ABSTRACT
***Journal of Cotton Research and Development* 27 (1) January, 2012**

J. Cotton Res. Dev. **27** (1) 1-6 (January, 2013)

Optimization of gene transfer in cotton *via Agrobacterium tumefaciens*: an assessment of factors influencing the efficiency of gene transfer mechanisms

V.H. SOLANKI*, VIKAS KHANDELWAL, D. H. PATEL, M.K. MAHATMA AND SUMAN JHA
Department of Biotechnology, Navsari Agricultural University, Navsari - 396 450
**E-mail : vanrajsinh_26@yahoo.co.in*

ABSTRACT: The present work was aimed to study factors affecting transformation of cotton variety G.Cot.10 using *Agrobacterium tumefaciens* strain LBA 4404 harboring binary vector pBIN1F having kanamycin resistance gene (*NPTII*) as selectable marker and *cryIF* gene for insect resistance. Factors affecting transformation efficiency, such as age of seedling, pH of co cultivation medium and co cultivation time period of *Agrobacterium* were studied. Results resolved that three days old seedlings inoculated with *A. tumefaciens* and co cultivated for three days in half MS medium at pH 5.8 depicted highest frequency of transformation 6 and 4 per cent in injection method and cut method respectively.

Key words: *Agrobacterium tumefaciens*, co cultivation, *cryIF* gene, *Gossypium hirsutum,* transformation

J. Cotton Res. Dev. **27** (1) 7-10 (January, 2013)

Hybrid vigour and inbreeding depression for fibre quality in upland cotton (*Gossypium hirsutum* L.)

S. K. KAUSHIK* AND C. J. KAPOOR
Rajmata Vijayaraje Scindiya Krishi Vishwa Vidyalaya, Krishi Vigyan Kendra, Ujjain - 456 010
**E-mail : kaushik.surendra@rediffmail.com*

ABSTRACT : In upland cotton (*Gossypium hirsutum* L.), 45 cross hybrids were produced by using 10 x 10 half diallel fashion and were evaluated alongwith their 45 F_2's and 10 parents in R.B.D. replicated thrice. The magnitude of heterosis over mid parent and better parent, as well as inbreeding depression, were calculated for various fibre quality traits. Twenty seven crosses showed significant positive heterobeltiosis for seed cotton yield/plant. Based on the present study eight crosses *viz.,* F 1867 x LH 1836, F 1867 x H 1123, F 1861 x C 2602-WIR 6109, F 1861 x LH 1836, C 2602-WIR 6109 x Pusa 101, PIL 8-5 x H 1123, LH 1836 x RS 2115, and H 1123 x RS 2115 were considered most promising for seed cotton yield/plant and most of the other fibre quality characters. The highest significant negative inbreeding depression were showed in crosses namely; C 2602-WIR 6109 x LH 1836 for ginning per cent; F 1861 x RS 2115 for lint index; F 1861 x LH 1896 for 2.5 per cent span length; C 2602-WIR-6109 x LH 1836 for fibre fineness; C 2602-WIR 6109 x Pusa 101 for seed index; and LH 1861 x H 1123 for seed cotton yield/plant. Significant negative inbreeding depression was recorded for yield and fibre quality traits indicating that the F_2 was superior to the F_1. The study showed the potential of commercial exploitation of heterosis through the production of hybrid cotton, as well as the potential of isolating the pure lines among the progenies of heterotic F_1s for improvement of yield as well as fibre quality potential in upland cotton.

Key words: Cotton, diallel cross, heterobeltiosis, heterosis, inbreeding depression

J. Cotton Res. Dev. **27** (1) 11-15 (January, 2013)

Heterosis for seed cotton yield and its contributing traits in upland cotton (*Gossypium hirsutum* L.)

MANISH KUMAR, K.S.NIRANIA*, R.S.SANGWAN, N.K.YADAV AND SOM PRAKASH
CCS Haryana Agricultural University, Cotton Research Station, Sirsa-125055
**E-mail : ksnirania@yahoo.com*

ABSTRACT : The present study was undertaken to estimate economic heterosis of newly developed cotton hybrids with the objective of exploring possibilities of their commercial utilization. For this purpose, 52 upland cotton hybrids were developed crossing 13 lines with four testers in a line x tester mating design during *kharif*, 2009.These hybrids along with their 17 parents (13 males and 4 females) and one standard check (HHH 223) were evaluated during *kharif,* 2010.The experimental material was grown at Cotton Research Station, Sirsa, during *kharif*, 2010 in a randomized block design with three replications. Considerable amount of heterosis was recorded for seed cotton yield and other related characters. Twenty five hybrids exhibited heterosis of more than 20 per cent for seed cotton yield/plant. Highest economic heterosis for seed cotton yield was observed in the hybrid H1226 x HS 1 to the tune of 68.98 per cent. Five other crosses which exhibited heterosis of more than 45 per cent were H1098 x DELTA SL (66.11%), HS182 x MC 82 (57.31%), H1226 x F 1378(47.76%), H1098 x DELCOT 517(47.56%) and H1226 x RS 875(45.16%).All the crosses which showed high heterosis for yield invariably showed high positive heterosis either for number of bolls and boll weight. The hybrids H1226 x HS 1 and H1098 x DELTA SL exhibited heterosis of more than 65 per cent and hence warrant their further testing over locations for commercial utilization.

Key words : Heterosis, *Gossypium hirsutum*, upland cotton

J. Cotton Res. Dev. **27** (1) 16-19 (January, 2013)

Gene effects for seed cotton yield and its traits in *desi* cotton (*Gossypium arboreum* L.)

S. S. SIWACH*, R. S. SANGWAN, O SANGWAN AND J. D. DESHMUKH
Department of Genetics and Plant Breeding, CCS Haryana Agricutural University, Hisar - 125 004
**E-mail : profsssiwach@gmail.com*

ABSTRACT : Generation mean analysis was carried out in three crosses of cotton to find out the gene effects for seed cotton yield/plant (g), seed index (g), lint index (g) and ginning outturn (%). Additive dominance model was inadequate in all the three crosses for seed cotton yield whereas, for rest of the characters namely seed index, lint index and ginning outturn this model was inadequate in crosses *i.e.* GMS 11 x P 502 and GMS1 x ADDH 7. Additive gene effects were more important for seed cotton yield/plant whereas additive and dominance effects were significant in most of the crosses. Among epistatic interactions, additive x dominance appeared to be significant for all the traits. There was predominance of complimentary type of gene effects in all crosses.

Key words : Cotton, flower, genetics, colour, *Gossypium arboreum*

J. Cotton Res. Dev. **27** (1) 20-23 (January, 2013)

Assessment of genetic diversity in *Gossypium barbadense* L.

D. KAVITHAMANI*, P. AMALA BALU AND S. RAJARATHINAM
Department of Cotton, Tamil Nadu Agricultural University, Coimbatore – 641 003
**E-mail : kavitharice@yahoo.co.in*

ABSTRACT : Study of genetic diversity and identification of genotypes with broad genetic base quickens the crop improvement. It enables the plant breeders to choose parental sources that will generate diverse populations. The present study was under taken to study the genetic diversity in 48 genotypes of *G. barbadense* using multivariate Mahalanobis D^2 analysis and these genotypes grouped into 13 clusters. Grouping of genotypes into different clusters was independent of their geographical origin. The distribution indicated that the geographical diversity and genetic diversity were not related and there were other forces responsible for diversity. The intra and inter distances revealed that inter cluster distance values were greater than intra cluster distance values.

Key words : D^2 statistic, genetic divergence, *Gossypium barbadense,* multivariate analysis

---

J. Cotton Res. Dev. **27** (1) 24-26 (January, 2013)

Performance of some newly developed *Bt* cotton hybrids for yield and fibre quality parameters

S.S. BHATADE*, D.H. SARANG AND D.B. DEOSARKAR
Marathwada Agricultural University, Cotton Research Station, Nanded – 431 604
**E-mail : bhatadess@rediffmail.com*

ABSTRACT : Performance of some newly developed cotton hybrids was tested during *kharif,* 2010. Out of 26 *Bt* hybrids tested, only five hybrids recorded significant superiority over high yielding check, Bunny BG I. Most of the *Bt* hybrids recorded low fibre tenacity which resulted into low S/L ratio (< 0.80). Need for improvement of fibre tenacity in relation to fibre length is emphasized while developing new *Bt* cotton hybrids.

Key words : *Bt* hybrid cotton, fibre tenacity, productivity gains, S/L ratio

J. Cotton Res. Dev. **27** (1) 27-31 (January, 2013)

Prediction of performance of F_1 hybrids from their parental properties in upland cotton (*Gossypium hirsutum* L.)

R.K. GUMBER*, PANKAJ RATHORE AND J.S. GILL
Punjab Agricultural University, Regional Station, Faridkot - 151 203
**E-mail : ramesh_gumber@yahoo.com*

ABSTRACT: Prediction of genetic potential of F_1 hybrids from the properties of their parental lines has great impact on the breeding programme. In the present study, attempts were made to find out whether various properties of parental lines *viz.*, the genetic distance between parents determined from Amplified Fragment Length Polymorphism (AFLP) data, means of two parents ($\overline{P}$) *i.e.* $(P_1+P_2)/2$, and absolute difference between the means of two parents ($|\overline{P1}-\overline{P2}|$) can be used to predict the *per se* performance and economic heterosis of F_1 hybrids. The line PIL43 with okra leaves was most diverse from other lines. It was also found that genetic distance estimated from AFLP markers is not necessarily associated with geographical diversity of the parents. Moreover, the study also revealed that the genetic distance was comparatively high between those parental lines that differ largely for morphological characters. Genetic distance among parents determined from AFLP data proved to be a good predictor of *per se* performance and economic heterosis of hybrids for seed cotton yield and boll weight. Likewise, the mean of the parents was a good predictor for seed cotton yield and boll number.

Key words: AFLP, economic heterosis, genetic distance, *G. hirsutum*, prediction

---

J. Cotton Res. Dev. **27** (1) 32-36 (January, 2013)

Genetics and morphological studies of genetic male sterile lines in diploid cotton (*Gossypium arboreum* L.)

SEKHAR BABU GEDDAM*, B. M. KHADI, SUMA C. MOGALI., NAGAPPA HARIJAN., RAJESH S. PATIL AND I. S. KATAGERI
Department of Genetics and Plant Breeding, University of Agricultural Sciences, Dharwad-580 005
**E-mail: sekharbabug.iari@gmail.com*

ABSTRACT: The large F_2 populations of two Asiatic cotton genetic male sterile genotypes (Hisar GMS and SRT 1 GMS) were evaluated during *kharif*, 2009 for morphological and inheritance studies. The male sterile plants did not show significant differences from the male fertile counterparts for plant morphological traits such as plant height and leaf area. But both the GMS populations exhibited significant differences between male sterile and fertile plants with respect to flower morphological traits *viz.*, flower pedicel length, staminal column length, style length, filament length and anther number with each trait having lower mean values in male sterile plants and higher mean values in fertile plants of both SRT 1 GMS and HISAR GMS populations. The F_2 segregating plants scored for male sterility and fertility based on the dichotonomous criteria revealed that genetic male sterility in both the genotypes is governed by the single recessive gene.

Key words : Asiatic cotton, genetic male sterility, inheritance, morphological characters

J. Cotton Res. Dev. **27** (1) 37-44 (January, 2013)

Risk aversion in shallow soils with innovative intercropping systems

A. RAVINDER RAJU*, SONIYA THAKARE, G. MAJUMDAR AND P.R.BHARAMBE
Central Institute for Cotton Research, Nagpur - 440 010
**E-mail : bumaraju@gmail.com*

ABSTRACT : Ten *Bt* hybrid cotton based innovative intercropping systems were compared with sole and paired row *Bt* hybrid cotton 90/135 x 45 cm in very shallow black soils (Lithic haplustert) during 2008 and 2009 monsoon seasons at Central Institute for Cotton Research, Nagpur. *Bt* hybrid cotton intercropped with leafy vegetable sorrel + maize + tomato produced maximum system biomass, uptake, nutrient use efficiency, but relatively less fertilizer use efficiency of nitrogen with maximum net returns and C:B ratio. *Bt* hybrid cotton intercropped with root crop radish + castor + cowpea intercropping system was significantly more efficient in N, P, K fertilizer use with second largest system biomass production, net returns, C:B ratio and N uptake by cotton. Most economical *Bt* hybrid cotton based inter cropping system was paired row *Bt* hybrid cotton + sorrel + maize hybrid komal and tomato var PKM 1 with pre emergence Oxyflurofen 0.1 kg a.i./ha with maximum net returns Rs. 1.07 lakh/ha followed by *Bt* hybrid cotton + radish var. Pusa chetki + castor var AKC 1+ cowpea var Mitali with Pendimethalin 1.0 kg a.i./ha PPI with Rs. 0.94 *lakh*/ha net returns, both systems were statistically similar except for C:B ratio. There is no significant change in *Bt* hybrid cotton fibre properties due to intercropping.

J. Cotton Res. Dev. **27** (1) 45-49 (January, 2013)

Keywords : *Bt* hybrid cotton, companion crop, drought, economics, FUE, intercropping, paired row planting, prop crop, NUE

Water use efficiency, nutrient uptake and production potential of extra long staple *Bt* cotton – maize system with moisture conservation techniques and ET based irrigation

P. NALAYINI*, S. PAUL RAJ AND K. SANKARANARAYANAN
Central Institute for Cotton Research, Regional Station, Coimbatore - 641003
**E-mail: nalayiniganesh@gmail.com*

ABSTRACT : Field experiments were conducted during 2006-2007, 2007- 2008 cropping season with winter cotton (August–February) followed by summer maize (March – May) under irrigated condition of Coimbatore. The moisture conservation techniques like drip at 0.4 Etc, drip at 0.8 Etc, poly mulch + drip at 0.4 Etc, poly mulch + drip at 0.8 Etc were evaluated and compared against poly mulching with conventional irrigation and the absolute control (no drip and no poly mulching). The results revealed that irrespective of the irrigation schedule, poly mulching improved the growth and seed cotton yield of ELS *Bt* cotton RCHB 708 significantly than drip and conventional methods. The yield improvement due to poly mulching was 40.8 per cent and that with poly mulch + drip at 0.4 Etc was 59.2 per cent over conventional method. Water use efficiency was the highest (142.7 kg seed cotton/ha cm of water) under poly mulch + drip at 0.4 Etc as against the lowest (42.7 kg seed cotton/ha cm of water) under conventional irrigation. The uptake of nutrients was significantly affected not only by polymulch + drip system but also by polymulching alone. The enhancement in NPK uptake due to polymulch + drip system was to the tune of 1.85,184 and 1.94 fold respectively than conventional method. Among the fibre quality parameters, fibre length was significantly enhanced due to polymulching and its combination with drip system. The zero tilled rotation maize grown after cotton harvest also responded significantly to polymulching with the yield increase ranging from 56.6 per cent to 65.9 per cent over conventional method. The highest maize grain yield of 8166 kg/ha was recorded under drip + polymulching as against 4923 kg/ha recorded under conventional method.

Key words : Cotton, drip, extra long staple, fibre quality, polyethylene mulching, seed cotton yield, water use efficiency, zero tilled rotation maize

J. Cotton Res. Dev. **27** (1) 50-55 (January, 2013)

Plant growth regulators and its influence on yield, morphophysiological and biochemical parameters in hybrid cotton

PRAKASH KOLER* AND B. C. PATIL
Department of Crop Physiology, University of Agricultural Sciences, Dharwad – 580 005
**E-mail : prakash2856@yahoo.co.in*

Abstract: Field experiments were conducted at Agricultural Research Station, Dharwad to find out the foliar spray of plant growth regulators on reducing vegetative growth of interspecific hybrid cotton. Some growth retardants *v/s.* growth promoters in different concentrations and different stages of the crop were used. Significant differences with observed in all the parameters studied during two years. The treatment naphthalene acetic acid (10, 20, 30 ppm) recorded significantly higher total dry matter, leaf area, leaf area index (LAI) and nitrate reductase activity as compared to other treatments. Yield in these treatments were also more because of the retention of more bolls and diversion of higher proportion of photosynthates to reproductive parts. Significantly higher specific leaf weight and chlorophyll content was recorded by plant growth retardant treatments as compared to naphthalene acetic acid at all concentrations, water spray and control.

Key words : Biochemical parameters, cotton, hybrid cotton, interspecific hybrid, LAI, leaf area, PGRs, TDM

J. Cotton Res. Dev. **27** (1) 56-59 (January, 2013)

Effect of growth regulators and weedicides as defoliants (harvest aids) on seed cotton yield of cotton

S. RATNA KUMARI*, MRIDULA GEORGE AND K. HEMA
Acharya N G Ranga Agricultural University, Regional Agricultural Research Station, Guntur – 522 034
**E-mail : ratnaks47@gmail.com*

Abstract : Defoliation similar to leaf abscission or shedding of leaves occurs in cotton naturally as a result of maturity. When the cotton plant is heavily loaded with bolls, at boll development and boll bursting stages, most of the nutrients will be transferred to the maturing bolls. This helps to complete the boll development and also it is easier to remove the leaves as the leaves come to senescence stage. In the present study, growth regulator, ethrel and some of the weedicides are used as defoliants and the effect of these defoliants were studied on boll opening, defoliation seed cotton yield and fibre quality. The pooled analysis of the two year experimental results indicated that spraying of ethrel @ 3000ppm at 145 DAS increased the seed cotton yield significantly (2577kg/ha) followed by ethrel @ 1500ppm at 130 DAS (2431 kg/ha) and ethrel @ 1500 ppm at 145 DAS (2358 kg/ha) without in loss in fibre quality. No yield reduction was noticed even with the weedicide sprays as defoliants. With the defoliants spray at 145DAS, the numbers of intact leaves to the plants were less facilitating the harvest of seed cotton. These foliar sprays did not show any negative impact on fibre quality of cotton.

Key Words : Cotton, defoliation, ethrel

J. Cotton Res. Dev. **27** (1) 60-62 (January, 2013)

Effect of ethrel dose and time of application on growth, yield and duration of *Bt* cotton in semi arid region of Punjab

G.S.BUTTAR* AND SUDEEP SINGH
Department of Agronomy, Punjab Agricultural University, Ludhiana 141 004
**E-mail: buttargs@rediffmail.com*

ABSTRACT : A field experiment was laid out to study the effect of ethrel defoliant applied at different timings on seed cotton yield of *Bt* cotton hybrid RCH 134 during 2009 and 2010. The results revealed that ethrel application did not contribute for increase in seed cotton yield as compared to control in all the treatments. However, the highest seed cotton yield was recorded in T_6 (3065 kg/ha). The higher seed cotton yields at all the levels of ethrel were obtained when defoliant was applied at 145 days after sowing (DAS) as compared to 130 DAS during 2009 and 2010. However, the application of ethrel in all the treatments irrespective of stage of the crop resulted in significantly reduction in crop duration from 24-29 days as compared to control and resulted in higher productivity / day than control. The application of ethrel results in early vacation of cotton field and facilitates the timely sowing of succeeding *rabi* crops for obtaining the potential yields. The results showed that application of ethrel @ 2500 ppm at 145 days after sowing of the *Bt* cotton hybrid RCH 134 gave higher seed cotton yield coupled with timely vacation of the field.

Key words : *Bt* cotton, defoliant, earliness, ethrel, seed cotton yield

---

J. Cotton Res. Dev. **27** (1) 63-65 (January, 2013)

Effect of spacings and fertilizer levels on seed cotton yield and economics of *Bt* cotton

B.V.ASEWAR*, S.U.PAWAR, G.P.BHOSLE AND D.N.GOKHALE
Cotton Research Scheme, Marathwada Krishi Vidyapeeth, Parbhani – 431 402
**E-mail : asewar2007@yahoo.co.in*

ABSTRACT : A field experiment was conducted during *kharif,* 2008 to 2010 at Marathwada Krishi Vidyapeeth, Parbhani to study the effect of plant spacings and fertilizer levels on growth and yield of *Bt* cotton. The pooled results revealed that among the different spacings significantly higher seed cotton yield (3162 kg/ha) was recorded with the spacing of 150 x 30 cm. The highest net monetary returns and Benefit: Cost ratio was also recorded with the same spacing. The seed cotton yield increased with increasing level of fertilizer application. However application of 150:75:75 kg NPK/ha found productive, remunerative and profitable.

Key words: *Bt* cotton, economics, fertilizer levels, spacings

J. Cotton Res. Dev. **27** (1) 66-69 (January, 2013)

Impact of dry sowing and *in situ* moisture conservation on productivity of rainfed cotton

A.S.TAYADE* AND M.K.MESHRAM
Central Institute for Cotton Research, Nagpur, 440 010
**E-mail:drast_agron@rediffmail.com*

ABSTRACT: Onfarm participatory research for assessing the impact of dry sowing and *in situ* moisture conservation practices (opening of ridges and furrow) on the productivity and profitability of cotton was conducted during 2003 to 2005 crop seasons. The results indicated improvement in mean seed cotton yield of 11.28 and 15.68 per cent due to dry sowing and opening of ridges and furrow at first intercultural operation in cotton, respectively over farmer's practice. Further, it was observed that dry sowing of cotton has substantially recorded higher net returns of Rs. 14625 and B: C ratio of 2.58, respectively, over farmers practice. In a similar way opening of ridges and furrow at first intercultural operation was found beneficial in increasing net returns (11240) and B: C ratio (2.10), respectively, over farmers practice. Thus farmer's participatory approach was found effective in disseminating the technology to the resource poor farmers for improvement in seed cotton yield of cotton.

Key words: Dry sowing; *in situ* moisture conservation; ridges and furrow; seed cotton yield

---

J. Cotton Res. Dev. **27** (1) 70-72 (January, 2013)

Effect of moisture conservation and nutrient management for improvement in productivity and fibre quality of cotton

P. L. NEHRA* AND P. S. YADAV
Swami Keshwanand Rajasthan Agricultural University, Agricultural Research Station, Sriganganagar – 335 001
**E-mail : pl.nehra@yahoo.co.in*

ABSTRACT: The field experiment was conducted on sandy loam soil of ARS, Sriganganagar to find out the effect of moisture conservation and nutrient management for improvement in productivity and fibre quality of cotton. The treatment green manuring of *Dhaincha* (3269 kg/ha.) gave highest seed cotton yield followed by opening of alternate furrows during last inter culture (3141 kg/ha.) and lowest was recorded in inter cropping of short duration legumes like *moong* (2958 kg/ha). As regards nutrient management treatments, RDF+ Zn gave highest seed cotton yield followed by RDF with soil testing, 50 per cent through inorganic and remaining 50 per cent through vermicompost whereas lowest yield was noticed in INM of RDF with soil testing ((50% through inorganic and remaining 50 per cent through FYM).

Key words: *Dhaincha*, INM, inter culture, moisture conservation, vermicompost

J. Cotton Res. Dev. **27** (1) 73-75 (January, 2013)

Effect of stubble management of preceding rice crop on growth and yield of *Gossypium hirsutum* cotton

G. SRINIVASAN*
Tamil Nadu Agricultural University, Cotton Research Station, Srivilliputtur- 626 125
**E-mail : gsrinivasan.tnau@gmail.com*

Abstract: Field experiment was conducted at Cotton Research Station, Srivilliputtur between 2005-2007 to evaluate the response of summer irrigated cotton to the preceding rice stubble incorporation and nutrient management practices. The results revealed that harvesting winter rice by leaving a stubble height of 6 inches and incorporating the same by roto tilling followed by summer cotton resulted in the highest seed cotton yield of 1752 kg/ ha. Among the integrated nutrient management practices, application of 100 per cent recommended dose of fertilizers in combination with azophos as seed and soil application registered the highest seed cotton yield.

Key words: Organic residue, rice stubble incorporation, summer irrigated cotton

---

J. Cotton Res. Dev. **27** (1) 76-79 (January, 2013)

Response of *Bt* cotton cultivars on growth and yield irrigated with sodic water

K.S.SEKHON*, G. S. BUTTAR, ANUREET KAUR AND B. S. SIDHU
Punjab Agricultural University, Regional Research Station, Bathinda-151 001
**E-mail : sekhon_1313@rediffmail.com*

ABSTRACT: This study was conducted on sandy loam soil in semi arid region of Punjab at PAU Regional Research Station, Bathinda. Four different American cotton *Bt* hybrids (RCH134 BG I, MRC 6304 BG I, MRC 7017 BG II, MRC 7031 BG II) and one American variety (LH 2076) were compared to study the effect of sodic water (Residual sodium carbonate 6.4 meq/1 and electrical conductivity 2200 µmhos/cm) on growth and seed cotton yield as compared to good quality canal water irrigation. The results revealed that various yield attributing characters varied significantly with quality of irrigation water among various cultivars of upland cotton tested in the experiment. Among different cultivars MRC 7017 showed excellent performance even under sodic water. The reduction in seed cotton yield in sodic water irrigation as compared to canal water was the lowest in MRC 7017 (4.6 %), followed by MRC 7031 (8.5 %), MRC 6304 (10.5 %), RCH 134 (10.6 %) and LH 2076 (18.5%). Similar trend was observed in yield attributing characters also.

Key words : *Bt* cotton, hybrids, seed cotton yield, sodic water, varieties, yield attributes

J. Cotton Res. Dev. **27** (1) 80-84 (January, 2013)

Spatial and temporal expression of *Bt* toxin on commercial *bt* cotton hybrids

V.CHINNA BABU NAIK*, N.V.V.S.D PRASAD, M.S.R. KRISHNA AND G.RAMACHANDRA RAO

Acharya N G Ranga Agricultural University, Department of Entomology, Agricultural College, Bapatla-522101
**E-mail:chinnaenton@gmail.com*

ABSTRACT : The laboratory experiments were conducted to estimate crystalline protein (Cry toxins) levels in four *Bt* cotton hybrids (RCH 2 *Bt,* RCH 2 BG II, JK Durga *Bt,* and Nath baba *Bt)* indicated that the order of Cry protein content in different plant parts was leaves > squares > bolls > flowers. The Cry protein content in all the plant parts decreased by 90 days after sowing as compared to 60 DAS and it further decreased at 120 DAS and reached to negligible levels by 150 DAS. The expression of the protein content was significantly high in leaves from upper canopy and it decreased with advancement of crop age advanced.

Key words: *Bt* cotton, Cry1Ac, Cry protein, endotoxin, sowing period, transgenic

---

J. Cotton Res. Dev. **27** (1) 85-88 (January, 2013)

Occurrence of mealybug *Phenacoccus solenopsis* Tinsley and its parasitization on *Bt* cotton

N.K.BHUTE*, B.B.BHOSLE, D.G.MORE AND B.V. BHEDE

Department of Entomology, Marathwada Agriculture University, Parbhani-431402
**E-mail : nandu.bhutte@gmail.com*

ABSTRACT : The field experiments were conducted during *kharif,* 2007-2008 and 2008-2009 at Department of Agricultural Entomology, Marathwada Agricultural University, Parbhani. The incidence of mealybugs during *kharif,* 2007-2008 was started from 31st MW (0.40 mealybugs/2.5 cm shoot length) with first peak (8.45 mealybugs/2.5 cm shoot length) in 37th MW and the second peak 42.40 mealybugs/2.5 cm shoot length was observed in 51st MW. During *kharif,* 2008-2009 the mealybug incidence was started from 32nd MW (0.30 mealybugs/2.5 shoot length) and highest population noted during 49th MW (2.25 mealybugs/2.5 cm shoot length). The parasitoids recorded on the *Phenacoccus solenopsis* may play a vital role in natural control of the pest. During *kharif,* 2007-2008 the parasitization in mealybugs ranged between 7.18 to 61.49 per cent and during 2008-2009 ranged from 16.67 to 75.00 per cent. The parasitized mealybugs were noticed from 32nd MW (7.69%) and increased gradually reaching its first peak 42.86 per cent during 40th MW. Thereafter the second (54.65%) and third peak parasitization (61.49 %) was observed in 44th and 1st MW. During 2008-2009 the parasitization started from 32nd MW (16.67 %) with first peak of 45.83 per cent in 35th MW. Thereafter, second (75 %) and third peak (66.67%) of parasitized mealybugs were recorded during 46th and 1st MW, respectively.

Key words : *Bt* cotton, mealybug, occurrence, parasitization, *Phenacoccus solenopsis*

J. Cotton Res. Dev. **27** (1) 89-94 (January, 2013)

Effect of different density of leafhopper, *Amrasca biguttula biguttula* (Ishida) on *Bt* cotton

G. N. SHREEVANI*, A.G.SREENIVAS, M.BHEEMANNA, A.C.HOSAMANI, A.NAGANAGOUD, Y.S.AMARESH AND S.S.UDIKERI
Department of Agricultural Entomology, University of Agricultural Sciences, Raichur-584 102
**E-mail : shreevanign@gmail.com*

ABSTRACT: An experiment was conducted at College of Agriculture, Raichur during *kharif,* 2009-2010 to know the effect of differential population of leafhoppers, growth parameters and yield of *Bt* cotton both under glasshouse and field conditions. Seven treatments including untreated control were designed. The treatments were imposed at 20 and 40 DAS. The results revealed that at 20 DAS released leafhopper treatments both under glasshouse and field conditions, there was reduction in the plant growth and yield parameters *viz.,* plant height (41.70 and 37.30 cm), squares (6.00 and 6.40), monopods (3.70 and 6.40) and sympod (3.30 and2.50) and also the good opened bolls (13.30 and 28.60) as the population levels increased which ultimately reflected on lower yield (115 and 7.8 g) and also in quality parameters.

Keywords: *Amrasca biguttula biguttula*, *Bt* cotton, loss estimation

---

J. Cotton Res. Dev. **27** (1) 95-98 (January, 2013)

Field evaluation of new insect growth retardant, Chlorfluazuron (UPL 106 5 EC) against *Helicoverpa armigera* (Hubner) on cotton

A. K. DHAWAN*, KAMALDEEP SINGH AND VIJAY KUMAR
Department of Entomology, Punjab Agricultural University, Ludhiana -141 004
**E-mail : ashokdhawan@yahoo.com*

ABSTRACT : New insect growth retardant, chlorfluazuron (UPI 106 5 EC) of M/s United Phosphorus Ltd., Mumbai was tested @ 50, 75, 100 and 125 g a.i./ha for the control of *H. armigera* on cotton variety, F 1378 and F 1861 in 2007 and F 1378 in 2008 in the field. On the basis of overall analysis, Chlorfluazuron @ 100 g a.i./ha recorded lowest damage in shed fruiting bodies *i.e.* 1.06 per cent, boll and loculi damage to pickable bolls of 1.91 and 0.73 per cent, respectively, and remained *at par* among its higher dose of 125 g a.i./ha and standard check, indoxacarb. The seed cotton yield in chlorfluazuron @ 100 g a.i./ha was 19.64 q/ha still remained *at par* with among its higher dose of 125 g a.i./ha and standard check, indoxacarb. On the basis of effect on natural enemies population/10 plant, chlorfluazuron @ 100 g a.i./ha did not showed any significant reduction as compared to the standard check. From the above results, it can be concluded that new IGR, chlorfluazuron @ 100 g a.i./ha is an effective dose for the management of *H. armigera* in the field and offers a good alternative for a selective insect pest control that is in harmony with existing IPM programmes.

Key words: Bollworms, chlorfluazuron, cotton, insect growth regulators

J. Cotton Res. Dev. **27** (1) 99-103 (January, 2013)

Bionomics of mealybug, *Phenacoccus solenopsis* on cotton in Haryana

S.C. KEDAR*, R.K. SAINI AND PALA RAM
Department of Entomology, CCS Haryana Agricultural University, Hisar-125 004
**E-mail: santosh_kedar_agri@yahoo.co.in*

ABSTRACT : Bionomics of mealybug, *Phenacoccus solenopsis* Tinsley was studied on potted cotton plants under laboratory conditions (23.2 to 33.2°C and 51.3 to 79.0 % R.H.) during 2009. The female developed through three nymphal instars and the adult stage, while the males developed through two nymphal instars, "cocoon" and adult stage. Preoviposition, oviposition and postoviposition periods of adult females were observed to be 5.96 ± 0.73, 10.08 ± 1.12, and 3.00 ± 0.76 days, respectively. The total life span of male and female was 19.25 ± 1.55 and 33.00 ± 1.67 days, respectively. The reproduction took place both by sexually as well as parthenogenetically and female laid an average of 373.24 ± 36.7 eggs during its life period. Female adult was wingless, larger in size (on average 4.13 mm in length and 2.05 mm in width) and lived longer (19.10 ± 1.49 days) as compared to male adult, which was winged, smaller in size (1.22 mm in length and 0.25 mm in width) and short lived (1.90 ± 0.79 days).

Key words: Bionomics, cotton, mealybug, *Phenacoccus solenopsis*

J. Cotton Res. Dev. **27** (1) 104-110 (January, 2013)

Molecular screening of American cotton (*Gossypium hirsutum* L.) genotypes for resistance to cotton leaf curl disease (CLCuD)

G.S. BHATOA*, P.S. SEKHON, D.PATHAK AND D.MONGA
Department of Plant Pathology, Punjab Agricultural University, Ludhiana - 141 004
**E-mail : gagpathology@gmail.com*

ABSTRACT : Cotton leaf curl disease (CLCuD) caused by single stranded circular Gemini virus consisting of DNA A and satellite molecule DNA β, is constraint to *G.hirsutum* cultivation in northern India. During *kharif*, 2009, a total number of 110 genotypes comprising it 64 published CLCuD resistant genotypes of *G.hirsutum* collected from north India and 46 resistant entries of different varietal trial were subjected to screening against CLCuD artificially under natural epiphytotic conditions. During 2009, CLCuD had appeared in epidemic form at Cotton Research Station, Abohar where these genotypes had varying degree of disease incidence and severity indicating partial or complete breakdown of resistance in 62 genotypes. Only two genotypes namely LHH 144 hybrid and its male parent PIL 8 were found to be resistant. Screening results revealed that under natural epiphytotic condition were most suitable as hot dry weather and presence of highly virulent strains of virus favors the high disease incidence and severity. During 2009, genotypes which had partial breakdown of resistance were having some disease free plants were selected and ratooned to check the possibility of latent carry over. During *kharif,* 2010, DNA extracted from ratooned disease free plants of 24 genotypes were subjected to PCR amplification with CLCuV DNA A and DNA β specific primers. The results of PCR mediated amplification were correlated with field screening where different disease reaction were observed, 15 genotypes which were resistant under field conditions till October 2010, were also confirmed for absence of CLCuV DNA A and DNA β. During 2009, six genotypes showing resistant reaction under field conditions, tested positive for presence of DNA A and DNA β during 2010. Three genotypes namely ABH 47, P 57-6 and F 2164 showed resistant reaction under field but their molecular reaction indicated the latent carry over of DNA A and DNA β molecules in these symptomless plants. These findings indicated that CLCuD resistance is complicated and role of importance in resistance breeding involving true resistant genotypes thus rejecting latent carriers.

Key words: Cotton leaf curl disease, disease resistance, Gemini viruses, *Gossypium* species, PCR

J. Cotton Res. Dev. **27** (1) 111-114 (January, 2013)

Effect of biocontrol agents and chemicals on disease intensity of bacterial blight and Myrothecium leaf blight of cotton

D. S. TOMAR* AND P. P. SHASTRY
Jawaharlal Nehru Krishi Vishwa Vidyala, College of Agriculture, Tikamgarh - 472 001
**E-mail : tomar_sd@rediffmail.com*

ABSTRACT: One species of fungal biocontrol agent like *Trichoderma viride* and two strains of bacterial biocontrol agent *Pseudomonas flurescens viz.*, Pf1 and CHO and chemicals like copper oxychloride + streptocycline were tested in field trials for their bioefficacy against bacterial leaf blight and Myrothecium leaf blight of cotton for two successive crop seasons. Seed treatment and foliar spray of all the biocontrol agents and chemicals significantly reduced the intensity of both diseases and also significantly increased yield of seed cotton. The effectiveness of biocontrol agents was comparable to that of chemicals like copper oxychloride + streptocycline. Hence these bioagents can be utilized as a component of integrated disease management in cotton.

Key words : Biocontrol agents, chemicals, foliar spray, intensity, seed treatment

---

J. Cotton Res. Dev. **27** (1) 115-118 (January, 2013)

Estimation of crop losses due to bacterial blight disease of cotton

S. L. BHATTIPROLU*
Aharya N. G. Ranga Agricultural University Regional AgriculturalResearch Station, Guntur – 522 034.
**E-mail : bhattiprolu2023@gmail.com*

ABSTRACT: A field trial was conducted at Regional Agricultural Research Station, Guntur, during *kharif,* 2009-2010, 2010-2011 and 2011-12, to estimate the losses due to bacterial blight disease in cotton variety, LRA 5166. Copper oxychloride (COC @ 0.3%) along with antibiotic streptocycline (100ppm) was sprayed at 15 days interval starting from 35 days to 95 days after sowing. Lowest mean per cent disease intensity (PDI) of 14.83 was recorded with COC + streptocycline sprays at 50, 65, 80 and 95 days after sowing. Pooled data showed reduction of disease in all treatments. Yield data from different treatments showed that protection by spraying Propiconazole (0.1%) from 50 days after sowing at 15 days interval up to 95 days resulted in avoidable losses to the tune of 38.78 per cent with benefit cost ratio of 2.87.

Key words: Bacterial blight, cotton, yield losses

J. Cotton Res. Dev. **27** (1) 119-123 (January, 2013)

Relative toxicity of some insecticides against *Chrysoperla zastrowi sillemi* (Esben – Petersen) under laboratory conditions

NEETAN AND NAVEEN AGGARWAL*

Department of Entomology, Punjab Agricultural University, Ludhiana - 141 004
**E-mail: naveen_ag_in@yahoo.com*

Abstract: Comparative toxicities of eight newer and already recommended insecticides for the management of *P. solenopsis* were studied against immature stages of *Chrysoperla zastrowi sillemi* (Esben – Petersen) under laboratory conditions. Clothianidin, profenophos and acephate had shown extremely high ovicidal action as no egg hatching was observed. Imidacloprid with moderate ovicidal action showed 63.33 per cent egg hatching followed by chlorpyriphos (56.67%) and thiodicarb (46.67%). Buprofezin (73.33 %) and endosulfan (70.00%) recorded significantly higher hatching of eggs. Clothianidin, profenophos, imidacloprid, chlorpyriphos, acephate and thiodicarb were found to be most toxic to the second instar larvae and adults of the predator. In case of adult emergence from treated pupae and their survival buprofezin again was found to be the safest insecticide with 76.67 per cent adult emergence and 70.00 per cent adult survival followed by endosulfan. However, the lowest adult emergence (53.33 %) and survival (10.00%) was observed in case of clothianidin.

Key words: Buprofezin, *Chrysoperla zastrowi sillemi*, clothianidin, endosulfan, insecticides toxicity

---

J. Cotton Res. Dev. **27** (1) 124-125 (January, 2013)

In vitro evaluation of plant leaf extracts against *Colletotrichum gossypii* Southw., the causal organism of Anthracnose disease of cotton

S. H. KANHERKAR*
Department of Botany, Yashwantrao Chavan Arts and Science College, Mangrulpir - 444 403
**E-mail : shkanherkar@rediffmail.com,*

ABSTRACT : *In vitro* evaluation of plant leaf extracts were studied against the pathogenic fungi of cotton *Colletotichum gossypii* Southw. Aqueous and acetone leaf extracts of five botanicals were used for its antifungal activity. The antifungal efficacy of leaf extracts was determined against fungal pathogen following the poisoned food technique. Among five botanicals aqueous and acetone leaf extracts of *Catharanthus roseus* (*Vinca rosea*) was most promising followed by *Eucalyptus globulus* and *Lantana camera*. Leaf extracts of *Azadirachta indica* and *Withania somnifera* found to be least effective showed minimum growth inhibition.

Key words : *Colletotrichum gossypii,* cotton, inhibition, leaf extracts

J. Cotton Res. Dev. **27** (1) 126-133 (January, 2013)

Technology interventions performance under front line demonstrations in *Bt* hybrid cotton (*Gossypium hirsutum* L.)

S.M.WASNIK*, A. RAVINDER RAJU, S. M. PALVE, G. MAJUMDAR AND P. P. PARWATE
Central Institute for Cotton Research, Nagpur – 440 010
**E-mail : wasniksm2012@gmail.com*

ABSTRACT: Front line demonstrations (FLDs) in cotton during 2006-2011 periods at Central Institute for Cotton Research, Nagpur found cotton cultivation in shallow soils and costly hybrid seeds are bottle necks in a year of seedling droughts with crop losses. Among the interventions tested there is no significant differences between commercial and public *Bt* hybrid NHH 44,both were quite promising over non *Bt* varieties/ hybrids. *Bt* hybrid cotton + soybean paired row intercrop planting significantly out yielded 27 per cent more seed cotton yield with LER of 1.32 and profitability of Rs. 6180/ over farmer's practice. Supplemental winter irrigations with higher inputs of fertilizers and micronutrients resulted in a net profit of Rs. 51,010/ha and cost: benefit ratio of 1:2.04 was registered with sprinkler irrigation. Post emergence herbicide *Targasuper* (Quizalofop ethyl) 5 per cent EC @ 0.5 kg/ha graminicide increased 44 per cent more seed cotton yield with C: B ratio 1:73. Although the seed cotton yields in IPM *v/s* non IPM were non significant but the net savings were due to 74 per cent lower inputs on pesticides and avoided unnecessary and wasteful applications.

Key words : *Bt* cotton, front line demonstration, herbicide, INM, IPM, sprinkler irrigation, technology interventions

---

J. Cotton Res. Dev. **27** (1) 134-137 (January, 2013)

Estimation of cotton yield through growth indices of plant biometrical characters

D.R. ANEJA* AND LAJPAT RAI
Department of Mathematics and Statistics CCS Haryana Agricultural University, Hisar - 125004
**E-mail : noreply@m10.myzamanamail.com*

ABSTRACT : A statistical model for pre-harvest estimation of cotton yield on the basis of growth indices is proposed. Growth indices are the weighted accumulations of observations on plant biometrical characters in different periods with weights being their respective correlation coefficients with yield. Pooled data of four years (2003- 2006) on characters like, height, girth, total bolls, opened and unopened bolls and yields of various pickings obtained through pilot survey have been used. On the basis of regression model, it has been concluded that no. of unopened bolls, girth and yield obtained after five months of sowing are fairly adequate for building advance estimates of cotton yield. The estimated yield of cotton (H 1098) in mid October was 1324 kg/ha.

Key words : Correlation, growth indices, prediction models, regression

J. Cotton Res. Dev. **27** (1) 138-143 (January, 2013)

Organic cotton farming in Andhra Pradesh – a constraint analysis

P. PRASHANTH*, M. JAGAN MOHAN REDDY AND I. SREENIVASA RAO
Department of Agricultural Extension, Acharya N.G. Ranga Agricultural University, Hyderabad – 500 030
**E-mail : Prashanth897@gmail.com*

ABSTRACT : The study brought to surface the valid, reliable and pertinent constraints expressed by both the organic and conventional cotton farmers on organic cotton farming. The Telangana region of Andhra Pradesh state was selected purposively for the study. The district Karimanagar of Telangana region was selected randomly. Ex post facto research design was followed. A sample of 60 organic and 60 conventional cotton practicing farmers from six villages of two *mandals* of the district were selected randomly. Farmers were asked to elicit their constraints identified for the study. All the constraints were ranked based on the percentage of farmers under respective constraint. A great majority of the organic cotton farmers perceived the problem of lack of community approach for organic cotton cultivation, followed by small herd size, weak marketing system on organic cotton trade, complex and costly certification process for organic cotton farming. A significant amount of conventional cotton farmers perceived the problem of complex and costly certification process for organic cotton cultivation, followed by labour intensive, lack of specific package of practices etc.

Key words : Constraint analysis, organic cotton farming, organic cotton farmers

---

J. Cotton Res. Dev. **27** (1) 144-148 (January, 2013)

Input utilization and constraints of cotton production in Punjab

SUKHPAL SINGH*, H. S. KINGRA AND RANDEEP SINGH
Department of Economics and Sociology, Punjab Agricultural University, Ludhiana - 141 004
**E-mail : sukhpalpau@yahoo.com*

ABSTRACT: An analysis was carried out to study the input utilization pattern and input used in cotton production in Punjab. A survey was conducted during 2010-2011 on 120 farm households having various sizes of land holdings *i.e.* marginal, small, semi medium, medium and large numbered 60 each from 2 cotton growing district of Punjab were selected. The study revealed that the total cost on cotton crop cultivation was Rs. 38377/ha. The returns over variable costs of the cotton growers came out to be Rs 62864.50 / ha in the Punjab state. It was further found that cotton growers facing large number of constraints in Punjab *viz.,* quality and high price of *Bt* seed (100 %), labor shortage (75.8 %) , availability and price of fertilizer (85.8 %), lack of knowledge about package of practices (65.0 %), inadequate irrigation facilities (52.0 %) , low availability of irrigation water (38.3 %), incidence of diseases and pests attack (100 %), lack of genuine plant protection chemicals (25.8 %), lack of capital resources (98.7 %), lack of credit availability from institutional sources (92.5 %) , high cost of credit (95.0 %). However, 100 per cent of the farmers are facing the problem of low price of farm produce at the time of harvesting, price fluctuation and lack of timely information on market prices. These problems are much severe among the small and marginal farmers due to their small land base and crunch of capital and other resources.

Key words: Cotton, constraints, productivity, land holding size

J. Cotton Res. Dev. **27** (1) 149-151 (January, 2013)

Adoption of *Bt* cotton technologies and constraints faced by cotton growers in Haryana

JOGENDER SINGH*, UDAIVIR SINGH, DEVIDASS, PARVENDER SHEORAN, RAMESH SHARMA AND SOM PRAKASH

CCS Haryana Agricultural University, Hisar

**E-mail: jstomatv@yahoo.com*

ABSTRACT: A field survey was conducted during 2010-2011 at Mithanpura, Kasi Kabas, Madhosinghana, Malekhan of Sirsa and Hukmawali, Rattankhera, Mathana, Mehuwala of Fatehabad district, Haryana to study the factors influencing the adoption of *Bt* cotton production technologies and investigating constraints faced the Bt cotton farmers. It revealed that majority of the farmers adopted *Bt* cotton technology mainly because of more remuneration, less pesticide spray and comparatively higher yields. The problems faced by farmers were that of high seed cost (86%), lack of recommended package of practices (71%), scarcity of pure and quality seed of *Bt* cotton (68%) and scarcity of labour for cotton picking (67%). It was observed by the farmers that *Bt* cotton is a rewarding and promising technology.

Key words: Adoption, *Bt* cotton, constraints, return, yield

J. Cotton Res. Dev. **27** (1) 152-156 (January, 2013)

Classification of cotton plants using Decision Tree

DHARMENDER KUMAR AND RITU KALIRAMAN*

Department of Computer Science and Engineering, Guru Jambheshwar University of Science and Technology Hisar - 125 001

**E-mail : ritukaliraman@gmail.com*

Abstract : Cotton is an important commercial crop in the world. It provides fibre, feed, fuel and vegetable oil. Its yield can be improved by improving plants/unit land, balls/plant, and seed/boll or lint/seed weight by amending of one or more components. Keeping this concept in view, the classification technique of the data mining can be used for analyzing the various varieties of the cotton to find out the best variety for various regions. Data mining is the extraction of hidden predictive information from large database; it is a powerful new technology with great potential to analyze important information from the data warehouse. Classification is one of the techniques of the data mining which classify the given data based on many attribute given in the database. This approach normally uses a training set where all objects are already associated with the known class labels. The classification algorithm learns from the training set and builds a model. The model is used to classify new objects. It is an attempt to apply classification techniques of data mining on the cotton database and to find out some hidden knowledge which can be used further to improve the yield. For this, cotton database of Hisar region is extracted from the Department of Genetics and Plant Breeding, CCS HAU Hisar. Classification techniques (Decision Tree) of data mining have been applied on cotton database of Hisar region using WEKA tool and observed that the productivity of cotton varieties like CSH 2838, CA 105, LH 2256, CSH 3088 is high so the farmers can choose these varieties for cultivation whereas GJHV 398, TCH 1740, CNH 50, RAH 1003 have low productivity so they are not being chosen for cultivation.

Key words : Classification, cotton, data mining, decision tree