

**Bt COTTON
EVALUATION REPORT
First Year
(40 Bt hybrids)**

CENTRAL ZONE

Submitted to
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

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Executive Summary

The All India Coordinated Cotton Improvement Project (AICCIP) undertook the evaluation of 40 cotton hybrids, viz., ACH-33-1, ACH-155-1, BRAHMA, GK.204, GK.205, GK.206, JKCH.226, JKCH.666, KDCHH.9632, KIRTIMAN, KRISHNA, MRC.6352, NCS.138, NCS.145, NCS.207, NECH.2R, NECH.3R, NPH.2171, NPH.2250, NPH.2270, PRCH.101, PRCH.102, PRCH.103, RCH.377, Tulasi.117, Tulasi.4, VARUN, VCH.110, VCH.111, VCH.112, possessing BG I gene, ACH-11-2x, KDCHH.441X, KDCHH.531X, MRC.7226X, MRC.7347X, RCH.512X, RCH.533X with Bollgard II genes, Bunny VIP, 2-58 VIP, & 2-81 VIP in five central Zone centres, viz., Central Institute for Cotton Research Institute, Nagpur, Dr.Punjabrao Deshmukh Krishi Vidyapeeth, Akola, Cotton Research Station of Marathwada Agricultural University, Nanded, Cotton research Station, Khandwa of Jawaharlal Nehru Krishi Vishwa Vidyalaya, and Cotton Research Station, Surat of Navsari Agricultural University for the second year in succession (vide ICAR letter No.2(8)/2003-C.C.I. dated 25.4.2003). The trials were laid out in accordance with standard package of practices of cotton cultivation, followed at respective centers, where the evaluations were undertaken. The untreated, acid de-linted seeds of the relevant test hybrids were provided by the above seed companies. MECH.162Bt & RCH.2Bt were the Bt check hybrids while NHH.44 was the non-Bt check hybrid for this zone.

Under unprotected conditions, the Spotted bollworm and American bollworm were in low levels in various centres of central zone. The number American bollworm per plant was recorded at three centres under protected conditions. There was no infestation of this pest so as to be seen above the mean count of 1 per plant. While NHH.44 recorded over 5% damage due to American bollworm on the squares, the all Bt test recorded only 0.1 to 3.08% square damage, as seen below. The maximum number of Pink bollworm in test hybrids, under unprotected condition, was in ACH-155-1 (19.8), NCS.145 (18.5), NCS.207 (19.6), followed by Bunny -VIP (13.6) in comparison to that in NHH.44 (16.9). The expression of the candidate gene to deter Pink bollworm survivorship in green boll is doubtful in these entries. The entries possessing BG II genes were found to counter Pink bollworm damage more effectively over VIP gene. The Pink bollworms in green bolls in BG II entries were at par with that of BG I entries. The VIP gene-possessing hybrids recorded 13 to 14% as against 18.42% in NHH.44 hybrid. The percent open boll damage was quite high in the VIP gene bearing hybrids (25-29%) in comparison to the check hybrid, NHH.44 (39.8%). The open boll damage above 10% indicates poor bollworm suppression in these hybrids.

Grey mildew disease was noticed only at Nanded in both protected and unprotected plots. Under unprotected conditions, the following Bt hybrids have been found to be susceptible to Grey mildew having more than 20 percent disease incidence in the grades of three and four; NECH 32, Bunny VIP, 2 - 81 VIP, ACH – 33 – 1, MRC 6325, MRC 7226X, MRC 7347X, NCS 138, NCS 145, BRAHMA, KDCHH 9632, KDCHH 531X, KDCHH 441X, GK 206, and also the zonal check NHH 44 and common check MECH 162 Bt. The above hybrids were also found to be susceptible to a less extent under protected conditions.

Central Zone is known to have Parawilt syndrome in cotton. Special effort to record observations on this was taken up in these test hybrids. The Parawilt was noticed at a higher percentage at Khandwa than at Akola. A maximum incidence of 32.22 percent was seen in the Bt hybrid NPH 2270. The seed cotton yield was not affected due to the late occurrence of the Para wilt.

Even though Alternaria leaf spot disease was noticed both at Nagpur and Nanded, there was significant incidence only at Nanded. Under **protected conditions** a disease incidence of more than 10.00 percent was noticed in NECH 3R, 2 – 81 VIP, JKCH 666, ACH – 11 – 2X, ACH – 33 – 1, RCH- 533X, MRC -6325, MRC – 7226X, MRC 7347X, NCH 138, Brahma, Krishna, KDCHH 441X, NPH 2250, GK 204, GK 205, GK 206, VCH 112, MECH 162 Bt (cc), and NHH 44(2c). The rest of the hybrids had less than 10.00 percent incidence.

The number of spraying against sap sucking pests (SP) and bollworms (BW), undertaken in different Bt and non Bt genotypes under PROTECTED conditions show that NHH.44 had 4.67 sprayings in this zone. Many test hybrids had similar number of sprayings as in the case of check Bt hybrids. Under unprotected conditions, the number of sprayings was 3.0 to 3.33 in Bt hybrids against 4 in NHH.44. Under protected conditions, this was above 4 for Bt hybrids, indicating that they also received one or more sprays against bollworms.

Under Protected condition, those hybrids that yielded over 1900 kg/ha were RCH.377 (2115 kg/ha), JKCH.226 (2078 kg/ha), PRCH.101 (2036 kg/ha) & GK.205 (1987 kg/ha), RCH.512X (1971 kg/ha) and MRC.7226 (1940 kg/ha). However, under unprotected condition, GK.205 (1648 kg/ha),PRCH.103 (1554 kg/ha),RCH.377 (1546 kg/ha),NCS.207 (1535 kg/ha),MRC.7226X (1514 kg/ha),ACH-155-1(1517 kg/ha) and VCH.110 (1506 kg/ha) were the top yielding genotypes.

The fibre property values indicated that most of the entries did not satisfy CIRCOT and SITRA (South India Textile Research Association – Textile Ministry) norms. The fibre strength values did not match with the span length data in all the test hybrids.

Introduction

The All India Coordinated Cotton Improvement Project (AICCIP) undertook the evaluation of 40 cotton hybrids, viz., ACH-33-1, ACH-155-1, BRAHMA, GK.204, GK.205, GK.206, JKCH.226, JKCH.666, KDCHH.9632, KIRTIMAN, KRISHNA, MRC.6352, NCS.138, NCS.145, NCS.207, NECH.2R, NECH.3R, NPH.2171, NPH.2250, NPH.2270, PRCH.101, PRCH.102, PRCH.103, RCH.377, Tulasi.117, Tulasi.4, VARUN, VCH.110, VCH.111, VCH.112, possessing BG I gene, ACH-11-2x, KDCHH.441X, KDCHH.531X, MRC.7226X, MRC.7347X, RCH.512X, RCH.533X with Bollgard II genes, Bunny VIP, 2-58 VIP, & 2-81 VIP in five central Zone centres, viz., Central Institute for Cotton Research Institute, Nagpur, Dr.Punjabrao Deshmukh Krishi Vidyapeeth, Akola, Cotton Research Station of Marathwada Agricultural University, Nanded, Cotton research Station, Khandwa of Jawaharlal Nehru Krishi Vishwa Vidyalaya, and Cotton Research Station, Surat of Navsari Agricultural University for the second year in succession (vide ICAR letter No.2(8)/2003-C.C.I. dated 25.4.2003). The trials were laid out in accordance with standard package of practices of cotton cultivation, followed at respective centers, where the evaluations were undertaken. The untreated, acid de-linted seeds of the relevant test hybrids were provided by the above seed companies. MECH.162Bt & RCH.2Bt were the Bt check hybrids while NHH.44 was the non-Bt check hybrid for this zone.

Date of sowing and final harvest

Dates	Nagpur	Akola	Nanded	Surat	Khandwa
Date of sowing	17.06.04	9.7.04	05.07.04	15.6.2004	26.06.04
Date of final harvesting	31.01.05	29.01.05	02.02.05	11.01.05	25.01.05

BREEDING EVALUATION

DESIGN: Randomised Block Design 2 Replications – 3 ROWS X 6 metre rows with plant protection, based on recommended package of practices of the respective centres with plant protection against all pests and diseases at the prescribed economic threshold levels for each of those biotic stresses in the concerned entries from time to time, based on close monitoring for their incidence and damage. These observations on pests and diseases were also recorded from time to time.

PLANT PROTECTION EVALUATION

DESIGN: Randomised Block design 2 Replications – 3 ROWS X 6 metre rows with no plant protection measures against prevalent bollworms and diseases. However, protection against sap sucking pests in respective entries, based on the recommended practices of respective centres was made. These observations on pests and diseases were also recorded from time to time.

RESULTS OF EVALUATIONS

The Breeding and Plant Protection evaluations were undertaken and the data recorded in the designated five centers. The results are given below in this report.

BREEDING EVALUATION

The breeding evaluation concentrated on various observations on plant biometric characters such as number of monopodia per plant, number of sympodia per plant, nodes per plant, mean length of sympodia, number of fruiting points per sympodium, number of green bolls per plant at harvest, number of burst bolls per plant at harvest, mean boll weight, seed index, Lint index, mean seed cotton yield per plant and per plot and final yield (calculated) of seed cotton yield per hectare in addition to the fibre length, strength and micronaire of the entries tested.

The Germination data of the Breeding evaluation are given below. The general plant stand of all entries was quite good, as seen from the following tables.

Germination Data (%)

Entry	Nagpur	Akola	Nanded	Surat	Khandwa	Mean
NECH.2R	100	94	98	98	90	96
NECH.3R	100	95	100	98	90	97
Bunny VIP	100	100	100	98	95	99
2-58 VIP	100	95	100	99	95	98
2-81 VIP	100	97	100	96	90	97
VARUN	100	97	98	99	100	99
JKCH.226	100	95	100	98	100	99
JKCH.666	100	91	100	100	100	98
ACH-11-2x	100	99	100	96	80	95
ACH-33-1	100	96	98	98	100	99
ACH-155-1	100	99	98	99	100	99
RCH.512X	100	99	100	98	98	99
RCH.533X	100	98	100	96	100	99
RCH.377	100	97	100	97	100	99
MRC.6352	100	97	100	99	100	99
MRC.7226X	100	98	98	99	95	98
MRC.7347X	100	97	100	98	100	99
NCS.138	100	96	100	98	100	99
NCS.145	100	96	100	99	100	99
NCS.207	100	95	97	100	100	98
BRAHMA	100	90	98	99	100	97
KRISHNA	100	78	98	99	95	94
KIRTIMAN	100	97	100	99	100	99
KDCHH.9632	100	96	100	97	100	99
KDCHH.531X	100	98	98	98	100	99
KDCHH.441X	100	98	100	100	95	99
PRCH.101	100	98	100	99	90	97
PRCH.102	100	98	98	98	95	98
PRCH.103	100	97	100	98	100	99
NPH.2171	100	91	98	97	100	97
NPH.2250	100	99	100	99	100	100
NPH.2270	100	100	100	97	80	95
GK.204	100	99	98	100	100	99
GK.205	100	99	100	99	100	100
GK.206	100	100	100	99	98	99
VCH.110	100	99	97	99	95	98
VCH.111	100	97	100	99	100	99
VCH.112	100	94	98	99	100	98

Tulasi.4	100	96	100	98	100	99
Tulasi.117	100	97	97	96	100	98
RCH.2Bt(CC)	100	96	100	99	100	99
MECH.162Bt(CC)	100	95	100	98	96	98
NHH.44(ZC)	100	88	100	96	95	96

General observations on test hybrids

General observations on the plant types, mixtures of genotypes, variations in morphological characters such pollen and anther colours, sterile plants, tendency for square drying etc. were recorded in various centres. It has to be pointed out that the variations in plant type were seen in the test hybrids of many companies unlike that seen in previous years. The centres reported anther colour variation (yellow & buff) in NECH.2R, non-uniform plants in JKCH.666, ACH-155-1 & Kirtiman. Sterile plants were observed in 2-58 VIP, MRC.6352, and KDCHH.441X. Many entries showed square drying, as given below.

Entry	General observations
NECH.2R	Anther colour variation was observed (Yellow and buff)
NECH.3R	-
Bunny VIP	Square drying was observed
2-58 VIP	Square drying was observed
2-81 VIP	Sterile plants (in RI – 1 in 36 plants) and Square drying was observed
VARUN	Square drying was observed
JKCH.226	Square drying was observed
JKCH.666	Plant variation was observed
ACH-11-2x	Wilting and hairy and Non hairy plants observed
ACH-33-1	-
ACH-155-1	Plant variation was observed (Hairy and Non hairy)
RCH.512X	Square drying was observed
RCH.533X	-
RCH.377	-
MRC.6352	Sterile plants and Square drying was observed
MRC.7226X	-
MRC.7347X	-
NCS.138	-
NCS.145	-
NCS.207	-
BRAHMA	-
KRISHNA	-
KIRTIMAN	Plant variation was observed (Hairy and Non hairy)
KDCHH.9632	Square drying was observed
KDCHH.531X	-
KDCHH.441X	Sterile plants (2 in 36, and 1 in 35 plants) and Square drying was observed
PRCH.101	-
PRCH.102	Square drying was observed
PRCH.103	-
NPH.2171	Square drying was observed
NPH.2250	-
NPH.2270	Square drying was observed
GK.204	Square drying was observed
GK.205	Square drying was observed
GK.206	-
VCH.110	-
VCH.111	-

VCH.112	-
Tulasi.4	-
Tulasi.117	-
RCH.2Bt(CC)	Square drying was observed
MECH.162Bt(CC)	-
NHH.44(ZC)	Square drying was observed

Number of Sympodia

It was noticed that the number of sympodia varied from 12.6 to 17.1 in different genotypes. The best was in ACH-155-1.

Entry	Nagpur	Nanded	Surat	Khandwa	Mean
NECH.2R	18.3	13.8	18.0	11.0	13.6
NECH.3R	18.3	12.9	18.0	8.0	12.6
Bunny VIP	18.5	14.8	20.0	11.3	14.5
2-58 VIP	21.1	13.0	25.0	11.0	15.1
2-81 VIP	18.5	13.6	21.0	11.6	14.1
VARUN	17.5	14.3	18.0	10.3	13.2
JKCH.226	19.5	14.4	23.0	15.3	15.8
JKCH.666	18.0	12.8	20.0	9.6	13.3
ACH-11-2x	18.9	14.2	21.0	11.0	13.9
ACH-33-1	17.8	12.4	18.0	11.0	13.3
ACH-155-1	18.7	14.6	27.0	20.0	17.1
RCH.512X	19.3	14.6	20.0	12.3	14.2
RCH.533X	20.3	14.8	17.0	9.0	13.4
RCH.377	20.0	13.5	24.0	19.6	16.4
MRC.6352	18.9	14.5	18.0	17.6	14.9
MRC.7226X	17.7	13.4	23.0	11.6	14.0
MRC.7347X	19.0	14.1	25.0	11.6	14.9
NCS.138	19.1	14.2	24.0	10.6	14.6
NCS.145	18.8	14.6	23.0	14.6	15.3
NCS.207	18.3	14.1	24.0	11.0	14.6
BRAHMA	17.5	12.8	21.0	10.6	13.3
KRISHNA	18.6	14.0	20.0	10.0	13.7
KIRTIMAN	16.9	12.6	15.0	9.6	11.7
KDCHH.9632	18.4	14.9	20.0	12.3	14.3
KDCHH.531X	19.5	14.2	21.0	13.3	14.8
KDCHH.441X	19.7	13.0	18.0	11.3	13.4
PRCH.101	20.8	14.0	22.0	14.0	15.2
PRCH.102	19.1	13.3	26.0	13.3	15.4
PRCH.103	18.3	14.5	25.0	15.3	15.7
NPH.2171	17.4	13.7	17.0	12.0	13.1
NPH.2250	18.4	13.9	20.0	12.6	13.9
NPH.2270	17.9	15.1	21.0	11.3	14.1
GK.204	18.5	14.3	22.0	11.6	14.1
GK.205	17.9	13.6	24.0	15.0	15.1
GK.206	20.7	13.8	20.0	9.0	13.6
VCH.110	19.7	13.9	24.0	15.0	15.7
VCH.111	16.9	13.4	17.0	10.3	12.4
VCH.112	19.7	15.1	22.0	15.0	15.5
Tulasi.4	19.0	14.2	18.0	12.0	13.5
Tulasi.117	17.5	13.3	23.0	14.6	14.7
RCH.2Bt(CC)	18.0	12.8	16.0	10.0	12.3
MECH.162Bt(CC)	18.8	11.7	24.0	13.6	14.6
NHH.44(ZC)	23.3	8.7	25.0	17.0	16.1
CD (0.05)	3.1	1.8	6.1		3.7
CV%	9.9	6.7	17.8	12.8	11.8

TOTAL BOLLS / PLANT:

The table below provides the number bolls per plant. The entries such as VCH.112 and Tulasi-117 recorded mean number over 30/plant in this zone. NHH.44 recorded 23.4 bolls/plant, similar to that in Bt check hybrids.

Entry	Nagpur	Akola	Nanded	Surat	Khandwa	Mean
NECH.2R	27.6	20.6	19.9	26.0	27.2	24.3
NECH.3R	65.5	26.4	17.1	38.0	19.3	33.3
Bunny VIP	42.4	14.6	15.1	29.0	13.8	23.0
2-58 VIP	26.9	9.5	12.7	43.0	16.1	21.7
2-81 VIP	35.4	18.3	20.2	31.0	19.9	24.9
VARUN	46.6	23.8	17.8	33.0	13.2	26.9
JKCH.226	35.0	15.6	23.3	35.0	20.3	25.8
JKCH.666	39.9	14.6	15.4	33.0	15.2	23.6
ACH-11-2x	42.6	19.8	16.6	29.0	26.7	26.9
ACH-33-1	42.9	20.7	21.1	28.0	23.2	27.2
ACH-155-1	25.9	17.9	24.1	37.0	21.3	25.2
RCH.512X	38.7	19.4	18.6	28.0	20.2	25.0
RCH.533X	45.8	23.3	21.4	27.0	15.2	26.5
RCH.377	44.9	20.4	21.6	29.0	22.2	27.6
MRC.6352	34.9	13.2	13.9	29.0	16.0	21.4
MRC.7226X	36.6	18.5	19.5	28.0	17.2	24.0
MRC.7347X	43.3	14.8	15.1	30.0	16.9	24.0
NCS.138	43.0	19.5	15.9	31.0	27.8	27.4
NCS.145	36.1	19.3	16.3	31.0	21.9	24.9
NCS.207	27.1	14.4	14.2	40.0	20.2	23.2
BRAHMA	35.0	19.5	18.6	23.0	18.9	23.0
KRISHNA	39.2	14.7	22.3	41.0	24.4	28.3
KIRTIMAN	34.5	18.9	17.8	27.0	16.0	22.8
KDCHH.9632	38.3	17.2	18.0	25.0	14.2	22.5
KDCHH.531X	43.6	17.1	17.0	32.0	15.9	25.1
KDCHH.441X	38.7	15.3	18.4	30.0	17.6	24.0
PRCH.101	40.0	15.4	18.4	36.0	23.4	26.6
PRCH.102	36.1	19.9	17.0	30.0	19.1	24.4
PRCH.103	36.0	25.6	21.3	38.0	23.4	28.9
NPH.2171	35.1	17.1	20.7	30.0	17.6	24.1
NPH.2250	41.6	18.8	19.3	34.0	22.0	27.1
NPH.2270	43.5	15.8	21.4	49.0	17.2	29.4
GK.204	35.1	20.9	22.7	34.0	21.4	26.8
GK.205	25.4	19.7	18.9	46.0	23.6	26.7
GK.206	39.7	14.0	16.3	50.0	25.3	29.1
VCH.110	52.5	26.3	17.5	36.0	19.3	30.3
VCH.111	29.7	15.0	19.3	36.0	18.8	23.8
VCH.112	48.8	19.6	22.8	37.0	23.1	30.3
Tulasi.4	46.1	11.9	16.1	29.0	19.8	24.6
Tulasi.117	76.2	12.6	13.9	29.0	20.4	30.4
RCH.2Bt(CC)	39.2	16.7	18.1	33.0	16.9	24.8
MECH.162Bt(CC)	35.3	10.2	13.2	43.0	20.6	24.5
NHH.44(ZC)	16.3	11.5	9.9	51.0	26.7	23.1
CD (0.05)	4.5	6.8	5.6	8.2		
CV%	7.0	23.8	15.8	14.8	7.7	

BOLL WEIGHT (g):

Many hybrids, as given below recorded 4g and above bolls weight in this zone during this season. RCH.2Bt, the check hybrid also recoded similar boll weight.

Entry	Nagpur	Akola	Nanded	Surat	Khandwa	Mean
NECH.2R	5.21	4.07	3.20	4.00	5.10	4.32
NECH.3R	4.50	3.81	2.90	3.70	3.67	3.72
Bunny VIP	5.28	3.94	3.10	4.60	3.87	4.16
2-58 VIP	5.96	4.17	3.20	4.70	4.10	4.43
2-81 VIP	4.85	4.17	3.00	3.80	3.40	3.84
VARUN	4.85	3.65	2.80	3.10	3.23	3.53
JKCH.226	4.88	3.70	3.10	3.70	3.40	3.76
JKCH.666	4.76	4.04	3.30	4.00	2.97	3.81
ACH-11-2x	4.51	3.79	2.70	3.60	3.53	3.63
ACH-33-1	4.25	3.80	3.50	3.60	4.27	3.88
ACH-155-1	5.27	3.62	3.00	4.40	4.37	4.13
RCH.512X	6.14	4.04	2.90	4.70	3.47	4.25
RCH.533X	4.79	3.82	3.30	4.40	3.93	4.05
RCH.377	4.83	4.39	3.10	4.00	4.27	4.12
MRC.6352	4.75	4.22	3.20	3.90	4.17	4.05
MRC.7226X	5.12	4.89	3.30	4.00	4.70	4.40
MRC.7347X	5.88	4.70	3.20	4.10	4.70	4.52
NCS.138	5.03	3.75	3.00	4.00	3.90	3.94
NCS.145	5.08	4.37	3.10	4.40	4.20	4.23
NCS.207	5.68	4.59	3.00	4.10	4.23	4.32
BRAHMA	4.53	4.88	3.10	3.70	4.23	4.09
KRISHNA	4.59	4.20	2.80	3.10	4.33	3.80
KIRTIMAN	5.19	4.64	3.10	4.10	3.67	4.14
KDCHH.9632	4.81	3.34	2.90	4.30	3.93	3.86
KDCHH.531X	5.29	4.01	3.00	4.00	3.53	3.97
KDCHH.441X	6.36	4.90	3.20	3.80	3.97	4.45
PRCH.101	4.59	3.68	2.80	3.60	3.90	3.71
PRCH.102	6.09	5.44	2.80	4.20	4.63	4.63
PRCH.103	4.10	3.60	3.00	4.00	3.53	3.65
NPH.2171	4.42	3.82	2.70	4.10	3.70	3.75
NPH.2250	5.45	3.75	2.80	3.60	4.03	3.93
NPH.2270	4.71	3.51	2.90	3.60	2.83	3.51
GK.204	4.33	3.61	2.80	3.70	3.80	3.65
GK.205	4.77	3.86	3.10	3.60	3.67	3.80
GK.206	5.10	3.57	3.00	3.50	3.97	3.83
VCH.110	4.01	3.31	2.90	3.80	4.07	3.62
VCH.111	5.36	3.99	3.00	3.60	3.43	3.88
VCH.112	4.91	3.79	3.00	3.40	3.67	3.75
Tulasi.4	4.75	3.60	3.10	3.80	3.80	3.81
Tulasi.117	4.28	3.92	2.30	3.30	4.50	3.66
RCH.2Bt(CC)	4.98	4.22	3.20	3.60	4.47	4.09
MECH.162Bt(CC)	4.21	3.32	2.70	3.10	3.87	3.44
NHH.44(ZC)	4.16	3.44	2.50	3.30	4.80	3.64
CD (0.05)	0.72	0.35	0.81	0.60		
CV%	8.96	5.45	10.52	10.20	7.70	

PERCENT GINNING OUTTURN:

The following bolded entries recorded Ginning out turn (%) high percentage of Ginning out turn, over 36%. This is important for this zone, where the fibre yield is to be maintained for getting good quantity of raw material.

Entry	Nagpur	Akola	Nanded	Surat	Khandwa	Mean
NECH.2R	34.6	39.4	38.0	36.4	30.3	35.7
NECH.3R	34.4	37.0	39.0	35.3	30.7	35.3
Bunny VIP	30.3	35.0	37.8/	33.4	32.7	32.8
2-58 VIP	36.9	45.7	40.0	36.8	33.8	38.6
2-81 VIP	32.9	37.8	36.8	36.2	33.4	35.4
VARUN	39.7	40.8	40.0	42.3	37.5	40.1
JKCH.226	35.6	36.4	36.9	35.8	31.0	35.1
JKCH.666	38.5	41.2	40.0	40.5	37.7	39.6
ACH-11-2x	33.8	36.5	35.8	34.6	31.8	34.5
ACH-33-1	32.7	38.9	37.2	37.0	33.5	35.9
ACH-155-1	37.6	40.1	39.0	39.6	34.2	38.1
RCH.512X	37.0	42.9	38.4	38.6	34.9	38.4
RCH.533X	36.0	36.4	39.0	34.3	33.0	35.7
RCH.377	34.5	33.1	34.6	33.0	34.6	34.0
MRC.6352	34.5	39.9	34.7	37.1	34.0	36.0
MRC.7226X	32.4	32.7	34.2	35.6	30.5	33.1
MRC.7347X	39.0	38.7	34.6	36.2	32.9	36.3
NCS.138	33.8	36.7	35.6	35.9	30.6	34.5
NCS.145	33.8	34.9	37.5	35.0	32.1	34.7
NCS.207	32.9	40.0	36.7	35.7	32.0	35.5
BRAHMA	33.7	33.7	34.0	33.9	31.6	33.4
KRISHNA	31.5	36.3	33.0	34.7	34.5	34.0
KIRTIMAN	32.2	36.7	36.8	37.0	32.8	35.1
KDCHH.9632	32.7	37.0	34.5	35.7	31.9	34.4
KDCHH.531X	29.8	32.6	31.0	33.0	34.2	32.1
KDCHH.441X	34.4	33.5	36.5	37.7	34.8	35.4
PRCH.101	31.2	32.2	37.0	32.4	33.3	33.2
PRCH.102	37.0	39.6	39.0	38.7	34.8	37.8
PRCH.103	33.0	35.3	36.4	35.0	34.3	34.8
NPH.2171	32.6	35.3	36.5	36.5	33.3	34.8
NPH.2250	37.0	39.4	39.6	37.8	38.1	38.4
NPH.2270	33.7	35.3	36.7	34.8	33.80	35.1
GK.204	34.1	36.8	37.5	37.3	31.9	35.5
GK.205	35.0	37.6	37.8	36.2	32.9	35.9
GK.206	34.0	37.0	38.0	36.3	32.5	35.6
VCH.110	32.9	38.4	37.6	35.4	33.5	35.6
VCH.111	37.2	38.9	39.7	36.4	34.4	37.3
VCH.112	34.4	38.3	37.0	36.3	34.1	36.0
Tulasi.4	35.3	36.3	37.2	36.5	33.4	35.7
Tulasi.117	34.1	36.0	36.8	37.3	33.5	35.5
RCH.2Bt(CC)	33.4	38.1	35.0	34.9	33.0	34.9
MECH.162Bt(CC)	35.2	36.2	37.4	38.0	34.6	36.3
NHH.44(ZC)	32.4	30.9	34	33.8	32.7	32.8
CD (0.05)	2.3		3.2	2.0		
CV%	4.2		13.3	3.4	1.9	

MEAN LINT INDEX (g)

The mean lint index was the highest in 2.58 VIP (6.1) and PRCH.102 (6.0), while the bolded entries recorded above 5 lint index in this zone.

Mean Lint Index (g)

Entry	Nagpur	Akola	Nanded	Surat	Mean
NECH.2R	5.31	5.15	5.51	4.94	5.2
NECH.3R	4.97	4.95	5.75	4.64	5.1
Bunny VIP	4.61	4.78	6.01	4.69	5.0
2-58 VIP	5.93	7.26	6.53	4.75	6.1
2-81 VIP	5.51	5.3	5.82	4.64	5.3
VARUN	4.61	5.46	5	5.01	5.0
JKCH.226	6.33	5.03	6.22	4.94	5.6
JKCH.666	5.59	5.1	5.19	4.75	5.2
ACH-11-2x	4.59	4.44	4.91	4.61	4.6
ACH-33-1	4.36	4.69	4.67	4.4	4.5
ACH-155-1	5.47	5.2	5.49	5.24	5.4
RCH.512X	5.44	6.21	5.23	5.65	5.6
RCH.533X	5.65	4.88	5.11	5.13	5.2
RCH.377	5.78	4.51	5.33	4.6	5.1
MRC.6352	5.09	5.02	5.26	5.34	5.2
MRC.7226X	5.57	4.86	5.18	5.16	5.2
MRC.7347X	5.31	5.04	5.04	4.53	5.0
NCS.138	4.98	5.19	5.19	4.68	5.0
NCS.145	5.55	4.51	5.88	4.42	5.1
NCS.207	5.22	5.37	5.27	4.53	5.1
BRAHMA	5.77	5.06	5.4	4.68	5.2
KRISHNA	3.41	4.11	3.94	3.61	3.8
KIRTIMAN	4.25	4.7	4.94	5.49	4.8
KDCHH.9632	4.68	4.51	4.63	5.07	4.7
KDCHH.531X	4.87	4.48	4.8	4.77	4.7
KDCHH.441X	6.74	4.79	6.32	5.56	5.9
PRCH.101	4.72	4.62	5.28	4.38	4.8
PRCH.102	6.24	6.45	5.62	5.58	6.0
PRCH.103	4.18	3.97	4.63	4.31	4.3
NPH.2171	4	4.05	4.48	4.89	4.4
NPH.2250	5.25	4.79	5.24	5.17	5.1
NPH.2270	4.4	4.12	4.81	3.83	4.3
GK.204	4.9	4.33	5.1	4.68	4.8
GK.205	4.97	5.04	5.71	4.71	5.1
GK.206	4.71	4.77	5.88	4.28	4.9
VCH.110	4.17	4.99	5.12	4.12	4.6
VCH.111	5.5	5.43	4.93	4.38	5.1
VCH.112	4.63	4.93	4.81	4.65	4.8
Tulasi.4	5.16	4.41	5.09	4.44	4.8
Tulasi.117	4.06	3.86	4.07	4.47	4.1
RCH.2Bt(CC)	5.82	5.64	4.84	5.09	5.3
MECH.162Bt(CC)	5.14	4.26	4.3	4.61	4.6
NHH.44(ZC)	4.71	3.21	4.89	4	4.2
CD (0.05)	1.01	0.469	0.728	0.7	
CV%	12.2	5.959	8.125	8.4	

MEAN SEED INDEX (g):

The following table provides the observations on mean seed index. The seed index in many entries had above seven.

Genotypes	Nagpur	Akola	Nanded	Surat	Mean
NECH.2R	10.0	7.9	9.0	8.7	8.9
NECH.3R	9.5	8.4	9.0	8.5	8.9
Bunny VIP	10.6	8.9	9.9	9.3	9.7
2-58 VIP	10.3	8.6	9.8	8.2	9.2
2-81 VIP	10.5	8.7	10.0	8.2	9.3
VARUN	7.3	7.9	7.5	6.8	7.4
JKCH.226	11.4	8.8	10.6	8.8	9.9
JKCH.666	8.0	7.3	7.8	7.0	7.5
ACH-11-2x	9.6	7.7	8.8	8.7	8.7
ACH-33-1	8.6	7.4	7.9	7.5	7.8
ACH-155-1	9.1	7.8	8.6	8.0	8.4
RCH.512X	9.3	8.3	8.4	9.0	8.7
RCH.533X	10.2	8.5	8.0	9.8	9.1
RCH.377	11.6	9.1	10.1	9.3	10.0
MRC.6352	10.0	7.6	8.7	9.0	8.8
MRC.7226X	10.2	10.0	10.0	9.3	9.9
MRC.7347X	9.4	8.0	9.5	8.0	8.7
NCS.138	9.8	9.1	9.4	8.3	9.1
NCS.145	10.9	8.4	9.8	8.8	9.5
NCS.207	10.6	8.0	9.1	8.2	9.0
BRAHMA	10.7	10.0	10.5	9.7	10.2
KRISHNA	7.7	7.2	8.0	6.8	7.4
KIRTIMAN	9.1	8.1	8.5	9.3	8.7
KDCHH.9632	9.0	7.7	8.8	9.2	8.7
KDCHH.531X	11.5	9.3	10.7	9.7	10.3
KDCHH.441X	11.4	9.5	11.0	9.2	10.3
PRCH.101	10.4	9.8	9.0	9.2	9.6
PRCH.102	10.6	9.8	8.8	8.8	9.5
PRCH.103	8.8	7.3	8.1	8.0	8.0
NPH.2171	8.6	7.4	7.8	8.5	8.1
NPH.2250	8.9	7.4	8.0	8.5	8.2
NPH.2270	8.6	7.5	8.3	7.2	7.9
GK.204	8.9	7.4	8.5	7.8	8.2
GK.205	9.5	8.4	9.4	8.3	8.9
GK.206	9.2	8.1	9.6	7.5	8.6
VCH.110	8.5	8.0	8.5	7.5	8.1
VCH.111	9.3	8.5	7.5	7.7	8.2
VCH.112	8.8	7.9	8.2	8.2	8.3
Tulasi.4	7.6	7.7	8.6	7.7	7.9
Tulasi.117	7.9	6.8	7.0	7.5	7.3
RCH.2Bt(CC)	11.6	9.2	9.0	9.5	9.8
MECH.162Bt(CC)	9.5	7.5	7.2	7.5	7.9
NHH.44(ZC)	10.1	7.2	9.5	7.8	8.7
CD (0.05)	1.41	0.38	0.659	0.96	
CV%	8.98	2.859	6.219	7.1	

SEED COTTON YIELD

Many hybrids yielded over 1600 kg/ha. GK.106 (1737.4 kg/ha), GK.107 (1708.8 kg/ha), JKCH.226 (1681.8 kg/ha), 2-58VIP (1666.8 kg/ha), RCH.377 (1670 kg/ha) were the top most entries. Many test hybrids (Varun, MRC. 6352, JKCH.666, Kirtiman, NPH.2171, NPH.2220, and Tulasi.4 & Tulasi.117) yielded lower than the check hybrids.

Seed Cotton Yield (Kg/ha) under Protected condition

Entry	Nagpur	Akola	Nanded	Surat	Khandwa	Mean
NECH.2R	1419	1396	1574	2807	1049	1649
NECH.3R	1829	1305	1267	2442	1342	1637
Bunny VIP	2019	952	1088	4031	1336	1885
2-58 VIP	1992	954	1163	3066	1087	1652
2-81 VIP	1949	1066	1204	2942	1290	1690
VARUN	1534	983	943	3278	717	1491
JKCH.226	2386	1158	1435	4088	1323	2078
JKCH.666	1512	1046	885	3350	953	1549
ACH-11-2x	2074	1258	1042	3438	1010	1764
ACH-33-1	1867	1341	1215	3335	1566	1865
ACH-155-1	2327	862	1152	2942	1418	1740
RCH.512X	1611	1269	1175	3442	1232	1746
RCH.533X	2055	1198	1383	4196	1025	1971
RCH.377	2276	1169	1574	3922	1633	2115
MRC.6352	1366	728	1140	2650	1084	1394
MRC.7226X	1776	1489	1435	3603	1397	1940
MRC.7347X	1967	1044	1192	3558	1134	1779
NCS.138	1765	1150	880	2990	1036	1564
NCS.145	1947	1223	1140	3144	1479	1787
NCS.207	1671	1015	1076	3695	1357	1763
BRAHMA	1578	1279	1105	3282	928	1634
KRISHNA	1658	809	1215	4185	1450	1863
KIRTIMAN	1164	934	1180	3158	1004	1488
KDCHH.9632	1685	1067	1209	3393	985	1668
KDCHH.531X	2248	1207	1539	3247	1084	1865
KDCHH.441X	1861	947	1453	3362	1366	1798
PRCH.101	2084	1258	1140	4132	1568	2036
PRCH.102	1895	1461	1076	3996	983	1882
PRCH.103	1403	1323	1100	4117	1448	1878
NPH.2171	1543	830	1285	3691	1239	1718
NPH.2250	1735	1091	1059	3416	1109	1682
NPH.2270	1696	708	1308	2323	944	1396
GK.204	1832	1013	1360	3239	919	1673
GK.205	1962	1243	1331	3862	1539	1987
GK.206	1806	1141	1372	2986	1467	1754
VCH.110	1689	1175	1476	2874	1242	1691
VCH.111	1819	1123	1163	3156	1175	1687
VCH.112	2305	1081	1192	3516	1288	1876
Tulasi.4	1612	955	1175	3658	1206	1721
Tulasi.117	1892	815	770	2484	924	1377
RCH.2Bt(CC)	2002	1038	1539	3560	924	1813
MECH.162Bt(CC)	1931	1149	833	3724	1389	1805
NHH.44(ZC)	1707	387	573	3321	1449	1487
CD (0.05)	502	137	299	766	139	
CV%	17	8	13	14.13	7.1	

Fibre property data

2.5% Span length(mm)

Many of the entries recorded average fibre length of 30 mm and above in this zone. The following table provides a glimpse of the variation in fibre length amongst test entries.

Genotypes	Nagpur	Akola	Nanded	Surat	Khandwa	mean
NECH.2R	29.1	30.5	27.8	31.7	32.5	30.32
NECH.3R	30.4	30.1	28.2	28.9	30.7	29.66
Bunny VIP	30.2	30.3	27.9	30.9	32.4	30.34
2-58 VIP	29.0	28.8	27.4	29.1	29.3	28.72
2-81 VIP	28.9	28.6	27.7	30.0	29.5	28.94
VARUN	28.8	28.5	24.5	28.4	31.9	28.42
JKCH.226	26.4	26.5	24.8	26.0	27.9	26.32
JKCH.666	29.9	28.7	26.0	27.3	28.2	28.02
ACH-11-2x	27.0	27.1	24.2	27.7	26.9	26.58
ACH-33-1	28.9	28.1	25.4	27.9	28.9	27.84
ACH-155-1	25.6	26.8	24.4	27.0	28.3	26.42
RCH.512X	27.2	26.7	23.7	27.4	26.6	26.32
RCH.533X	30.0	29.0	27.2	29.4	29.8	29.08
RCH.377	30.5	30.0	28.9	30.3	30.9	30.12
MRC.6352	24.0	24.7	25.0	25.6	-	24.83
MRC.7226X	29.2	28.4	26.8	30.1	31.9	29.28
MRC.7347X	28.2	28.4	27.3	28.0	28.5	28.08
NCS.138	27.1	27.5	26.1	28.1	29.2	27.6
NCS.145	31.9	31.8	30.1	33.4	29.4	31.32
NCS.207	29.9	29.8	27.6	31.3	31.7	30.06
BRAHMA	31.0	31.1	28.6	32.1	27.8	30.12
KRISHNA	26.5	25.9	25.6	26.2	31.2	27.08
KIRTIMAN	26.3	27.4	26.8	27.5	28.2	27.24
KDCHH.9632	27.8	27.6	25.4	26.7	27.8	27.06
KDCHH.531X	28.4	27.8	25.6	28.9	27.6	27.66
KDCHH.441X	26.9	27.1	25.1	26.7	25.6	26.28
PRCH.101	31.0	32.0	27.9	32.4	31.1	30.88
PRCH.102	29.7	29.3	26.7	31.0	25.8	28.5
PRCH.103	28.0	27.5	24.8	28.9	29.2	27.68
NPH.2171	27.1	28.1	25.7	29.5	26.9	27.46
NPH.2250	27.1	27.2	25.5	27.6	27.9	27.06
NPH.2270	26.0	26.8	25.7	27.0	27.3	26.56
GK.204	26.5	26.9	25.8	26.4	27.6	26.64
GK.205	28.1	27.8	26.0	28.2	28.2	27.66
GK.206	28.3	28.4	26.2	28.8	30.1	28.36
VCH.110	28.0	28.0	25.6	26.8	28.6	27.4
VCH.111	29.6	29.6	26.7	28.1	31.2	29.04
VCH.112	26.7	26.8	25.3	26.8	29.1	26.94
Tulasi.4	26.4	27.1	26.3	27.5	28.5	27.16
Tulasi.117	26.2	27.2	24.8	28.2	32.3	27.74
RCH.2Bt(CC)	31.8	31.6	27.6	31.2	26.4	29.72
MECH.162Bt(CC)	25.0	25.4	23.6	25.4	25.6	25.00
NHH.44(ZC)	23.4	25.7	24.7	27.1	27.4	25.66

Tenacity (g/tex)

The tenacity of the fibre ranged from 19 to 22 g/tex in various entries in this zone. It is important to note that the improvement of fibre quality was evident in these test hybrids.

Genotypes	Nagpur	Akola	Nanded	Surat	Khandwa	Mean
NECH.2R	22.3	22.6	21.7	20.3	21.9	21.8
NECH.3R	20.9	20.7	20.8	19.4	21.2	20.6
Bunny VIP	22.9	23.2	22.9	21.8	23.6	22.9
2-58 VIP	21.4	21.9	21.2	19.4	21.2	21.0
2-81 VIP	23.8	23.1	21.4	21.8	23.4	22.7
VARUN	20.2	20.6	19.1	19.8	19.9	19.9
JKCH.226	22.0	22.1	19.9	19.2	23.1	21.3
JKCH.666	23.6	22.6	19.9	19.1	23.1	21.7
ACH-11-2x	21.0	21.1	19.8	20.0	23.9	21.2
ACH-33-1	21.1	21.4	19.2	22.5	24.3	21.7
ACH-155-1	21.7	22.5	19.3	18.3	22.1	20.8
RCH.512X	21.0	21.3	20.2	20.2	22.9	21.1
RCH.533X	21.3	20.8	20.7	19.0	21.1	20.6
RCH.377	22.7	22.0	21.8	20.2	24.0	22.1
MRC.6352	22.6	21.4	21.3	20.6	-	21.5
MRC.7226X	21.8	21.0	21.3	20.3	22.4	21.4
MRC.7347X	21.7	21.8	21.3	20.8	22.8	21.7
NCS.138	21.5	21.3	20.7	20.6	20.8	21.0
NCS.145	21.3	22.1	22.6	20.4	22.3	21.7
NCS.207	22.7	22.8	21.5	20.8	20.1	21.6
BRAHMA	23.2	22.1	20.8	19.5	20.5	21.2
KRISHNA	23.0	22.5	20.7	22.1	24.1	22.5
KIRTIMAN	23.2	23.1	20.2	21.2	23.0	22.1
KDCHH.9632	22.9	22.0	19.8	22.1	22.7	21.9
KDCHH.531X	21.4	21.7	19.9	21.4	20.4	21.0
KDCHH.441X	22.8	21.8	19.1	20.6	22.4	21.3
PRCH.101	22.6	23.4	21.0	23.6	21.4	22.4
PRCH.102	22.2	22.3	20.9	23.3	22.3	22.2
PRCH.103	22.4	22.6	20.3	22.1	22.0	21.9
NPH.2171	24.2	24.0	20.4	22.1	22.3	22.6
NPH.2250	24.0	22.9	20.1	21.0	20.3	21.7
NPH.2270	20.8	21.3	19.8	20.0	21.7	20.7
GK.204	21.7	21.1	19.7	20.4	22.0	21.0
GK.205	21.6	21.3	19.6	20.4	19.1	20.4
GK.206	26.5	24.2	21.3	23.1	19.8	23.0
VCH.110	21.2	21.0	18.6	17.6	22.0	20.1
VCH.111	23.2	22.0	21.4	20.0	19.8	21.3
VCH.112	22.7	22.5	19.6	20.8	22.0	21.5
Tulasi.4	21.0	20.5	20.2	21.2	20.1	20.6
Tulasi.117	20.5	21.6	18.8	18.8	19.7	20.0
RCH.2Bt(CC)	21.6	21.2	19.5	19.5	21.6	20.7
MECH.162Bt(CC)	20.6	20.6	18.5	19.2	18.9	19.6
NHH.44(ZC)	19.2	20.3	18.1	19.3	17.0	18.8

Micronaire

Micronaire values were quite appreciable in many entries and matched with their length and strength of fibre so as to be spun at 50s and 60s counts.

Genotypes	Nagpur	Akola	Nanded	Surat	Khandwa	mean
NECH.2R	3.4	3.5	4.0	4.3	4.1	3.7
NECH.3R	3.4	3.3	3.7	4.6	3.7	3.7
Bunny VIP	3.2	3.0	3.8	4.7	4.0	3.7
2-58 VIP	3.1	3.3	4.3	4.8	3.7	3.8
2-81 VIP	3.4	3.4	4.2	4.9	4.2	4.0
VARUN	4.1	3.9	4.2	5.2	4.9	4.5
JKCH.226	4.0	3.9	5.1	5.1	4.8	4.6
JKCH.666	3.6	3.4	3.7	4.7	4.0	3.9
ACH-11-2x	3.5	3.4	4.1	5.0	3.1	3.8
ACH-33-1	3.1	3.2	4.1	4.9	3.8	3.8
ACH-155-1	3.5	3.4	4.0	4.4	4.0	3.9
RCH.512X	3.9	4.0	4.3	5.4	4.5	4.4
RCH.533X	3.0	3.2	4.0	5.1	4.0	3.9
RCH.377	3.5	3.5	4.4	4.8	4.1	4.1
MRC.6352	2.7	3.1	4.8	5.5	-	4.0
MRC.7226X	3.8	3.9	4.7	4.3	4.5	4.2
MRC.7347X	3.3	3.2	4.3	4.7	3.4	3.8
NCS.138	3.5	3.4	4.2	5.0	4.1	4.0
NCS.145	4.0	3.6	4.0	4.9	3.7	4.0
NCS.207	3.9	3.6	3.8	4.6	4.4	4.1
BRAHMA	3.3	3.2	3.7	4.4	4.5	3.8
KRISHNA	3.1	3.0	4.4	4.9	3.3	3.7
KIRTIMAN	3.2	3.1	4.3	5.4	4.8	4.2
KDCHH.9632	3.2	3.4	4.0	4.8	3.5	3.8
KDCHH.531X	3.6	3.4	4.2	4.7	3.8	3.9
KDCHH.441X	3.9	3.5	4.7	4.4	4.0	4.1
PRCH.101	3.3	3.1	3.5	4.5	4.0	3.7
PRCH.102	4.5	3.8	4.5	5.2	3.5	4.3
PRCH.103	3.1	3.0	3.4	4.3	4.5	3.7
NPH.2171	2.9	2.8	4.5	4.3	3.6	3.6
NPH.2250	3.4	3.6	4.4	4.6	3.2	3.8
NPH.2270	2.7	2.8	4.0	4.5	4.7	3.7
GK.204	3.1	3.2	3.8	4.2	4.0	3.7
GK.205	3.4	3.2	4.2	4.7	3.2	3.7
GK.206	2.9	3.2	4.3	4.6	3.7	3.7
VCH.110	3.3	3.3	4.0	5.1	4.0	3.9
VCH.111	3.8	3.6	3.7	5.0	4.0	4.0
VCH.112	3.9	3.8	4.6	5.3	3.9	4.3
Tulasi.4	3.5	3.1	4.2	3.7	3.8	3.7
Tulasi.117	2.7	2.9	3.8	5.0	4.2	3.7
RCH.2Bt(CC)	3.1	3.1	3.6	4.3	3.6	3.5
MECH.162Bt(CC)	3.5	3.4	4.2	5.0	4.3	4.1
NHH.44(ZC)	3.9	3.9	3.7	4.6	4.6	4.1

CONSOLIDATED FIBRE PROPERTY FOR CENTRAL ZONE

The zone's average fibre property data of various parameters are given below. The fibre property values indicated that most of the entries did not satisfy CIRCOT and SITRA (South India Textile Research Association – Textile Ministry) norms. The fibre strength values did not match with the span length data in all the test hybrids.

CONSOLIDATED FIBRE PROPERTY FOR CENTRAL ZONE

Genotypes	Length (mm)	Tensile Strength (g/tex)	micronaire
NECH.2R	30.3	21.8	3.9
NECH.3R	29.7	20.6	3.7
Bunny VIP	30.3	22.9	3.7
2-58 VIP	28.7	21.0	3.8
2-81 VIP	28.9	22.7	4.0
VARUN	28.4	19.9	4.5
JKCH.226	26.3	21.3	4.6
JKCH.666	28.0	21.7	3.9
ACH-11-2x	26.6	21.2	3.8
ACH-33-1	27.8	21.7	3.8
ACH-155-1	26.4	20.8	3.9
RCH.512X	26.3	21.1	4.4
RCH.533X	29.1	20.6	3.9
RCH.377	30.1	22.1	4.1
MRC.6352	24.8	21.5	4.0
MRC.7226X	29.3	21.4	4.2
MRC.7347X	28.1	21.7	3.8
NCS.138	27.6	21.0	4.0
NCS.145	31.3	21.7	4.0
NCS.207	30.1	21.6	4.1
BRAHMA	30.1	21.2	3.8
KRISHNA	27.1	22.5	3.7
KIRTIMAN	27.2	22.1	4.2
KDCHH.9632	27.1	21.9	3.8
KDCHH.531X	27.7	21.0	3.9
KDCHH.441X	26.3	21.3	4.1
PRCH.101	30.9	22.4	3.7
PRCH.102	28.5	22.2	4.3
PRCH.103	27.7	21.9	3.7
NPH.2171	27.5	22.6	3.6
NPH.2250	27.1	21.7	3.8
NPH.2270	26.6	20.7	3.7
GK.204	26.6	21.0	3.7
GK.205	27.7	20.4	3.7
GK.206	28.4	23.0	3.7
VCH.110	27.4	20.1	3.9
VCH.111	29.0	21.3	4.0
VCH.112	26.9	21.5	4.3
Tulasi.4	27.2	20.6	3.7
Tulasi.117	27.7	19.9	3.7
RCH.2Bt(CC)	29.7	20.7	3.5
MECH.162Bt(CC)	25.0	19.6	4.1
NHH.44(ZC)	25.7	18.8	4.1

PLANT PROTECTION EVALUATION

The FIVE AICCIP CENTRES in central zone were directed to evaluate the performance of the eight Bt hybrid entries for reaction to all the prevailing pests and diseases along with their non-Bt counterparts as well as with their Bt check and local check variety. Data were recorded on the incidence and damage due to various pests and diseases prevalent during the season in these five AICCIP centers.

Under protected and un-protected conditions, the performance of test hybrids against prominent pests such as leaf hoppers (jassids), whitefly amongst sap sucking insects and all the bollworm species in addition to other minor pests such a leaf feeding caterpillars was evaluated. Amongst diseases, the presence of Bacterial blight, Grey mildew and Parawilt were given paramount attention in this zone.

Entomology Evaluation

The Entomology evaluation was targeted primarily to test the action of Cry IA (c) gene in forty Bt trial hybrids against the following bollworms.

SPOTTED BOLLWORM- *Earias vittella* Fabricius

SPINY BOLLWORM – *Earias insulana* Boisdual

AMERICAN BOLLWORM – *Heicoverpa armigera* Hubner

PINK BOLLWORM – *Pectinophora gossypiella* (Saunders)

This was undertaken in sprayed plots of Breeding evaluation and unsprayed plots of Plant Protection evaluation in all the five locations of central zone. The insecticides sprayings were decided based on the threshold levels of sap sucking pest species and bollworms that invaded the various test hybrids. The sprayings were undertaken in both the plots of the two replications, once it is made sure that one of the plots in a replication has crossed the threshold level of bollworm infestation in respect of the candidate hybrid. The incidence of American bollworm was low to moderate in the AICCIP centres of this zone during the entire 2004 *kharif* season.

PLANT PROTECTION EVALUATION – protected conditions
(Details of plant protection against insect pests in breeding trials)

Sap sucking pests

The maximum aphid population, observed in the early phase of the crop was quite high in some hybrids, as seen from the following table, requiring plant protection measures.

Aphid (average of 3 leaves/plant)

Entry	Nagpur	Akola	Nanded	Surat	Mean
NECH.2R	0.9	7.2	24.6	4.0	9.2
NECH.3R	1.3	7.5	23.1	2.8	8.7
Bunny VIP	0.7	10.5	29.2	2.1	10.6
2-58 VIP	1.2	12.4	21.0	8.6	10.8
2-81 VIP	0.7	11.9	18.5	1.6	8.2
VARUN	2.1	17.0	26.6	5.9	12.9
JKCH.226	1.8	8.5	18.9	6.7	9.0
JKCH.666	2.1	9.5	22.3	2.3	9.1
ACH-11-2x	1.2	11.7	25.2	4.0	10.5
ACH-33-1	1.0	10.7	19.7	4.2	8.9
ACH-155-1	1.2	9.3	23.6	3.5	9.4
RCH.512X	1.2	8.8	19.8	10.7	10.1
RCH.533X	1.2	10.6	6.9	1.7	5.1
RCH.377	0.9	6.9	15.9	3.1	6.7
MRC.6352	1.6	16.3	20.5	1.9	10.1
MRC.7226X	1.2	13.8	11.7	9.9	9.1
MRC.7347X	1.3	12.4	15.6	4.9	8.5
NCS.138	1.0	12.4	31.1	11.2	13.9
NCS.145	1.2	10.1	27.5	15.7	13.6
NCS.207	1.8	9.4	16.3	12.6	10.0
BRAHMA	1.0	12.0	21.0	2.9	9.2
KRISHNA	1.2	16.4	19.5	1.9	9.7
KIRTIMAN	1.4	8.1	13.9	2.1	6.4
KDCHH.9632	1.3	13.8	25.2	4.7	11.3
KDCHH.531X	0.8	15.1	9.0	7.4	8.1
KDCHH.441X	1.4	17.0	5.7	5.4	7.4
PRCH.101	1.7	11.6	16.2	7.0	9.1
PRCH.102	0.9	12.1	14.0	7.2	8.6
PRCH.103	1.0	11.5	19.4	8.3	10.1
NPH.2171	1.6	12.3	22.1	4.8	10.2
NPH.2250	2.0	18.5	24.8	6.3	12.9
NPH.2270	1.9	15.2	23.4	10.5	12.8
GK.204	1.2	11.5	16.8	3.3	8.2
GK.205	0.8	10.2	15.4	1.1	6.9
GK.206	1.1	17.7	23.4	2.1	11.1
VCH.110	1.5	10.7	25.5	7.5	11.3
VCH.111	1.4	10.6	20.2	6.3	9.6
VCH.112	1.1	12.1	22.1	8.5	10.9
Tulasi.4	1.5	9.9	26.9	11.8	12.5
Tulasi.117	1.3	7.1	15.7	3.6	7.0
RCH.2Bt(CC)	1.2	14.1	13.7	12.3	10.3
MECH.162Bt(CC)	1.2	15.5	37.8	8.7	15.8
NHH.44(ZC)	1.2	12.4	21.0	6.9	10.4

The maximum jassid population was above threshold limits, as can be seen from the following table. The data shows that at Akola and Nanded, the population was uniformly high in all the genotypes.

Jassids (average of 3 leaves/plant)

Entry	Nagpur	Akola	Nanded	Surat	Mean
NECH.2R	0.9	2.1	2.6	0.8	1.6
NECH.3R	1.3	1.9	2.0	1.7	1.7
Bunny VIP	0.7	2.9	1.7	0.8	1.5
2-58 VIP	1.2	3.0	1.8	0.7	1.7
2-81 VIP	0.7	2.8	2.2	0.5	1.5
VARUN	2.1	6.5	2.2	0.7	2.9
JKCH.226	1.8	3.5	2.1	1.1	2.1
JKCH.666	2.1	3.3	2.0	0.7	2.0
ACH-11-2x	1.2	2.2	1.9	1.0	1.6
ACH-33-1	1.0	2.9	1.8	0.9	1.6
ACH-155-1	1.2	2.1	2.1	2.9	2.1
RCH.512X	1.2	2.5	1.5	1.1	1.6
RCH.533X	1.2	3.2	2.7	3.4	2.6
RCH.377	0.9	2.0	2.3	1.2	1.6
MRC.6352	1.6	2.5	3.3	1.1	2.1
MRC.7226X	1.2	2.0	2.5	1.6	1.8
MRC.7347X	1.3	2.0	1.8	1.2	1.6
NCS.138	1.0	2.6	1.6	0.6	1.5
NCS.145	1.2	2.3	1.9	1.2	1.6
NCS.207	1.8	2.6	2.3	1.2	2.0
BRAHMA	1.0	2.5	2.0	1.1	1.6
KRISHNA	1.2	1.9	2.5	1.6	1.8
KIRTIMAN	1.4	2.6	3.4	0.6	2.0
KDCHH.9632	1.3	2.5	2.0	0.6	1.6
KDCHH.531X	0.8	2.1	2.1	1.4	1.6
KDCHH.441X	1.4	2.2	2.8	0.9	1.8
PRCH.101	1.7	2.7	2.3	2.1	2.2
PRCH.102	0.9	3.2	1.8	2.3	2.1
PRCH.103	1.0	2.3	3.0	1.3	1.9
NPH.2171	1.6	2.5	2.4	1.4	2.0
NPH.2250	2.0	3.1	1.9	1.1	2.0
NPH.2270	1.9	3.2	2.7	1.0	2.2
GK.204	1.2	2.8	2.2	1.3	1.9
GK.205	0.8	2.1	1.9	1.7	1.6
GK.206	1.1	2.2	1.7	1.1	1.5
VCH.110	1.5	2.4	3.4	1.4	2.2
VCH.111	1.4	3.1	2.7	1.2	2.1
VCH.112	1.1	2.1	3.1	2.4	2.2
Tulasi.4	1.5	3.1	1.8	2.0	2.1
Tulasi.117	1.3	3.0	2.1	1.2	1.9
RCH.2Bt(CC)	1.2	4.1	2.3	1.6	2.3
MECH.162Bt(CC)	1.2	2.9	3.1	2.6	2.5
NHH.44(ZC)	1.2	2.9	4.3	1.8	2.5
CD (0.05)			0.18	0.2	
CV%			5.81	9.5	

The maximum population of thrips was recorded in all entries and presented in the following table. The mean values of the zone indicate high susceptibility to the early season pest.

Thrips (mean on three leaves/plant)

Entry	Nagpur	Akola	Nanded	Surat	Mean
NECH.2R	4.5	17.6	39.7	9.3	17.8
NECH.3R	4.3	17.8	35.2	5.4	15.7
Bunny VIP	4.6	17.8	35.1	7.5	16.3
2-58 VIP	6.0	23.2	29.5	9.1	16.9
2-81 VIP	5.1	22.2	39.2	5.5	18.0
VARUN	4.0	17.8	31.7	9.4	15.7
JKCH.226	4.2	15.6	31.7	5.2	14.2
JKCH.666	4.7	19.8	34.5	4.3	15.8
ACH-11-2x	4.7	20.9	33.8	6.2	16.4
ACH-33-1	6.4	25.2	30.7	7.0	17.3
ACH-155-1	5.1	21.2	38.5	2.6	16.9
RCH.512X	6.5	19.5	30.5	4.5	15.2
RCH.533X	4.0	14.8	34.4	5.7	14.7
RCH.377	6.2	23.5	38.9	6.3	18.7
MRC.6352	6.6	19.7	40.0	6.7	18.2
MRC.7226X	4.2	19.8	37.4	5.4	16.7
MRC.7347X	6.1	26.5	32.7	6.0	17.8
NCS.138	4.7	20.6	34.0	5.3	16.2
NCS.145	4.6	18.9	33.3	3.1	15.0
NCS.207	3.9	17.2	32.8	2.8	14.2
BRAHMA	4.6	23.2	30.3	5.6	15.9
KRISHNA	4.7	19.9	31.2	5.2	15.3
KIRTIMAN	5.5	19.0	31.3	4.6	15.1
KDCHH.9632	4.9	18.7	36.1	6.6	16.6
KDCHH.531X	4.6	19.0	39.3	4.4	16.8
KDCHH.441X	3.9	17.4	27.6	5.4	13.6
PRCH.101	6.5	25.2	34.4	3.8	17.5
PRCH.102	3.6	18.2	36.5	6.5	16.2
PRCH.103	6.2	25.6	34.2	5.5	17.9
NPH.2171	6.1	21.3	39.8	6.1	18.3
NPH.2250	4.8	18.9	32.1	5.9	15.4
NPH.2270	4.2	19.2	38.4	7.1	17.2
GK.204	3.8	19.3	31.1	6.3	15.1
GK.205	5.3	20.8	39.1	5.9	17.8
GK.206	4.8	21.6	31.6	5.4	15.9
VCH.110	5.9	22.6	34.6	8.3	17.8
VCH.111	4.0	22.1	32.4	4.2	15.7
VCH.112	6.8	21.5	35.2	3.2	16.7
Tulasi.4	5.0	18.8	31.5	2.9	14.5
Tulasi.117	4.8	16.9	37.4	6.3	16.3
RCH.2Bt(CC)	4.3	17.7	33.8	3.7	14.9
MECH.162Bt(CC)	4.6	18.1	29.6	5.3	14.4
NHH.44(ZC)	6.9	16.7	33.5	6.8	16.0

The maximum whitefly population was recorded in these forty hybrids and is presented in the following table. The mean values of the zone indicate the high population in these entries. Nanded centre recorded maximum whitefly population during this season.

Whitefly (mean on three leaves/plant)

Entry	Nagpur	Akola	Nanded	Surat	Mean
NECH.2R	2.5	1.2	42.5	0.9	11.8
NECH.3R	2.5	2.1	41.0	1.2	11.7
Bunny VIP	3.3	1.6	32.4	1.1	9.6
2-58 VIP	2.5	2.7	32.0	0.8	9.5
2-81 VIP	2.5	2.3	35.4	2.0	10.6
VARUN	3.5	1.8	32.3	1.1	9.7
JKCH.226	4.5	1.9	39.1	0.5	11.5
JKCH.666	2.7	2.0	31.6	0.6	9.2
ACH-11-2x	3.2	2.2	34.4	0.7	10.1
ACH-33-1	2.5	2.1	34.5	0.9	10.0
ACH-155-1	3.3	2.2	29.5	0.6	8.9
RCH.512X	3.5	1.7	27.0	0.8	8.3
RCH.533X	3.6	1.3	34.0	1.2	10.0
RCH.377	2.3	2.4	31.3	0.8	9.2
MRC.6352	4.2	1.9	36.6	0.6	10.8
MRC.7226X	4.0	2.9	37.0	0.8	11.2
MRC.7347X	2.4	1.8	30.3	1.1	8.9
NCS.138	2.1	1.9	42.4	0.7	11.8
NCS.145	2.4	1.6	29.5	0.6	8.5
NCS.207	3.0	2.1	33.9	1.2	10.1
BRAHMA	3.0	2.2	30.3	0.9	9.1
KRISHNA	3.6	2.4	34.5	0.9	10.4
KIRTIMAN	3.7	2.0	32.4	1.0	9.8
KDCHH.9632	3.1	1.6	34.5	0.7	10.0
KDCHH.531X	3.8	2.4	28.1	0.5	8.7
KDCHH.441X	3.8	2.0	31.7	0.6	9.5
PRCH.101	3.7	2.6	34.2	0.9	10.3
PRCH.102	2.0	1.7	28.6	1.3	8.4
PRCH.103	2.6	2.2	39.4	0.6	11.2
NPH.2171	3.5	2.1	38.3	0.5	11.1
NPH.2250	2.3	2.1	37.2	0.9	10.6
NPH.2270	2.8	2.1	30.3	0.9	9.1
GK.204	1.5	2.2	43.9	0.9	12.1
GK.205	2.5	2.0	29.2	0.6	8.6
GK.206	3.7	2.2	34.3	0.4	10.2
VCH.110	2.3	2.2	30.3	0.8	8.9
VCH.111	2.3	2.3	32.1	0.9	9.4
VCH.112	3.0	2.0	34.8	0.6	10.1
Tulasi.4	3.1	1.7	32.4	0.5	9.4
Tulasi.117	3.4	1.9	29.5	0.9	8.9
RCH.2Bt(CC)	2.4	1.6	35.6	0.5	10.0
MECH.162Bt(CC)	2.8	1.6	33.8	0.5	9.7
NHH.44(ZC)	2.2	1.6	32.8	0.6	9.3

Spotted bollworms

The Spotted bollworms did not appear in all the centres. In Nanded and Surat, this pest was noticed in the experimental plots, as seen in the following table. NHH.44, the check hybrid harboured the maximum population in the zone. The Bt hybrids had the juveniles of this pest below the threshold level.

Spotted bollworms

Entry	Nanded	Surat	Mean
NECH.2R	0.5	0.6	0.4
NECH.3R	0.5	0.5	0.3
Bunny VIP	0.0	0.1	0.0
2-58 VIP	0.5	0.1	0.2
2-81 VIP	0.0	0.1	0.0
VARUN	1.0	0.1	0.4
JKCH.226	0.0	1.0	0.3
JKCH.666	0.0	0.9	0.3
ACH-11-2x	0.0	0.1	0.0
ACH-33-1	0.0	0.1	0.0
ACH-155-1	0.0	0.1	0.0
RCH.512X	1.0	0.1	0.4
RCH.533X	0.5	0.1	0.2
RCH.377	0.5	0.2	0.3
MRC.6352	0.0	0.9	0.3
MRC.7226X	1.0	0.1	0.4
MRC.7347X	0.0	0.1	0.0
NCS.138	1.0	0.1	0.4
NCS.145	0.5	0.1	0.2
NCS.207	0.0	0.1	0.0
BRAHMA	0.0	0.1	0.0
KRISHNA	0.5	0.2	0.2
KIRTIMAN	0.0	0.2	0.1
KDCHH.9632	0.5	1.0	0.5
KDCHH.531X	0.0	0.1	0.0
KDCHH.441X	0.5	0.1	0.2
PRCH.101	0.0	0.1	0.0
PRCH.102	0.0	0.1	0.0
PRCH.103	1.0	0.1	0.4
NPH.2171	0.0	0.3	0.1
NPH.2250	0.0	0.2	0.1
NPH.2270	0.5	0.2	0.2
GK.204	0.0	1.1	0.4
GK.205	1.0	1.0	0.7
GK.206	0.5	0.2	0.2
VCH.110	0.5	0.1	0.2
VCH.111	0.5	0.3	0.3
VCH.112	0.0	0.1	0.0
Tulasi.4	0.5	0.1	0.2
Tulasi.117	0.0	2.5	0.8
RCH.2Bt(CC)	0.5	0.2	0.2
MECH.162Bt(CC)	1.0	0.1	0.4
NHH.44(ZC)	3.5	0.3	1.3

American Bollworms

This pest was recorded at very low level in this zone during 2004-05 season. The Bt test hybrids did not have this caterpillar above threshold limits. However, the Bt check hybrid, MECH.162Bt and NHH.44 were seen to have more than the threshold level. The data provided herein shows the maximum incidence during this crop season, after looking into the weekly data of observations.

American Bollworms

Entry	Nagpur	Nanded	Surat	Mean
NECH.2R	0.39	1.00	0.18	0.52
NECH.3R	0.22	0.50	0.00	0.24
Bunny VIP	0.44	1.00	0.00	0.48
2-58 VIP	0.50	0.50	0.00	0.33
2-81 VIP	0.56	0.00	0.00	0.19
VARUN	0.11	0.00	0.18	0.10
JKCH.226	0.61	0.50	0.80	0.64
JKCH.666	0.28	0.00	0.46	0.25
ACH-11-2x	0.06	0.50	0.06	0.21
ACH-33-1	0.44	0.00	0.00	0.15
ACH-155-1	0.33	0.00	0.00	0.11
RCH.512X	0.00	0.00	0.00	0.00
RCH.533X	0.06	0.00	0.00	0.02
RCH.377	0.22	0.50	0.12	0.28
MRC.6352	0.14	0.00	0.58	0.24
MRC.7226X	0.00	0.00	0.00	0.00
MRC.7347X	0.33	0.50	0.00	0.28
NCS.138	0.28	0.00	0.06	0.11
NCS.145	0.56	1.00	0.00	0.52
NCS.207	0.44	0.00	0.00	0.15
BRAHMA	0.00	0.00	0.00	0.00
KRISHNA	0.17	0.50	0.00	0.22
KIRTIMAN	0.11	1.00	0.06	0.39
KDCHH.9632	0.28	0.00	0.58	0.29
KDCHH.531X	0.00	0.00	0.00	0.00
KDCHH.441X	0.00	0.50	0.06	0.19
PRCH.101	0.22	0.00	0.06	0.09
PRCH.102	0.11	0.50	0.00	0.20
PRCH.103	0.17	0.00	0.00	0.06
NPH.2171	0.11	0.00	0.00	0.04
NPH.2250	0.22	0.00	0.12	0.11
NPH.2270	0.17	0.50	0.00	0.22
GK.204	0.17	0.00	0.58	0.25
GK.205	0.17	0.00	0.94	0.37
GK.206	0.17	0.50	0.00	0.22
VCH.110	0.06	0.00	0.00	0.02
VCH.111	0.11	0.00	0.73	0.28
VCH.112	0.06	0.50	0.00	0.19
Tulasi.4	0.44	0.00	0.00	0.15
Tulasi.117	0.06	0.00	2.25	0.77
RCH.2Bt(CC)	0.00	0.50	0.00	0.17
MECH.162Bt(CC)	0.50	4.50	0.06	1.69
NHH.44(ZC)	0.44	8.00	0.06	2.83
CD (0.05)		0.48		
CV%		27.03		

American bollworms square damage

The percent damage due to American bollworm was assessed in this zone on the test hybrids and are presented in the following table. Negligible damage was seen in all the Bt hybrids. The check hybrids also did not show any appreciable damage, showing thereby that the pest pressure was low during this season.

American bollworms square damage

Entry	Nanded		Surat		Mean %
	TV*	%	TV	%	
NECH.2R	TV*	%	TV	%	Mean %
NECH.3R	1.6	1.3	2.4	0.2	0.7
Bunny VIP	0.0	0.0	0.4	0.0	0.0
2-58 VIP	3.7	0.9	2.8	0.2	0.6
2-81 VIP	0.0	0.0	2.9	0.3	0.1
VARUN	0.0	0.0	8.9	2.4	1.2
JKCH.226	0.0	0.0	1.6	0.1	0.0
JKCH.666	3.1	0.6	5.4	0.9	0.7
ACH-11-2x	0.0	0.0	4.3	0.6	0.3
ACH-33-1	0.0	0.0	2.6	0.2	0.1
ACH-155-1	2.7	0.5	0.4	0.0	0.3
RCH.512X	6.3	1.2	2.9	0.3	0.7
RCH.533X	5.2	1.6	1.4	0.1	0.8
RCH.377	0.0	0.0	2.9	0.3	0.1
MRC.6352	3.3	0.7	4.6	0.7	0.7
MRC.7226X	3.4	0.7	4.0	0.5	0.6
MRC.7347X	4.9	1.5	7.8	1.8	1.7
NCS.138	4.8	1.4	2.6	0.2	0.8
NCS.145	0.0	0.0	1.6	0.1	0.0
NCS.207	0.0	0.0	4.0	0.5	0.2
BRAHMA	0.0	0.0	0.4	0.0	0.0
KRISHNA	0.0	0.0	0.4	0.0	0.0
KIRTIMAN	0.0	0.0	3.6	0.4	0.2
KDCHH.9632	0.0	0.0	0.4	0.0	0.0
KDCHH.531X	0.0	0.0	2.8	0.2	0.1
KDCHH.441X	6.3	2.4	1.1	0.0	1.2
PRCH.101	6.1	2.3	0.4	0.0	1.2
PRCH.102	6.0	2.2	6.5	1.3	1.7
PRCH.103	6.3	2.4	0.4	0.0	1.2
NPH.2171	5.8	2.0	0.4	0.0	1.0
NPH.2250	0.0	0.0	1.4	0.1	0.0
NPH.2270	0.0	0.0	1.6	0.1	0.0
GK.204	0.0	0.0	3.8	0.5	0.2
GK.205	0.0	0.0	4.5	0.6	0.3
GK.206	4.6	1.3	1.5	0.1	0.7
VCH.110	0.0	0.0	5.4	0.5	0.3
VCH.111	3.7	0.9	1.2	0.0	0.5
VCH.112	0.0	0.0	4.9	0.7	0.4
Tulasi.4	0.0	0.0	1.5	0.1	0.0
Tulasi.117	0.0	0.0	1.4	0.1	0.0
RCH.2Bt(CC)	0.0	0.0	6.2	7.8	3.9
MECH.162Bt(CC)	3.1	0.6	1.5	0.1	0.3
NHH.44(ZC)	0.0	0.0	0.4	0.0	0.0
CD (0.05)	0.0	0.0	1.4	0.1	0.0
CV%	8.3		4.4		
	21.7		20.0		

* TV – transformed vales

Pink Boll Worm in green bolls

The maximum number of Pink bollworms in green bolls was 11.82 in NHH.44 hybrid. The Bt hybrids had very low number of population of this bollworm in comparison to NHH.44. Maximum number of Pink bollworm was recorded in Nanded. The next highest was in Tulasi.177, as shown in the following table.

Entry	Nanded		Surat		Mean number
	TV*	number	TV	number	
NECH.2R	15.0	6.7	2.7	0.2	3.5
NECH.3R	13.4	5.4	0.4	0.0	2.7
Bunny VIP	13.9	5.8	2.3	0.2	3.0
2-58 VIP	12.7	4.9	0.4	0.0	2.5
2-81 VIP	14.2	6.0	0.4	0.0	3.0
VARUN	11.8	4.2	2.4	0.2	2.2
JKCH.226	14.5	6.3	9.0	2.4	4.4
JKCH.666	13.5	5.5	9.7	2.9	4.2
ACH-11-2x	15.5	7.2	0.4	0.0	3.6
ACH-33-1	16.0	7.6	0.4	0.0	3.8
ACH-155-1	12.8	5.0	2.8	0.3	2.6
RCH.512X	14.6	6.4	0.4	0.0	3.2
RCH.533X	15.4	7.1	2.4	0.2	3.6
RCH.377	12.7	4.9	0.4	0.0	2.5
MRC.6352	13.9	5.9	7.8	1.9	3.9
MRC.7226X	16.0	7.7	0.4	0.0	3.9
MRC.7347X	14.3	6.3	0.4	0.0	3.2
NCS.138	14.2	6.2	0.4	0.0	3.1
NCS.145	16.3	8.0	2.8	0.2	4.1
NCS.207	14.6	6.4	0.4	0.0	3.2
BRAHMA	16.0	7.6	0.4	0.0	3.8
KRISHNA	12.9	5.0	0.4	0.0	2.5
KIRTIMAN	14.3	6.1	2.8	0.2	3.2
KDCHH.9632	13.6	5.7	9.0	2.5	4.1
KDCHH.531X	15.9	7.5	2.8	0.2	3.9
KDCHH.441X	13.2	5.4	0.4	0.0	2.7
PRCH.101	13.7	5.7	0.4	0.0	2.9
PRCH.102	12.2	7.8	2.9	0.3	4.0
PRCH.103	15.8	7.5	0.4	0.0	3.8
NPH.2171	12.5	5.6	0.4	0.0	2.8
NPH.2250	13.1	5.4	2.9	0.3	2.8
NPH.2270	14.6	6.4	0.4	0.0	3.2
GK.204	14.3	6.2	9.5	2.8	4.5
GK.205	14.9	6.7	8.0	2.0	4.3
GK.206	14.9	6.6	0.4	0.0	3.3
VCH.110	14.3	6.1	0.4	0.0	3.1
VCH.111	15.1	6.8	9.8	2.9	4.8
VCH.112	12.6	4.8	2.9	0.3	2.5
Tulasi.4	15.4	7.1	0.4	0.0	3.6
Tulasi.117	15.1	6.9	5.2	6.9	6.9
RCH.2Bt(CC)	14.9	6.7	0.4	0.0	3.4
MECH.162Bt(CC)	14.9	6.6	0.4	0.0	3.3
NHH.44(ZC)	28.8	23.4	2.8	0.2	11.8
CD (0.05)		4.0	0.4		
CV%		13.9	81.3		

* TV – transformed vales

Locule damage (%)

The percent locule damage was found to be high in NHH.44 hybrid in comparison to all the Bt hybrids of this evaluation. Nanded centre recorded the most damage, as can be seen from the following table.

Entry	Nanded		Surat		Mean %
	TV	%	TV	%	
NECH.2R	11.5	4.0	19.1	10.8	7.4
NECH.3R	11.2	3.8	11.6	4.1	3.9
Bunny VIP	10.6	3.4	20.2	11.9	7.7
2-58 VIP	10.0	3.1	17.2	8.9	6.0
2-81 VIP	11.3	3.9	12.0	4.4	4.1
VARUN	9.5	2.8	9.4	2.8	2.8
JKCH.226	12.1	4.5	9.2	2.6	3.6
JKCH.666	11.6	4.1	14.0	7.0	5.5
ACH-11-2x	11.6	4.1	14.4	6.2	5.2
ACH-33-1	11.8	4.2	11.4	3.9	4.1
ACH-155-1	10.4	3.3	16.8	8.3	5.8
RCH.512X	12.1	4.4	9.3	2.6	3.5
RCH.533X	12.6	4.8	11.4	4.0	4.4
RCH.377	11.3	3.9	12.3	4.6	4.3
MRC.6352	11.5	3.8	11.7	4.5	4.1
MRC.7226X	14.0	5.9	16.1	7.8	6.9
MRC.7347X	11.8	4.3	13.8	5.8	5.0
NCS.138	10.7	3.7	9.4	2.8	3.2
NCS.145	14.2	6.0	20.9	12.8	9.4
NCS.207	11.7	4.1	12.8	4.9	4.5
BRAHMA	14.4	6.3	13.3	5.4	5.9
KRISHNA	12.6	4.8	8.9	2.4	3.6
KIRTIMAN	12.0	4.4	9.3	2.6	3.5
KDCHH.9632	12.5	4.8	11.1	3.7	4.3
KDCHH.531X	13.0	5.1	10.8	3.5	4.3
KDCHH.441X	10.7	3.5	14.0	5.9	4.7
PRCH.101	12.4	4.7	10.1	3.1	3.9
PRCH.102	13.9	5.9	12.2	4.5	5.2
PRCH.103	13.9	5.8	12.7	4.9	5.4
NPH.2171	11.6	4.2	8.3	2.3	3.3
NPH.2250	9.6	3.0	13.0	5.6	4.3
NPH.2270	11.8	4.3	14.1	6.0	5.1
GK.204	11.0	3.7	11.4	3.9	3.8
GK.205	12.5	4.7	13.2	5.5	5.1
GK.206	12.4	4.6	9.5	2.8	3.7
VCH.110	12.9	5.0	7.9	1.9	3.5
VCH.111	12.1	4.5	11.6	4.2	4.4
VCH.112	10.1	3.2	10.3	3.3	3.2
Tulasi.4	13.2	5.4	15.5	7.5	6.4
Tulasi.117	13.3	5.4	16.9	8.5	7.0
RCH.2Bt(CC)	12.5	4.8	10.7	3.5	4.2
MECH.162Bt(CC)	12.4	4.6	9.5	2.7	3.7
NHH.44(ZC)	22.4	18.0	17.3	8.9	13.5
CD (0.05)	3.5		3.9		
CV%	14.8		18.4		

Open boll damage (%)

The Percent open boll damage was recorded in this zone. The following table provides the information. The Bt hybrids that showed more than 10% damage are NECH.2R, Bunny VIP and NCS.145.

Entry	Nanded		Surat		Mean %
	TV	%	TV	%	
NECH.2R	15.0	6.7	22.6	15.0	10.9
NECH.3R	13.4	5.4	15.4	7.1	6.2
Bunny VIP	13.9	5.8	26.3	19.7	12.8
2-58 VIP	12.7	4.9	22.5	14.8	9.9
2-81 VIP	14.2	6.0	16.4	8.0	7.0
VARUN	11.8	4.2	12.4	4.8	4.5
JKCH.226	14.5	6.3	11.2	3.9	5.1
JKCH.666	13.5	5.5	13.6	5.7	5.6
ACH-11-2x	15.5	7.2	18.7	10.3	8.8
ACH-33-1	16.0	7.6	15.6	7.3	7.5
ACH-155-1	12.8	5.0	20.1	11.8	8.4
RCH.512X	14.6	6.4	12.0	4.3	5.4
RCH.533X	15.4	7.1	14.3	6.2	6.6
RCH.377	12.7	4.9	16.4	8.0	6.5
MRC.6352	13.9	5.9	16.1	7.7	6.8
MRC.7226X	16.0	7.7	20.5	12.3	10.0
MRC.7347X	14.3	6.3	18.9	10.6	8.5
NCS.138	14.2	6.2	13.1	5.2	5.7
NCS.145	16.3	8.0	23.6	16.1	12.1
NCS.207	14.6	6.4	16.7	8.3	7.3
BRAHMA	16.0	7.6	17.0	8.7	8.1
KRISHNA	12.9	5.0	11.4	4.0	4.5
KIRTIMAN	14.3	6.1	12.8	4.9	5.5
KDCHH.9632	13.6	5.7	15.2	6.9	6.3
KDCHH.531X	15.9	7.5	14.7	6.5	7.0
KDCHH.441X	13.2	5.4	18.7	10.3	7.9
PRCH.101	13.7	5.7	12.7	5.0	5.3
PRCH.102	16.2	7.8	14.7	6.7	7.3
PRCH.103	15.8	7.5	16.1	7.8	7.7
NPH.2171	13.5	5.6	10.9	4.0	4.8
NPH.2250	13.1	5.4	16.1	8.1	6.7
NPH.2270	14.6	6.4	17.8	9.4	7.9
GK.204	14.3	6.2	15.2	6.9	6.6
GK.205	14.9	6.7	16.7	12.6	9.7
GK.206	14.9	6.6	12.7	4.9	5.7
VCH.110	14.3	6.1	10.8	3.6	4.8
VCH.111	15.1	6.8	14.8	6.6	6.7
VCH.112	12.6	4.8	13.3	5.3	5.1
Tulasi.4	15.4	7.1	19.0	10.8	9.0
Tulasi.117	15.1	6.9	20.6	12.5	9.7
RCH.2Bt(CC)	14.9	6.7	14.7	6.5	6.6
MECH.162Bt(CC)	14.9	6.6	12.3	4.5	5.6
NHH.44(ZC)	28.8	23.0	21.5	13.6	18.3
CD (0.05)	4.0		3.8		
CV%	13.9		14.3		

The following table provides the number of spraying against sap sucking pests (SP) and bollworms (BW). The number of sprayings, undertaken in different Bt and non Bt genotypes under PROTECTED conditions show that NHH.44 had 4.67 sprayings in this zone. Many test hybrids had similar number of sprayings as in the case of check Bt hybrids.

Number of pesticide sprayings under protected conditions

Entry	Akola			Nanded			Surat			Mean		
	SP	BW	Total	SP	BW	total	SP	BW	total	SP	BW	total
NECH.2R	4	0	4	2	0	2	2	2	4	2.67	0.67	3.33
NECH.3R	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
Bunny VIP	4	0	4	2	0	2	2	1	3	2.67	0.33	3.00
2-58 VIP	4	0	4	2	0	2	2	1	3	2.67	0.33	3.00
2-81 VIP	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
VARUN	4	0	4	2	0	2	1	1	2	2.33	0.33	2.67
JKCH.226	4	0	4	2	0	2	2	1	3	2.67	0.33	3.00
JKCH.666	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
ACH-11-2x	4	0	4	2	0	2	2	2	4	2.67	0.67	3.33
ACH-33-1	4	0	4	2	0	2	2	2	4	2.67	0.67	3.33
ACH-155-1	4	3	7	2	0	2	2	0	2	2.67	1.00	3.67
RCH.512X	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
RCH.533X	4	0	4	2	0	2	2	1	3	2.67	0.33	3.00
RCH.377	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
MRC.6352	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
MRC.7226X	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
MRC.7347X	4	0	4	2	0	2	2	1	3	2.67	0.33	3.00
NCS.138	4	0	4	2	0	2	3	1	4	3.00	0.33	3.33
NCS.145	4	0	4	2	0	2	1	1	2	2.33	0.33	2.67
NCS.207	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
BRAHMA	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
KRISHNA	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
KIRTIMAN	4	3	7	2	0	2	3	0	3	3.00	1.00	4.00
KDCHH.9632	4	0	4	2	0	2	3	0	3	3.00	0.00	3.00
KDCHH.531X	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
KDCHH.441X	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
PRCH.101	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
PRCH.102	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
PRCH.103	4	0	4	2	0	2	3	0	3	3.00	0.00	3.00
NPH.2171	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
NPH.2250	4	0	4	2	0	2	3	0	3	3.00	0.00	3.00
NPH.2270	4	0	4	2	0	2	3	1	4	3.00	0.33	3.33
GK.204	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
GK.205	4	0	4	2	0	2	3	1	4	3.00	0.33	3.33
GK.206	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
VCH.110	4	0	4	2	0	2	3	0	3	3.00	0.00	3.00
VCH.111	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
VCH.112	4	0	4	2	0	2	3	0	3	3.00	0.00	3.00
Tulasi.4	4	0	4	2	0	2	2	1	3	2.67	0.33	3.00
Tulasi.117	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
RCH.2Bt(CC)	4	0	4	2	0	2	2	0	2	2.67	0.00	2.67
MECH.162Bt(CC)	4	0	4	2	2	4	2	0	2	2.67	0.67	3.33
NHH.44(ZC)	4	3	7	2	1	3	2	2	4	2.67	2.00	4.67

PLANT PROTECTION EVALUATION - Unprotected Condition

The aphid population, in unprotected evaluation, was at the highest level during the season, as given in the following table. The Nanded centre had more aphids on the crop than Surat and others.

Aphid (average of 3 leaves/plant)

Entry	Nanded		Surat		Mean number
	TV	Number	TV	Number	
NECH.2R	4.0	16.2	2.1	3.9	10.0
NECH.3R	3.9	15.5	2.4	5.5	10.5
Bunny VIP	3.7	13.5	1.8	2.9	8.2
2-58 VIP	3.1	10.0	2.2	4.2	7.1
2-81 VIP	4.3	17.9	2.2	4.4	11.1
VARUN	3.4	12.3	2.6	6.0	9.2
JKCH.226	3.4	11.0	2.1	3.9	7.4
JKCH.666	4.0	15.3	2.1	4.1	9.7
ACH-11-2x	4.2	17.9	1.9	3.3	10.6
ACH-33-1	5.4	29.5	2.1	4.0	16.8
ACH-155-1	3.4	11.6	2.1	3.7	7.7
RCH.512X	3.7	13.4	1.9	3.0	8.2
RCH.533X	3.4	18.6	2.4	5.1	11.8
RCH.377	3.2	9.9	2.0	3.5	6.7
MRC.6352	3.4	11.3	2.6	6.3	8.8
MRC.7226X	5.0	24.8	1.8	2.6	13.7
MRC.7347X	4.9	25.6	1.6	2.1	13.9
NCS.138	3.4	11.3	1.9	3.0	7.2
NCS.145	4.0	15.2	2.0	3.3	9.3
NCS.207	3.9	14.8	2.2	4.5	9.6
BRAHMA	5.2	27.8	1.9	3.0	15.4
KRISHNA	4.2	17.4	1.4	1.4	9.4
KIRTIMAN	2.9	8.0	2.2	4.1	6.1
KDCHH.9632	3.5	11.5	2.0	3.5	7.5
KDCHH.531X	5.1	26.1	1.6	2.2	14.1
KDCHH.441X	4.7	21.8	2.0	3.7	12.8
PRCH.101	4.0	15.9	1.9	2.9	9.4
PRCH.102	2.8	7.3	1.8	2.7	5.0
PRCH.103	3.1	9.3	2.0	3.5	6.4
NPH.2171	2.4	8.1	2.0	3.7	5.9
NPH.2250	2.9	8.5	2.3	4.6	6.5
NPH.2270	3.6	12.7	2.1	3.9	8.3
GK.204	4.9	24.2	1.8	2.6	13.4
GK.205	5.1	25.1	2.5	5.6	15.3
GK.206	4.2	17.3	2.3	4.9	11.1
VCH.110	3.4	11.3	2.8	3.7	7.5
VCH.111	3.6	12.9	2.2	4.5	8.7
VCH.112	2.8	7.1	2.1	4.1	5.6
Tulasi.4	3.5	11.5	1.9	3.1	7.3
Tulasi.117	4.1	17.0	2.1	3.8	10.4
RCH.2Bt(CC)	5.0	24.8	2.2	4.2	14.5
MECH.162Bt(CC)	4.9	25.6	1.7	2.5	14.1
NHH.44(ZC)	2.5	5.7	2.5	4.9	5.3

The jassid population, in unprotected evaluation, was at the highest level during the season, as given in the following table. The Akola centre had more jassids on the crop than Surat and others.

Jassids (average of 3 leaves/plant)

Entry	Akola		Nanded		Surat		Mean number
	TV	Number	TV	Number	TV	Number	
NECH.2R	2.0	3.8	2.2	4.4	1.5	1.8	3.3
NECH.3R	2.0	3.9	2.0	3.7	1.5	1.8	3.1
Bunny VIP	2.6	6.1	1.9	3.3	1.2	1.0	3.5
2-58 VIP	2.6	6.2	1.7	2.5	1.4	1.4	3.4
2-81 VIP	2.8	7.6	1.5	1.9	1.4	1.5	3.7
VARUN	3.5	11.8	1.6	2.1	1.9	3.0	5.6
JKCH.226	2.6	6.0	1.8	2.7	1.5	1.8	3.5
JKCH.666	2.9	7.9	1.8	2.6	1.4	1.4	4.0
ACH-11-2x	2.6	6.4	2.0	3.4	1.2	1.0	3.6
ACH-33-1	2.6	6.0	2.0	3.6	1.2	1.0	3.6
ACH-155-1	2.5	5.7	1.8	2.9	1.2	0.8	3.1
RCH.512X	2.5	5.7	1.9	3.3	1.4	1.4	3.5
RCH.533X	2.8	7.6	2.2	4.2	1.3	1.2	4.3
RCH.377	2.1	4.6	2.0	3.7	1.1	0.8	3.0
MRC.6352	2.3	4.9	2.3	5.0	1.3	1.3	3.7
MRC.7226X	2.3	4.8	1.8	2.6	1.1	2.1	3.2
MRC.7347X	2.2	4.4	1.9	3.3	1.3	1.3	3.0
NCS.138	2.6	6.4	1.6	2.0	1.2	0.9	3.1
NCS.145	2.3	5.2	2.1	4.0	1.3	1.3	3.5
NCS.207	2.3	4.9	1.8	2.8	1.5	1.8	3.2
BRAHMA	2.3	5.3	1.9	3.3	1.3	1.1	3.2
KRISHNA	1.9	3.9	1.9	3.3	1.2	0.9	2.7
KIRTIMAN	2.4	5.3	1.8	2.9	1.3	1.2	3.1
KDCHH.9632	2.3	4.9	1.8	2.6	1.3	1.1	2.9
KDCHH.531X	2.1	4.0	1.5	1.9	1.3	1.1	2.3
KDCHH.441X	2.4	5.6	1.7	2.5	1.4	1.5	3.2
PRCH.101	2.5	0.1	1.8	2.9	1.3	1.3	1.4
PRCH.102	3.1	0.1	1.6	2.2	1.4	1.4	1.2
PRCH.103	2.1	3.9	1.7	2.5	1.6	1.9	2.8
NPH.2171	2.2	4.7	1.8	2.9	1.4	1.6	3.1
NPH.2250	2.3	0.1	1.9	3.0	1.5	1.9	1.6
NPH.2270	2.9	8.1	1.7	2.5	1.4	1.6	4.1
GK.204	2.7	6.7	1.6	2.2	1.6	1.8	3.6
GK.205	2.2	4.6	1.7	2.3	1.2	1.0	2.6
GK.206	2.6	6.3	1.5	1.9	1.3	1.2	3.2
VCH.110	2.4	5.5	1.5	1.8	1.6	1.9	3.1
VCH.111	2.8	7.3	1.6	2.2	1.7	2.3	4.0
VCH.112	2.4	5.3	1.8	2.9	1.5	1.8	3.4
Tulasi.4	2.6	6.3	1.6	2.1	1.5	1.8	3.4
Tulasi.117	2.8	7.1	1.7	2.4	1.6	2.0	3.8
RCH.2Bt(CC)	3.1	9.2	1.6	2.2	1.6	2.1	4.5
MECH.162Bt(CC)	2.8	7.5	1.6	2.0	1.3	1.2	3.6
NHH.44(ZC)	2.7	0.1	1.5	1.7	1.4	1.4	1.0
CD (0.05)	0.8	NS	0.4		0.2		
CV%	19.7		10.8		11.2		

The maximum thrips population of the season, in unprotected evaluation, was at the highest level during the season, as given in the following table. The Akola centre had more thrips population on the crop than Surat and others.

Thrips (mean of 3 leaves/plant)

Entry	Akola		Nanded		Surat		Mean number
	TV	Number	TV	Number	TV	Number	
NECH.2R	8.7	75.0	5.8	33.6	2.4	5.0	37.9
NECH.3R	8.9	79.1	5.3	28.2	2.5	5.9	37.7
Bunny VIP	9.1	82.7	5.9	34.2	2.7	6.3	41.1
2-58 VIP	10.2	105.8	6.1	36.6	2.4	5.3	49.2
2-81 VIP	10.1	101.8	5.7	32.5	2.6	6.5	46.9
VARUN	8.5	73.5	6.0	35.4	2.2	4.5	37.8
JKCH.226	7.5	56.7	6.4	40.1	2.2	4.3	33.7
JKCH.666	9.0	81.8	5.4	29.1	2.0	3.3	38.1
ACH-11-2x	9.7	95.3	5.9	35.0	2.6	6.3	45.5
ACH-33-1	10.8	118.0	5.2	26.4	2.8	7.2	50.5
ACH-155-1	9.7	94.8	5.5	30.1	2.8	7.3	44.1
RCH.512X	9.2	84.9	6.0	35.1	2.7	6.5	42.2
RCH.533X	7.7	61.2	5.8	32.8	2.5	5.3	33.1
RCH.377	9.9	98.6	6.1	37.4	2.5	5.6	47.2
MRC.6352	9.4	89.7	5.6	31.0	2.8	7.5	42.7
MRC.7226X	8.9	79.9	6.3	39.8	2.4	5.0	41.6
MRC.7347X	10.7	117.7	5.9	33.8	2.6	6.3	52.6
NCS.138	9.3	88.7	5.7	31.9	2.6	6.1	42.2
NCS.145	9.2	84.0	6.4	41.1	2.4	5.4	43.5
NCS.207	8.3	69.0	6.0	36.0	2.2	4.4	36.5
BRAHMA	10.4	108.6	5.3	27.9	2.0	3.3	46.6
KRISHNA	8.8	78.1	6.3	39.6	2.3	4.8	40.9
KIRTIMAN	9.1	83.1	6.0	36.1	2.2	4.2	41.1
KDCHH.9632	8.7	76.1	6.1	36.3	2.0	3.6	38.7
KDCHH.531X	8.5	73.2	5.8	33.0	2.1	4.0	36.7
KDCHH.441X	9.2	83.7	6.2	37.8	2.2	4.1	41.9
PRCH.101	11.2	126.9	5.5	29.5	2.5	5.9	54.1
PRCH.102	8.6	74.3	6.3	38.8	2.6	6.4	39.9
PRCH.103	11.2	128.3	5.6	31.3	2.4	5.2	54.9
NPH.2171	9.4	89.5	5.8	33.5	2.1	4.1	42.4
NPH.2250	8.6	74.0	5.7	32.4	2.3	4.8	37.1
NPH.2270	9.0	80.8	6.0	36.0	2.3	4.8	40.5
GK.204	9.2	85.7	6.5	41.7	2.5	5.5	44.3
GK.205	9.0	81.4	5.4	28.5	2.9	8.1	39.3
GK.206	9.3	87.3	6.3	38.9	2.9	7.7	44.7
VCH.110	10.4	108.4	6.0	35.1	2.1	4.0	49.2
VCH.111	9.9	98.3	6.0	36.2	2.4	5.2	46.6
VCH.112	9.5	91.3	5.9	34.4	2.7	4.3	43.3
Tulasi.4	8.7	74.6	5.6	30.6	2.9	8.0	37.7
Tulasi.117	8.9	80.5	6.3	39.1	2.2	4.4	41.3
RCH.2Bt(CC)	8.4	71.6	5.9	34.9	2.2	4.3	36.9
MECH.162Bt(CC)	8.4	72.9	6.1	37.3	3.3	10.1	40.1
NHH.44(ZC)	8.4	70.3	5.7	32.1	3.4	11.2	37.9
CD (0.05)	1.4				0.7		
CV%	9.4				16.2		

The maximum thrips population of the season, in unprotected evaluation, was at the highest level during the season, as given in the following table. The Akola centre had more thrips population on the crop than Surat and others.

Whitefly (average on 3 leaves/plant)

Entry	Akola		Nanded		Surat		Mean number
	TV	Number	TV	Number	TV	Number	
NECH.2R	1.72	2.45	5.72	32.3	1.38	1.40	12.05
NECH.3R	2.44	5.44	6.13	37.1	1.28	1.14	14.56
Bunny VIP	2.30	4.78	5.46	29.4	1.27	1.11	11.76
2-58 VIP	2.85	7.65	6.3	39.3	1.34	1.30	16.08
2-81 VIP	2.39	5.22	5.35	28.2	1.31	1.22	11.55
VARUN	1.93	3.22	5.7	32.2	1.06	0.62	12.01
JKCH.226	2.48	5.67	5.48	29.7	1.1	0.71	12.03
JKCH.666	2.20	4.33	5.39	28.6	1.17	0.87	11.27
ACH-11-2x	2.27	4.67	5.85	33.8	1.42	1.52	13.33
ACH-33-1	2.70	6.78	6.0	35.6	1.53	1.84	14.74
ACH-155-1	2.42	5.34	5.36	28.4	1.57	1.96	11.90
RCH.512X	1.84	2.89	6.26	38.8	1.25	1.06	14.25
RCH.533X	1.55	1.89	5.93	34.8	1.37	1.38	12.69
RCH.377	2.92	8.0	5.59	30.8	1.3	1.19	13.33
MRC.6352	2.46	5.56	5.98	35.4	1.25	1.06	14.01
MRC.7226X	2.74	7.0	5.44	29.2	1.51	1.78	12.66
MRC.7347X	2.22	4.44	5.82	33.5	1.45	1.60	13.18
NCS.138	2.37	5.11	6.26	38.8	1.31	1.22	15.04
NCS.145	2.39	5.22	5.75	32.8	1.52	1.81	13.28
NCS.207	2.80	7.33	5.07	25.3	1.59	2.03	11.55
BRAHMA	2.35	5.0	6.21	38.1	1.39	1.43	14.84
KRISHNA	2.57	6.11	5.76	32.8	1.57	1.96	13.62
KIRTIMAN	2.25	4.56	5.45	29.3	1.73	2.49	12.12
KDCHH.9632	2.22	4.45	8.5	29.8	1.43	1.54	11.93
KDCHH.531X	1.98	3.44	5.74	32.5	1.78	2.67	12.87
KDCHH.441X	1.84	2.89	5.67	31.8	1.84	2.89	12.53
PRCH.101	3.15	9.44	5.49	29.7	1.63	2.16	13.77
PRCH.102	2.57	6.11	5.14	26.0	1.34	1.30	11.14
PRCH.103	2.22	4.44	5.39	28.7	1.53	1.84	11.66
NPH.2171	2.44	5.45	5.79	33.1	1.49	1.72	13.42
NPH.2250	2.44	5.44	5.91	34.5	1.58	2.00	13.98
NPH.2270	2.61	6.33	5.69	32.0	1.47	1.66	13.33
GK.204	2.44	5.44	5.67	31.8	1.32	1.24	12.83
GK.205	2.20	4.33	5.31	27.8	1.41	1.49	11.21
GK.206	2.27	4.66	5.59	30.8	1.24	1.04	12.17
VCH.110	2.95	8.22	5.07	25.3	1.31	1.22	11.58
VCH.111	2.25	4.56	5.61	31.0	1.44	1.57	12.38
VCH.112	1.93	3.22	5.87	34.0	1.47	1.66	12.96
Tulasi.4	2.25	4.55	6.14	37.3	1.27	1.11	14.32
Tulasi.117	2.25	4.56	6.05	36.2	1.28	1.14	13.97
RCH.2Bt(CC)	1.84	2.89	5.62	31.3	1.26	1.09	11.76
MECH.162Bt(CC)	1.68	2.33	5.46	29.4	1.4	1.46	11.06
NHH.44(ZC)	1.58	2.00	6.02	35.9	1.28	1.14	13.01
CD (0.05)	0.74		0.61		0.29		
CV%	20		5.47		9.5		

Spotted bollworms

Under unprotected conditions, the pest was in low levels in various centres of central zone. Nanded and Surat recorded more of this insect than Akola. NHH.44 recorded over 2 larvae per plant, while the test Bt hybrids recorded very low numbers of this pest per plant, as seen in the table below.

Spotted bollworms (number/plant)

Entry	Akola		Nanded		Surat		Mean
	TV	Number	TV	Number	TV	Number	
NECH.2R	0.7	0.0	0.7	2.5	1.4	1.4	1.3
NECH.3R	0.7	0.0	1.5	2.0	0.9	0.2	0.8
Bunny VIP	0.7	0.0	1.0	0.5	0.9	0.3	0.3
2-58 VIP	0.7	0.0	1.1	1.0	0.9	0.4	0.5
2-81 VIP	0.7	0.0	1.1	1.0	1.5	1.6	0.9
VARUN	0.7	0.0	1.6	2.0	0.8	0.1	0.7
JKCH.226	0.7	0.0	1.1	1.0	0.9	0.3	0.4
JKCH.666	0.7	0.0	1.0	0.5	0.8	0.2	0.2
ACH-11-2x	0.7	0.0	1.4	1.5	1.2	1.0	0.8
ACH-33-1	0.7	0.0	0.7	0.0	1.4	1.5	0.5
ACH-155-1	0.9	0.3	1.7	2.5	1.4	1.4	1.4
RCH.512X	0.7	0.0	1.1	1.0	1.0	0.6	0.5
RCH.533X	0.7	0.0	1.0	0.5	0.8	0.2	0.2
RCH.377	0.7	0.0	1.5	2.0	0.8	0.1	0.7
MRC.6352	0.7	0.0	1.0	0.5	0.8	0.1	0.2
MRC.7226X	0.7	0.0	0.7	0.0	0.9	0.4	0.1
MRC.7347X	0.7	0.0	1.6	2.0	1.0	0.5	0.8
NCS.138	0.7	0.0	1.1	1.0	0.8	0.2	0.4
NCS.145	0.7	0.0	1.2	1.0	1.4	1.5	0.8
NCS.207	0.7	0.0	1.2	1.0	1.3	1.1	0.7
BRAHMA	0.7	0.0	1.0	0.5	0.9	0.3	0.3
KRISHNA	0.7	0.0	1.0	0.5	1.0	0.5	0.3
KIRTIMAN	0.7	0.0	1.1	1.0	0.8	0.1	0.4
KDCHH.9632	0.7	0.0	1.6	2.0	0.8	0.1	0.7
KDCHH.531X	0.7	0.0	1.0	0.5	1.0	0.6	0.4
KDCHH.441X	0.7	0.0	1.1	1.0	0.9	0.3	0.4
PRCH.101	0.7	0.0	1.4	1.5	0.8	0.1	0.5
PRCH.102	0.7	0.0	1.0	0.5	0.9	0.3	0.3
PRCH.103	0.7	0.0	1.4	1.5	0.9	0.3	0.6
NPH.2171	0.7	0.0	0.7	0.0	0.9	0.3	0.1
NPH.2250	0.7	0.0	0.7	0.0	0.8	0.2	0.1
NPH.2270	0.7	0.0	1.0	0.5	0.9	0.4	0.3
GK.204	0.7	0.0	1.0	0.5	1.4	1.4	0.6
GK.205	0.7	0.0	1.1	1.0	0.8	0.2	0.4
GK.206	0.7	0.0	1.1	1.0	0.8	0.2	0.4
VCH.110	0.7	0.0	0.7	0.0	0.8	0.1	0.0
VCH.111	0.7	0.0	1.4	1.5	0.9	0.3	0.6
VCH.112	0.7	0.0	0.7	0.0	0.9	0.4	0.1
Tulasi.4	0.7	0.0	1.0	0.5	0.8	0.2	0.2
Tulasi.117	0.7	0.0	1.0	0.5	0.9	0.3	0.3
RCH.2Bt(CC)	0.7	0.0	1.4	1.5	1.0	0.6	0.7
MECH.162Bt(CC)	0.7	0.0	1.0	0.5	0.9	0.4	0.3
NHH.44(ZC)	0.8	0.1	2.4	5.5	1.1	0.7	2.1
CD (0.05)	0.1		0.7		1.2		
CV%	6.3		32.4		11.9		

American bollworms

The number of American bollworms per plant was recorded at three centres under protected conditions. There was no infestation of this pest so as to be seen above the mean count of 1 per plant.

American bollworms (Number/plant)

Entry	Akola		Nanded		Surat		Mean Number
	TV	Number	TV	Number	TV	Number	
NECH.2R	0.9	0.3	1.1	1.0	1.1	0.7	0.7
NECH.3R	0.7	0.0	1.2	1.0	0.8	0.1	0.4
Bunny VIP	0.7	0.0	1.0	0.5	0.7	0.0	0.2
2-58 VIP	1.1	0.7	1.2	1.0	0.8	0.2	0.6
2-81 VIP	1.1	0.7	1.1	1.0	1.1	0.8	0.8
VARUN	0.7	0.0	1.2	1.0	0.7	0.0	0.3
JKCH.226	0.9	0.3	1.1	1.0	0.8	0.2	0.5
JKCH.666	0.7	0.0	1.0	0.5	0.7	0.0	0.2
ACH-11-2x	0.7	0.0	1.1	1.0	1.0	0.5	0.5
ACH-33-1	0.9	0.3	1.1	1.0	1.1	0.8	0.7
ACH-155-1	1.1	0.7	0.7	0.0	1.1	0.8	0.5
RCH.512X	0.7	0.0	1.0	0.5	0.8	0.1	0.2
RCH.533X	0.9	0.3	1.0	0.5	0.8	0.1	0.3
RCH.377	0.9	0.3	0.7	0.0	0.8	0.1	0.1
MRC.6352	0.7	0.0	1.0	0.5	0.8	0.2	0.2
MRC.7226X	0.7	0.0	1.7	2.5	0.8	0.1	0.9
MRC.7347X	0.7	0.0	1.0	0.5	0.8	0.1	0.2
NCS.138	0.7	0.0	1.0	0.5	0.8	0.1	0.2
NCS.145	0.7	0.0	1.2	1.0	0.8	0.1	0.4
NCS.207	0.7	0.0	1.0	0.5	0.8	0.2	0.2
BRAHMA	0.7	0.0	1.2	1.0	0.8	0.1	0.4
KRISHNA	0.7	0.0	1.4	1.5	0.7	0.0	0.5
KIRTIMAN	0.7	0.0	1.0	0.5	0.7	0.0	0.2
KDCHH.9632	0.7	0.0	1.1	1.0	0.8	0.1	0.4
KDCHH.531X	0.7	0.0	0.7	0.0	0.7	0.0	0.0
KDCHH.441X	0.7	0.0	1.0	0.5	0.8	0.2	0.2
PRCH.101	0.7	0.0	1.0	0.5	0.8	0.1	0.2
PRCH.102	0.7	0.0	1.0	0.5	0.7	0.0	0.2
PRCH.103	0.7	0.0	1.1	1.0	0.7	0.0	0.3
NPH.2171	0.9	0.3	1.0	0.5	0.8	0.2	0.3
NPH.2250	0.7	0.0	0.7	0.0	0.8	0.1	0.0
NPH.2270	0.9	0.3	1.2	1.0	0.8	0.2	0.5
GK.204	0.7	0.0	1.1	1.0	1.1	0.7	0.6
GK.205	0.7	0.0	1.0	0.5	0.8	0.1	0.2
GK.206	0.7	0.0	1.0	0.5	0.8	0.2	0.2
VCH.110	0.7	0.0	1.0	0.5	0.7	0.0	0.2
VCH.111	0.7	0.0	1.0	0.5	0.7	0.0	0.2
VCH.112	0.7	0.0	1.0	0.5	0.8	0.2	0.2
Tulasi.4	0.7	0.0	1.0	0.5	0.7	0.0	0.2
Tulasi.117	0.9	0.3	0.7	0.0	0.9	0.3	0.2
RCH.2Bt(CC)	0.7	0.0	0.7	0.0	0.9	0.3	0.1
MECH.162Bt(CC)	0.7	0.0	0.7	0.0	0.8	0.2	0.1
NHH.44(ZC)	1.1	0.7	1.2	1.0	1.0	0.5	0.7
CD (0.05)	0.3		-		0.2		
CV%	21.1		-		10.7		

Square damage due to American bollworms (%)

While NHH.44 recorded over 5% damage due to American bollworm on the squares, the all Bt test recorded only 0.1 to 3.08% square damage, as seen below.

American bollworms square damage

Entry	Nanded		Surat		Mean
	TV	%	TV	Number	%
NECH.2R	11.1	3.8	8.8	2.4	3.1
NECH.3R	8.6	2.3	2.6	0.2	1.3
Bunny VIP	8.4	4.2	2.0	0.1	2.2
2-58 VIP	7.4	3.3	3.9	0.5	1.9
2-81 VIP	4.6	1.3	4.5	0.6	1.0
VARUN	0.0	0.0	2.5	0.2	0.1
JKCH.226	6.1	2.3	1.9	0.1	1.2
JKCH.666	4.8	1.4	3.8	0.4	0.9
ACH-11-2x	10.8	3.6	5.9	1.1	2.3
ACH-33-1	6.6	2.6	8.4	2.2	2.4
ACH-155-1	9.9	3.0	7.6	1.8	2.4
RCH.512X	3.1	3.1	0.4	0.0	1.6
RCH.533X	3.6	0.8	1.6	0.1	0.4
RCH.377	8.5	2.3	3.0	0.3	1.3
MRC.6352	4.6	1.3	2.3	0.2	0.7
MRC.7226X	0.0	0.0	4.0	0.5	0.2
MRC.7347X	12.1	4.6	2.5	0.2	2.4
NCS.138	10.7	3.7	6.9	1.4	2.6
NCS.145	9.2	3.0	8.5	2.2	2.6
NCS.207	8.2	2.1	5.6	1.0	1.5
BRAHMA	0.0	0.0	2.9	0.3	0.1
KRISHNA	6.2	2.3	1.6	0.1	1.2
KIRTIMAN	5.5	1.9	0.7	0.0	1.0
KDCHH.9632	13.7	5.7	3.4	0.4	3.0
KDCHH.531X	10.7	3.7	3.4	0.4	2.0
KDCHH.441X	7.3	3.2	2.3	0.2	1.7
PRCH.101	0.0	0.0	3.0	0.3	0.1
PRCH.102	0.0	0.0	0.8	0.0	0.0
PRCH.103	12.5	5.3	3.6	0.4	2.8
NPH.2171	0.0	0.0	2.8	0.2	0.1
NPH.2250	0.0	0.0	19.4	0.1	0.1
NPH.2270	0.0	0.0	3.3	0.3	0.2
GK.204	0.0	0.0	5.8	1.1	0.5
GK.205	6.2	2.3	6.0	1.1	1.7
GK.206	0.0	0.0	3.1	0.4	0.2
VCH.110	0.0	0.0	2.4	0.2	0.1
VCH.111	3.4	0.7	2.2	0.2	0.4
VCH.112	0.0	0.0	1.6	0.1	0.0
Tulasi.4	15.0	12.0	3.2	0.3	6.2
Tulasi.117	0.0	0.0	3.0	0.3	0.2
RCH.2Bt(CC)	11.1	3.7	3.2	0.3	2.0
MECH.162Bt(CC)	8.6	2.3	9.6	2.8	2.5
NHH.44(ZC)	15.7	7.6	10.5	3.3	5.5
CD (0.05)			5.4		
CV%			76.8		

Pink Boll worm in green bolls

The maximum number of Pink bollworm in test hybrids, under unprotected condition, was in ACH-155-1 (19.80), NCS.145, NCS.255 followed by Bunny -VIP (13.55), as given in the following table. The expression of the candidate gene to deter Pink bollworm survivorship in green boll is doubtful in these entries. The entries possessing BG II genes were found to counter Pink bollworm damage more effectively over VIP gene. The Pink bollworms in green bolls in BG II entries were at par with that of certain BG I entries (NECH.2R, NECH.3R, Varun, JKCH.226, JKCH.666, RCH.377, MRC.6352, NCS.138, Krishna, Kirtiman, PRCH hybrids, NPH hybrids, VCH hybrids and Tulasi hybrids.

Average Number of Pink Boll worm in 20 green bolls

Entry	Akola		Nanded		Mean number
	TV	Number	TV	Number	
NECH.2R	1.9	3.3	1.1	1.0	2.2
NECH.3R	2.3	8.0	1.4	1.5	4.8
Bunny VIP	5.0	24.6	1.7	2.5	13.6
2-58 VIP	4.0	15.3	1.1	1.0	8.2
2-81 VIP	3.7	13.0	1.3	1.5	7.3
VARUN	1.7	3.7	1.6	2.0	2.8
JKCH.226	2.1	4.7	1.8	3.0	3.8
JKCH.666	4.0	17.3	2.1	4.0	10.7
ACH-11-2x	4.2	18.0	1.7	2.5	10.3
ACH-33-1	4.5	20.3	1.7	2.5	11.4
ACH-155-1	6.1	37.6	1.4	2.0	19.8
RCH.512X	2.1	5.7	1.7	2.5	4.1
RCH.533X	2.6	9.0	0.7	0.0	4.5
RCH.377	2.4	5.3	1.9	3.0	4.2
MRC.6352	0.9	0.3	1.5	2.0	1.2
MRC.7226X	2.1	4.7	1.9	3.0	3.8
MRC.7347X	1.6	2.3	1.9	3.5	2.9
NCS.138	2.3	6.0	1.7	2.5	4.3
NCS.145	6.0	36.0	1.2	1.0	18.5
NCS.207	6.2	38.6	1.0	0.5	19.6
BRAHMA	2.7	10.6	1.5	2.5	6.6
KRISHNA	1.8	5.0	1.6	2.0	3.5
KIRTIMAN	0.9	0.3	1.3	1.5	0.9
KDCHH.9632	2.1	5.0	1.3	1.5	3.3
KDCHH.531X	1.8	4.0	1.7	2.5	3.3
KDCHH.441X	2.0	3.7	2.0	3.5	3.6
PRCH.101	1.7	3.0	1.1	1.0	2.0
PRCH.102	1.9	4.7	1.5	2.0	3.3
PRCH.103	2.2	5.7	1.9	3.0	4.3
NPH.2171	1.7	4.0	2.0	3.5	3.8
NPH.2250	4.2	17.6	1.3	1.5	9.6
NPH.2270	1.7	2.7	1.4	1.5	2.1
GK.204	1.6	2.3	0.7	0.0	1.2
GK.205	2.4	7.3	1.4	2.0	4.7
GK.206	1.2	1.0	1.1	1.0	1.0
VCH.110	3.2	13.0	1.4	1.5	7.3
VCH.111	1.7	2.3	1.8	3.0	2.7
VCH.112	2.5	9.0	1.6	2.0	5.5
Tulasi.4	1.5	1.7	1.7	2.5	2.1
Tulasi.117	0.9	0.3	1.7	2.5	1.4
RCH.2Bt(CC)	2.3	7.0	1.1	1.0	4.0
MECH.162Bt(CC)	3.8	16.3	1.6	2.0	9.2
NHH.44(ZC)	5.0	24.3	3.1	9.5	16.9

Percent Locule damage

The VIP gene possessing hybrids recorded 13 to 14% as against 18.42% in NHH.44 hybrid.

Locule damage (%)

Entry	Akola		Surat		Mean %
	TV	%	TV	%	
NECH.2R	0.0	0.0	23.7	16.4	7.8
NECH.3R	0.0	0.0	21.8	14.6	7.4
Bunny VIP	30.0	25.0	18.3	10.0	14.0
2-58 VIP	28.2	22.5	18.8	11.2	13.5
2-81 VIP	28.3	23.3	19.6	11.4	13.1
VARUN	0.0	0.0	17.3	10.2	4.8
JKCH.226	0.0	0.0	18.0	10.5	5.5
JKCH.666	0.0	0.0	13.6	6.3	4.0
ACH-11-2x	6.6	3.8	16.8	9.8	6.4
ACH-33-1	0.0	0.0	16.2	9.3	4.5
ACH-155-1	9.7	4.5	17.5	9.4	6.1
RCH.512X	0.0	0.0	11.6	4.9	3.9
RCH.533X	0.0	0.0	12.3	5.3	4.3
RCH.377	0.0	0.0	13.2	5.4	2.8
MRC.6352	0.0	0.0	12.1	4.5	2.9
MRC.7226X	0.0	0.0	13.5	5.8	3.8
MRC.7347X	0.0	0.0	13.5	5.7	3.3
NCS.138	0.0	0.0	15.7	7.9	4.6
NCS.145	0.0	0.0	21.7	13.6	7.2
NCS.207	0.0	0.0	24.2	18.5	8.2
BRAHMA	0.0	0.0	11.6	4.3	4.3
KRISHNA	0.0	0.0	19.0	11.2	5.1
KIRTIMAN	0.0	0.0	15.7	7.4	4.4
KDCHH.9632	0.0	0.0	14.7	6.5	4.0
KDCHH.531X	0.0	0.0	11.3	4.5	4.2
KDCHH.441X	2.4	0.5	13.2	5.4	3.5
PRCH.101	0.0	0.0	15.0	6.9	4.5
PRCH.102	0.0	0.0	13.5	6.1	4.4
PRCH.103	0.0	0.0	13.4	5.9	3.8
NPH.2171	0.0	0.0	15.9	7.7	4.3
NPH.2250	0.0	0.0	11.7	4.4	3.2
NPH.2270	0.0	0.0	12.5	5.3	3.5
GK.204	0.0	0.0	14.1	6.2	4.0
GK.205	0.0	0.0	12.1	5.1	3.3
GK.206	0.0	0.0	11.8	4.5	3.6
VCH.110	0.0	0.0	10.9	3.7	4.1
VCH.111	0.0	0.0	10.9	3.9	3.2
VCH.112	0.0	0.0	12.1	4.5	3.2
Tulasi.4	0.0	0.0	7.4	1.8	2.7
Tulasi.117	0.0	0.0	9.6	3.3	2.6
RCH.2Bt(CC)	0.0	0.0	8.7	2.4	2.0
MECH.162Bt(CC)	0.0	0.0	13.0	5.2	3.2
NHH.44(ZC)	30.0	25.3	23.4	16.0	18.4
CD (0.05)	4.7		7.4		
CV%	93.1		29.9		

Open boll damage:

The percent open boll damage was quite high in the VIP gene bearing hybrids in comparison to other Bt hybrids. The maximum damage was in NHH.44. The open boll damage above 10% indicates poor Pink bollworm (PBW) suppression in those hybrids. The Hybrids with BG I and BG II genes did not vary in their damage level due to PBW.

Open boll damage (%)

Entry	Akola		Nanded		Surat		Mean %
	TV	%	TV	5	TV	%	
NECH.2R	0.0	0.0	18.4	10.0	29.7	24.7	11.6
NECH.3R	0.0	0.0	19.4	11.0	28.3	23.1	11.4
Bunny VIP	53.0	63.7	18.7	10.0	21.6	13.7	29.1
2-58 VIP	49.9	57.8	17.8	9.4	24.0	17.4	28.2
2-81 VIP	47.0	53.3	15.6	7.3	24.1	17.0	25.9
VARUN	0.0	0.0	15.9	7.6	22.1	16.0	7.9
JKCH.226	0.0	0.0	17.9	9.6	23.4	17.2	8.9
JKCH.666	0.0	0.0	16.9	8.5	17.5	10.3	6.3
ACH-11-2x	7.1	4.4	17.0	8.6	21.8	15.7	9.6
ACH-33-1	0.0	0.0	14.1	6.0	20.3	14.1	6.7
ACH-155-1	15.4	11.1	15.8	7.5	21.1	13.6	10.7
RCH.512X	0.0	0.0	18.6	10.0	15.1	7.9	6.0
RCH.533X	0.0	0.0	13.7	5.6	14.9	7.5	4.4
RCH.377	0.0	0.0	14.2	6.0	16.4	8.3	4.8
MRC.6352	0.0	0.0	15.8	7.5	16.0	7.7	5.1
MRC.7226X	0.0	0.0	17.3	9.1	17.4	9.5	6.2
MRC.7347X	0.0	0.0	18.7	10.0	17.5	9.2	6.4
NCS.138	0.0	0.0	13.7	5.8	19.8	12.3	6.0
NCS.145	0.0	0.0	19.4	11.0	26.5	19.9	10.3
NCS.207	0.0	0.0	18.6	10.0	29.9	26.5	12.2
BRAHMA	0.0	0.0	19.6	11.0	15.2	7.0	6.0
KRISHNA	0.0	0.0	15.7	7.4	24.1	17.7	8.4
KIRTIMAN	0.0	0.0	17.5	9.1	18.7	10.3	6.5
KDCHH.9632	0.0	0.0	16.8	8.6	18.2	10.0	6.2
KDCHH.531X	0.0	0.0	19.2	10.0	14.2	6.8	5.6
KDCHH.441X	0.0	0.0	16.7	8.7	16.0	7.9	5.5
PRCH.101	5.0	2.2	15.9	7.5	17.5	9.3	6.3
PRCH.102	0.0	0.0	19.6	11.0	16.8	9.1	6.7
PRCH.103	0.0	0.0	15.2	6.9	17.0	9.5	5.5
NPH.2171	0.0	0.0	18.1	9.8	19.6	11.5	7.1
NPH.2250	0.0	0.0	13.6	5.5	14.8	7.0	4.2
NPH.2270	0.0	0.0	16.6	8.2	16.0	8.5	5.6
GK.204	0.0	0.0	17.0	8.6	17.4	9.5	6.0
GK.205	0.0	0.0	18.3	10.0	15.5	8.0	6.0
GK.206	0.0	0.0	15.6	7.4	14.9	7.0	4.8
VCH.110	0.0	0.0	17.3	9.1	13.3	5.5	4.9
VCH.111	0.0	0.0	16.5	8.1	14.4	6.9	5.0
VCH.112	0.0	0.0	16.7	8.4	15.6	7.3	5.2
Tulasi.4	0.0	0.0	17.1	8.7	10.0	3.0	3.9
Tulasi.117	0.0	0.0	14.0	5.9	13.3	6.2	4.1
RCH.2Bt(CC)	0.0	0.0	14.8	6.5	11.7	4.2	3.6
MECH.162Bt(CC)	0.0	0.0	15.1	6.8	16.1	7.8	4.9
NHH.44(ZC)	63.8	73.1	37.9	24.0	28.1	22.4	39.8
CD (0.05)	8.6		4.9		9.1		
CV%	95.2		14.4		29.6		

Under unprotected conditions, the number of sprayings was 3.0 to 3.33 in Bt hybrids against 4 in NHH.44. Under protected conditions, this was above 4 for Bt hybrids, indicating that they also received one or more spray against bollworms.

Number of sprayings for sucking pest under UNPROTECTED conditions

Entry	Akola	Nanded	Surat	Mean
NECH.2R	3	2	3	2.67
NECH.3R	5	2	3	3.33
Bunny VIP	5	2	3	3.33
2-58 VIP	5	2	3	3.33
2-81 VIP	5	2	3	3.33
VARUN	5	2	3	3.33
JKCH.226	5	2	3	3.33
JKCH.666	5	2	3	3.33
ACH-11-2x	5	2	3	3.33
ACH-33-1	5	2	3	3.33
ACH-155-1	4	2	4	3.33
RCH.512X	5	2	3	3.33
RCH.533X	5	2	3	3.33
RCH.377	4	2	3	3.00
MRC.6352	5	2	3	3.33
MRC.7226X	4	2	3	3.00
MRC.7347X	5	2	3	3.33
NCS.138	5	2	3	3.33
NCS.145	5	2	3	3.33
NCS.207	5	2	3	3.33
BRAHMA	5	2	3	3.33
KRISHNA	5	2	3	3.33
KIRTIMAN	5	2	3	3.33
KDCHH.9632	4	2	3	3.00
KDCHH.531X	4	2	3	3.00
KDCHH.441X	5	2	3	3.33
PRCH.101	4	2	4	3.33
PRCH.102	5	2	3	3.33
PRCH.103	4	2	3	3.00
NPH.2171	5	2	3	3.33
NPH.2250	6	2	3	3.67
NPH.2270	5	2	2	3.00
GK.204	5	2	3	3.33
GK.205	5	2	3	3.33
GK.206	5	2	2	3.00
VCH.110	5	2	3	3.33
VCH.111	5	2	3	3.33
VCH.112	5	2	3	3.33
Tulasi.4	5	2	3	3.33
Tulasi.117	4	2	3	3.00
RCH.2Bt(CC)	5	2	2	3.00
MECH.162Bt(CC)	6	2	4	4.00
NHH.44(ZC)	6	2	4	4.00

Seed cotton yield

The seed cotton yield, under unprotected conditions, was the highest in RCH.377 (1991 kg/ha), followed by RCH.533X (1941 kg/ha). The seed cotton yield in other comparable hybrids was PRCH.101(1935 kg/ha), PRCH.103(1929 kg/ha), GK.205 (1898 kg/ha), VCH.111 (1809 kg/ha). Check Bt hybrids, viz., MECH.162Bt and RCH.2Bt yielded 1651 and 1694 respectively, while NHH.44 yielded 1371 kg/ha.

Seed cotton yield (Kg/ha) – Unprotected

Entry	Nagpur	Akola	Nanded	Surat	Khandwa	Mean
NECH.2R	1961	1420	740	1591	798	1302
NECH.3R	2100	1226	789	2140	770	1405
Bunny VIP	1788	833	766	1965	681	1207
2-58 VIP	1625	957	821	3138	820	1472
2-81 VIP	2016	1061	925	1847	915	1353
VARUN	1718	686	1093	1514	630	1128
JKCH.226	2315	1132	960	2107	876	1478
JKCH.666	1483	1064	1041	1965	655	1242
ACH-11-2x	1990	1089	995	1602	825	1300
ACH-33-1	2258	1117	1076	1475	1146	1414
ACH-155-1	1997	878	1238	2315	1155	1517
RCH.512X	2015	1041	1221	1792	942	1402
RCH.533X	2359	996	1203	1627	951	1427
RCH.377	2644	1064	1232	1698	1094	1546
MRC.6352	1831	704	908	1651	893	1197
MRC.7226X	2555	1346	1244	1554	872	1514
MRC.7347X	2018	798	902	1803	1173	1339
NCS.138	2029	1105	1050	1760	782	1345
NCS.145	2007	1326	966	2023	803	1425
NCS.207	2051	1046	1012	2596	971	1535
BRAHMA	1611	1207	1278	1736	1082	1383
KRISHNA	2122	736	807	1962	1084	1342
KIRTIMAN	1803	923	972	1384	1016	1220
KDCHH.9632	1397	835	1159	1291	819	1100
KDCHH.531X	2263	1124	1137	1788	1113	1485
KDCHH.441X	2157	995	1339	1700	985	1435
PRCH.101	2219	1092	1221	1872	1011	1483
PRCH.102	1533	1151	1350	1700	687	1284
PRCH.103	1925	1177	1302	2243	1125	1554
NPH.2171	1842	848	1059	1754	695	1240
NPH.2250	1791	850	1255	1751	731	1276
NPH.2270	1538	738	1403	2737	1039	1491
GK.204	1539	1124	1348	1809	812	1326
GK.205	1960	1286	1354	2612	1026	1648
GK.206	1416	1145	1064	2755	1047	1485
VCH.110	1901	1215	1527	1865	1022	1506
VCH.111	1639	1113	1096	1872	800	1304
VCH.112	2271	1111	1134	1864	1012	1478
Tulasi.4	1757	738	972	1398	956	1164
Tulasi.117	1983	758	839	1204	470	1051
RCH.2Bt(CC)	1897	1029	1165	1694	821	1321
MECH.162Bt(CC)	1929	855	723	2091	1022	1324
NHH.44(ZC)	1661	479	445	2659	947	1238
CD (0.05)	530	2890	297	515	254	
CV%	18.5	17.6	16.4	17	9.9	

The following table provides an idea about the performance of these test Bt hybrids under protected and unprotected conditions. It is found that most of them gave more seed cotton yield under unprotected conditions. Under low bollworm pressure, the assessment of performance based on seed cotton yield is difficult with the available data of this year. The only Bt hybrid that provided good seed cotton yield under both the conditions is RCH.377 and GK.205.

Comparative seed cotton yield under protected and unprotected conditions during 2004

Entry	Mean Seed cotton yield (kg/ha)	
	Protected	Unprotected
NECH.2R	1649	1302
NECH.3R	1637	1405
Bunny VIP	1885	1207
2-58 VIP	1652	1472
2-81 VIP	1690	1353
VARUN	1491	1128
JKCH.226	2078	1478
JKCH.666	1549	1242
ACH-11-2x	1764	1300
ACH-33-1	1865	1414
ACH-155-1	1740	1517
RCH.512X	1746	1402
RCH.533X	1971	1427
RCH.377	2115	1546
MRC.6352	1394	1197
MRC.7226X	1940	1514
MRC.7347X	1779	1339
NCS.138	1564	1345
NCS.145	1787	1425
NCS.207	1763	1535
BRAHMA	1634	1383
KRISHNA	1863	1342
KIRTIMAN	1488	1220
KDCHH.9632	1668	1100
KDCHH.531X	1865	1485
KDCHH.441X	1798	1435
PRCH.101	2036	1483
PRCH.102	1882	1284
PRCH.103	1878	1554
NPH.2171	1718	1240
NPH.2250	1682	1276
NPH.2270	1396	1491
GK.204	1673	1326
GK.205	1987	1648
GK.206	1754	1485
VCH.110	1691	1506
VCH.111	1687	1304
VCH.112	1876	1478
Tulasi.4	1721	1164
Tulasi.117	1377	1051
RCH.2Bt(CC)	1813	1321
MECH.162Bt(CC)	1805	1324
NHH.44(ZC)	1487	1238

PLANT PATHOLOGY EVALUATION

During this year Bacterial blight disease was prevalent in the five centres where the 40 Bt cotton hybrids were evaluated for their reaction to diseases. Alternaria leaf spot was noticed only at Nagpur and Nanded whereas serious incidence of Grey mildew was observed in Nanded. Parawilt was present in Khandwa and Akola. Low incidence of Myrothecium leaf spot was also noticed in Nagpur.

Bacterial Blight

Very high incidence of bacterial blight was noticed at Akola and Surat. At Nagpur, Nanded and Khandwa this disease was seen in less severe form. Almost all Bt hybrids were found susceptible to this disease at Akola with JKCH 226 having maximum disease incidence (35.81%) and VCH 112 and Tulasi-4 with least disease incidence (11.37%). At Surat, JKCH 226 (32.75%) had the maximum disease, as given in the following table.

Reaction of Bt hybrids to Bacterial blight disease (Percent Disease Incidence)

Entry	Nagpur	Surat	Nanded		Khandwa		Akola
			Protected	Un protected	Protected	Un protected	
NECH.2R	2.60	15.04	3.23	5.00	3.00	1.90	-
NECH.3R	0.49	22.04	3.23	7.38	1.90	2.20	22.84
Bunny VIP	2.06	0.57	0.00	5.00	2.10	2.30	34.26
2-58 VIP	4.15	15.47	5.00	5.00	1.90	2.00	32.44
2-81 VIP	3.05	0.57	0.00	0.00	1.90	2.10	27.13
VARUN	0.47	0.57	0.00	3.21	2.20	2.30	33.64
JKCH.226	1.76	32.75	7.00	12.15	3.10	1.90	35.81
JKCH.666	0.00	17.42	0.00	0.00	3.00	1.90	22.84
ACH-11-2x	1.04	7.79	0.00	0.00	2.80	2.00	33.95
ACH-33-1	0.21	0.57	0.00	5.00	3.10	2.10	40.12
ACH-155-1	2.16	6.71	0.00	5.00	2.20	2.30	28.70
RCH.512X	1.18	16.03	0.00	0.00	2.60	1.80	25.31
RCH.533X	0.89	19.63	0.00	0.00	3.10	3.20	31.48
RCH.377	1.15	25.87	0.00	0.00	3.10	1.80	28.70
MRC.6352	1.50	19.95	9.13	15.00	2.20	2.20	27.16
MRC.7226X	0.00	22.26	9.20	4.21	2.00	2.10	18.21
MRC.7347X	1.68	0.57	0.00	0.00	3.10	3.20	20.37
NCS.138	0.20	5.04	0.00	5.00	2.90	2.20	31.97
NCS.145	2.78	13.35	0.00	5.00	2.40	1.80	27.78
NCS.207	5.27	11.38	0.00	0.00	2.10	2.30	26.24
BRAHMA	0.43	0.57	0.00	0.00	2.10	2.30	24.71
KRISHNA	2.01	21.98	0.00	0.00	2.00	2.20	23.15
KIRTIMAN	0.20	19.92	0.00	3.21	3.00	2.10	31.48

KDCHH.9632	0.62	10.97	0.00	7.90	2.20	2.10	26.85
KDCHH.531X	0.07	5.69	9.32	9.32	2.00	2.10	25.93
KDCHH.441X	0.54	13.74	3.10	2.13	2.10	2.70	28.09
PRCH.101	0.43	22.90	2.00	5.32	3.20	3.20	17.59
PRCH.102	0.00	7.61	0.00	0.00	3.00	3.20	21.67
PRCH.103	4.69	0.57	5.00	10.00	3.00	2.00	16.36
NPH.2171	0.31	7.33	5.00	5.00	2.00	2.10	14.20
NPH.2250	0.00	20.63	0.00	0.00	2.20	2.20	19.45
NPH.2270	2.68	26.80	5.00	5.00	1.90	2.40	19.14
GK.204	0.58	30.23	5.00	5.00	2.10	2.30	28.02
GK.205	0.00	20.01	5.00	5.00	2.30	2.50	13.27
GK.206	3.91	21.70	2.20	0.00	2.00	2.00	16.36
VCH.110	0.57	24.21	0.00	3.13	3.10	2.10	15.12
VCH.111	0.73	0.57	3.13	0.00	2.00	2.10	21.61
VCH.112	0.00	21.37	0.00	2.00	2.30	2.50	11.73
Tulasi.4	0.00	5.79	6.95	6.95	1.90	2.20	11.73
Tulasi.117	0.00	15.47	0.00	0.00	2.30	2.10	14.82
RCH.2Bt(CC)	0.00	16.92	3.21	3.21	3.00	2.90	11.97
MECH.162Bt(CC)	0.00	14.06	3.21	3.21	2.10	2.90	12.97
NHH.44(ZC)	0.62	8.65	5.00	5.00	1.80	2.80	12.04

Alternaria Leaf Spot

Even though this disease was noticed both at Nagpur and Nanded, there was significant incidence only at Nanded. Under **protected conditions** a disease incidence of more than 10.00 percent was noticed in NECH 3R, 2 – 81 VIP, JKCH 666, ACH – 11 – 2X, ACH – 33 – 1, RCH- 533X, MRC -6325, MRC – 7226X, MRC 7347X, NCH 138, Brahma, Krishna, KDCHH 441X, NPH 2250, GK 204, GK 205, GK 206, VCH 112, MECH 162 Bt (cc), and NHH 44(2c). The rest of the hybrids had lesser than 10.00 percent incidence, as given below.

**Reaction of Bt hybrids to Alternaria Leaf Spot
(Percent Disease Incidence)**

Entry	Nagpur	Nanded	
		Protected	Unprotected
NECH.2R	0.58	3.00	5.00
NECH.3R	0.88	8.35	10.00
Bunny VIP	0.00	5.00	5.90
2-58 VIP	2.02	5.00	5.53
2-81 VIP	0.31	9.10	12.75
VARUN	1.52	5.00	5.95
JKCH.226	1.63	5.00	5.50
JKCH.666	0.40	10.00	12.00
ACH-11-2x	1.33	10.00	15.00
ACH-33-1	0.73	7.90	10.00
ACH-155-1	0.10	7.90	7.90
RCH.512X	0.69	7.90	9.80
RCH.533X	0.71	10.00	15.00
RCH.377	0.00	3.20	5.70
MRC.6352	0.30	6.93	10.75
MRC.7226X	2.24	12.38	15.00
MRC.7347X	1.91	10.00	10.54
NCS.138	1.15	10.00	15.00
NCS.145	0.91	9.34	9.34
NCS.207	0.98	9.34	9.34
BRAHMA	0.28	10.00	12.95
KRISHNA	1.01	12.38	15.00
KIRTIMAN	1.00	10.00	9.09
KDCHH.9632	1.23	9.90	9.09
KDCHH.531X	0.29	9.00	9.50
KDCHH.441X	1.16	15.00	15.87
PRCH.101	0.86	1.21	5.00
PRCH.102	0.83	5.00	5.00
PRCH.103	0.74	5.00	5.09
NPH.2171	0.00	5.95	9.00
NPH.2250	0.92	10.00	10.00
NPH.2270	1.42	3.21	2.00
GK.204	0.42	10.00	10.00
GK.205		10.00	15.00
GK.206	0.00	10.00	12.53
VCH.110	0.47	5.00	5.00
VCH.111	1.18	7.00	8.95
VCH.112	2.02	7.00	10.00
Tulasi.4		2.00	2.00
Tulasi.117	0.25	2.00	5.00
RCH.2Bt(CC)	1.31	2.00	5.95
MECH.162Bt(CC)	0.00	10.00	15.00
NHH.44(ZC)	0.85	5.94	10.00

Grey mildew

Grey mildew was noticed only at Nanded in both protected and unprotected plots. Under unprotected conditions, the following Bt hybrids have been found to be susceptible to Grey mildew having more than 20 percent disease incidence in the grades of three and four; NECH 32, Bunny VIP, 2 - 81 VIP, ACH – 33 – 1, MRC 6325, MRC 7226X, MRC 7347X, NCS 138, NCS 145, BRAHMA, KDCHH 9632, KDCHH 531X, KDCHH 441X, GK 206, and also the zonal check NHH 44 and common check MECH 162 Bt. The above hybrids were also found to be susceptible to a less extent under protected conditions, as given in the following table

Reaction of Bt hybrids to Grey mildew (*Percent Disease Incidence)

Entry	Nanded					
	Protected			Unprotected		
	PDI*	Max. grade	Yield (Kg/ha)	PDI	Max. grade	Yield (Kg/ha)
NECH.2R	10.00	2	740	15.00	3	1574
NECH.3R	10.00	2	789	30.00	4	1267
Bunny VIP	15.31	3	766	25.25	4	1088
2-58 VIP	10.00	2	821	10.00	2	1163
2-81 VIP	15.00	3	925	25.10	4	1204
VARUN	10.00	2	1093	10.00	2	943
JKCH.226	5.00	1	960	10.00	2	1435
JKCH.666	10.03	2	1041	15.00	3	885
ACH-11-2x	10.23	3	995	15.35	3	1042
ACH-33-1	15.00	3	1076	25.00	4	1215
ACH-155-1	15.90	4	1238	15.00	3	1152
RCH.512X	10.09	2	1221	9.89	2	1175
RCH.533X	10.00	2	1203	10.00	2	1383
RCH.377	5.00	1	1232	10.00	2	1574
MRC.6352	10.95	3	908	20.32	4	1140
MRC.7226X	20.00	4	1244	25.09	4	1435
MRC.7347X	17.25	3	902	23.21	4	1192
NCS.138	20.00	4	1050	35.07	4	880
NCS.145	20.00	4	966	35.00	4	1140
NCS.207	10.00	2	1012	15.00	3	1076
BRAHMA	20.03	4	1278	35.93	4	1105
KRISHNA	15.00	3	807	15.00	3	1215
KIRTIMAN	9.95	2	972	10.00	2	1180
KDCHH.9632	20.23	4	1159	30.00	4	1209
KDCHH.531X	20.13	4	1137	35.32	4	1539
KDCHH.441X	20.00	4	1339	30.07	4	1453
PRCH.101	5.00	1	1221	5.00	1	1140
PRCH.102	10.00	2	1350	10.53	3	1076
PRCH.103	5.00	1	1302	5.00	1	1100
NPH.2171	10.00	2	1059	10.00	2	1285
NPH.2250	15.00	3	1255	15.00	3	1059
NPH.2270	9.90	2	1403	9.91	2	1308
GK.204	5.00	1	1348	5.00	1	1360
GK.205	5.00	1	1354	5.00	1	1331
GK.206	20.25	4	1064	25.25	4	1372
VCH.110	8.05	1	1527	8.05	2	1476
VCH.111	1.23	1	1096	1.23	1	1163
VCH.112	9.11	2	1134	9.11	2	1192
Tulasi.4	15.21	3	972	15.21	3	1175
Tulasi.117	10.00	2	839	10.00	2	770
RCH.2Bt(CC)	5.00	1	1165	5.00	1	1539
MECH.162Bt(CC)	25.00	4	723	25.00	4	833
NHH.44(ZC)	21.23	3	445	21.23	4	573

Parawilt

The Parawilt was noticed at a higher percentage at Khandwa than at Akola. A maximum incidence of 32.22 percent was seen in the Bt hybrid NPH 2270. The hybrids Bunny VIP, MRC 6325, and NCS 207 did not suffer from wilting both at Khandwa and Akola. The seed cotton yield was not affected due to the late occurrence of the Para wilt.

Reaction of Bt hybrids to Parawilt (*Percent Disease Incidence)

Entry	Khandwa				Akola	
	Protected		Unprotected		PDI	Yield (Kg/ha)
	PDI*	Yield (Kg/ha)	PDI	Yield (Kg/ha)		
NECH.2R	1.11	798	2.22	1049	0.0 (0.7)**	1419.7
NECH.3R	0.00	770	0.00	1342	2.4 (1.4)	1225.8
Bunny VIP	0.00	681	0.00	1336	0.0 (0.7)	833.4
2-58 VIP	3.33	820	2.22	1087	0.0 (0.7)	956.8
2-81 VIP	10.00	915	1.11	1290	0.0 (0.7)	1061.1
VARUN	10.00	630	0.00	717	0.0 (0.7)	686.4
JKCH.226	1.11	876	10.00	1323	0.0 (0.7)	1131.7
JKCH.666	3.33	655	2.22	953	2.4 (1.4)	1064.1
ACH-11-2x	4.44	825	0.00	1010	0.0 (0.7)	1089.1
ACH-33-1	0.00	1146	7.77	1566	0.0 (0.7)	1117.1
ACH-155-1	0.00	1155	1.11	1418	0.0 (0.7)	877.5
RCH.512X	6.66	942	0.00	1232	0.0 (0.7)	1040.5
RCH.533X	3.33	951	10.00	1025	7.3 (2.5)	996.4
RCH.377	10.00	1094	1.11	1633	4.9 (2.1)	1064.1
MRC.6352	0.00	893	0.00	1084	0.0 (0.7)	704
MRC.7226X	1.11	872	7.77	1397	0.0 (0.7)	1346.3
MRC.7347X	0.00	1173	11.11	1134	7.1 (2.0)	798
NCS.138	0.00	782	0.00	1036	2.4 (1.4)	1105.2
NCS.145	1.11	803	1.11	1479	2.4 (1.4)	1325.8
NCS.207	0.00	971	0.00	1357	0.0 (0.7)	1046.4
BRAHMA	14.44	1082	8.86	928	3.0 (1.5)	1206.7
KRISHNA	5.56	1084	1.11	1450	0.0 (0.7)	736.3
KIRTIMAN	11.11	1016	0.00	1004	2.4 (1.4)	923
KDCHH.9632	5.55	819	4.44	985	2.6 (1.4)	834.8
KDCHH.531X	7.77	1113	10.00	1084	0.0 (0.7)	1124.4
KDCHH.441X	10.00	985	12.24	1366	2.6 (1.4)	994.9
PRCH.101	8.88	1011	0.00	1568	2.4 (1.4)	1092
PRCH.102	5.55	687	4.44	983	0.0 (0.7)	1150.8
PRCH.103	5.55	1125	6.66	1448	4.8 (1.8)	1177.2
NPH.2171	16.66	695	8.88	1239	4.8 (2.1)	848
NPH.2250	13.33	731	7.78	1109	2.4 (1.4)	849.5
NPH.2270	32.22	1039	8.89	944	0.0 (0.7)	737.8
GK.204	17.77	812	14.44	919	0.0 (0.7)	1124.3
GK.205	8.89	1026	5.55	1539	0.0 (0.7)	1286
GK.206	3.33	1047	11.11	1467	2.4 (1.4)	1144.9
VCH.110	7.78	1022	5.55	1242	0.0 (0.7)	1215.4
VCH.111	1.11	800	0.00	1175	0.0 (0.7)	1112.6
VCH.112	8.90	1012	11.11	1288	0.0 (0.7)	1111.1
Tulasi.4	7.77	956	10.00	1206	0.0 (0.7)	737.8
Tulasi.117	0.00	470	5.55	924	4.8 (2.1)	758.4
RCH.2Bt(CC)	1.12	821	0.00	924	0.0 (0.7)	1028.8
MECH.162Bt(CC)	10.00	1022	7.77	1389	0.0 (0.7)	855.4
NHH.44(ZC)	5.55	947	0.00	1241	0.0 (0.7)	479.1
C.D (0.05)	7.25	254.12	7.25		0.8	
CV%	41.71	9.94	41.71	7.12	76.4	

**Values in the parentheses are square root transformed values

Myrothecium Leaf Spot

A maximum incidence of 7.73 percent was noticed on the hybrids VCH 111 and 7.03 on Kirtiman at Nagpur and the rest of them very low incidence, as given below. This disease at times becomes serious under central zone conditions of alternating dry and wet spells.

Reaction of Bt hybrids to Myrothecium Leaf Spot (Percent Disease Incidence)

Entry	Nagpur
NECH.2R	1.54
NECH.3R	3.40
Bunny VIP	2.14
2-58 VIP	4.25
2-81 VIP	3.28
VARUN	1.99
JKCH.226	2.64
JKCH.666	1.88
ACH-11-2x	3.85
ACH-33-1	3.13
ACH-155-1	1.75
RCH.512X	1.66
RCH.533X	1.19
RCH.377	3.02
MRC.6352	1.58
MRC.7226X	2.45
MRC.7347X	2.44
NCS.138	4.39
NCS.145	1.71
NCS.207	5.27
BRAHMA	2.85
KRISHNA	2.52
KIRTIMAN	7.03
KDCHH.9632	1.85
KDCHH.531X	3.01
KDCHH.441X	1.48
PRCH.101	1.22
PRCH.102	5.73
PRCH.103	3.13
NPH.2171	2.87
NPH.2250	3.40
NPH.2270	4.89
GK.204	2.00
GK.205	-
GK.206	2.14
VCH.110	2.46
VCH.111	7.73
VCH.112	1.94
Tulasi.4	-
Tulasi.117	2.81
RCH.2Bt(CC)	2.80
MECH.162Bt(CC)	3.54
NHH.44(ZC)	1.66

CONCLUSIONS:

□ Since the bollworm Spotted bollworm and American bollworm pressure was quite low, actual gene action to resist these pests could not be tested. However, the data on Pink bollworm number in green bolls and their damage to bolls do speak about the poor efficacy of various Bt genotypes to counteract this bollworm that is building up in central India in cotton.

□ Under Protected condition, those hybrids that yielded over 1900 kg/ha were RCH.377 (2115 kg/ha), JKCH.226 (2078 kg/ha), PRCH.101 (2036 kg/ha) & GK.205 (1987 kg/ha), RCH.512X (1971 kg/ha) and MRC.7226 (1940 kg/ha). However, under unprotected condition, GK.205 (1648 kg/ha), PRCH.103 (1554 kg/ha), RCH.377 (1546 kg/ha), NCS.207 (1535 kg/ha), MRC.7226X (1514 kg/ha), ACH-155-1(1517 kg/ha) and VCH.110 (1506 kg/ha) were the top yielding genotypes. The genotypes that yielded better in both the protected and unprotected conditions during 2004 season were JKCH.226 (2078, 1478 kg/ha), RCH.377 (2115, 1546 kg/ha), MRC.7226X (1940, 1514 kg/ha), PRCH.101 (2036, 1483 kg/ha) and GK.205 (1987, 1648 kg/ha).

□ The fibre property values indicated that most of the entries did not satisfy CIRCOT and SITRA (South India Textile Research Association – Textile Ministry) norms. The fibre strength values did not match with the span length data in all the test hybrids.

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