

**Bt COTTON**  
**EVALUATION REPORT**  
Second year - 6 H x H Bt hybrids  
and combined report for 2003 & 2004 seasons

**SOUTH ZONE**

*Submitted to*  
**INDIAN COUNCIL OF AGRICULTURAL RESEARCH**

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## Executive Summary

The six Bt hybrids, vide ICAR letter No.2(8)/2003-C.C.I. dated 25.4.2003 were evaluated in the South Zone AICCIP centers. The report for 2004 season as well as the combined report of 2003 and 2004 seasons in regard to these eight Bt hybrids is provided.

The six Bt hybrids, viz., RCH.344 Bt, RCH. 362 Bt, RCH. 368 Bt, MRC. 6160 Bt, MRC. 6322 Bt, MRC. 6703 Bt were evaluated with MECH.162Bt and RCH2Bt as check hybrids and Bunny as Zonal hybrid check. These entries were evaluated at Central Institute for Cotton Research Institute, Regional Station, Coimbatore, University of Agricultural Sciences, Dharwad and its RARS, Siruguppa, Acharya NG Ranga Agricultural University, Guntur and its RARS, Nandyal for the second year in succession with the same protocol observed during 2003 *kharif* season.

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 jassid population in the test hybrids was quite high in spite of protection with insecticides at threshold level, as seen from below. The check entries were also quite susceptible to this pest during this season in this zone. The incidence of thrips was uniformly high in most of the test entries in spite of being under protected conditions in this zone. Under unsprayed condition, the jassid build up was quite high in the test hybrids and check hybrids. All these genotypes seem to be highly susceptible to jassids. The thrips population was also quite high in all the test hybrids in different phonological stages of the crop in unsprayed condition during this season. The whitefly incidence was above threshold in unsprayed plots in both test hybrids as well as check hybrids. Their incidence was high in Nandyal and Guntur centres in unprotected plots.
- ◆ The American bollworm per plant was observed in all test entries in this zone. The pest was noticed at very low population and the results of this observation are inconclusive. Last season too, this pest poorly infested the test hybrids.

- ◆ The Pink bollworm was seen to build up in this zone during this season. The extent of locule damage was recorded in the test entries under protected condition. RCH 344 and 362 Bt hybrids had less locule damage over other test Bt hybrids and checks. Bt check hybrids also had 10% locule damage due to this pest incidence. The mean percent locule damage was quite low in RCH.344 Bt unlike other test Bt hybrids as well as check and non-Bt hybrids. The zonal check had over 30% locule damage. The percent open boll damage was, however, quite high in RCH Bt hybrids under unprotected condition. The MRC.6160Bt hybrid had the lowest of 16.1% amongst the six Bt test hybrids under unprotected condition. The average number of spraying in Bt hybrids in south zone during 2004 season was between 4.3 to 5.0 rounds while the same in non-Bt hybrids and checks ranged between 5.5 to 6.8 rounds during the season for both sap sucking pests and bollworms. The plant protection in unprotected plots was done only against sap sucking pests and ranged from 2.0 to 2.7 in Bt test hybrids.
- ◆ Very high incidence of Grey mildew was noticed in Dharwad and Siruguppa and moderate incidence in Lam and Coimbatore (TNAU). In the trials with H x H Bt I hybrids the disease incidence varied from 34.82 to 48.91 percent in Dharwad, 31.95 to 46.54 percent in Siruguppa and 19.25 to 30.62 percent in the Lam farm (Guntur). Both Bt and non-Bt hybrids were found equally susceptible to Grey mildew. Among the Bt hybrids RCH 344 Bt had lower disease incidence in three centres.
- ◆ Bacterial Blight disease was noticed only in the Dharwad and Siruguppa centres at moderate level in H x H Bt I hybrids (16.34 to 23.72 %) and on BG II hybrids (14.73 to 21.09 %). All hybrids (Bt and non-Bt) were moderately susceptible in both trials and there were no significant differences among them.
- ◆ Among these H x H Bt hybrids, very high incidence of alternaria leaf spot was seen at Dharwad and Siruguppa and to a less extent at the Lam centre. At Coimbatore, this disease was noticed during the early phase of crop. There was higher disease incidence under the UNSPRAYED PLOTS. Both Bt and non-Bt hybrids were equally susceptible to this disease. There was no significant difference in the incidence among the hybrids. MRC.6322 Bt had the highest disease incidence (31.85%) followed by RCH 2Bt (30.48%) when overall mean was compared in unsprayed plots. These two diseases were observed only in the Lam (Guntur) centre in the H x H Bt I

and BG II hybrid trials. All hybrids (Bt and non-Bt) as well as check were found to be moderately susceptible to the two diseases.

- ◆ The best hybrids that performed uniformly in the zone were MRC.6160Bt (2238.8 kg/ha) and RCH.344Bt (2071.3 kg/ha) in all the test centres under protected condition. However, due to terminal drought at Nandyal and Siruguppa, the expression of the test hybrids was not up to the expectations. Hence the mean seed cotton yield was recalculated removing the Nandyal and Siruguppa data, RCH.368.Bt performed well, yielding 2439.3 kg/ha. This hybrid seems to perform better under irrigated conditions or in assured rainfall areas. There was clear indication of adaptation of hybrids to the zone as seen in the yield of RCH.2Bt check hybrid. Other checks and non-Bt counter-parts were less yielding in seed cotton than the six test Bt hybrids.
- ◆ The seed cotton yield under unprotected conditions in the test hybrids of South zone show that 1935 kg/ha in the case of RCH.368Bt followed by 1791 kg/ha in RCH.344Bt, 1679 kg/ha for MRC.6703Bt and 1592 kg/ha for MRC.6160Bt (after excluding bad data from Siruguppa and Nandyal due to drought). If the seed cotton yield of all the five centres are considered, the best hybrid is MRC.6160Bt (1527 kg/ha) followed by RCH.368Bt (1445 kg/ha), RCH.344Bt (1334 kg/ha) and MRC.6703Bt (1295 kg/ha). Consistency of seed cotton yield over 2003 and 2004 seasons was clearly seen in RCH.362Bt (1935 kg/ha in protected plots and 1759 kg/ha in unprotected plots) and RCH.344Bt (1791 kg/ha in protected plots and 1590 kg/ha in unprotected plots), in both unprotected and unprotected conditions in South zone was clear. These two hybrids did show superiority in performance in terms of seed cotton yield in comparison to the other four Bt hybrids.
- ◆ A comparative study of mean span length with mean fibre strength along with the respective micronaire values show that none of these entries fall within the SITRA (South India Textile Research Association – Textile Ministry) norms of getting the desired yarn quality with optimum use of the fibre. The mean micronaire values are very high to make the fibre coarser in these six Bt test entries during 2004 season. Fibre samples from large plots may provide better picture about the status of the fibre quality. The fibres of the bolded entries such as RCH.368Bt and MRC.6160 are nearer to the achievable SITRA norms. Large scale cultivation with mill test of a

minimum of 50 kg as is done in All India Coordinated Cotton improvement Project has to be undertaken to realize the actual fibre quality of the test hybrids.

### **Overall assessment of two year results:**

- ◆ During 2003 season, the sap-sucking pests were similar in pattern of infestation in unprotected and protected plots. Due to drought conditions, the general population of jassids was low; however, their numbers on three leaves per plant did show a significant difference between various entries. During 2004, under unsprayed condition, the jassids was quite high in the test hybrids and check hybrids. All these genotypes seem to be highly susceptible to jassids. In spite of protection with insecticides at threshold level, their population was quite high.
- ◆ Although the American bollworm was in low in population during both the years, the test hybrids did show certain degree of suppression of Pink bollworm during both the years. During 2004, the percent open boll damage was, however, quite high in RCH Bt hybrids. The MRC.6160Bt hybrid had the lowest of 16.1% amongst the six Bt test hybrids under unprotected condition. During 2003 season, the percent open boll damage was virtually fifty percent of that in non-Bt hybrids as well as in check hybrids. The highest percent was in MRC.6322Bt (20.88%) followed by RCH.362Bt (16.92%).
- ◆ A comparison of the seed cotton yield of both protected and non-protected plots showed that RCH.2Bt and RCH.362Bt hybrids had consistent superiority over other Bt hybrids in spite of being a drought year. Consistency of seed cotton yield over 2003 and 2004 seasons was clearly seen in RCH.362Bt (1935 kg/ha in protected plots and 1759 kg/ha in unprotected plots) and RCH.344Bt (1791 kg/ha in protected plots and 1590 kg/ha in unprotected plots), in both unprotected and unprotected conditions in South zone was clear, as given below. These two hybrids did show superiority in performance in terms of seed cotton yield in comparison to the other four Bt hybrids.
- ◆ The fibre quality values of the various test hybrids during two seasons provide wide variation in the strength and micronaire values. Hence, it is not possible to state that

the fibre obtained from this evaluation of these six test hybrids possess the desired fibre quality to achieve specific yarn count. The same is true for the check Bt and conventional hybrids. Large scale cultivation with mill test of a minimum of 50 kg as is done in All India Coordinated Cotton improvement Project has to be undertaken to realize the actual fibre quality of the test hybrids. The fibres of the bolded entries such as RCH.368Bt and MRC.6160 are nearer to the achievable SITRA norms.

# EVALUATION REPORT FOR SECOND YEAR (2004-05 season)

## Introduction

The All India Coordinated Cotton Improvement Project (AICCIP) undertook the evaluation of **SIX cotton hybrids, viz.**, RCH.344 Bt, RCH. 362 Bt, RCH. 368 Bt, MRC. 6160 Bt, MRC. 6322 Bt, MRC. 6703 Bt, possessing the Cry 1 A(c) gene expressing delta- endotoxin, were evaluated with MECH.162Bt and RCH.2Bt as check hybrids and Bunny as Zonal hybrid check. in South Zone centres, viz., Central Institute for Cotton Research Institute, Regional Station, Coimbatore, University of Agricultural Sciences, Dharwad and its RARS, Siruguppa, Acharya NG Ranga Agricultural University, RARS, Guntur and RARS, Nandyal for the second year in succession (vide ICAR letter No.2(8)/2003-C.C.I. dated 25.4.2003) with the same protocol observed during 2003 *kharif* season.

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 and their non-Bt counterparts were provided by the above seed companies. The relevant Bt check, local checks were included for comparison and results are furnished below:

## BREEDING (protected) & PLANT PROTECTION (unprotected) Evaluation

DESIGN-RBD - No. of treatments :16, 3 REPLICATIONS – 6 ROWS X 6 metre rows

### Breeding Evaluation (Protected from sap sucking pests at ETL) Intra-hirsutum Bt hybrids

#### Germination percentage

The experiments were planted during the stipulated time of planting and there was good germination in all the entries, as given below for both the evaluations.

#### Germination % - Breeding Evaluation

| Entry        | Siruguppa | Nandyal | Lam Guntur | Dharwad | CICR CBE | Mean |
|--------------|-----------|---------|------------|---------|----------|------|
| RCH.344 Bt   | 92.9      | 100     | 59.5       | 89.39   | 82.3     | 85   |
| RCH.344      | 90.9      | 99      | 57.5       | 89.39   | 70.6     | 81   |
| RCH. 362 Bt  | 88.9      | 100     | 59.0       | 90.90   | 77.0     | 83   |
| RCH. 362     | 91.2      | 99      | 60.0       | 90.15   | 78.9     | 84   |
| RCH. 368 Bt  | 92.2      | 99      | 59.5       | 89.39   | 84.5     | 85   |
| RCH. 368     | 88.4      | 99      | 58.5       | 88.63   | 82.3     | 83   |
| MRC. 6160 Bt | 89.10     | 100     | 58.5       | 90.15   | 88.6     | 85   |
| MRC. 6160    | 93.4      | 99      | 60.0       | 98.39   | 91.2     | 88   |
| MRC. 6322 Bt | 83.60     | 99      | 59.0       | 90.90   | 70.0     | 81   |
| MRC. 6322    | 90.7      | 99      | 60.0       | 9.90    | 89.2     | 70   |
| MRC. 6703 Bt | 86.90     | 100     | 60.0       | 85.89   | 80.9     | 83   |
| MRC. 6703    | 92.9      | 97      | 60.0       | 85.60   | 84.8     | 84   |



|                     |       |     |      |       |      |    |
|---------------------|-------|-----|------|-------|------|----|
| RCH.2 Bt (check)    | 68.00 | 99  | 60.0 | 89.39 | 83.6 | 80 |
| MECH.162 Bt (check) | 88.40 | 100 | 58.5 | 90.15 | 89.2 | 85 |
| Local checks        | 67.70 | 99  | 56.5 | 90.15 | 69.7 | 77 |
| BUNNY (Zonal check) | 87.6  | 100 | 59.5 | 90.90 | 86.4 | 85 |

Local checks : LAHH.5 (AP)/DHH.11 (T.N. & Karnataka)

### Boll weight (g)

The boll weight ranged from 5.8 to 4.8g in Bt hybrids over the range of 4.4. to 4.6 in hybrids for comparison, as given below.

| Entry                  | Siruguppa | Nandyal | Lam Guntur | Dharwad | CICR CBE | Mean |
|------------------------|-----------|---------|------------|---------|----------|------|
| RCH.344 Bt             | 4.46      | 2.6     | 4.88       | 5.83    | 6.1      | 4.8  |
| RCH.344                | 4.52      | 2.5     | 4.12       | 5.75    | 5.6      | 4.5  |
| RCH. 362 Bt            | 4.58      | 4.1     | 5.57       | 6.20    | 5.8      | 5.3  |
| RCH. 362               | 3.83      | 2.4     | 4.54       | 5.20    | 5.2      | 4.2  |
| RCH. 368 Bt            | 4.75      | 2.9     | 4.47       | 5.33    | 5.7      | 4.6  |
| RCH. 368               | 3.43      | 2.5     | 4.66       | 5.00    | 6.1      | 4.3  |
| MRC. 6160 Bt           | 5.08      | 4.4     | 4.86       | 5.68    | 5.2      | 5.0  |
| MRC. 6160              | 4.93      | 3.1     | 4.57       | 5.05    | 5.2      | 4.6  |
| MRC. 6322 Bt           | 4.94      | 4.4     | 6.44       | 6.73    | 6.3      | 5.8  |
| MRC. 6322              | 3.73      | 2.2     | 4.61       | 5.20    | 5.3      | 4.2  |
| MRC. 6703 Bt           | 4.29      | 3.5     | 4.71       | 5.93    | 5.1      | 4.7  |
| MRC. 6703              | 3.50      | 2.5     | 4.28       | 5.05    | 4.9      | 4.0  |
| RCH.2 Bt (CC)          | 4.01      | 4.1     | 4.80       | 5.45    | 5.8      | 4.8  |
| MECH.162 Bt (Bt check) | 3.87      | 2.7     | 4.15       | 4.55    | 4.5      | 4.0  |
| Local check            | 3.90      | 2.8     | 4.78       | 5.38    | 5.3      | 4.4  |
| BUNNY (Zonal check)    | 4.24      | 2.7     | 4.48       | 5.13    | 5.3      | 4.4  |
| CD (0.05%)             |           |         | NS         | 0.45    | 0.9      |      |
| CV                     |           |         | 0.5        | 3.94    | 7.3      |      |

Local check :LAHH.5 (AP)/DHH.11 (T.N. & Karnataka)

### Total number of bolls/plant

There was no difference in the boll number per plant in all the hybrid entries in the zone. The range was between 35 to 37.9 bolls on an average in the zone, as given below.

| Entry                 | Siruguppa | Nandyal | Lam Guntur | Dharwad | CICR CBE | Mean |
|-----------------------|-----------|---------|------------|---------|----------|------|
| RCH.344 Bt            | 35.73     | 37.5    | 35.7       | 37.89   | 34.0     | 36.2 |
| RCH.344               | 36.24     | 36.2    | 33.4       | 37.55   | 34.5     | 35.6 |
| RCH. 362 Bt           | 39.12     | 30.8    | 35.8       | 39.89   | 40.0     | 37.1 |
| RCH. 362              | 38.92     | 34.5    | 33.8       | 40.22   | 38.0     | 37.1 |
| RCH. 368 Bt           | 38.16     | 38.4    | 37.0       | 37.89   | 35.5     | 37.4 |
| RCH. 368              | 39.01     | 39.0    | 33.5       | 38.22   | 35.5     | 37.0 |
| MRC. 6160 Bt          | 32.20     | 38.6    | 36.5       | 39.11   | 37.0     | 36.7 |
| MRC. 6160             | 37.26     | 38.6    | 33.4       | 39.67   | 34.0     | 36.6 |
| MRC. 6322 Bt          | 33.56     | 35.7    | 33.7       | 35.44   | 34.0     | 34.5 |
| MRC. 6322             | 39.46     | 38.2    | 34.6       | 39.67   | 37.5     | 37.9 |
| MRC. 6703 Bt          | 38.65     | 31.6    | 33.1       | 36.33   | 35.0     | 34.9 |
| MRC. 6703             | 40.15     | 36.4    | 33.6       | 38.22   | 37.0     | 37.1 |
| RCH.2 Bt (CC)         | 35.20     | 36.0    | 33.1       | 36.11   | 34.0     | 34.9 |
| MECH.162 Bt (Bt heck) | 37.52     | 30.8    | 35.0       | 38.44   | 36.0     | 35.6 |
| Local check           | 39.60     | 33.0    | 33.3       | 39.00   | 37.5     | 36.5 |
| BUNNY (Zonal check)   | 35.80     | 36.5    | 33.4       | 36.55   | 32.5     | 35.0 |
| CD (0.05)             |           |         | NS         | 0.40    | 2.2      |      |
| CV%                   |           |         | 4.5        | -       |          |      |

Local Check :LAHH.5 (AP)/DHH.11 (T.N. & Karnataka)

### Mean Lint index

It was observed that the lint index did not vary between Bt hybrids although in non-Bt hybrids it was lower numerically when the zonal average was considered and as given in the following table.

| Entry            | Siruguppa | Nandyal | Lam Guntur | Dharwad | CICR CBE | Mean |
|------------------|-----------|---------|------------|---------|----------|------|
| RCH.344 Bt       | 4.94      | 6       | 6.35       | 6.85    | 6.7      | 6.2  |
| RCH. 362 Bt      | 5.13      | 4       | 6.50       | 6.97    | 7.6      | 6.0  |
| RCH. 368 Bt      | 5.60      | 5       | 6.10       | 6.36    | 7.2      | 6.1  |
| MRC. 6160 Bt     | 6.00      | 5       | 5.70       | 6.75    | 6.4      | 6.0  |
| MRC. 6322 Bt     | 4.13      | 5       | 5.70       | 6.03    | 6.4      | 5.5  |
| MRC. 6703 Bt     | 5.07      | 4       | 5.35       | 6.27    | 5.7      | 5.3  |
| RCH.2 Bt (CC)    | 4.40      | 5       | 5.35       | 6.21    | 6.5      | 5.5  |
| Local check      | 3.97      | 4       | 5.35       | 6.07    | 6.5      | 5.2  |
| BUNNY (ZC)       | 4.61      | 5       | 5.15       | 5.76    | 5.5      | 5.2  |
| MECH.162 Bt (CC) | 4.02      | 3       | 5.05       | 5.61    | 5.4      | 4.6  |
| RCH.344          | 5.05      | 5       | 6.10       | 6.91    | 7.3      | 6.1  |
| RCH. 362         | 4.03      | 4       | 4.90       | 6.05    | 7.2      | 5.2  |
| RCH. 368         | 4.18      | 5       | 4.85       | 7.46    | 6.7      | 5.6  |
| MRC. 6160        | 4.88      | 5       | 5.20       | 7.23    | 6.8      | 5.8  |
| MRC. 6322        | 3.61      | 5       | 5.35       | 5.94    | 6.4      | 5.3  |
| MRC. 6703        | 4.29      | 4       | 5.10       | 6.18    | 5.9      | 5.1  |
| CD (0.05)        | 0.70      |         | 0.49       | 0.72    | 1.0      |      |
| CV               | 7.06      |         | 4.3        | 5.31    | 7.1      |      |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka)

### Mean Seed Index

The seed index was higher in Bt hybrids in comparison to check hybrids as well as the non-Bt counterparts in this zone, as given below.

| Entry               | Siruguppa | Nandyal | Lam Guntur | Dharwad | CICR CBE | Mean |
|---------------------|-----------|---------|------------|---------|----------|------|
| RCH.344 Bt          | 8.88      | 10      | 11.20      | 12.00   | 13.2     | 11.1 |
| RCH.344             | 8.88      | 9       | 13.15      | 11.50   | 13.5     | 11.2 |
| RCH. 362 Bt         | 8.07      | 10      | 11.05      | 10.50   | 11.3     | 10.2 |
| RCH. 362            | 6.31      | 8       | 9.60       | 9.00    | 11.7     | 8.9  |
| RCH. 368 Bt         | 9.08      | 8       | 10.95      | 10.00   | 12.8     | 10.2 |
| RCH. 368            | 6.52      | 8       | 10.55      | 11.00   | 11.9     | 9.6  |
| MRC. 6160 Bt        | 9.71      | 8       | 10.50      | 10.50   | 10.8     | 9.9  |
| MRC. 6160           | 8.22      | 8       | 10.35      | 11.00   | 11.5     | 9.8  |
| MRC. 6322 Bt        | 8.17      | 9       | 11.50      | 11.00   | 12.5     | 10.4 |
| MRC. 6322           | 5.53      | 8       | 9.50       | 9.00    | 10.7     | 8.5  |
| MRC. 6703 Bt        | 8.05      | 9       | 11.25      | 11.00   | 10.5     | 10.0 |
| MRC. 6703           | 6.38      | 7       | 10.35      | 10.00   | 9.9      | 8.7  |
| RCH.2 Bt (CC)       | 8.07      | 9       | 11.45      | 11.00   | 12.7     | 10.4 |
| MECH.162 Bt (CC)    | 6.69      | 8       | 9.40       | 9.00    | 9.6      | 8.5  |
| Local checks*       | 6.06      | 8       | 11.90      | 9.50    | 11.6     | 9.4  |
| BUNNY (Zonal check) | 8.26      | 9       | 10.35      | 10.00   | 11.1     | 9.7  |
| CD (0.05)           |           |         | 1.06       | 0.75    | 1.6      |      |
| CV%                 |           |         | 4.7        | 3.41    | 6.3      |      |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka)

### Seed Cotton Yield – Protected Condition

The best hybrids that performed uniformly in the zone were MRC.6160Bt (2238.8 kg/ha) and RCH.344Bt (2071.3 kg/ha) in all the test centres. However, due to terminal drought at Nandyal and Siruguppa, the expression of the test hybrids was not up to the expectations. Hence the mean seed cotton yield was recalculated removing the Nandyal and Siruguppa data, RCH.368.Bt performed well, yielding 2439.3 kg/ha. This hybrid seems to perform better under irrigated conditions or in assured rainfall areas. There was clear indication of adaptation of hybrids to the zone as seen in the yield of RCH.2Bt check hybrid. Other checks and non-Bt counter-parts were less yielding in seed cotton than the six test Bt hybrids, as seen from the following table.

#### SEED COTTON YIELD (kg/ha) – Protected Condition

| Entry               | Siruguppa   | CICR CBE    | Nandyal     | Lam Guntur  | Dharwad     | Mean of the zone | Mean without Nandyal and Siruguppa data |
|---------------------|-------------|-------------|-------------|-------------|-------------|------------------|---|
| <b>RCH.344 Bt</b>   | <b>1350</b> | <b>1699</b> | <b>1140</b> | <b>3435</b> | <b>1801</b> | <b>1885</b>      | <b>2312</b>                             |
| RCH.344             | 370         | 1244        | 291         | 2063        | 943         | 982              | 1416                                    |
| <b>RCH. 362 Bt</b>  | 810         | 1640        | 917         | 3610        | 1475        | <b>1690</b>      | <b>2242</b>                             |
| RCH. 362            | 500         | 1326        | 343         | 2927        | 1016        | 1222             | 1756                                    |
| <b>RCH. 368 Bt</b>  | 1240        | 1993        | 754         | 3492        | 1833        | <b>1862</b>      | <b>2439</b>                             |
| RCH. 368            | 450         | 1232        | 411         | 2703        | 894         | 1138             | 1610                                    |
| <b>MRC. 6160 Bt</b> | <b>2410</b> | <b>1672</b> | <b>1200</b> | <b>2837</b> | <b>2036</b> | <b>2031</b>      | <b>2182</b>                             |
| MRC. 6160           | 850         | 1219        | 437         | 2326        | 1198        | 1206             | 1581                                    |
| MRC. 6322 Bt        | 570         | 1139        | 565         | 2951        | 1395        | 1324             | 1828                                    |
| MRC. 6322           | 290         | 1141        | 394         | 2245        | 797         | 973              | 1394                                    |
| <b>MRC. 6703 Bt</b> | 950         | 1487        | 1372        | 3498        | 1487        | <b>1759</b>      | <b>2157</b>                             |
| MRC. 6703           | 410         | 946         | 377         | 1856        | 1009        | 920              | 1270                                    |
| RCH.2 Bt (check)    | 650         | 1551        | 908         | 3435        | 1136        | 1536             | 2041                                    |
| MECH.162 Bt (check) | 590         | 1076        | 806         | 2617        | 1249        | 1268             | 1647                                    |
| Local check*        | 340         | 1202        | 463         | 2248        | 1345        | 1120             | 1598                                    |
| BUNNY (Zonal check) | 430         | 1252        | 523         | 2399        | 708         | 1062             | 1453                                    |
| CD (0.05)           | 29          | 398.6       | 239         | 584.5       | 494         |                  |   |
| CV%                 | 18.3        | 13.7        | 17.2        | 9.7         | 18.29       |                  |   |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka)

### Fibre quality parameters

The matching values of fibre tenacity (strength) to the span length of the Bt test hybrid in south zone were not observed in any hybrid of this evaluation. Until and unless fibre samples from large scale farms are tested, no specific comment on the desirability of these hybrids to satiate future mill requirements can be made.

## 2.5% span length

| Entry               | CICR CBE | Nandyal | Lam Guntur | Dharwad | Mean |
|---------------------|----------|---------|------------|---------|------|
| RCH.344 Bt          | 29.2     | 26.8    | 29.9       | 30.4    | 29.1 |
| RCH. 362 Bt         | 30.5     | 29.0    | 30.1       | 30.3    | 30.0 |
| RCH. 368 Bt         | 32.3     | 28.0    | 32.4       | 32.2    | 31.2 |
| MRC. 6160 Bt        | 28.3     | 26.1    | 26.9       | 28.6    | 27.5 |
| MRC. 6322 Bt        | 31.7     | 30.1    | 30.3       | 31.4    | 30.9 |
| MRC. 6703 Bt        | 29.7     | 29.5    | 30.1       | 30.3    | 29.9 |
| RCH.344             | 30.3     | 30.5    | 29.4       | 30.2    | 30.1 |
| RCH. 362            | 28.6     | 26.1    | 29.6       | 28.8    | 28.3 |
| RCH. 368            | 30.3     | 30.8    | 29.6       | 29.9    | 30.2 |
| MRC. 6160           | 28.7     | 25.1    | 27.6       | 27.6    | 27.3 |
| MRC. 6322           | 27.7     | 27.0    | 26.3       | 26.9    | 27.0 |
| MRC. 6703           | 27.8     | 24.3    | 27.1       | 28.8    | 27.0 |
| RCH.2 Bt (check)    | 32.5     | 30.6    | 31.4       | 30.2    | 31.2 |
| MECH.162 Bt (check) | 25.8     | 22.9    | 25.0       | 27.3    | 25.3 |
| Local check*        | 28.4     | 27.5    | 28.3       | 28.2    | 28.1 |
| BUNNY (Zonal check) | 30.8     | 29.6    | 30.1       | 32.1    | 30.6 |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka)

## Strength (g/tex)

| Entry               | CICR CBE | Nandyal | Lam Guntur | Dharwad | Mean |
|---------------------|----------|---------|------------|---------|------|
| RCH.344 Bt          | 21.8     | 20.1    | 19.8       | 21.3    | 20.8 |
| RCH. 362 Bt         | 22.1     | 22.8    | 20.4       | 21.7    | 21.7 |
| RCH. 368 Bt         | 22.6     | 20.2    | 22.2       | 21.2    | 21.5 |
| MRC. 6160 Bt        | 21.6     | 20.9    | 20.1       | 19.1    | 20.4 |
| MRC. 6322 Bt        | 24.5     | 23.1    | 20.3       | 22.2    | 22.5 |
| MRC. 6703 Bt        | 23.7     | 21.7    | 21.7       | 21.0    | 22.0 |
| RCH.344             | 23.1     | 23.6    | 19.8       | 20.5    | 21.8 |
| RCH. 362            | 21.9     | 20.0    | 20.7       | 23.6    | 21.6 |
| RCH. 368            | 22.8     | 22.5    | 21.9       | 20.8    | 22.0 |
| MRC. 6160           | 21.5     | 20.4    | 19.1       | 19.0    | 20.0 |
| MRC. 6322           | 21.8     | 20.1    | 20.0       | 19.1    | 20.2 |
| MRC. 6703           | 22.4     | 22.5    | 20.5       | 20.4    | 21.5 |
| RCH.2 Bt (check)    | 24.0     | 21.9    | 19.8       | 21.3    | 21.7 |
| MECH.162 Bt (check) | 20.4     | 22.3    | 19.4       | 19.1    | 20.3 |
| Local check*        | 24.0     | 23.0    | 21.3       | 19.8    | 22.0 |
| BUNNY (Zonal check) | 22.6     | 23.1    | 20.2       | 22.1    | 22.0 |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka)

## Micronaire (10<sup>-6</sup> g/in)

| Entry               | CICR CBE | Nandyal | Lam Guntur | Dharwad | Mean |
|---------------------|----------|---------|------------|---------|------|
| RCH.344 Bt          | 5.3      | 4.34    | 5.79       | 5.0     | 5.1  |
| RCH. 362 Bt         | 4.9      | 3.24    | 6.15       | 4.6     | 4.7  |
| RCH. 368 Bt         | 4.3      | 2.45    | 4.55       | 3.9     | 3.8  |
| MRC. 6160 Bt        | 4.6      | 2.40    | 5.35       | 4.6     | 4.2  |
| MRC. 6322 Bt        | 3.9      | 3.38    | 5.34       | 4.2     | 4.2  |
| MRC. 6703 Bt        | 3.7      | 2.33    | 4.76       | 3.9     | 3.7  |
| RCH.344             | 4.7      | 3.21    | 6.31       | 4.5     | 4.7  |
| RCH. 362            | 4.9      | 3.41    | 5.69       | 4.6     | 4.7  |
| RCH. 368            | 4.5      | 3.19    | 5.28       | 4.1     | 4.3  |
| MRC. 6160           | 4.8      | 2.98    | 5.71       | 4.6     | 4.5  |
| MRC. 6322           | 4.3      | 2.66    | 5.18       | 3.8     | 4.0  |
| MRC. 6703           | 4.3      | 2.76    | 5.02       | 4.1     | 4.0  |
| RCH.2 Bt (check)    | 4.1      | 2.86    | 4.42       | 3.8     | 3.8  |
| MECH.162 Bt (check) | 4.3      | 2.89    | 5.06       | 4.2     | 4.1  |
| Local check*        | 4.6      | 2.62    | 5.05       | 4.1     | 4.1  |
| BUNNY (Zonal check) | 4.0      | 2.88    | 4.81       | 3.8     | 3.9  |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka)

A comparative study of mean span length with mean fibre strength, as given below, along with the respective micronaire values show that none of these entries fall within the CIRCOT/SITRA (South India Textile Research Association – Textile Ministry) norms of getting the desired yarn quality with optimum use of the fibre. The mean micronaire values are very high to make the fibre coarser in these six Bt test entries. Fibre samples from large plots may provide better picture about the status of the fibre quality.

**Comparative values of fibre length, strength & micronaire in South zone**

| Entry               | Mean Span length (mm) | Mean fibre strength (g/tex) | Mean Micronaire $10^{-6}$ g/in |
|---------------------|-----------------------|-----------------------------|--------------------------------|
| RCH.344 Bt          | 29.1                  | 20.8                        | 5.1                            |
| RCH. 362 Bt         | 30.0                  | 21.7                        | 4.7                            |
| RCH. 368 Bt         | 31.2                  | 21.5                        | 3.8                            |
| MRC. 6160 Bt        | 27.5                  | 20.4                        | 4.2                            |
| MRC. 6322 Bt        | 30.9                  | 22.5                        | 4.2                            |
| MRC. 6703 Bt        | 29.9                  | 22.0                        | 3.7                            |
| RCH.344             | 30.1                  | 21.8                        | 4.7                            |
| RCH. 362            | 28.3                  | 21.6                        | 4.7                            |
| RCH. 368            | 30.2                  | 22.0                        | 4.3                            |
| MRC. 6160           | 27.3                  | 20.0                        | 4.5                            |
| MRC. 6322           | 27.0                  | 20.2                        | 4.0                            |
| MRC. 6703           | 27.0                  | 21.5                        | 4.0                            |
| RCH.2 Bt (check)    | 31.2                  | 21.7                        | 3.8                            |
| MECH.162 Bt (check) | 25.3                  | 20.3                        | 4.1                            |
| Local check*        | 28.1                  | 22.0                        | 4.1                            |
| BUNNY (Zonal check) | 30.6                  | 22.0                        | 3.9                            |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka)

## Plant Protection Evaluation – Protected Condition

### Sap Sap sucking pests

The jassid population in the test hybrids was quite high in spite of protection with insecticides at threshold level, as seen from below. The check entries were also quite susceptible to this pest during this season in this zone.

#### Jassids ( average of 3 leaves/plant)

| Entry               | Siruguppa | CICR CBE | Nandyal |        | Lam Guntur |        | Mean number |
|---------------------|-----------|----------|---------|--------|------------|--------|-------------|
|                     | Number    | Number   | **TV    | Number | TV         | Number |             |
| RCH.344 Bt          | 0.80      | 15.0     | 1.90    | 3.30   | 1.00       | 0      | 3.7         |
| RCH. 362 Bt         | 0.50      | 15.0     | 2.99    | 3.50   | 3.18       | 9.15   | 5.7         |
| RCH. 368 Bt         | 0.40      | 18.0     | 1.55    | 2.01   | 1.64       | 1.70   | 4.2         |
| MRC. 6160 Bt        | 0.70      | 23.0     | 4.20    | 17.30  | 1.65       | 1.75   | 8.1         |
| MRC. 6322 Bt        | 0.60      | 11.0     | 1.66    | 2.40   | 3.24       | 9.55   | 4.7         |
| MRC. 6703 Bt        | 0.40      | 14.0     | 1.56    | 2.00   | 2.02       | 3.15   | 3.9         |
| RCH.344             | 0.25      | 13.6     | 1.63    | 2.20   | 1.36       | 1.00   | 3.3         |
| RCH. 362            | 0.30      | 16.5     | 3.23    | 10.15  | 3.05       | 8.35   | 6.9         |
| RCH. 368            | 0.80      | 17.0     | 2.32    | 5.40   | 1.64       | 1.70   | 4.8         |
| MRC. 6160           | 0.40      | 12.5     | 2.17    | 5.12   | 1.96       | 2.85   | 4.2         |
| MRC. 6322           | 0.30      | 24.5     | 2.89    | 8.41   | 1.11       | 0.25   | 6.2         |
| MRC. 6703           | 0.40      | 17.0     | 1.68    | 2.40   | 1.63       | 1.70   | 4.1         |
| RCH.2 Bt (check)    | 0.50      | 20.0     | 2.77    | 7.20   | 2.88       | 7.35   | 6.8         |
| MECH.162 Bt (check) | 1.00      | 17.0     | 3.21    | 10.05  | 1.53       | 1.35   | 5.7         |
| Local check*        | 1.00      | 19.0     | 1.56    | 1.95   | 1.88       | 2.25   | 4.6         |
| BUNNY (Zonal check) | 0.40      | 18.5     | 2.30    | 4.79   | 1.54       | 1.40   | 4.8         |
| CD (0.05)           |           | -        |         | 1.16   |            | 11.1   |             |
| CV %                |           | 21.38    |         | 23.05  |            |        |             |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka); \*\*TV-transformed values

The incidence of thrips was uniformly high in most of the test entries in spite of being under protected conditions in this zone.

#### Thrips (mean of 3 leaves per plant)

| Entry               | Nandyal |        | Lam, Guntur |        | Mean number |
|---------------------|---------|--------|-------------|--------|-------------|
|                     | **TV    | Number | TV          | number |             |
| RCH.344 Bt          | 3.04    | 10.4   | 4.06        | 15.5   | 12.95       |
| RCH. 362 Bt         | 3.16    | 10.7   | 3.95        | 14.6   | 12.65       |
| RCH. 368 Bt         | 2.18    | 4.3    | 4.57        | 20.2   | 12.25       |
| MRC. 6160 Bt        | 2.24    | 4.9    | 2.43        | 4.9    | 4.9         |
| MRC. 6322 Bt        | 2.39    | 5.30   | 3.01        | 8.1    | 6.7         |
| MRC. 6703 Bt        | 3.01    | 10.2   | 4.68        | 21.0   | 15.6        |
| RCH.344             | 1.56    | 2.2    | 4.16        | 12.3   | 7.25        |
| RCH. 362            | 1.64    | 2.4    | 3.64        | 11.9   | 7.15        |
| RCH. 368            | 1.91    | 3.4    | 3.59        | 10.3   | 6.85        |
| MRC. 6160           | 3.96    | 15.35  | 1.77        | 2.2    | 8.775       |
| MRC. 6322           | 1.31    | 1.30   | 2.81        | 6.9    | 4.1         |
| MRC. 6703           | 4.02    | 15.80  | 3.92        | 9.9    | 12.85       |
| RCH.2 Bt (check)    | 1.53    | 1.85   | 2.88        | 7.5    | 4.675       |
| Local check*        | 3.08    | 9.10   | 3.7         | 12.7   | 10.9        |
| BUNNY (Zonal check) | 3.16    | 9.7    | 3.8         | 13.7   | 11.7        |
| MECH.162 Bt (check) | 3.82    | 14.4   | 4.16        | 17.0   | 15.7        |
| CD (0.05)           |         | 1.72   |             | 0.81   |             |
| CV %                |         | 30.76  |             | 11.0   |             |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka); \*\*TV-transformed values

However, the whitefly population was low in this zone during 2004 season. Their population was uniformly available in all the test hybrids.

### Whitefly

| Entry               | Nandyal |        | Lam Guntur |        | CICR<br>CBE | Mean<br>number |
|---------------------|---------|--------|------------|--------|-------------|----------------|
|                     | **TV    | Number | TV         | Number | Number      |                |
| RCH.344 Bt          | 1.8     | 2.8    | 1.0        | 0.0    | 0.5         | 1.1            |
| RCH. 362 Bt         | 1.8     | 2.6    | 1.0        | 0.0    | 0.5         | 1.0            |
| RCH. 368 Bt         | 1.6     | 2.1    | 2.0        | 2.0    | 2.0         | 2.0            |
| MRC. 6160 Bt        | 2.0     | 3.5    | 1.5        | 1.7    | 1.0         | 2.0            |
| MRC. 6322 Bt        | 1.5     | 1.9    | 1.0        | 0.0    | 0.5         | 0.8            |
| MRC. 6703 Bt        | 1.7     | 2.5    | 1.0        | 0.0    | 1.5         | 1.3            |
| RCH.344             | 1.4     | 1.6    | 2.0        | 3.7    | 1.5         | 2.3            |
| RCH. 362            | 1.3     | 1.3    | 1.6        | 1.6    | 1.5         | 1.5            |
| RCH. 368            | 1.4     | 1.6    | 1.9        | 2.7    | 0.0         | 1.4            |
| MRC. 6160           | 1.6     | 2.2    | 1.5        | 1.4    | 2.0         | 1.9            |
| MRC. 6322           | 1.3     | 1.2    | 2.4        | 4.9    | 1.0         | 2.4            |
| MRC. 6703           | 1.6     | 2.0    | 2.1        | 4.4    | 0.5         | 2.3            |
| RCH.2 Bt (check)    | 1.7     | 2.3    | 1.0        | 0.0    | 2.0         | 1.4            |
| Local check*        | 1.9     | 3.0    | 1.0        | 0.0    | 0.5         | 1.2            |
| BUNNY (Zonal check) | 1.3     | 1.1    | 2.9        | 8.3    | 3.5         | 4.3            |
| MECH.162 Bt (check) | 1.5     | 1.6    | 1.2        | 0.5    | 1.5         | 1.2            |
| CD (0.05)           |         | 0.5    |            | NS     | -           |                |
| CV %                |         | 14.9   |            | 47.0   | 27.9        |                |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka); \*\*TV-transformed values

### American bollworms

The American bollworm per plant was observed in all test entries in this zone. The pest was noticed at very low population and the results of this observation are inconclusive. Last season too, this pest was poorly infesting the test hybrids.

| Entry               | Siruguppa        | Nandyal |                  | Lam Guntur |                  | Mean Number/<br>plant |
|---------------------|------------------|---------|------------------|------------|------------------|-----------------------|
|                     | Number/<br>plant | **TV    | Number/<br>Plant | TV         | Number/<br>Plant |                       |
| RCH.344 Bt          | 0.5              | 0.7     | 0.0              | 1.0        | 0.0              | 0.2                   |
| RCH. 362 Bt         | 0.5              | 0.7     | 0.0              | 1.1        | 0.1              | 0.2                   |
| RCH. 368 Bt         | 0.4              | 0.7     | 0.0              | 1.0        | 0.0              | 0.1                   |
| MRC. 6160 Bt        | 0.8              | 0.7     | 0.0              | 1.1        | 0.1              | 0.3                   |
| MRC. 6322 Bt        | 1.3              | 0.7     | 0.0              | 1.1        | 0.1              | 0.5                   |
| MRC. 6703 Bt        | 0.7              | 0.7     | 0.0              | 1.0        | 0.0              | 0.2                   |
| RCH.344             | 0.9              | 0.7     | 0.0              | 1.0        | 0.0              | 0.3                   |
| RCH. 362            | 0.3              | 1.1     | 1.0              | 1.3        | 0.7              | 0.7                   |
| RCH. 368            | 0.7              | 0.7     | 0.0              | 1.1        | 0.2              | 0.3                   |
| MRC. 6160           | 0.3              | 1.1     | 1.0              | 1.0        | 0.0              | 0.4                   |
| MRC. 6322           | 0.7              | 0.7     | 0.0              | 1.1        | 0.2              | 0.3                   |
| MRC. 6703           | 1.2              | 0.7     | 0.0              | 1.0        | 0.0              | 0.4                   |
| RCH.2 Bt (check)    | 0.6              | 1.0     | 6.5              | 1.1        | 0.1              | 2.4                   |
| Local check*        | 0.4              | 0.7     | 0.0              | 1.0        | 0.0              | 0.1                   |
| BUNNY (Zonal check) | 1.6              | 0.7     | 0.0              | 1.0        | 0.0              | 0.5                   |
| MECH.162 Bt (check) | 0.6              | 0.7     | 0.0              | 1.1        | 0.1              | 0.2                   |
| CD (0.05)           |                  |         | 0.5              | NS         | NS               |                       |
| CV %                |                  |         | 31.3             | 10.9       | 10.9             |                       |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka), \*\* TV: transformed values

## Pink bollworm infestation under protected condition

The Pink bollworm was seen to build up in this zone during this season. The extent of locule damage was recorded in the test entries. RCH 344 and 362 Bt hybrids had less locule damage over other test Bt hybrids and checks. Bt check hybrids also had 10% locule damage due to this pest incidence.

### Locule damage (%)

| Entry               | Siruguppa |      | Nandyal |      | Lam Guntur |      | Dharwad |      | CICR CBE |             | Mean % |
|---------------------|-----------|------|---------|------|------------|------|---------|------|----------|-------------|--------|
|                     | %         | TV** | %       | TV   | %          | TV   | %       | TV   | %        |             |        |
| RCH.344 Bt          | 9.7       | 14.9 | 7.0     | 4.6  | 0.7        | 16.0 | 23.5    | 10.3 | 3.2      | <b>8.8</b>  |        |
| RCH. 362 Bt         | 13.0      | 6.7  | 1.3     | 10.6 | 4.8        | 14.3 | 22.2    | 10.8 | 3.5      | <b>9.0</b>  |        |
| RCH. 368 Bt         | 10.5      | 30.5 | 26.1    | 12.6 | 4.7        | 20.7 | 20.0    | 12.1 | 4.4      | <b>13.1</b> |        |
| MRC. 6160 Bt        | 15.9      | 15.7 | 7.4     | 7.4  | 1.8        | 14.4 | 22.3    | 11.8 | 4.2      | <b>10.3</b> |        |
| MRC. 6322 Bt        | 12.3      | 20.6 | 12.5    | 10.7 | 3.0        | 20.6 | 27.0    | 16.1 | 7.7      | <b>12.5</b> |        |
| MRC. 6703 Bt        | 10.3      | 20.9 | 12.7    | 11.6 | 2.2        | 13.5 | 21.6    | 14.7 | 6.4      | <b>10.6</b> |        |
| RCH.344             | 16.7      | 34.2 | 31.6    | 7.1  | 3.0        | 35.8 | 36.7    | 21.6 | 13.6     | 20.3        |        |
| RCH. 362            | 10.0      | 24.4 | 17.1    | 7.5  | 1.7        | 27.1 | 31.3    | 22.5 | 14.7     | 15.0        |        |
| RCH. 368            | 6.1       | 36.4 | 35.9    | 11.7 | 4.2        | 29.0 | 32.5    | 24.3 | 16.9     | 19.1        |        |
| MRC. 6160           | 16.9      | 17.5 | 9.2     | 10.9 | 3.8        | 32.3 | 24.6    | 25.4 | 18.3     | 14.6        |        |
| MRC. 6322           | 13.9      | 7.5  | 2.0     | 12.9 | 5.0        | 20.1 | 36.6    | 20.6 | 12.4     | 14.0        |        |
| MRC. 6703           | 10.6      | 16.8 | 9.3     | 14.1 | 6.0        | 28.0 | 31.9    | 25.3 | 18.2     | 15.2        |        |
| RCH.2 Bt (CC)       | 20.9      | 10.2 | 4.0     | 11.4 | 3.9        | 9.6  | 18.0    | 13.3 | 5.3      | 10.4        |        |
| MECH.162 Bt (CC)    | 13.1      | 19.9 | 12.5    | 6.8  | 1.5        | 13.4 | 21.4    | 14.1 | 5.9      | 10.9        |        |
| Local check*        | 13.5      | 19.3 | 12.0    | 12.1 | 4.9        | 36.9 | 27.3    | 24.0 | 16.6     | 14.8        |        |
| BUNNY (Zonal check) | 11.9      | 41.1 | 43.4    | 13.5 | 5.5        | 42.8 | 40.8    | 23.0 | 15.3     | 23.4        |        |
| CD (0.05)           | 6.33      |      | 14.0    |      | NS         |      | 1.5     | 3.6  | 3.6      |             |        |
| CV %                | 18.5      |      | 30.9    |      | 41.5       |      | 2.5     | 9.3  | 9.29     |             |        |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka), \*\* TV: transformed values

The Percent open boll damage data is given below. Since the dominance of Pink bollworm (PBW) population in the test entries was seen, the percent open boll damage is indicative of the infestation of PBW. Although numerically the mean damage was low in RCH.344Bt hybrid, it was quite high in the harvest of bad seed cotton.

### Open boll damage (%)

| Entry               | Siruguppa |      | Nandyal |      | Lam Guntur |      | Dharwad |      | CICR CBE |             | Mean % |
|---------------------|-----------|------|---------|------|------------|------|---------|------|----------|-------------|--------|
|                     | %         | TV** | %       | TV   | %          | TV   | %       | TV   | %        |             |        |
| RCH.344 Bt          | 37.6      | 15.0 | 7.0     | 1.7  | 7.5        | 9.7  | 18.1    | 17.9 | 9.4      | <b>15.9</b> |        |
| RCH. 362 Bt         | 48.3      | 6.8  | 1.4     | 1.0  | 5.6        | 15.0 | 22.8    | 17.2 | 8.7      | <b>17.4</b> |        |
| RCH. 368 Bt         | 28.1      | 30.4 | 26.0    | 10.5 | 18.9       | 9.1  | 17.5    | 19.2 | 10.8     | <b>20.3</b> |        |
| MRC. 6160 Bt        | 32.2      | 16.0 | 7.7     | 3.6  | 10.9       | 10.7 | 19.1    | 21.0 | 12.8     | <b>16.5</b> |        |
| MRC. 6322 Bt        | 46.1      | 20.0 | 12.8    | 4.8  | 12.6       | 11.5 | 19.8    | 24.9 | 17.7     | <b>21.8</b> |        |
| MRC. 6703 Bt        | 32.9      | 21.1 | 13.0    | 8.3  | 16.6       | 7.3  | 15.7    | 22.8 | 15.0     | <b>18.6</b> |        |
| RCH.344             | 42.2      | 33.6 | 30.7    | 3.0  | 7.1        | 34.3 | 35.8    | 30.9 | 26.4     | 28.4        |        |
| RCH. 362            | 35.0      | 24.6 | 17.4    | 4.4  | 12.1       | 22.1 | 28.0    | 32.5 | 28.8     | 24.3        |        |
| RCH. 368            | 47.0      | 28.2 | 39.1    | 7.8  | 16.1       | 32.4 | 34.6    | 36.6 | 35.6     | 34.5        |        |
| MRC. 6160           | 64.7      | 17.6 | 9.3     | 7.5  | 15.5       | 31.9 | 34.3    | 34.1 | 31.5     | 31.1        |        |
| MRC. 6322           | 51.9      | 8.7  | 2.7     | 10.4 | 18.7       | 34.0 | 35.6    | 30.9 | 26.3     | 27.0        |        |
| MRC. 6703           | 55.7      | 16.8 | 9.3     | 9.0  | 16.7       | 26.7 | 31.1    | 36.2 | 34.9     | 29.5        |        |
| RCH.2 Bt (CC)       | 33.2      | 10.1 | 3.9     | 6.0  | 14.1       | 9.7  | 18.2    | 22.6 | 14.8     | 16.8        |        |
| MECH.162 Bt (CC)    | 58.4      | 19.9 | 12.5    | 0.9  | 4.9        | 19.2 | 26.0    | 22.0 | 14.0     | 23.2        |        |
| Local check*        | 37.9      | 20.1 | 13.1    | 8.1  | 16.0       | 21.1 | 27.3    | 33.6 | 30.6     | 25.0        |        |
| BUNNY (Zonal check) | 33.9      | 40.4 | 42.0    | 10.9 | 19.3       | 30.2 | 33.3    | 34.6 | 32.3     | 32.2        |        |
| CD (0.05)           | 4.44      |      | 14.0    | 8.9  |            |      | 1.8     |      | 5.7      |             |        |
| CV %                | 14.0      |      | 30.9    | 31.5 |            |      | 3.2     |      | 9.8      |             |        |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka), \*\* TV: transformed values



The average number of spraying in Bt hybrids in south zone during 2004 season was between 4.3 to 5.0 rounds while the same in non-Bt hybrids and checks including t checks ranged between 5.5 to 6.8 rounds during the season.

### Number of sprayings undertaken in different Bt and non Bt genotypes under PROTECTED conditions

| Entry               | Siruguppa |     |       | Nandyal |    |       | Lam Guntur |    |       | CICR CBE |    |       | Mean |     |       |
|---------------------|-----------|-----|-------|---------|----|-------|------------|----|-------|----------|----|-------|------|-----|-------|
|                     | SP#       | BW* | total | SP      | BW | total | SP         | BW | total | SP       | BW | total | SP   | BW  | total |
| RCH.344 Bt          | 3         | 2   | 5     | 4       | 2  | 6     | 0          | 0  | 0     | 4        | 2  | 6     | 2.8  | 1.5 | 4.3   |
| RCH. 362 Bt         | 3         | 2   | 5     | 4       | 3  | 7     | 1          | 1  | 2     | 4        | 2  | 6     | 3.0  | 2.0 | 5.0   |
| RCH. 368 Bt         | 3         | 2   | 5     | 4       | 1  | 5     | 0          | 0  | 0     | 4        | 5  | 9     | 2.8  | 2.0 | 4.8   |
| MRC. 6160 Bt        | 3         | 2   | 5     | 4       | 1  | 5     | 0          | 1  | 1     | 4        | 2  | 6     | 2.8  | 1.5 | 4.3   |
| MRC. 6322 Bt        | 3         | 2   | 5     | 4       | 2  | 6     | 1          | 2  | 3     | 4        | 3  | 7     | 3.0  | 2.3 | 5.3   |
| MRC. 6703 Bt        | 3         | 2   | 5     | 4       | 1  | 5     | 0          | 1  | 1     | 4        | 2  | 6     | 2.8  | 1.5 | 4.3   |
| RCH.344             | 3         | 2   | 5     | 4       | 2  | 6     | 0          | 4  | 4     | 4        | 5  | 9     | 2.8  | 3.3 | 6.0   |
| RCH. 362            | 3         | 2   | 5     | 4       | 3  | 7     | 1          | 3  | 4     | 4        | 7  | 11    | 3.0  | 3.8 | 6.8   |
| RCH. 368            | 3         | 2   | 5     | 4       | 1  | 5     | 0          | 4  | 4     | 4        | 6  | 10    | 2.8  | 3.3 | 6.0   |
| MRC. 6160           | 3         | 2   | 5     | 4       | 1  | 5     | 0          | 4  | 4     | 4        | 5  | 9     | 2.8  | 3.0 | 5.8   |
| MRC. 6322           | 3         | 2   | 5     | 4       | 2  | 6     | 0          | 5  | 5     | 4        | 5  | 9     | 2.8  | 3.5 | 6.3   |
| MRC. 6703           | 3         | 2   | 5     | 4       | 3  | 7     | 1          | 5  | 6     | 4        | 5  | 9     | 3.0  | 3.8 | 6.8   |
| RCH.2 Bt (CC)       | 3         | 2   | 5     | 4       | 2  | 6     | 1          | 0  | 1     | 4        | 3  | 7     | 3.0  | 1.8 | 4.8   |
| MECH.162 Bt (CC)    | 3         | 2   | 5     | 4       | 3  | 7     | 1          | 3  | 4     | 4        | 3  | 7     | 3.0  | 2.8 | 5.8   |
| (LC)                | 3         | 2   | 5     | 4       | 2  | 6     | 0          | 2  | 2     | 4        | 5  | 9     | 2.8  | 2.8 | 5.5   |
| BUNNY (Zonal Check) | 3         | 2   | 5     | 4       | 1  | 5     | 0          | 6  | 6     | 4        | 5  | 9     | 2.8  | 3.5 | 6.3   |

Local Check: LAHH.5 (AP)/DHH.11 (T.N. & Karnataka)

# SP=Sucking pests, \* BW=Bollworms

### Plant Protection Evaluation – Unprotected Condition

Under unsprayed condition, the jassids was quite high in the test hybrids and check hybrids. All these genotypes seem to be highly susceptible to jassids.

#### Jassids ( average of 3 leaves/plant)

| Entry               | Siruguppa | Nandyal |        | Lam Guntur |        | Dharwad | CICR CBE | Mean Number |
|---------------------|-----------|---------|--------|------------|--------|---------|----------|-------------|
|                     | Number    | **TV    | Number | TV         | Number | Number  | Number   |             |
| RCH.344 Bt          | 0.8       | 2.9     | 8.0    | 3.1        | 8.4    | 1.4     | 2.7      | 21.2        |
| RCH. 362 Bt         | 0.5       | 3.2     | 9.9    | 3.1        | 8.9    | 0.5     | 2.7      | 22.5        |
| RCH. 368 Bt         | 0.4       | 3.4     | 11.7   | 2.4        | 5.0    | 0.3     | 2.7      | 20.0        |
| MRC. 6160 Bt        | 0.7       | 2.9     | 7.8    | 2.3        | 4.5    | 0.5     | 3.7      | 17.1        |
| MRC. 6322 Bt        | 0.6       | 3.0     | 8.3    | 3.1        | 8.4    | 1.0     | 6.0      | 24.3        |
| MRC. 6703 Bt        | 0.4       | 3.0     | 8.2    | 2.7        | 3.9    | 0.9     | 4.5      | 17.9        |
| RCH.344             | 0.3       | 3.0     | 8.6    | 3.1        | 8.2    | 0.4     | 9.5      | 27.0        |
| RCH. 362            | 0.3       | 3.0     | 3.8    | 3.2        | 9.3    | 0.6     | 6.0      | 20.0        |
| RCH. 368            | 0.8       | 3.7     | 13.0   | 3.7        | 13.0   | 1.1     | 16.5     | 44.4        |
| MRC. 6160           | 0.4       | 3.4     | 10.9   | 2.5        | 5.1    | 1.4     | 5.0      | 22.8        |
| MRC. 6322           | 0.3       | 3.7     | 13.6   | 2.4        | 10.1   | 1.4     | 9.0      | 34.4        |
| MRC. 6703           | 0.4       | 3.5     | 12.1   | 3.1        | 8.9    | 1.1     | 6.0      | 28.5        |
| RCH.2 Bt (CC)       | 0.5       | 3.0     | 8.2    | 4.0        | 5.1    | 0.9     | 18.0     | 32.7        |
| MECH.162 Bt (CC)    | 1.0       | 2.9     | 7.7    | 3.0        | 8.2    | 0.6     | 2.5      | 20.0        |
| *Local check        | 1.0       | 3.7     | 13.2   | 2.7        | 6.4    | 0.4     | 12.0     | 33.0        |
| BUNNY (Zonal check) | 0.4       | 2.8     | 7.6    | 2.9        | 7.6    | 1.0     | 12.0     | 28.6        |
| CD (0.05)           | 0.28      |         | 0.8    |            | NS     | 0.4     | 1.3      |             |
| CV %                | 23.9      |         | 11.8   |            | 13.6   | 24.38   | 22.1     |             |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka); \*\* TV: transformed values

## Thrips

The thrips population was also quite high in all the test hybrids in different phonological stages of the crop in unsprayed condition during this season.

| Entry               | Nandyal |      | Lam Guntur |      | Dharwad | Mean |
|---------------------|---------|------|------------|------|---------|------|
|                     | **TV    | AV   | TV         | AV   | AV      |      |
| RCH.344 Bt          | 3.1     | 9.4  | 5.4        | 28.7 | 10.0    | 16.0 |
| RCH. 362 Bt         | 2.9     | 8.1  | 4.8        | 22.5 | 6.7     | 12.4 |
| RCH. 368 Bt         | 2.8     | 7.3  | 6.9        | 47.9 | 9.0     | 21.4 |
| MRC. 6160 Bt        | 3.0     | 8.4  | 1.9        | 10.9 | 7.7     | 9.0  |
| MRC. 6322 Bt        | 2.3     | 4.8  | 4.5        | 19.8 | 8.8     | 11.1 |
| MRC. 6703 Bt        | 2.9     | 8.1  | 6.2        | 37.0 | 9.5     | 18.2 |
| RCH.344             | 2.6     | 6.3  | 5.6        | 32.5 | 8.2     | 15.7 |
| RCH. 362            | 1.9     | 3.0  | 5.4        | 27.9 | 8.8     | 13.2 |
| RCH. 368            | 2.3     | 4.7  | 4.9        | 22.9 | 7.9     | 11.8 |
| MRC. 6160           | 3.6     | 12.5 | 3.2        | 9.6  | 9.9     | 10.7 |
| MRC. 6322           | 2.9     | 3.9  | 4.5        | 20.8 | 11.0    | 11.9 |
| MRC. 6703           | 3.8     | 13.9 | 6.8        | 45.5 | 8.4     | 22.6 |
| RCH.2 Bt (CC)       | 1.6     | 2.0  | 4.3        | 17.9 | 10.1    | 10.0 |
| MECH.162 Bt (CC)    | 3.6     | 12.2 | 5.7        | 23.4 | 9.7     | 15.1 |
| Local check*        | 2.7     | 6.8  | 6.5        | 41.5 | 8.1     | 18.8 |
| BUNNY (Zonal check) | 2.8     | 7.2  | 5.3        | 26.5 | 8.3     | 14.0 |
| CD (0.05)           |         | 0.6  |            | 2.1  | NS      |      |
| CV %                |         | 11.5 |            | 19.0 | 11.60   |      |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka); \*\* TV: transformed values

## Whitefly

The whitefly incidence was above threshold in unsprayed plots in both test hybrids as well as check hybrids. Their incidence was high in Nandyal and Guntur centres.

| Entry               | Nandyal |        | Lam Guntur |        | CICR CBE | Mean number |
|---------------------|---------|--------|------------|--------|----------|-------------|
|                     | **TV    | Number | TV         | Number | Number   |             |
| RCH.344 Bt          | 2.0     | 3.5    | 2.6        | 5.7    | 0.5      | 3.2         |
| RCH. 362 Bt         | 1.8     | 2.6    | 2.1        | 3.5    | 0.5      | 2.2         |
| RCH. 368 Bt         | 1.9     | 3.3    | 2.0        | 2.9    | 1.0      | 2.4         |
| MRC. 6160 Bt        | 1.9     | 3.3    | 2.7        | 6.5    | 3.5      | 4.4         |
| MRC. 6322 Bt        | 1.5     | 1.7    | 2.4        | 4.7    | 0.0      | 2.1         |
| MRC. 6703 Bt        | 1.9     | 3.2    | 2.6        | 5.7    | 1.0      | 3.3         |
| RCH.344             | 1.4     | 1.5    | 2.2        | 3.9    | 1.5      | 2.3         |
| RCH. 362            | 1.8     | 2.6    | 2.2        | 3.8    | 1.5      | 2.6         |
| RCH. 368            | 2.0     | 3.7    | 2.5        | 8.7    | 2.0      | 4.8         |
| MRC. 6160           | 2.1     | 4.2    | 2.6        | 5.6    | 2.0      | 3.9         |
| MRC. 6322           | 1.7     | 2.5    | 2.3        | 4.5    | 2.0      | 3.0         |
| MRC. 6703           | 1.7     | 2.7    | 2.5        | 5.8    | 1.0      | 3.2         |
| RCH.2 Bt (CC)       | 1.5     | 1.9    | 2.1        | 3.3    | 1.0      | 2.1         |
| MECH.162 Bt (CC)    | 1.8     | 2.9    | 2.0        | 2.9    | 2.5      | 2.8         |
| Local check*        | 1.9     | 3.3    | 12.7       | 6.1    | 1.5      | 3.6         |
| BUNNY (Zonal check) | 2.1     | 3.8    | 2.4        | 4.7    | 1.0      | 3.2         |
| CD (0.05)           | 0.6     |        | NS         |        | -        |             |
| CV %                | 14.2    |        | 18.2       |        | -        |             |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka) \*\* TV: transformed values

The incidence of American bollworm in South Zone was quite low. The test hybrid could not be effectively tested against this pest due to poor incidence of this pest during 2004 season.

### American bollworms

| Entry               | Siruguppa | CICR CBE |        | Nandyal |        | Lam Guntur |        | Dharwad | Mean Number |
|---------------------|-----------|----------|--------|---------|--------|------------|--------|---------|-------------|
|                     | Number    | **TV     | Number | TV      | Number | TV         | Number | Number  |             |
| RCH.344 Bt          | 0.9       | 0.0      | 0.0    | 0.7     | 0.0    | 1.0        | 0.0    | 1.3     | 0.4         |
| RCH. 362 Bt         | 1.5       | 0.7      | 0.5    | 0.7     | 0.0    | 1.0        | 0.0    | 1.9     | 0.8         |
| RCH. 368 Bt         | 1.5       | 0.0      | 0.0    | 0.7     | 0.0    | 1.0        | 0.0    | 0.3     | 0.4         |
| MRC. 6160 Bt        | 0.3       | 0.0      | 0.0    | 0.7     | 0.0    | 1.0        | 0.0    | 1.0     | 0.3         |
| MRC. 6322 Bt        | 1.5       | 0.0      | 0.0    | 0.7     | 0.0    | 1.0        | 0.5    | 2.0     | 0.8         |
| MRC. 6703 Bt        | 0.8       | 0.0      | 0.0    | 0.7     | 0.0    | 1.0        | 0.0    | 2.0     | 0.6         |
| RCH.344             | 1.5       | 0.0      | 0.0    | 0.7     | 0.0    | 1.1        | 1.0    | 2.1     | 0.9         |
| RCH. 362            | 1.5       | 1.2      | 1.5    | 0.7     | 0.0    | 1.1        | 1.0    | 1.4     | 1.1         |
| RCH. 368            | 1.5       | 1.2      | 1.5    | 0.7     | 0.0    | 1.0        | 0.5    | 1.1     | 0.9         |
| MRC. 6160           | 0.8       | 1.2      | 1.5    | 0.7     | 0.0    | 1.0        | 0.0    | 4.4     | 1.3         |
| MRC. 6322           | 1.5       | 2.5      | 6.0    | 1.1     | 1.0    | 1.1        | 3.5    | 1.5     | 2.7         |
| MRC. 6703           | 0.7       | 1.6      | 2.5    | 0.7     | 0.0    | 1.0        | 0.5    | 2.1     | 1.2         |
| RCH.2 Bt (CC)       | 1.3       | 0.0      | 0.0    | 0.7     | 0.0    | 1.0        | 0.0    | 1.1     | 0.5         |
| MECH.162 Bt (CC)    | 1.2       | 0.7      | 0.5    | 0.7     | 0.0    | 1.0        | 0.5    | 1.6     | 0.8         |
| Local check*        | 2.2       | 2.0      | 4.0    | 0.7     | 0.0    | 1.0        | 0.0    | 2.1     | 1.7         |
| BUNNY (Zonal check) | 1.2       | 0.7      | 0.5    | 0.7     | 0.0    | 1.1        | 1.5    | 2.6     | 1.2         |
| CD (0.05)           | 0.30      | 0.8      |        |         | 0.3    |            |        | 0.1     |             |
| CV %                | 23.9      | 34.3     |        |         | 21.0   |            |        | 3.25    |             |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka); \*\* TV: transformed values

The mean percent locule damage was quite low in RCH.344 Bt unlike other test Bt hybrids as well as check and non-Bt hybrids. The zonal check had over 30% locule damage.

### Locule damage

| Entry            | Siruguppa | Nandyal |        | Lam Guntur |        | Dharwad | CICR CBE |        | Mean Number |
|------------------|-----------|---------|--------|------------|--------|---------|----------|--------|-------------|
|                  | Number    | **TV    | Number | TV         | Number | Number  | TV       | Number |             |
| RCH.344 Bt       | 12.9      | 15.0    | 7.2    | 16.3       | 8.1    | 5.195   | 10.1     | 3.1    | <b>7.8</b>  |
| RCH. 362 Bt      | 18.9      | 22.0    | 15.7   | 19.4       | 11.4   | 14.3    | 12.5     | 4.7    | <b>13.0</b> |
| RCH. 368 Bt      | 10.5      | 24.0    | 16.9   | 15.1       | 8.6    | 26.7    | 11.4     | 3.9    | <b>13.3</b> |
| MRC. 6160 Bt     | 15.9      | 23.3    | 15.7   | 12.2       | 4.6    | 14.4    | 9.3      | 2.6    | <b>10.6</b> |
| MRC. 6322 Bt     | 13.4      | 23.0    | 15.3   | 17.7       | 9.2    | 20.6    | 14.5     | 6.3    | <b>13.0</b> |
| MRC. 6703 Bt     | 20.9      | 14.1    | 8.4    | 15.4       | 7.3    | 13.5    | 13.4     | 5.4    | <b>11.1</b> |
| RCH.344          | 16.7      | 68.5    | 80.3   | 22.1       | 14.3   | 35.8    | 21.0     | 12.8   | 32.0        |
| RCH. 362         | 15.8      | 49.8    | 57.8   | 16.1       | 7.7    | 37.1    | 20.6     | 12.4   | 26.2        |
| RCH. 368         | 23.0      | 23.8    | 17.0   | 20.4       | 13.5   | 29.0    | 25.0     | 17.8   | 20.1        |
| MRC. 6160        | 17.1      | 51.8    | 60.9   | 20.0       | 16.7   | 32.3    | 26.4     | 19.7   | 29.3        |
| MRC. 6322        | 13.9      | 39.7    | 41.0   | 19.6       | 11.6   | 20.1    | 22.5     | 14.7   | 20.2        |
| MRC. 6703        | 10.6      | 38.8    | 40.1   | 22.1       | 14.2   | 28.0    | 22.6     | 14.8   | 21.5        |
| RCH.2 Bt (CC)    | 16.9      | 27.9    | 23.0   | 19.2       | 10.9   | 9.6     | 10.6     | 3.4    | 12.7        |
| MECH.162 Bt (CC) | 13.1      | 23.0    | 15.7   | 19.1       | 10.8   | 13.4    | 7.9      | 1.9    | 11.0        |
| Local check*     | 21.2      | 15.2    | 9.8    | 18.0       | 10.0   | 36.9    | 25.5     | 18.5   | 19.3        |
| BUNNY (ZC)       | 16.9      | 64.4    | 73.2   | 16.5       | 8.0    | 42.8    | 20.8     | 12.6   | 30.7        |
| CD (0.05)        | 2.39      |         | 29.3   |            | NS     | 1.5     |          | 4.2    |             |
| CV %             | 7.2       |         | 41.6   |            | 22.5   | 2.5     |          | 11.5   |             |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka); \*\* TV: transformed values

The percent open boll damage was, however, quite high in RCH Bt hybrids. The MRC.6160Bt hybrid had the lowest of 16.1% amongst the six Bt test hybrids under unprotected condition.

### Open boll damage

| Entry               | Siruguppa |      | Nandyal |      | Lam Guntur |      | Dharwad | CICR | CBE         | Mean % |
|---------------------|-----------|------|---------|------|------------|------|---------|------|-------------|--------|
|                     | %         | **TV | %       | TV   | %          | %    | TV      | %    |             |        |
| RCH.344 Bt          | 53.8      | 15.3 | 7.4     | 19.2 | 11.0       | 9.7  | 16.2    | 78.9 | 32.1        |        |
| RCH. 362 Bt         | 52.2      | 22.4 | 16.3    | 20.0 | 11.9       | 15.0 | 21.1    | 13.0 | 21.7        |        |
| RCH. 368 Bt         | 58.5      | 23.4 | 16.2    | 22.3 | 14.5       | 9.1  | 18.4    | 10.0 | 21.6        |        |
| MRC. 6160 Bt        | 37.6      | 23.6 | 16.0    | 16.8 | 8.5        | 10.7 | 16.2    | 7.8  | <b>16.1</b> |        |
| MRC. 6322 Bt        | 51.6      | 23.5 | 15.9    | 22.1 | 14.0       | 11.5 | 19.9    | 11.6 | 20.9        |        |
| MRC. 6703 Bt        | 57.2      | 14.0 | 8.3     | 20.8 | 12.7       | 7.3  | 24.0    | 16.6 | 20.4        |        |
| RCH.344             | 48.3      | 69.1 | 81.3    | 30.2 | 23.9       | 34.3 | 20.7    | 23.0 | 42.1        |        |
| RCH. 362            | 55.5      | 50.5 | 58.9    | 18.4 | 10.1       | 22.1 | 28.2    | 22.3 | 33.8        |        |
| RCH. 368            | 48.1      | 23.8 | 17.0    | 19.1 | 11.3       | 32.4 | 35.0    | 32.9 | 28.4        |        |
| MRC. 6160           | 65.4      | 51.8 | 60.8    | 22.1 | 14.3       | 31.9 | 35.7    | 34.0 | 41.3        |        |
| MRC. 6322           | 54.4      | 40.1 | 41.7    | 19.2 | 11.4       | 34.0 | 33.2    | 30.0 | 34.3        |        |
| MRC. 6703           | 64.2      | 39.1 | 40.3    | 20.9 | 13.3       | 26.7 | 32.8    | 29.3 | 34.8        |        |
| RCH.2 Bt (CC)       | 62.4      | 28.0 | 22.9    | 22.6 | 14.9       | 9.7  | 18.8    | 10.4 | 24.1        |        |
| MECH.162 Bt (CC)    | 66.9      | 23.3 | 16.3    | 18.1 | 10.4       | 19.2 | 12.8    | 4.9  | 23.5        |        |
| Local check*        | 52.6      | 14.8 | 9.3     | 25.2 | 18.2       | 21.1 | 36.7    | 35.7 | 27.4        |        |
| BUNNY (Zonal check) | 49.3      | 65.5 | 75.0    | 24.8 | 17.7       | 30.2 | 31.5    | 37.3 | 41.9        |        |
| CD (0.05)           | 3.64      |      | 29.3    |      | NS         | 1.8  | 5.1     |      |             |        |
| CV %                | 13.8      |      | 41.6    |      | 22.5       | 3.20 | 9.5     |      |             |        |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka); \*\* TV:transformed values

### Number of sprayings for sucking pest under UNPROTECTED conditions

The plant protection was done only against sap sucking pests and ranged from 2.0 to 2.7 in Bt test hybrids.

| Entry            | Siruguppa | Nandyal | Lam Guntur | Mean |
|------------------|-----------|---------|------------|------|
| RCH.344 Bt       | 2         | 4       | 1          | 2.3  |
| RCH. 362 Bt      | 2         | 4       | 2          | 2.7  |
| RCH. 368 Bt      | 2         | 4       | 1          | 2.3  |
| MRC. 6160 Bt     | 2         | 4       | 0          | 2.0  |
| MRC. 6322 Bt     | 2         | 4       | 2          | 2.7  |
| MRC. 6703 Bt     | 2         | 4       | 1          | 2.3  |
| RCH.344          | 2         | 4       | 1          | 2.3  |
| RCH. 362         | 2         | 4       | 2          | 2.7  |
| RCH. 368         | 2         | 4       | 1          | 2.3  |
| MRC. 6160        | 2         | 4       | 1          | 2.3  |
| MRC. 6322        | 2         | 4       | 1          | 2.3  |
| MRC. 6703        | 2         | 4       | 1          | 2.3  |
| RCH.2 Bt (CC)    | 2         | 4       | 2          | 2.7  |
| MECH.162 Bt (CC) | 2         | 4       | 1          | 2.3  |
| Local check*     | 2         | 4       | 1          | 2.3  |
| BUNNY (ZC)       | 2         | 4       | 1          | 2.3  |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka)

The following table provides the seed cotton yield under unprotected conditions in the test hybrids of South zone. The seed cotton yield of 1935 kg/ha (after excluding two bad

data from Siruguppa and Nandyal due to drought) in the case of RCH.368Bt followed by 1791 kg/ha in RCH.344Bt, 1679 kg/ha for MRC.6703Bt and 1592 kg/ha for MRC.6160Bt. If the seed cotton yield of all the five centres are considered, the best hybrid is MRC.6160Bt (1527 kg/ha) followed by RCH.368Bt (1445 kg/ha), RCH.344Bt (1334 kg/ha) and MRC.6703Bt (1295 kg/ha).

### Seed cotton yield (Kg/ha) - Unprotected

| Entry            | Siruguppa | CICR CBE | Nandyal | Lam Guntur | Dharwad | Zone Mean   | Mean excluding Siruguppa & Nandyal |
|------------------|-----------|----------|---------|------------|---------|-------------|------------------------------------|
| RCH.344 Bt       | 440       | 1773     | 857     | 2438       | 1162    | <b>1334</b> | <b>1791</b>                        |
| RCH. 362 Bt      | 440       | 1408     | 857     | 1881       | 976     | 1112        | 1422                               |
| RCH. 368 Bt      | 650       | 2031     | 772     | 2797       | 976     | <b>1445</b> | <b>1935</b>                        |
| MRC. 6160 Bt     | 2020      | 1834     | 840     | 1986       | 954     | <b>1527</b> | <b>1592</b>                        |
| MRC. 6703 Bt     | 280       | 976      | 444     | 1122       | 967     | 758         | 1022                               |
| MRC. 6322 Bt     | 710       | 1365     | 729     | 2525       | 1146    | <b>1295</b> | <b>1679</b>                        |
| RCH.344          | 60        | 1020     | 80      | 1016       | 583     | 552         | 873                                |
| RCH. 362         | 90        | 936      | 51      | 614        | 576     | 453         | 709                                |
| RCH. 368         | 110       | 1152     | 172     | 868        | 561     | 573         | 860                                |
| MRC. 6160        | 240       | 1159     | 128     | 2061       | 747     | 867         | 1322                               |
| MRC. 6322        | 80        | 963      | 214     | 854        | 641     | 550         | 819                                |
| MRC. 6703        | 120       | 913      | 60      | 929        | 689     | 542         | 844                                |
| RCH.2 Bt (CC)    | 860       | 1541     | 626     | 1033       | 1238    | 1060        | 1271                               |
| MECH.162 Bt (CC) | 250       | 1144     | 420     | 1366       | 846     | 805         | 1119                               |
| Local check*     | 310       | 921      | 172     | 1012       | 646     | 612         | 860                                |
| BUNNY (ZC)       | 290       | 1335     | 189     | 1807       | 682     | 861         | 1275                               |
| CD (0.05)        | 22        | 456      | 361     | 114        | 57      |             |                                    |
| CV %             | 23.2      | 16.7     | 4.5     | 28.2       | 12.56   |             |                                    |

\*LAHH.5 (AP)/DHH.11 (T.N. & Karnataka)

## PLANT PATHOLOGY EVALUATION

During 2004 – 05, there was moderate to high level of incidences of Grey mildew and Alternaria leaf spot at Dharwad, Siruguppa, Lam (Guntur) and Coimbatore; moderate incidence of Bacterial leaf blight at Dharwad and Siruguppa and Helminthosporium and Cercospora leaf spots at Lam. We were able to assess properly the reaction of various Bt and non-Bt hybrids to the above mentioned diseases in the Southern Centres.

### Alternaria leaf spot

Among these H x H Bt hybrids, very high incidence of alternaria leaf spot was seen at Dharwad and Siruguppa and to a less extent at the Lam centre. At Coimbatore, this disease was noticed during the early phase of crop. There was higher disease incidence under the UNSPRAYED PLOTS. Both Bt and non-Bt hybrids were equally susceptible to this disease. There was no significant difference in the incidence among the hybrids. MRC.6322 Bt had the highest disease incidence (31.85%) followed by RCH 2Bt (30.48%) when overall mean was compared in unsprayed plots, as given below.

#### Alternaria leaf spot incidence in unprotected plots (Per cent Disease Incidence)

| Name of entry    | Dharwad       | Siruguppa     | LAM, Guntur | CICR,CBE | Mean  |
|------------------|---------------|---------------|-------------|----------|-------|
| RCH.344 Bt       | 36.61 (37.23) | 33.68 (35.49) | 24.5(29.66) | 17.50    | 28.07 |
| RCH. 362 Bt      | 35.30 (36.45) | 35.34 (36.45) | 25.5(30.32) | 11.30    | 26.36 |
| RCH. 368 Bt      | 35.19 (36.39) | 37.04 (37.46) | 22.5(28)    | 8.80     | 25.88 |
| MRC. 6160 Bt     | 37.80 (37.94) | 38.43 (38.29) | 23.5(28.97) | 15.00    | 28.68 |
| MRC. 6703Bt      | 32.93 (35.00) | 34.46 (35.97) | 22.5(28.3)  | 25.00    | 28.72 |
| MRC. 6322 Bt     | 35.92 (36.81) | 43.49 (41.27) | 23.0(28.65) | 25.00    | 31.85 |
| RCH.344          | 34.25 (35.85) | 38.48 (38.35) | 25.5(30.3)  | 12.50    | 27.68 |
| RCH. 362         | 35.39 (36.51) | 42.85 (40.92) | 22.5(28.28) | 10.00    | 27.66 |
| RCH. 368         | 35.03 (36.27) | 40.55 (39.58) | 17.5(24.71) | 8.80     | 25.47 |
| MRC. 6160        | 34.59 (36.03) | 41.54 (40.11) | 16.0(23.53) | 25.00    | 29.28 |
| MRC. 6703        | 33.70 (35.49) | 38.28 (38.23) | 15.0(22.68) | 21.30    | 27.07 |
| MRC. 6322        | 35.28 (36.45) | 40.57 (39.58) | 15.0(22.68) | 23.80    | 28.66 |
| RCH.2 Bt (CC)    | 36.31 (37.05) | 40.10 (39.29) | 18.0(28.05) | 27.50    | 30.48 |
| MECH.162 Bt (CC) | 37.04 (37.46) | 38.29 (38.23) | 18.0(25.03) | 11.30    | 26.16 |
| Local Check      | 37.89 (37.94) | 37.43 (37.70) | 21.5(27.61) | 13.80    | 27.66 |
| BUNNY (ZC)       | 35.69 (36.69) | 45.94 (42.36) | 17.0(24.34) | 16.30    | 28.11 |

### Bacterial leaf blight

Bacterial Blight disease was noticed only in the Dharwad and Siruguppa centres at moderate level in H x H Bt I hybrids (16.34 to 23.72 %) and on BG II hybrids (14.73 to 21.09 %). All hybrids (Bt and non-Bt) were moderately susceptible in both trials and there were no significant differences among them, as given below.

### Bacterial blight incidence in unprotected plots

| Name of entry       | Dharwad       | Siruguppa     | Mean  |
|---------------------|---------------|---------------|-------|
| RCH.344 Bt          | 31.20 (33.96) | 14.23 (22.14) | 22.71 |
| RCH. 362 Bt         | 29.59 (32.96) | 17.85 (25.03) | 23.72 |
| RCH. 368 Bt         | 28.04 (31.95) | 12.34 (20.53) | 20.19 |
| MRC. 6160 Bt        | 29.11 (32.65) | 9.80 (26.42)  | 19.46 |
| MRC. 6703Bt         | 26.06 (30.72) | 8.61 (17.05)  | 17.34 |
| MRC. 6322 Bt        | 29.04 (32.58) | 10.40 (18.81) | 19.72 |
| RCH.344             | 29.62 (32.96) | 10.23 (18.63) | 19.93 |
| RCH. 362            | 30.38 (33.46) | 10.51 (18.91) | 20.45 |
| RCH. 368            | 28.71 (32.39) | 11.34 (19.64) | 20.03 |
| MRC. 6160           | 28.41 (32.20) | 10.74 (19.09) | 19.58 |
| MRC. 6703           | 26.44 (30.92) | 11.85 (20.18) | 19.15 |
| MRC. 6322           | 28.36 (32.20) | 9.82 (18.24)  | 19.09 |
| RCH.2 Bt (CC)       | 26.82 (31.18) | 10.20 (18.63) | 18.51 |
| MECH.162 Bt (CC)    | 30.58 (33.65) | 9.62 (18.05)  | 20.10 |
| Local Check         | 26.72 (31.11) | 10.79 (19.19) | 18.76 |
| BUNNY (Zonal check) | 28.16 (32.08) | 9.41 (17.85)  | 18.79 |
| CD at 5%            | NS            | NS            |       |
| CV %                | 5.16          | 14.21         |       |

### Grey mildew

Very high incidence of Grey mildew was noticed in Dharwad and Siruguppa and moderate incidence in Lam and Coimbatore (TNAU). In the trials with H x H Bt I hybrids the disease incidence varied from 34.82 to 48.91 percent in Dharwad, 31.95 to 46.54 percent in Siruguppa and 19.25 to 30.62 percent in the Lam farm (Guntur). Overall the entomology trial plots had marginally higher incidence of Grey mildew disease. Both Bt and non-Bt hybrids were found equally susceptible to Grey mildew. Among the Bt hybrids RCH 344 Bt had lower disease incidence in three centres.

### Grey mildew disease incidence in unprotected plots

| Entry               | Dharwad       | Siruguppa     | Lam, Guntur  | Mean  |
|---------------------|---------------|---------------|--------------|-------|
| RCH.344 Bt          | 40.43 (39.47) | 32.25 (34.63) | 19.25(26.02) | 30.64 |
| RCH. 362 Bt         | 41.55 (40.16) | 32.86 (35.00) | 19.62(26.19) | 31.31 |
| RCH. 368 Bt         | 41.90 (40.34) | 37.68 (37.88) | 22.75(28.44) | 34.11 |
| MRC. 6160 Bt        | 43.52 (41.27) | 37.88 (38.00) | 20.25(26.72) | 33.88 |
| MRC. 6322 Bt        | 41.85 (40.16) | 34.53 (35.97) | 27.0(31.27)  | 34.46 |
| MRC. 6703Bt         | 42.91 (40.92) | 40.09 (39.29) | 30.0(33.20)  | 37.67 |
| MRC. 6322 Bt        | 42.77 (40.86) | 39.41 (38.88) | 24.5(29.61)  | 35.56 |
| Local Check         | 43.98 (41.55) | 39.58 (39.00) | 27.3(31.52)  | 36.95 |
| BUNNY (Zonal check) | 43.54 (41.27) | 46.54 (42.99) | 23.25(28.77) | 37.78 |
| MECH.162 Bt (CC)    | 48.91 (44.37) | 43.28 (41.15) | 23.12(28.70) | 38.44 |
| RCH.344             | 47.11 (43.34) | 44.90 (42.07) | 29.25(32.71) | 40.42 |
| RCH. 362            | 45.27 (42.25) | 43.77 (41.44) | 30.62(33.56) | 39.89 |
| RCH. 368            | 41.84 (40.28) | 41.58 (40.16) | 29.0(32.57)  | 37.47 |
| MRC. 6160           | 41.15 (39.93) | 41.33 (39.99) | 21.75(27.71) | 34.74 |
| MRC. 6322           | 44.08 (41.61) | 42.54 (40.69) | 25.62(30.39) | 37.41 |
| MRC. 6703           | 44.34 (41.73) | 44.21 (41.67) | 23.25(28.81) | 37.27 |
| CD at 5%            | NS            | 4.76          |              |       |
| CV %                | 4.74          | 5.69          | 8.3          |       |

\*LAHH.5 (AP)/DHH.11(T.N. & Karnataka)

### **Helminthosporium and Cercospora leaf spots**

These two diseases were observed only in the Lam (Guntur) centre in the H x H Bt I and BG II hybrid trials. All hybrids (Bt and non-Bt) as well as check were found to be moderately susceptible to the two diseases.

## **Combined report for 2003 & 2004 - (6 Bt hybrids BG-I)**

### **Overall assessment of two year results:**

During 2003 season, the sap-sucking pests were similar in pattern of infestation in unprotected and protected plots. Due to drought conditions, the general population of jassids was low; however, their numbers on three leaves per plant did show a significant difference between various entries. During 2004, under unsprayed condition, the jassids was quite high in the test hybrids and check hybrids. All these genotypes seem to be highly susceptible to jassids. In spite of protection with insecticides at threshold level, their population was quite high.

Although the Amercian bollworm was in low in population during both the years, the test hybrids did show certain degree of suppression of Pink bollworm during both the years. During 2004, the percent open boll damage was, however, quite high in RCH Bt hybrids. The MRC.6160Bt hybrid had the lowest of 16.1% amongst the six Bt test hybrids under unprotected condition. During 2003 season, the percent open boll damage was virtually fifty percent of that in non-Bt hybrids as well as in check hybrids. The highest percent was in MRC.6322Bt (20.88%) followed by RCH.362Bt (16.92%).

A comparison of the seed cotton yield of both protected and non-protected plots showed that RCH.2Bt and RCH.362Bt hybrids had consistent superiority over other Bt hybrids in spite of being a drought year. Consistency of seed cotton yield over 2003 and 2004 seasons was clearly seen in RCH.362Bt (1935 kg/ha in protected plots and 1759 kg/ha in unprotected plots) and RCH.344Bt (1791 kg/ha in protected plots and 1590 kg/ha in unprotected plots), in both unprotected and unprotected conditions in South zone was clear, as given below. These two hybrids did show superiority in performance in terms of seed cotton yield in comparison to the other four Bt test hybrids.



### Analysis of Seed cotton yield (kg/ha)

| Entry              | Protected   |             |             | Unprotected |             |             |
|--------------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                    | 2003        | 2004        | Mean        | 2003        | 2004        | Mean        |
| <b>RCH.344 Bt</b>  | <b>1732</b> | <b>2052</b> | <b>1892</b> | <b>1389</b> | <b>1791</b> | <b>1590</b> |
| RCH.344            | 1210        | 1419        | 1315        | 849         | 1422        | 1136        |
| <b>RCH. 362 Bt</b> | <b>1783</b> | <b>2089</b> | <b>1936</b> | <b>1583</b> | <b>1935</b> | <b>1759</b> |
| RCH. 362           | 1272        | 1674        | 1473        | 1023        | 1592        | 1308        |
| RCH. 368 Bt        | 1803        | 1731        | 1767        | 1357        | 1022        | 1190        |
| RCH. 368           | 1104        | 1645        | 1375        | 960         | 1679        | 1320        |
| MRC. 6160 Bt       | 1668        | 1528        | 1598        | 1345        | 873         | 1109        |
| MRC. 6160          | 840         | 1145        | 993         | 880         | 709         | 795         |
| MRC. 6322 Bt       | 1608        | 1344        | 1476        | 1415        | 860         | 1138        |
| MRC. 6322          | 1038        | 1358        | 1198        | 1167        | 1322        | 1245        |
| MRC. 6703 Bt       | 1718        | 1488        | 1603        | 1487        | 819         | 1153        |
| MRC. 6703          | 1036        | 1057        | 1047        | 908         | 844         | 876         |
| RCH.2 Bt (CC)      | -           | 1656        | 1656        | -           | 1271        | 1271        |
| MECH.162 Bt (CC)   | 1474        | 1383        | 1429        | 1037        | 1119        | 1078        |
| Local checks       | 1329        | 1229        | 1279        | 782         | 860         | 821         |
| BUNNY (ZC)         | 1009        | 1364        | 1187        | 1216        | 1275        | 1246        |

The fibre quality values of the various test hybrids during two seasons provide wide variation in the strength and micronaire values. Hence, it is not possible to state that the fibre obtained from this evaluation of these six test hybrids possess the desired fibre quality to achieve specific yarn count. The same is true for the check Bt and conventional hybrids. Large scale cultivation with mill test of a minimum of 50 kg as is done in All India Coordinated Cotton improvement Project has to be undertaken to realize the actual fibre quality of the test hybrids. The fibres of the bolded entries such as RCH.368Bt and MRC.6160 are nearer to the achievable SITRA norms.

| Genotype               | Span length (mm) |             | Fibre tenacity (g/tex) |             | Micronaire (10 <sup>-6</sup> g/in) |            |
|------------------------|------------------|-------------|------------------------|-------------|------------------------------------|------------|
|                        | 2003             | 2004        | 2003                   | 2004        | 2003                               | 2004       |
| RCH.344 Bt             | 30.2             | 29.1        | 24.6                   | 20.8        | 4.9                                | 5.1        |
| RCH. 362 Bt            | 28.5             | 30.0        | 24.0                   | 21.7        | 4.7                                | 4.7        |
| <b>RCH. 368 Bt</b>     | <b>28.4</b>      | <b>31.2</b> | <b>24.1</b>            | <b>21.5</b> | <b>3.9</b>                         | <b>3.8</b> |
| MRC. 6160 Bt           | 27.3             | 27.5        | 22.9                   | 20.4        | 4.3                                | 4.2        |
| MRC. 6322 Bt           | 28.5             | 30.9        | 23.0                   | 22.5        | 3.6                                | 4.2        |
| MRC. 6703 Bt           | 27.2             | 29.9        | 22.1                   | 22.0        | 4.2                                | 3.7        |
| RCH.344                | 30.7             | 30.1        | 24.2                   | 21.8        | 4.3                                | 4.7        |
| RCH. 362               | 28.9             | 28.3        | 23.7                   | 21.6        | 4.7                                | 4.7        |
| RCH. 368               | 28.8             | 30.2        | 23.5                   | 22.0        | 4.2                                | 4.3        |
| <b>MRC. 6160</b>       | <b>27.1</b>      | <b>27.3</b> | <b>23.2</b>            | <b>20.0</b> | <b>3.5</b>                         | <b>4.5</b> |
| MRC. 6322              | 27.8             | 27.0        | 22.3                   | 20.2        | 3.7                                | 4.0        |
| MRC. 6703              | 26.7             | 27.0        | 21.3                   | 21.5        | 4.1                                | 4.0        |
| MECH.162 Bt (Bt check) | 26.7             | 31.2        | 20.4                   | 21.7        | 4.5                                | 3.8        |
| *Local checks          | <b>26.6</b>      | <b>25.3</b> | <b>21.9</b>            | <b>20.3</b> | <b>4.3</b>                         | <b>4.1</b> |
| BUNNY (Zonal check)    | 30.2             | 28.1        | 22.9                   | 22.0        | 3.7                                | 4.1        |
|                        |                  | 30.6        |                        | 22.0        |                                    | 3.9        |

\* LAHH.5/DHH.11/SAVITA

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