srivilliputtur	Mean
Tulasi 135 BG II	3.4	5.4	5.4	5.2	6.2	5.1
NCS 9012 Bt 2	5.4	5.0	5.0	4.8	5.2	5.1
MRC 7388 BG II	5.6	5.6	5.6	4.6	5.3	5.3
RCH 2 BG I	3.4	4.6	4.6	4.3	4.6	4.3
NCS 567 Bt 2	5.2	5.7	5.7	5.6	6.7	5.8
RCH 668 BG II	4.6	5.7	5.7	4.8	5.5	5.3
PCH 9605 Bt 2	5.4	5.1	5.1	4.8	5.2	5.1
Tulasi 171 BG II	4.8	5.9	6.0	5.0	5.9	5.5
Namcot 614 BG II	3.0	4.3	4.3	4.2	4.8	4.1
DPC 9066 BG II	2.4	4.7	4.7	5.0	5.3	4.4
RCH 2 BG II	3.2	4.2	4.2	4.2	4.4	4.0
PRCH 731 Bt 2	5.0	5.7	5.7	5.2	6.0	5.5
NSPL 252 BG II	4.0	5.5	5.5	5.5	6.0	5.3
Sudarshan BG II	3.2	5.1	5.1	5.3	6.3	5.0
Namcot 605 BG II	2.0	5.0	5.0	4.3	5.2	4.3
VBCH 1539 BG II	3.6	4.6	4.6	4.6	5.2	4.5
PCH 789 Bt 2	3.4	5.0	5.0	3.9	5.1	4.5
MRC 7391 BG II	5.8	5.0	5.0	5.0	6.7	5.5

Table 2. Ginning Outturn %

Hybrid	Siruguppa	Raichur	Coimbatore	Srivilliputtur	Mean
Tulasi 135 BG II	35.5	35.5	34.5	35.2	35.2
NCS 9012 Bt 2	36.8	36.8	34.3	36.6	36.1
MRC 7388 BG II	36.1	36.1	33.2	32.7	34.5
RCH 2 BG I	35.2	35.2	36.8	35.6	35.7
NCS 567 Bt 2	33.9	33.9	35.2	36.1	34.8
RCH 668 BG II	36.9	36.9	36.5	35.1	36.4
PCH 9605 Bt 2	34.8	34.8	33.2	38.6	35.4
Tulasi 171 BG II	33.1	33.1	30.8	31.4	32.1
Namcot 614 BG II	38.4	38.4	35.1	35.9	36.9
DPC 9066 BG II	37.0	37.0	35.5	35.4	36.2
RCH 2 BG II	35.8	35.8	34.4	36.9	35.7
PRCH 731 Bt 2	37.6	37.6	36.9	35.3	36.8
NSPL 252 BG II	36.6	36.6	35.7	34.9	35.9
Sudarshan BG II	33.0	33.1	32.4	33.1	32.9
Namcot 605 BG II	35.7	35.7	34.7	36.3	35.6
VBCH 1539 BG II	34.9	34.9	33.7	34.4	34.5
PCH 789 Bt 2	34.2	34.2	30.8	31.8	32.8
MRC 7391 BG II	36.5	36.5	34.4	34.3	35.4

Table 3. Lint Index (g) and Seed Index (g)

Hybrid	Lint Index (g)				Seed Index (g)			
	Siruguppa	Raichur	Coimbatore	Mean	Siruguppa	Raichur	Coimbatore	Mean
Tulasi 135 BG II	6.2	6.2	5.6	6.0	11.3	11.3	13.0	11.9
NCS 9012 Bt 2	5.8	5.8	6.0	5.9	10.0	10.0	11.0	10.4
MRC 7388 BG II	5.8	5.8	5.3	5.6	10.2	10.2	12.4	10.9
RCH 2 BG I	5.8	5.8	6.9	6.2	10.7	10.7	13.1	11.5
NCS 567 Bt 2	5.3	5.3	5.4	5.3	10.2	10.2	13.4	11.3
RCH 668 BG II	7.7	7.7	6.2	7.2	13.2	13.2	11.4	12.6
PCH 9605 Bt 2	5.1	5.1	4.5	4.9	9.4	9.4	11.1	10.0
Tulasi 171 BG II	5.9	5.9	5.7	5.8	11.8	11.8	12.4	12.0
Namcot 614 BG II	6.0	6.0	4.5	5.5	9.6	9.6	11.6	10.3
DPC 9066 BG II	5.6	5.6	6.3	5.8	9.5	9.5	13.1	10.7
RCH 2 BG II	5.8	5.8	5.5	5.7	10.3	10.3	12.5	11.0
PRCH 731 Bt 2	6.2	6.2	5.5	6.0	10.3	10.3	12.4	11.0
NSPL 252 BG II	5.9	5.9	6.2	6.0	10.3	10.3	11.7	10.8
Sudarshan BG II	5.1	5.1	6.2	5.5	10.3	10.3	13.2	11.2
Namcot 605 BG II	5.1	5.1	5.1	5.1	9.2	9.2	13.1	10.5
VBCH 1539 BG II	5.8	5.8	6.1	5.9	10.8	10.8	12.9	11.5
PCH 789 Bt 2	5.1	5.1	4.2	4.8	9.8	9.8	11.8	10.5
MRC 7391 BG II	5.5	5.5	5.4	5.5	9.5	9.5	13.0	10.7

B). MEAN SEED COTTON YIELD (KG/HA) UNDER PROTECTED CONDITIONS

The yield levels recorded at Coimbatore and Raichur were at moderate level, at Siruguppa and Srivilliputtur were at higher level, whereas at Warangal it was at lower level in most of the entries (Table 4). The highest mean seed cotton yield was recorded in the entry MRC 7391 (2485 kg/ha) with 49.4 % yield superiority over RCH 2 BG I (1663 kg/ha) and 60.4% yield increase over RCH 2 BG II (1549 kg/ha). All the entries showed yield superiority over both the check hybrids with a range of 6 to 60 % yield superiority.

Table 4. Seed Cotton Yield (kg/ha)

Hybrid	Warangal	Siruguppa	Raichur	Coimbatore	Srivilliputtur	Mean	% Inc. Over RCH 2 BG I	% Inc. Over RCH 2 BG II
Tulasi 135 BG II	804	2480	1848	1559	2516	1841	10.7	18.9
NCS 9012 Bt 2	745	2862	1744	1818	2473	1928	16.0	24.5
MRC 7388 BG II	992	2859	1731	1869	2891	2068	24.4	33.5
RCH 2 BG I	560	2044	1788	1830	2091	1663	0.0	7.3
NCS 567 Bt 2	718	3118	1406	2123	3172	2107	26.7	36.0
RCH 668 BG II	725	2860	1904	1760	3356	2121	27.5	36.9
PCH 9605 Bt 2	613	2917	2176	2156	2610	2094	25.9	35.2
Tulasi 171 BG II	798	2623	1826	1416	3141	1961	17.9	26.6
Namcot 614 BG II	736	2606	2155	1648	1904	1810	8.8	16.8
DPC 9066 BG II	637	2790	2032	1942	2765	2033	22.3	31.3
RCH 2 BG II	472	2019	1434	1824	1995	1549	-6.9	0.0
PRCH 731 Bt 2	1025	3124	2188	2269	2525	2226	33.9	43.7
NSPL 252 BG II	988	2951	2555	2062	2907	2293	37.9	48.0
Sudarshan BG II	969	2948	2329	2015	3062	2265	36.2	46.2
Namcot 605 BG II	667	2808	1843	1869	1747	1787	7.4	15.4
VBCH 1539 BG II	937	2531	2118	2001	2800	2077	24.9	34.1
PCH 789 Bt 2	620	2979	2042	1516	2482	1928	15.9	24.5
MRC 7391 BG II	1261	3244	2387	2142	3392	2485	49.4	60.4
CD @ 5 %	209	277	173	460	207			
CV %	17	10	9	15	5			

LINT YIELD (KG/HA)

For lint yield also, all the entries showed yield superiority and the trend was similar to that of seed cotton yield.

Table 5. Lint Yield (kg/ha)

Hybrid	Siruguppa	Raichur	Coimbatore	Srivilliputtur	Mean	% Inc. Over RCH 2 BG I	% Inc. Over RCH 2 BG II
Tulasi 135 BG II	879	655	540	886	740	6.9	13.7
NCS 9012 Bt 2	1053	642	626	905	807	16.5	23.9
MRC 7388 BG II	1034	628	619	943	806	16.5	23.8
RCH 2 BG I	718	629	674	747	692	0.0	6.3
NCS 567 Bt 2	1055	485	748	1144	858	24.0	31.8
RCH 668 BG II	1056	704	645	1178	896	29.4	37.6
PCH 9605 Bt 2	1018	761	718	1008	876	26.6	34.6
Tulasi 171 BG II	868	605	439	988	725	4.8	11.4
Namcot 614 BG II	998	828	576	683	771	11.5	18.5
DPC 9066 BG II	1033	752	692	979	864	24.9	32.7
RCH 2 BG II	724	514	630	737	651	-5.9	0.0
PRCH 731 Bt 2	1172	821	835	890	930	34.3	42.8
NSPL 252 BG II	1076	935	733	1016	940	35.8	44.4
Sudarshan BG II	975	769	653	1013	853	23.2	31.0
Namcot 605 BG II	1003	656	647	634	735	6.2	12.9
VBCH 1539 BG II	884	739	676	963	816	17.8	25.3
PCH 789 Bt 2	1018	698	468	791	744	7.5	14.2
MRC 7391 BG II	1184	874	738	1165	990	43.1	52.1

C). FIBRE QUALITY EVALUATION

The mean 2.5 % span length ranged from 26.6 mm (Namcot 605 BG II) to 31.8 mm (NCS 9012 Bt 2). There was not much variation in terms of micronaire and the bundle strength varied from 20.8 to 23.4 g/tex (Table 6).

D). ENTOMOLOGICAL EVALUATION

The entomological evaluations were primarily targeted for testing the entries against the bollworms and sap sucking insects.

Sucking pests

The data recorded in respect of jassids, aphids, whiteflies and thrips are furnished in Tables 7 to 10.

Natural enemies

In general, there was not much difference between the check hybrids and the other Bt entries in harbouring the natural enemies (Table 10).

Table 6. 2.5 % Span Length (mm), Micronaire and Bundle Strength

Hybrid	2.5 % Span Length (mm)				Micronaire				Bundle Strength			
	Warangal	Siruguppa	Coimbatore	Mean	Warangal	Siruguppa	Coimbatore	Mean	Warangal	Siruguppa	Coimbatore	Mean
Tulasi 135 BG II	26.4	30.6	26.7	27.9	3.7	3.8	3.9	3.8	23.8	23.5	20.3	22.5
NCS 9012 Bt 2	30.7	32.6	32.0	31.8	4.2	3.9	4.5	4.2	22.9	24.6	19.9	22.5
MRC 7388 BG II	30.4	30.8	28.4	29.9	3.8	4.0	3.7	3.8	21.3	22.3	18.8	20.8
RCH 2 BG I	26.7	30.8	31.4	29.6	4.0	4.7	3.9	4.2	22.3	21.5	22.1	22.0
NCS 567 Bt 2	29.0	32.6	29.7	30.4	3.4	4.4	3.9	3.9	22.8	23.0	20.4	22.1
RCH 668 BG II	30.4	32.5	30.5	31.1	4.1	4.4	4.0	4.2	23.4	23.0	23.0	23.1
PCH 9605 Bt 2	32.0	32.3	30.4	31.6	4.2	3.6	3.4	3.7	23.6	22.8	23.9	23.4
Tulasi 171 BG II	29.4	32.4	31.3	31.0	3.5	3.8	3.7	3.7	23.7	22.4	23.4	23.2
Namcot 614 BG II	25.0	30.2	28.7	28.0	3.1	3.8	3.3	3.4	22.9	21.1	21.4	21.8
DPC 9066 BG II	26.6	30.3	29.8	28.9	3.6	3.9	4.1	3.9	22.8	21.8	20.6	21.7
RCH 2 BG II	29.4	30.3	28.2	29.3	3.1	4.1	3.9	3.7	23.9	21.4	20.9	22.1
PRCH 731 Bt 2	28.7	31.7	30.0	30.1	4.1	4.0	3.6	3.9	23.5	24.3	21.1	23.0
NSPL 252 BG II	28.9	32.2	30.9	30.7	4.1	4.1	3.8	4.0	21.4	23.4	21.7	22.2
Sudarshan BG II	27.6	32.6	29.6	29.9	3.1	4.1	3.3	3.5	22.5	21.5	24.3	22.8
Namcot 605 BG II	24.6	28.6	26.5	26.6	3.9	3.2	3.1	3.4	21.4	22.5	19.0	21.0
VBCH 1539 BG II	28.6	31.6	30.4	30.2	3.7	3.8	3.5	3.7	19.8	21.4	23.8	21.7
PCH 789 Bt 2	28.3	30.8	27.5	28.9	3.7	4.0	3.6	3.8	22.8	22.0	21.3	22.0
MRC 7391 BG II	29.6	32.9	30.5	31.0	3.1	3.8	3.4	3.4	23.6	21.7	23.5	22.9

Table 7. Jassids / 3 leaves (pooled) and Jassid Injury Grade

Hybrid	Jassids / 3 leaves (pooled)				Jassid Injury Grade			
	Siruguppa	Raichur	Coimbatore	Mean	Siruguppa	Raichur	Coimbatore	Mean
Tulasi 135 BG II	4.8	5.1	2.9	4.3	2.0	2.0	4.0	2.7
NCS 9012 Bt 2	5.1	5.0	2.4	4.2	2.0	2.0	3.0	2.3
MRC 7388 BG II	3.7	3.5	2.9	3.4	2.0	2.0	4.0	2.7
RCH 2 BG I	4.8	4.9	3.2	4.3	2.0	2.0	4.0	2.7
NCS 567 Bt 2	4.8	4.7	6.6	5.4	2.0	2.0	3.0	2.3
RCH 668 BG II	5.2	5.0	2.9	4.4	3.0	2.0	2.0	2.3
PCH 9605 Bt 2	3.9	4.8	2.7	3.8	2.0	2.0	2.0	2.0
Tulasi 171 BG II	5.7	5.9	2.6	4.7	3.0	3.0	3.0	3.0
Namcot 614 BG II	5.4	5.1	3.3	4.6	3.0	2.0	3.0	2.7
DPC 9066 BG II	3.9	4.2	3.9	4.0	2.0	2.0	3.0	2.3
RCH 2 BG II	5.4	5.8	3.5	4.9	3.0	3.0	3.0	3.0
PRCH 731 Bt 2	6.7	6.6	3.8	5.7	4.0	4.0	2.0	3.3
NSPL 252 BG II	5.3	5.3	1.9	4.2	3.0	3.0	2.0	2.7
Sudarshan BG II	6.0	6.3	2.7	5.0	4.0	4.0	2.0	3.3
Namcot 605 BG II	5.2	5.1	3.4	4.6	3.0	2.0	3.0	2.7
VBCH 1539 BG II	7.1	6.9	3.7	5.9	4.0	4.0	2.0	3.3
PCH 789 Bt 2	5.6	5.8	4.8	5.4	3.0	3.0	2.0	2.7
MRC 7391 BG II	5.8	5.7	4.0	5.2	3.0	3.0	3.0	3.0

Table 8. Aphids / 3 leaves

Hybrid	Siruguppa	Raichur	Coimbatore	Mean
Tulasi 135 BG II	7.9	8.1	9.3	8.4
NCS 9012 Bt 2	10.9	9.3	8.4	9.5
MRC 7388 BG II	6.4	7.2	9.2	7.6
RCH 2 BG I	8.4	9.1	6.2	7.9
NCS 567 Bt 2	9.8	7.3	5.7	7.6
RCH 668 BG II	7.4	8.1	4.5	6.7
PCH 9605 Bt 2	7.2	6.5	7.1	6.9
Tulasi 171 BG II	10.2	9.7	7.1	9.0
Namcot 614 BG II	7.6	6.7	8.8	7.7
DPC 9066 BG II	6.2	7.2	6.4	6.6
RCH 2 BG II	5.6	5.5	4.8	5.3
PRCH 731 Bt 2	6.8	7.2	4.1	6.0
NSPL 252 BG II	12.4	11.4	7.2	10.3
Sudarshan BG II	8.4	7.3	4.1	6.6
Namcot 605 BG II	7.8	8.3	6.5	7.5
VBCH 1539 BG II	8.0	7.4	6.0	7.1
PCH 789 Bt 2	10.6	9.9	9.8	10.1
MRC 7391 BG II	6.8	7.4	6.5	6.9

Table 9. Whiteflies / 3 leaves

Hybrid	Siruguppa	Raichur	Coimbatore	Mean
Tulasi 135 BG II	1.1	1.3	0.0	0.8
NCS 9012 Bt 2	1.6	1.5	0.0	1.0
MRC 7388 BG II	0.8	1.1	0.0	0.6
RCH 2 BG I	1.4	1.3	0.0	0.9
NCS 567 Bt 2	1.2	1.5	0.0	0.9
RCH 668 BG II	0.7	0.9	0.2	0.6
PCH 9605 Bt 2	0.9	1.2	0.0	0.7
Tulasi 171 BG II	1.2	1.3	0.0	0.8
Namcot 614 BG II	1.1	1.0	0.0	0.7
DPC 9066 BG II	1.0	0.9	0.2	0.7
RCH 2 BG II	0.8	0.9	0.0	0.6
PRCH 731 Bt 2	1.4	1.2	0.0	0.9
NSPL 252 BG II	1.8	1.7	0.0	1.2
Sudarshan BG II	0.9	0.7	0.0	0.5
Namcot 605 BG II	1.2	1.0	0.3	0.8
VBCH 1539 BG II	1.0	1.2	0.0	0.7
PCH 789 Bt 2	1.8	1.9	0.0	1.2
MRC 7391 BG II	1.0	1.3	0.0	0.8

Table 10. Thrips / 3 leaves and Predators /plant

Hybrid	Thrips / 3 leaves				Predators /plant			
	Siruguppa	Raichur	Coimbatore	Mean	Siruguppa	Raichur	Coimbatore	Mean
Tulasi 135 BG II	3.2	3.9	0.5	2.5	0.5	0.7	0.2	0.5
NCS 9012 Bt 2	4.2	4.0	0.0	2.7	0.9	0.7	0.1	0.6
MRC 7388 BG II	2.8	2.7	0.0	1.8	0.9	0.8	0.0	0.6
RCH 2 BG I	3.8	3.6	0.0	2.5	0.3	0.4	0.0	0.3
NCS 567 Bt 2	3.7	3.8	0.0	2.5	0.8	0.7	0.0	0.5
RCH 668 BG II	3.5	2.8	0.0	2.1	0.9	0.7	0.0	0.5
PCH 9605 Bt 2	2.9	3.1	0.5	2.2	1.0	1.1	0.1	0.7
Tulasi 171 BG II	3.4	4.2	0.0	2.5	1.0	1.3	0.0	0.8
Namcot 614 BG II	4.1	3.9	0.0	2.7	0.8	0.9	0.0	0.6
DPC 9066 BG II	4.3	4.4	0.0	2.9	0.9	1.1	0.0	0.7
RCH 2 BG II	3.9	4.3	1.1	3.1	0.4	0.3	0.2	0.3
PRCH 731 Bt 2	4.2	3.9	0.0	2.7	0.9	0.8	0.1	0.6
NSPL 252 BG II	5.2	5.4	0.0	3.5	0.9	1.2	0.0	0.7
Sudarshan BG II	4.9	5.3	0.9	3.7	0.9	0.8	0.0	0.6
Namcot 605 BG II	5.8	4.8	0.0	3.5	0.9	1.1	0.0	0.7
VBCH 1539 BG II	2.4	4.5	0.0	2.3	0.9	0.7	0.1	0.6
PCH 789 Bt 2	3.9	4.1	0.4	2.8	0.8	0.7	0.0	0.5
MRC 7391 BG II	2.9	3.1	0.0	2.0	1.0	1.3	0.0	0.7

Bollworms**Larval population**

There was no larval populations of *Earias* spp. In all the locations where the data was taken and the population of *Helicoverpa armigera* (Table 11) was meagre at Siruguppa and Raichur in only a few entries and no incidence was noticed at Coimbatore. Similar situation existed for *Pectinophora gossypiella* (Table 12) also. All the entries recorded larval population of *Earias* and *Helicoverpa armigera* below ETL.

Table 11. Spotted bollworm and *Helicoverpa* bollworm population / 5 plants

Hybrid	Spotted bollworm population / 5 plants				<i>Helicoverpa</i> bollworm population / 5 plants			
	Siruguppa	Raichur	Coimbatore	Mean	Siruguppa	Raichur	Coimbatore	Mean
Tulasi 135 BG II	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.5
NCS 9012 Bt 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MRC 7388 BG II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RCH 2 BG I	0.0	0.0	0.0	0.0	2.2	2.9	0.0	1.7
NCS 567 Bt 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RCH 668 BG II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PCH 9605 Bt 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tulasi 171 BG II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Namcot 614 BG II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DPC 9066 BG II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RCH 2 BG II	0.0	0.0	0.0	0.0	1.9	2.2	0.0	1.4
PRCH 731 Bt 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NSPL 252 BG II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sudarshan BG II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Namcot 605 BG II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VBCH 1539 BG II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PCH 789 Bt 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MRC 7391 BG II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 12. Pink Bollworm larvae / 20 green bolls

Hybrid	Siruguppa	Raichur	Coimbatore	Mean
Tulasi 135 BG II	0.0	0.0	0.0	0.0
NCS 9012 Bt 2	0.0	0.0	0.0	0.0
MRC 7388 BG II	0.0	0.0	0.0	0.0
RCH 2 BG I	12.1	13.3	0.0	8.5
NCS 567 Bt 2	0.0	0.0	0.0	0.0
RCH 668 BG II	0.0	0.0	0.0	0.0
PCH 9605 Bt 2	0.0	0.0	0.0	0.0
Tulasi 171 BG II	0.0	0.0	0.0	0.0
Namcot 614 BG II	0.0	0.0	0.0	0.0
DPC 9066 BG II	0.0	0.0	0.0	0.0
RCH 2 BG II	11.5	10.9	0.0	7.5
PRCH 731 Bt 2	0.0	0.0	0.0	0.0
NSPL 252 BG II	0.0	0.0	0.0	0.0
Sudarshan BG II	0.0	0.0	0.0	0.0
Namcot 605 BG II	0.0	0.0	0.0	0.0
VBCH 1539 BG II	0.0	0.0	0.0	0.0
PCH 789 Bt 2	0.0	0.0	0.0	0.0
MRC 7391 BG II	0.0	0.0	0.0	0.0

Green boll damage by Pink bollworm

There was no green boll damage by pink bollworm at Coimbatore and only the check hybrids showed some damage in both Siruguppa and Raichur centres (Table 13).

Table 13. Per cent Green boll damage by PBW

Hybrid	Per cent Green boll damage by PBW			
	Siruguppa	Raichur	Coimbatore	Mean
Tulasi 135 BG II	0.0	0.0	0.0	0.0
NCS 9012 Bt 2	0.0	0.0	0.0	0.0
MRC 7388 BG II	0.0	0.0	0.0	0.0
RCH 2 BG I	20.5	21.3	0.0	13.9
NCS 567 Bt 2	0.0	0.0	0.0	0.0
RCH 668 BG II	0.0	0.0	0.0	0.0
PCH 9605 Bt 2	0.0	0.0	0.0	0.0
Tulasi 171 BG II	0.0	0.0	0.0	0.0
Namcot 614 BG II	0.0	0.0	0.0	0.0
DPC 9066 BG II	0.0	0.0	0.0	0.0
RCH 2 BG II	19.5	20.6	0.0	13.3
PRCH 731 Bt 2	0.0	0.0	0.0	0.0
NSPL 252 BG II	0.0	0.0	0.0	0.0
Sudarshan BG II	0.0	0.0	0.0	0.0
Namcot 605 BG II	0.0	0.0	0.0	0.0
VBCH 1539 BG II	0.0	0.0	0.0	0.0
PCH 789 Bt 2	0.0	0.0	0.0	0.0
MRC 7391 BG II	0.0	0.0	0.0	0.0

Open boll and locule damage

Moderate damage of open boll as well as locule was reported at Siruguppa and Raichur centres, whereas, no damage was reported at Coimbatore (Table 14).

Table 14. Open boll damage (%) - Boll and locule basis

Hybrid	Open boll damage (%) - Boll basis				Open boll damage (%) - locule basis			
	Siruguppa	Raichur	Coimbatore	Mean	Siruguppa	Raichur	Coimbatore	Mean
Tulasi 135 BG II	8.2	7.1	0.0	5.1	4.4	5.1	0.0	3.2
NCS 9012 Bt 2	9.4	8.3	0.0	5.9	5.6	5.4	0.0	3.7
MRC 7388 BG II	7.5	7.1	0.0	4.9	4.1	4.3	0.0	2.8
RCH 2 BG I	12.1	13.4	0.0	8.5	5.7	5.4	0.0	3.7
NCS 567 Bt 2	7.8	6.9	0.0	4.9	2.3	3.3	0.0	1.9
RCH 668 BG II	8.4	9.2	0.0	5.9	6.6	5.8	0.0	4.2
PCH 9605 Bt 2	7.2	8.3	0.0	5.2	3.3	3.6	0.0	2.3
Tulasi 171 BG II	9.3	8.6	0.0	6.0	2.4	2.8	0.0	1.7
Namcot 614 BG II	10.3	11.2	0.0	7.2	5.0	4.1	0.0	3.0
DPC 9066 BG II	9.5	8.8	0.0	6.1	3.5	3.3	0.0	2.3
RCH 2 BG II	12.2	14.4	0.0	8.9	5.1	5.0	0.0	3.3
PRCH 731 Bt 2	7.9	8.3	0.0	5.4	3.8	4.1	0.0	2.6
NSPL 252 BG II	8.4	7.8	0.0	5.4	5.2	5.0	0.0	3.4
Sudarshan BG II	9.6	7.5	0.0	5.7	4.1	3.8	0.0	2.6
Namcot 605 BG II	8.9	9.2	0.0	6.0	5.4	5.1	0.0	3.5
VBCH 1539 BG II	8.6	7.7	0.0	5.4	7.3	8.2	0.0	5.2
PCH 789 Bt 2	10.1	11.2	0.0	7.1	5.7	5.1	0.0	3.6
MRC 7391 BG II	9.5	10.1	0.0	6.5	3.4	4.1	0.0	2.5

Plant protection measures

All entries tested including the check hybrids were found to be susceptible to sucking pests at varying degrees and at different stages of crop growth at all locations, warranting chemical intervention. Depending upon the ETL level, 4 – 6 sprays were given for controlling sucking pests.

Overall Performance of Bt Hybrids tested under Irrigated Conditions

Hybrid	Mean Seed Cotton Yield (kg/ha)	% Inc over RCH 2 BG I	% Inc over RCH 2 BG II	Mean Lint Yield (kg/ha)	% Inc over RCH 2 BG I	% Inc over RCH 2 BG II	2.5 % Span Length (mm)	Micronaire	Bundle Strength (g/tex)
MRC 7391 BG II	2485	49.4	60.4	990	43.1	52.1	31.0	3.4	22.9
NSPL 252 BG II	2293	37.9	48.0	940	35.8	44.4	30.7	4.0	22.2
Sudarshan BG II	2265	36.2	46.2	853	23.2	31.0	29.9	3.5	22.8
PRCH 731 Bt 2	2226	33.9	43.7	930	34.3	42.8	30.1	3.9	23.0
RCH 668 BG II	2121	27.5	36.9	896	29.4	37.6	31.1	4.2	23.1
NCS 567 Bt 2	2107	26.7	36.0	858	24.0	31.8	30.4	3.9	22.1
PCH 9605 Bt 2	2094	25.9	35.2	876	26.6	34.6	31.6	3.7	23.4
VBCH 1539 BG II	2077	24.9	34.1	816	17.8	25.3	30.2	3.7	21.7
MRC 7388 BG II	2068	24.4	33.5	806	16.5	23.8	29.9	3.8	20.8
DPC 9066 BG II	2033	22.3	31.3	864	24.9	32.7	28.9	3.9	21.7
Tulasi 171 BG II	1961	17.9	26.6	725	4.8	11.4	31.0	3.7	23.2
NCS 9012 Bt 2	1928	16.0	24.5	807	16.5	23.9	31.8	4.2	22.5
PCH 789 Bt 2	1928	15.9	24.5	744	7.5	14.2	28.9	3.8	22.0
Tulasi 135 BG II	1841	10.7	18.9	740	6.9	13.7	27.9	3.8	22.5
Namcot 614 BG II	1810	8.8	16.8	771	11.5	18.5	28.0	3.4	21.8
Namcot 605 BG II	1787	7.4	15.4	735	6.2	12.9	26.6	3.4	21.0
RCH 2 BG I	1663	0.0	7.3	692	0.0	6.3	29.6	4.2	22.0
RCH 2 BG II	1549	-6.9	0.0	651	-5.9	0.0	29.3	3.7	22.1

RAINFED TRIALS

In the rainfed trial, 12 test hybrids belonging to different Private R & D firms were evaluated along with two check hybrids viz., Bunny BG I and Bunny BG II. Sowing of the trial was done at proper time in all the locations and all the agronomic practices were followed as per standard protocol.

A. BIOMETRICAL EVALUATION

In the ETL based plant protection trial, biometrical observations recorded were recorded and are presented below.

Germination and final plant stand

Very good germination was recorded in most of the entries and subsequently sufficient plant population was maintained till the harvest at all the locations where the trial has been conducted.

Boll weight, Ginning Outturn, Lint Index and Seed Index:

The biometrical data pertaining to boll weight, ginning outturn, lint index and seed index recorded in the trial are given in Tables 15-17.

Table 15. Boll weight (g)

Hybrid	Lam	Nandyal	Adilabad	Dharwad	Aruppukottai	Mean
PCH 789 BG II	5.0	4.9	4.4	5.3	5.6	5.0
DPC 7065 BG II	4.1	4.3	3.8	4.6	5.2	4.4
Namcot 615 BG II	4.1	4.4	3.9	4.8	6.0	4.6
Bunny BG II	5.2	4.5	3.7	5.6	6.4	5.1
Tulasi 162 BG II	4.7	4.6	4.1	5.3	5.4	4.8
NCS 567 BG II	4.6	5.4	4.8	6.5	7.1	5.7
VBCH 1503 BG II	5.5	4.7	4.6	5.8	6.9	5.5
Bunny BG I	4.0	4.3	4.0	4.9	5.2	4.5
PCH 9605 BG II	4.6	5.4	3.9	5.5	5.5	5.0
DPC 5061 BG II	4.1	4.2	3.8	4.7	5.7	4.5
Tulasi 144 BG II	4.1	5.1	4.7	5.9	6.5	5.3
PRCH 731 BG II	5.9	5.3	4.9	6.2	6.4	5.7
RCH 665 BG II	4.5	5.0	4.0	4.9	5.6	4.8
NCS 9012 BG II	5.8	4.8	4.5	5.6	6.1	5.4

Table 16. Ginning Outturn %

Hybrid	Lam	Nandyal	Adilabad	Dharwad	Aruppukottai	Mean
PCH 789 BG II	34.8	32.0	36.0	31.1	36.6	34.1
DPC 7065 BG II	34.3	37.0	36.0	37.4	38.7	36.7
Namcot 615 BG II	31.2	35.0	34.0	36.5	38.1	35.0
Bunny BG II	35.0	36.0	35.0	36.1	38.7	36.2
Tulasi 162 BG II	32.6	34.0	34.0	33.9	38.8	34.7
NCS 567 BG II	31.7	34.0	37.0	34.1	39.3	35.2
VBCH 1503 BG II	32.4	34.0	37.0	35.6	36.3	35.1
Bunny BG I	32.5	34.0	35.0	35.0	38.6	35.0
PCH 9605 BG II	35.0	35.0	37.0	35.9	38.6	36.3
DPC 5061 BG II	33.7	36.0	36.0	37.1	37.4	36.0
Tulasi 144 BG II	33.1	36.0	36.0	33.2	34.5	34.6
PRCH 731 BG II	30.8	37.0	38.0	34.8	35.1	35.1
RCH 665 BG II	31.1	34.0	34.0	34.0	37.5	34.1
NCS 9012 BG II	32.6	37.0	37.0	35.6	38.1	36.1

Table 17. Lint Index (g) and Seed Index (g)

Hybrid	Lint Index (g)			Seed Index (g)		
	Lam	Adilabad	Mean	Lam	Adilabad	Mean
PCH 789 BG II	5.2	6.2	5.7	9.5	10.6	10.1
DPC 7065 BG II	5.5	5.9	5.7	10.5	10.4	10.5
Namcot 615 BG II	5.1	5.1	5.1	11.2	9.7	10.5
Bunny BG II	5.3	5.4	5.4	9.7	9.7	9.7
Tulasi 162 BG II	4.9	5.8	5.4	10.1	10.8	10.5
NCS 567 BG II	4.8	6.1	5.5	10.3	10.2	10.3
VBCH 1503 BG II	5.0	6.4	5.7	10.4	10.5	10.5
Bunny BG I	5.3	5.2	5.3	11.0	9.5	10.3
PCH 9605 BG II	5.2	6.3	5.8	9.9	9.8	9.9
DPC 5061 BG II	4.9	5.5	5.2	9.6	9.5	9.6
Tulasi 144 BG II	4.8	6.4	5.6	9.7	11.3	10.5
PRCH 731 BG II	5.1	7.0	6.1	10.7	10.8	10.8
RCH 665 BG II	5.2	5.5	5.4	10.5	10.3	10.4
NCS 9012 BG II	5.1	5.9	5.5	10.5	9.6	10.1

B). MEAN SEED COTTON YIELD (KG/HA) UNDER PROTECTED CONDITIONS

Seed cotton yield recorded in different centres are furnished in Table 19. The data indicated that the highest mean seed cotton yield was recorded in the hybrid PCH 9605 BG II (2337 kg/ha) which was followed by the check hybrid Bunny BG II (2334 kg/ha). Only one more entry (PRCH 731 BG II – 2313 kg/ha) could show yield superiority over the other check hybrid (Bunny BG I – 2279 kg/ha). All the other hybrids performed poorer compared to both the check hybrids.

Table 19. Seed Cotton Yield (kg/ha)

Hybrid	Lam	Nandyal	Adilabad	Dharwad	Aruppu-kottai	Mean	% Inc. Over Bunny I	% Inc. Over Bunny BG II
PCH 789 BG II	1541	2096	1342	2707	1610	1859	-18.4	-20.3
DPC 7065 BG II	1757	2105	1450	4215	1629	2231	-2.1	-4.4
Namcot 615 BG II	1282	2031	1404	3169	1796	1936	-15.0	-17.0
Bunny BG II	1986	2326	2083	3665	1609	2334	2.4	0.0
Tulasi 162 BG II	1689	2112	1575	2913	1657	1989	-12.7	-14.8
NCS 567 BG II	1695	1875	1636	2864	1820	1978	-13.2	-15.3
VBCH 1503 BG II	2031	2036	1620	2607	1525	1964	-13.8	-15.9
Bunny BG I	1444	2171	1837	4150	1795	2279	0.0	-2.3
PCH 9605 BG II	2163	2286	1558	4000	1676	2337	2.5	0.1
DPC 5061 BG II	1723	2006	1234	3808	1409	2036	-10.7	-12.8
Tulasi 144 BG II	2023	2124	1296	3515	1404	2072	-9.1	-11.2
PRCH 731 BG II	1811	2101	1805	4446	1403	2313	1.5	-0.9
RCH 665 BG II	2278	2011	1481	3442	1399	2122	-6.9	-9.1
NCS 9012 BG II	1916	2235	1805	3198	1678	2166	-4.9	-7.2
CD @ 5 %	139	488	527	1157	392			
CV %	5	14	21	20	11			

For lint yield (kg/ha) also only one test hybrid was found to be superior to the best check hybrid while all other hybrids were inferior (Table 19).

Table 19. Lint Yield (kg/ha)

Hybrid	Lam	Nandyal	Adilabad	Dharwad	Aruppu-kottai	Mean	% Inc. Over Bunny I	% Inc. Over Bunny BG II
PCH 789 BG II	536	671	487	842	589	625	-21.8	-25.9
DPC 7065 BG II	603	779	526	1576	630	823	3.0	-2.4
Namcot 615 BG II	400	711	482	1157	684	687	-14.1	-18.5
Bunny BG II	695	837	740	1323	622	843	5.6	0.1
Tulasi 162 BG II	551	718	540	988	643	688	-13.9	-18.4
NCS 567 BG II	537	638	615	977	714	696	-12.9	-17.4
VBCH 1503 BG II	658	692	604	928	553	687	-14.0	-18.5
Bunny BG I	469	738	642	1453	693	799	0.0	-5.2
PCH 9605 BG II	757	800	587	1436	647	845	5.8	0.3
DPC 5061 BG II	581	722	444	1413	529	738	-7.7	-12.5
Tulasi 144 BG II	670	765	466	1167	484	710	-11.1	-15.7
PRCH 731 BG II	558	777	698	1547	494	815	2.0	-3.3
RCH 665 BG II	708	683	552	1170	524	728	-8.9	-13.7
NCS 9012 BG II	625	827	673	1138	639	780	-2.3	-7.4
CD @ 5 %			137		170			
CV %			11		13			

C). FIBRE QUALITY EVALUATION

Data on fibre quality evaluations tested in two locations viz., Lam and Nandyal are furnished in Table 20.

Table 20. 2.5 % Span Length (mm), Micronaire and Bundle Strength

Hybrid	2.5 % Span Length (mm)			Micronaire			Bundle Strength		
	Lam	Nandyal	Mean	Lam	Nandyal	Mean	Lam	Nandyal	Mean
PCH 789 BG II	28.4	31.0	29.7	3.7	4.6	4.2	23.0	23.0	23.0
DPC 7065 BG II	24.9	29.0	27.0	3.3	4.9	4.1	21.6	23.0	22.3
Namcot 615 BG II	26.5	30.0	28.3	3.3	4.2	3.8	20.4	20.0	20.2
Bunny BG II	32.1	34.0	33.1	3.4	4.1	3.8	23.0	22.0	22.5
Tulasi 162 BG II	33.7	32.0	32.9	3.4	4.1	3.8	27.9	23.0	25.5
NCS 567 BG II	30.4	29.0	29.7	3.6	4.4	4.0	22.9	24.0	23.5
VBCH 1503 BG II	31.5	33.0	32.3	3.6	4.4	4.0	23.3	21.0	22.2
Bunny BG I	30.6	33.0	31.8	3.6	4.3	4.0	24.2	23.0	23.6
PCH 9605 BG II	31.2	34.0	32.6	3.5	4.8	4.2	23.6	24.0	23.8
DPC 5061 BG II	28.8	28.0	28.4	3.7	4.7	4.2	24.2	22.0	23.1
Tulasi 144 BG II	31.7	35.0	33.4	3.4	4.1	3.8	25.7	24.0	24.9
PRCH 731 BG II	28.9	32.0	30.5	3.5	4.3	3.9	23.7	23.0	23.4
RCH 665 BG II	30.6	33.0	31.8	3.6	4.3	4.0	23.6	19.0	21.3
NCS 9012 BG II	32.0	32.0	32.0	3.5	4.7	4.1	22.4	21.0	21.7

D). ENTOMOLOGICAL EVALUATION

The entomological evaluations were made for testing the entries against the bollworms and sap sucking insects.

Sucking pests

The data recorded in respect of jassids, aphids, whiteflies and thrips are given in Tables 21 to 23.

Table 21. Jassids / 3 leaves (pooled) and Jassid Injury Grade

Hybrid	Jassids / 3 leaves (pooled)			Jassid Injury Grade		
	Lam	Dharwad	Mean	Lam	Dharwad	Mean
PCH 789 BG II	5.9	4.2	5.1	3.0	4.0	3.5
DPC 7065 BG II	6.6	3.2	4.9	3.0	3.0	3.0
Namcot 615 BG II	9.4	4.4	6.9	4.0	4.0	4.0
Bunny BG II	6.9	3.2	5.1	3.0	4.0	3.5
Tulasi 162 BG II	6.2	4.4	5.3	3.0	4.0	3.5
NCS 567 BG II	7.1	3.8	5.5	3.0	4.0	3.5
VBCH 1503 BG II	6.7	4.0	5.4	3.0	3.0	3.0
Bunny BG I	8.4	3.2	5.8	4.0	4.0	4.0
PCH 9605 BG II	7.7	3.8	5.8	4.0	3.0	3.5
DPC 5061 BG II	6.8	5.0	5.9	3.0	4.0	3.5
Tulasi 144 BG II	5.5	4.4	5.0	2.0	4.0	3.0
PRCH 731 BG II	7.2	4.8	6.0	3.0	4.0	3.5
RCH 665 BG II	6.8	3.6	5.2	3.0	4.0	3.5
NCS 9012 BG II	4.6	4.4	4.5	2.0	3.0	2.5

Table 22. Aphids / 3 leaves

Hybrid	Lam	Dharwad	Mean
PCH 789 BG II	15.0	25.2	20.1
DPC 7065 BG II	24.0	24.2	24.1
Namcot 615 BG II	7.0	26.1	16.6
Bunny BG II	11.4	21.1	16.3
Tulasi 162 BG II	12.2	27.1	19.7
NCS 567 BG II	10.6	26.2	18.4
VBCH 1503 BG II	18.2	21.2	19.7
Bunny BG I	13.8	23.7	18.8
PCH 9605 BG II	6.8	19.1	13.0
DPC 5061 BG II	21.0	23.7	22.4
Tulasi 144 BG II	15.6	25.2	20.4
PRCH 731 BG II	8.8	24.2	16.5
RCH 665 BG II	11.6	25.7	18.6
NCS 9012 BG II	14.4	18.7	16.6

Table 23. Whiteflies / 3 leaves and Thrips / 3 leaves

Hybrid	Whiteflies / 3 leaves		Thrips / 3 leaves	
	Lam	Dharwad	Lam	Mean
PCH 789 BG II	8.8	21.4	4.8	13.1
DPC 7065 BG II	9.6	23.4	5.8	14.6
Namcot 615 BG II	5.8	14.4	6.4	10.4
Bunny BG II	14.0	14.4	3.6	9.0
Tulasi 162 BG II	10.4	14.8	5.1	10.0
NCS 567 BG II	9.6	14.6	5.6	10.1
VBCH 1503 BG II	6.8	20.6	9.4	15.0
Bunny BG I	4.8	16.2	4.2	10.2
PCH 9605 BG II	5.4	16.2	3.4	9.8
DPC 5061 BG II	9.6	15.2	5.6	10.4
Tulasi 144 BG II	11.6	15.4	4.6	10.0
PRCH 731 BG II	5.6	15.0	2.9	9.0
RCH 665 BG II	9.4	13.2	3.4	8.3
NCS 9012 BG II	16.4	17.0	5.0	11.0

Natural enemies

There was no discrete difference between the check hybrids and other Bt entries in harbouring the natural enemies (Table 24).

Table 24. Predators /plant

Hybrid	Lam
PCH 789 BG II	0.1
DPC 7065 BG II	0.3
Namcot 615 BG II	0.2
Bunny BG II	0.3
Tulasi 162 BG II	0.1
NCS 567 BG II	0.2
VBCH 1503 BG II	0.3
Bunny BG I	0.1
PCH 9605 BG II	0.1
DPC 5061 BG II	0.2
Tulasi 144 BG II	0.3
PRCH 731 BG II	0.1
RCH 665 BG II	0.1
NCS 9012 BG II	0.2

Bollworms

Larval population

There was no larval populations of *Earias* spp. and *Helicoverpa armigera* recorded in both test entries as well as check hybrids (Table 25) and population of *Pectinophora gossypiella* (Table 26) was very low and below ETL.

Table 25. Spotted bollworm and *Helicoverpa* bollworm population / 5 plants

Hybrid	Spotted bollworm population / 5 plants	<i>Helicoverpa</i> bollworm population / 5 plants		
	Lam	Lam	Dharwad	Mean
PCH 789 BG II	0.0	0.0	0.0	0.0
DPC 7065 BG II	0.0	0.0	0.0	0.0
Namcot 615 BG II	0.0	0.0	0.0	0.0
Bunny BG II	0.0	0.0	0.0	0.0
Tulasi 162 BG II	0.0	0.0	0.0	0.0
NCS 567 BG II	0.0	0.0	0.0	0.0
VBCH 1503 BG II	0.0	0.0	0.0	0.0
Bunny BG I	0.0	0.0	0.0	0.0
PCH 9605 BG II	0.0	0.0	0.0	0.0
DPC 5061 BG II	0.0	0.0	0.0	0.0
Tulasi 144 BG II	0.0	0.0	0.0	0.0
PRCH 731 BG II	0.0	0.0	0.0	0.0
RCH 665 BG II	0.0	0.0	0.0	0.0
NCS 9012 BG II	0.0	0.0	0.0	0.0

Table 26. Pink Bollworm larvae / 20 green bolls

Hybrid	Lam	Dharwad	Mean
PCH 789 BG II	0.0	3.0	1.5
DPC 7065 BG II	0.0	0.0	0.0
Namcot 615 BG II	2.0	0.0	1.0
Bunny BG II	0.0	0.0	0.0
Tulasi 162 BG II	0.0	0.0	0.0
NCS 567 BG II	0.0	2.0	1.0
VBCH 1503 BG II	2.0	0.0	1.0
Bunny BG I	0.0	0.0	0.0
PCH 9605 BG II	0.0	2.0	1.0
DPC 5061 BG II	0.0	0.0	0.0
Tulasi 144 BG II	0.0	3.0	1.5
PRCH 731 BG II	0.0	0.0	0.0
RCH 665 BG II	4.0	0.0	2.0
NCS 9012 BG II	0.0	0.0	0.0

Green boll and Locule damage by Pink bollworm

There was no incidence of pink bollworm at Nagpur centre and correspondingly no green boll damage was noticed. At Akola, both green boll as well as locule damage was recorded and were found negligible (Table 27)

Table 27. Per cent Green boll damage and Per cent locules damage in green boll by PBW

Hybrid	Per cent Green boll damage by PBW	Per cent locules damage in green boll by PBW		
	Lam	Lam	Dharwad	Mean
PCH 789 BG II	0.0	0.0	0.0	0.0
DPC 7065 BG II	0.0	0.0	0.0	0.0
Namcot 615 BG II	0.0	0.0	0.0	0.0
Bunny BG II	0.0	0.0	0.0	0.0
Tulasi 162 BG II	0.0	0.0	0.0	0.0
NCS 567 BG II	0.0	0.0	0.0	0.0
VBCH 1503 BG II	0.0	0.0	0.0	0.0
Bunny BG I	0.0	0.0	0.0	0.0
PCH 9605 BG II	0.0	0.0	0.0	0.0
DPC 5061 BG II	0.0	0.0	0.0	0.0
Tulasi 144 BG II	0.0	0.0	0.0	0.0
PRCH 731 BG II	0.0	0.0	0.0	0.0
RCH 665 BG II	0.0	0.0	0.0	0.0
NCS 9012 BG II	0.0	0.0	0.0	0.0

Open boll and locule damage

Considerable damage of open boll as well as locule was reported at Bharuch (Table 28). No damage on the basis of both boll and locule was reported at Nagpur.

Table 28. Open boll damage (%) - Boll and locule basis

Hybrid	Open boll damage (%) - Boll basis	Open boll damage (%) - locule basis
	Lam	Lam
PCH 789 BG II	0.0	0.0
DPC 7065 BG II	0.0	0.0
Namcot 615 BG II	0.0	0.0
Bunny BG II	0.0	0.0
Tulasi 162 BG II	0.0	0.0
NCS 567 BG II	0.0	0.0
VBCH 1503 BG II	0.0	0.0
Bunny BG I	0.0	0.0
PCH 9605 BG II	0.0	0.0
DPC 5061 BG II	0.0	0.0
Tulasi 144 BG II	0.0	0.0
PRCH 731 BG II	0.0	0.0
RCH 665 BG II	0.0	0.0
NCS 9012 BG II	0.0	0.0

Plant protection measures

All entries tested including the check hybrids were found to be susceptible to sucking pests at varying degrees and at different stages of crop growth at all locations, warranting chemical intervention. Depending upon the ETL level, 4 – 6 sprays were given for controlling sucking pests.

Overall Performance of Bt Hybrids tested under Rainfed Conditions

Hybrid	Mean Seed Cotton Yield (kg/ha)	% Inc. Over Bunny I	% Inc. Over Bunny BG II	Mean Lint Yield (kg/ha)	% Inc. Over Bunny I	% Inc. Over Bunny BG II	2.5 % Span Length (mm)	Micronaire	Bundle Strength (g/tex)
PCH 9605 BG II	2337	2.5	0.1	845	5.8	0.3	32.6	4.2	23.8
Bunny BG II	2334	2.4	0.0	843	5.6	0.1	33.1	3.8	22.5
PRCH 731 BG II	2313	1.5	-0.9	815	2.0	-3.3	30.5	3.9	23.4
Bunny BG I	2279	0.0	-2.3	799	0.0	-5.2	31.8	4.0	23.6
DPC 7065 BG II	2231	-2.1	-4.4	823	3.0	-2.4	27.0	4.1	22.3
NCS 9012 BG II	2166	-4.9	-7.2	780	-2.3	-7.4	32.0	4.1	21.7
RCH 665 BG II	2122	-6.9	-9.1	728	-8.9	-13.7	31.8	4.0	21.3
Tulasi 144 BG II	2072	-9.1	-11.2	710	-11.1	-15.7	33.4	3.8	24.9
DPC 5061 BG II	2036	-10.7	-12.8	738	-7.7	-12.5	28.4	4.2	23.1
Tulasi 162 BG II	1989	-12.7	-14.8	688	-13.9	-18.4	32.9	3.8	25.5
NCS 567 BG II	1978	-13.2	-15.3	696	-12.9	-17.4	29.7	4.0	23.5
VBCH 1503 BG II	1964	-13.8	-15.9	687	-14.0	-18.5	32.3	4.0	22.2
Namcot 615 BG II	1936	-15.0	-17.0	687	-14.1	-18.5	28.3	3.8	20.2
PCH 789 BG II	1859	-18.4	-20.3	625	-21.8	-25.9	29.7	4.2	23.0

IRRIGATED TRIALS – INTER SPECIFIC (HIRSUTUM X BARBADENSE) HYBRIDS

In this trial, three test hybrids were evaluated with a Bt check hybrid viz., MRC 6918 BG I. The sowings were completed timely in all the centres.

A. BIOMETRICAL EVALUATION

Various biometrical observations recorded in the ETL based plant protection trial are described below.

Germination and final plant stand

The germination of all the entries at all the locations was very good and good plant stand was maintained till harvest.

Boll weight, Ginning Outturn, Lint Index and Seed Index:

The data recorded on boll weight (g/boll), ginning outturn (%), lint index (g) and seed index (g) in various locations are furnished in Tables 29-31.

Table 29. Boll weight (g)

Hybrid	Lam	Dharwad	Siruguppa	Coimbatore	Mean
Namcot 803 BG II	3.0	3.7	4.8	4.0	3.9
MRC 6918 BG I	3.0	3.6	4.0	4.1	3.7
Tulasi 333 BG II	4.2	4.0	4.1	3.6	4.0
MRC 6918 BG II	5.0	4.2	4.4	4.2	4.5

Table 30. Ginning Outturn %

Hybrid	Lam	Siruguppa	Coimbatore	Mean
Namcot 803 BG II	64.3	46.8	62.3	57.8
MRC 6918 BG I	64.6	61.2	74.9	66.9
Tulasi 333 BG II	60.6	66.4	71.2	66.1
MRC 6918 BG II	67.3	70.2	67.5	68.3

Table 31. Lint Index (g) and Seed Index (g)

Hybrid	Lint Index (g)				Seed Index (g)			
	Lam	Siruguppa	Coimbatore	Mean	Lam	Siruguppa	Coimbatore	Mean
Namcot 803 BG II	4.7	5.6	5.1	5.1	9.6	12.6	11.5	11.2
MRC 6918 BG I	5.1	5.2	5.6	5.3	9.9	12.3	11.8	11.3
Tulasi 333 BG II	4.7	4.9	4.4	4.7	9.5	12.5	10.4	10.8
MRC 6918 BG II	4.7	5.7	5.9	5.4	9.7	13.1	12.7	11.8

B). MEAN SEED COTTON YIELD (KG/HA) UNDER PROTECTED CONDITIONS

The highest mean seed cotton yield was recorded in the check hybrid MRC 6918 BG I (218 kg/ha) which was followed by MRC 6918 BG II (2457 kg/ha). Other two hybrids were found to record lesser yield to a tune of 12 to 50 per cent over the check hybrid (Table 32).

Table 32. Seed Cotton Yield (kg/ha)

Hybrid	Lam	Dharwad	Siruguppa	Coimbatore	Mean	% Inc. Over MRC 6918 BG I
Namcot 803 BG II	830	1463	643	2688	1406	-50.1
MRC 6918 BG I	1377	4331	1295	4268	2818	0.0
Tulasi 333 BG II	852	3202	1346	2373	1943	-31.0
MRC 6918 BG II	1422	3098	1798	3509	2457	-12.8
CD @ 5 %	243	862	195	356		
CV %	14	20	12	8		

LINT YIELD (KG/HA)

For lint yield also, similar trend was noticed with the check hybrid registering the highest yield (Table 33)

Table 33. Lint Yield (kg/ha)

Hybrid	Lam	Dharwad	Siruguppa	Coimbatore	Mean	% Inc. Over MRC 6918 BG I
Namcot 803 BG II	272	418	193	838	430	-45.0
MRC 6918 BG I	468	1347	388	930	783	0.0
Tulasi 333 BG II	281	954	387	1015	659	-15.8
MRC 6918 BG II	464	936	546	1135	770	-1.7
CD @ 5 %			57	261		
CV %			12	19		

C). FIBRE QUALITY EVALUATION

The fibre quality data recorded in Lam and Coimbatore are furnished in Table 34. The highest micronaire and strength was recorded in the check hybrid.

Table 34. 2.5 % Span Length (mm), Micronaire and Bundle Strength

Hybrid	2.5 % Span Length (mm)			Micronaire			Bundle Strength		
	Lam	Coimbatore	Mean	Lam	Coimbatore	Mean	Lam	Coimbatore	Mean
Namcot 803 BG II	35.1	35.0	35.1	3.7	2.6	3.2	24.5	24.3	24.4
MRC 6918 BG I	35.0	34.8	34.9	3.8	3.2	3.5	27.5	26.0	26.8
Tulasi 333 BG II	32.2	33.5	32.9	3.7	2.9	3.3	25.8	27.0	26.4
MRC 6918 BG II	35.5	34.5	35.0	3.6	2.7	3.2	23.9	26.8	25.4

D). ENTOMOLOGICAL EVALUATION

The entomological evaluations were primarily targeted for testing the entries against the bollworms and sap sucking insects.

Sucking pests

The data recorded in respect of jassids, aphids, whiteflies and thrips are furnished in Tables 35 to 38.

Natural enemies

There was no difference in the natural enemies population between the check hybrid and the other Bt entries (Table 38).

Table 35. Jassids / 3 leaves (pooled) and Jassid Injury Grade

Hybrid	Jassids / 3 leaves (pooled)					Jassid Injury Grade				
	Lam	Dhar-wad	Sirug-uppa	Coimb-atore	Mean	Lam	Dhar-wad	Sirug-uppa	Coimb-atore	Mean
Namcot 803 BG II	6.6	5.2	7.3	1.7	5.2	3.0	3.0	3.0	2.0	2.8
MRC 6918 BG I	8.4	4.2	7.0	2.5	5.5	4.0	4.0	2.0	2.0	3.0
Tulasi 333 BG II	9.7	5.2	6.8	1.9	5.9	4.0	4.0	2.0	3.0	3.3
MRC 6918 BG II	7.8	3.8	5.8	1.4	4.7	4.0	3.0	2.0	2.0	2.8

Table 36. Aphids / 3 leaves

Hybrid	Lam	Dharwad	Siruguppa	Coimbatore	Mean
Namcot 803 BG II	9.8	18.8	8.6	6.8	11.0
MRC 6918 BG I	6.8	19.2	5.1	4.1	8.8
Tulasi 333 BG II	9.4	24.4	6.2	3.2	10.8
MRC 6918 BG II	6.8	24.2	5.2	6.3	10.6

Table 37. Whiteflies / 3 leaves

Hybrid	Lam	Siruguppa	Coimbatore	Mean
Namcot 803 BG II	8.0	5.8	0.6	4.8
MRC 6918 BG I	5.6	3.4	0.6	3.2
Tulasi 333 BG II	4.8	2.9	0.7	2.8
MRC 6918 BG II	3.6	1.9	0.3	1.9

Table 38. Thrips / 3 leaves and Predators /plant

Hybrid	Thrips / 3 leaves					Predators /plant			
	Lam	Dhar-wad	Sirug-uppa	Coimb-atore	Mean	Lam	Sirug-uppa	Coimb-atore	Mean
Namcot 803 BG II	3.2	9.4	4.1	0.3	4.3	0.2	0.6	0.1	0.3
MRC 6918 BG I	2.6	18.2	3.2	0.1	6.0	0.1	0.7	0.0	0.3
Tulasi 333 BG II	2.6	18.0	3.9	0.0	6.1	0.1	0.6	0.2	0.3
MRC 6918 BG II	2.2	22.8	3.6	0.3	7.2	0.3	0.5	0.2	0.3

Bollworms

Larval population

There was no larval population of *Earias* spp. and *Helicoverpa armigera* at Lam, Coimbatore and Dharwad, whereas, *Pectinophora gossypiella* population was observed to some extent at Dharwad and Siruguppa in few entries (Table 39).

Table 39. Pink Bollworm larvae / 20 green bolls

Hybrid	Lam	Dharwad	Siruguppa	Coimbatore	Mean
Namcot 803 BG II	0.0	3.0	12.2	0.0	3.8
MRC 6918 BG I	0.0	0.0	0.0	0.0	0.0
Tulasi 333 BG II	0.0	1.0	0.0	0.0	0.3
MRC 6918 BG II	0.0	2.0	0.0	0.0	0.5

Green boll damage by Pink bollworm

There was no incidence of pink bollworm at Lam and Coimbatore centre. At Raichur, the green boll damage in Namcot 803 BG II was considerable (Table 40).

Table 40. Per cent Green boll damage by PBW

Hybrid	Per cent Green boll damage by PBW			
	Lam	Raichur	Coimbatore	Mean
Namcot 803 BG II	0.0	20.9	0.0	7.0
MRC 6918 BG I	0.0	0.0	0.0	0.0
Tulasi 333 BG II	0.0	0.0	0.0	0.0
MRC 6918 BG II	0.0	0.0	0.0	0.0

Open boll and locule damage

Both open boll damage on boll basis as well as locule basis was observed at Siruguppa, whereas at Lam and Coimbatore no damage was noticed (Table 41).

Table 41. Open boll damage (%) - Boll and locule basis

Hybrid	Open boll damage (%) - Boll basis				Open boll damage (%) - locule basis			
	Lam	Siruguppa	Coimbatore	Mean	Lam	Siruguppa	Coimbatore	Mean
Namcot 803 BG II	0.0	11.8	0.0	3.9	0.0	6.2	0.0	2.1
MRC 6918 BG I	0.0	6.6	0.0	2.2	0.0	2.8	0.0	0.9
Tulasi 333 BG II	0.0	5.2	0.0	1.7	0.0	2.1	0.0	0.7
MRC 6918 BG II	0.0	4.8	0.0	1.6	0.0	1.9	0.0	0.6

Plant protection measures

In all the entries tested including the check hybrids, sucking pest infestation was noted at varying degrees and at different stages of crop growth at all locations, warranting chemical intervention. Depending upon the ETL level, 5 – 6 sprays were given for controlling sucking pests.

Overall Performance of Bt Hybrids tested under Irrigated Conditions

Hybrid	Mean Seed Cotton Yield (kg/ha)	% Inc. Over MRC 6918 BG I	Mean Lint Yield (kg/ha)	% Inc. Over MRC 6918 BG I	2.5 % Span Length (mm)	Micronaire	Bundle Strength (g/tex)
MRC 6918 BG I	2818	0.0	783	0.0	34.9	3.5	26.8
MRC 6918 BG II	2457	-12.8	770	-1.7	35.0	3.2	25.4
Tulasi 333 BG II	1943	-31.0	659	-15.8	32.9	3.3	26.4
Namcot 803 BG II	1406	-50.1	430	-45.0	35.1	3.2	24.4

---- End of the Report ---