

## ABSTRACTS

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### **Genetic variation for some chemical and biochemical characteristics in cotton seed oil**

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**ABSTRACT :** *Gossypium arboreum* (LD 327, LD 491, LD 694, LD 733, LD 784, LD 805, LD 861, LD 866 and LD 900) and *G. hirsutum* (F1861, F 1946, F 2009, F 2022, F 2032, F 2036, LH 1556, LH 1961 and LH 1968) genotypes were evaluated for various chemical and biochemical characteristics. The mean values of American cotton and *desi* cotton genotypes were statistically at par for seed oil content, crude protein content, free fatty acids, iodine number, peroxide value, major fatty acids, palmitic acid, oleic acid, linoleic acid, oil, gossypol and mineral composition (except P). The mean values for seed cotton oil, protein content, free fatty acid content, iodine number, peroxide value, palmitic acid, oleic acid, linoleic acid, phospholipids and gossypol content in *G. arboreum* ranged from 14.4-18.7 per cent, 20.2-38.6 per cent, 0.30-0.70, 98-112, 5.2-9.0, 24.3-28.9 per cent, 19.1-29.1 per cent, 39.3-52.8 per cent, 0.19-0.90 (g/100 g) and 0.26-1.15 per cent, respectively. Similarly, among *G. hirsutum* entries tested, the range for these characters was 15.8-20.2 per cent, 25.6-34.8 per cent, 0.43-0.70, 101-113, 6.1-8.7, 24.9-29.5 per cent, 18.8-24.8 per cent, 42.0-52.8 per cent, 0.15-0.63 (g/100 g) and 0.17-1.42 per cent, respectively. Mineral composition of oil among *G. arboreum* genotypes ranged from 19-40 ppm (Zn), 27.3-76.3 ppm (Fe), 2.5-7.5 ppm (Cu), 0.8-1.4 per cent (K), 0.03-0.10 per cent (Na), 0.10-0.17 per cent (Ca) and 1.01-1.05 per cent (P). Similarly, among *G. hirsutum* genotypes, the mean values of various minerals ranged from 20-30 ppm (Zn), 23.8-60.0 ppm (Fe), 2.5-7.5 ppm (Cu), 1.2-1.3 per cent (K), 0.03-0.09 per cent (Na), 0.10-0.17 per cent (Ca) and 1.0-1.5 per cent (P).

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### **Screening of *G. arboreum*, *G. hirsutum* and introgressed diploid and tetraploid strains derived from inter-specific hybridization between cultivated species of cotton for drought tolerance**

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**ABSTRACT :** In the present investigation, four different groups consisting of *G. hirsutum*, *G. arboreum* Introgressed diploid genotypes of *G. arboreum* x *G. hirsutum* and Introgressed tetraploid genotypes of trispecies of *G. arboreum* x *G. hirsutum* x *G. barbadense*) were screened for three years with two important drought tolerant parameters *i. e.* chlorophyll stability index (CSI) and relative water content (RWC) at Marathwada Agricultural University, Parbhani, India with an object to single out most suitable species for drought prone regions of Marathwada region in order to cope with the present water crises. The results obtained from three years' average data demonstrated that diploid *G. arboreum* group yielded highest seed cotton yield followed by introgressed genotypes derived from *G. arboreum* x *G. hirsutum* population, whereas both the tetraploid groups *i. e.* *G. hirsutum* and introgressed trispecies genotypes ranked on third and fourth place, respectively, for seed cotton yield suggesting suitability of *G. arboreum* genotypes belonging to diploid species will be best suited for rainfed tracts of Marathwada region.

## **Studies on identification of cotton genotypes using SDS-PAGE of globulins**

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**ABSTRACT :** Eighteen genotypes of *Gossypium hirsutum* and four genotypes of *Gossypium arboreum* were examined using SDS-PAGE to assess the globulin polymorphism in identification of inter- and intra-specific variation and discriminating the hybrids from their parental lines. The electrophoretic profile of globulins was unique and distinct for each genotype. A total of 27 bands of different staining intensities were observed with relative mobility (Rm) values ranging from 0.50 to 0.73. Three bands were found to be common in all the genotypes under study. A minimum of 11 and a maximum of 15 bands were observed. The quantitative and qualitative variation in the banding pattern helped in distinguishing all the genotypes from one another.

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## **Studies on genetic diversity in upland cotton (*Gossypium hirsutum* L.)**

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**ABSTRACT :** Genetic diversity in 70 genotypes of *G. hirsutum* assessed using Mahalanobis  $D^2$  statistic indicated considerable diversity in the material. The 70 genotypes were grouped into 15 clusters. The distribution of genotypes indicated that the geographical diversity and genetic diversity were not related and there were forces other than geographical separation which were responsible for diversity. The intra- and inter-cluster distances revealed that inter-cluster distance values were greater than intra-cluster distance values.

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## **Studies on heterosis and combining ability through introgression in diploid cotton**

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**ABSTRACT :** Improvement in diploid cotton through introgression is an important tool. The well established stable varieties of diploid cotton were crossed with introgressed materials for better improvement in yield and to assess the heterosis and combining ability effects. The developed 18 diploid hybrids were evaluated alongwith line and testers. ANOVA revealed highly significant varietal differences for all the traits except boll weight, indicating sufficient variability among the genotypes in all traits except boll weight. The variances due to gca and sca were non-significant and gca : sca ratio indicated predominance to non-additive gene action for these traits except boll weight. Among female parents, G. Cot-23 appeared good general combiner for seed cotton yield, number of sympodia per plant and number of bolls per plant. Whereas among males, AKA-01-3 was isolated as a good general combiner for ginning percentage, plant height and boll weight. The cross of a poor x poor parents G. Cot-17 x AKA-01-4 registered high *per se* performance, coupled with significant heterobeltiosis and sca effects in desired direction, can be considered promising for commercial exploitation.

## **Heterosis for seed cotton yield and its quantitative characters of *Gossypium hirsutum* L.**

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**ABSTRACT** : A diallel crossing programme was taken up with six different genotypes for yield components and fibre quality parameters with a view to obtain information regarding selection of parents for heterosis seed cotton breeding. Maximum heterosis for seed cotton yield was observed in the cross combination AKH-101  $\times$  NH-587 (231.99%) followed by AKH-9912  $\times$  NH - 587 (115.14%), for plant height AKH-101  $\times$  NH-587 (33.98%), for number of sympodia per plant AKH-2018  $\times$  AKH-3-2-2 (45.08%), for number of bolls/plant AKH-101  $\times$  AKH-3-2-2 (22.74%), for GOT in cross AKH-2018  $\times$  AKH-101 (19.45%) and for 2.5 per cent span length AKH-9912  $\times$  NH-587 (14.30%). Looking at the *per se* performance of hybrid, seed cotton yield varied from 16.56 to 24.46 g. The highest yield per plant was recorded by the hybrid AKH-101  $\times$  NH-587 (24.46 g). Similarly, the mean value for boll weight varied from 1.87 (AKH-9912  $\times$  NH-587) to 2.59 (AKH-2018  $\times$  AKH -3-2-2). The maximum variability was exhibited by seed cotton yield (11.27%) followed by number of sympodia per plant (9.39%) and lint index (9.33%) Considering the performance of individual plant, AKH-9912 was found to be the best combiner for plant height, number of seeds per boll, seed cotton yield per plant, ginning per cent, lint index and 2.5 per cent span length.

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## **Phule JLA-794 diploid cotton variety for Khandesh tract of Maharashtra**

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**ABSTRACT** : Phule JLA-794, diploid cotton variety, was derived by hybridization through pedigree selection method from a cross Jyoti  $\times$  NA-208. It had good fibre properties having 25.3 mm staple length and 20 g/t staple strength. The variety was moderately resistant to BLB, ALB and grey mildew disease. Based on performance of station and multilocation trials, the culture JLA-794 consistently recorded 40.37 per cent increased yield over variety Y-1. In coordinated varietal trial, and national trial, the culture JLA-794 recorded 12.23 and 21.75 per cent increased yield over zonal check AKA-5. It performed well in adaptive trials conducted in Khandesh tract under rainfed conditions. Therefore, variety was released under the name Phule JLA-794 for commercial cultivation in Khandesh tract of Maharashtra in 2003.

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## **Heterosis study in cotton (*Gossypium hirsutum*) under rainfed conditions**

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**ABSTRACT** : The present investigation was undertaken by adopting diallel analysis involving seven diverse parents to estimate extent of heterosis for yield and its quantitative traits some crosses of *G. hirsutum*. For this purpose, 21 hybrids were developed by using seven parents during *kharif* 2005. These hybrids alongwith seven parents and two checks NHH-44 and PHH-316 were planted in *kharif* 2006. The hybrid KH-923  $\times$  KH-113 exhibited significant positive heterosis over mid parent, better parent and standard check PHH-316 for seed cotton yield and lint yield. This hybrid also showed significant heterosis for plant height, number of bolls per plant, boll weight, lint yield, number of monopodia and sympodia per plant. Hybrids *viz.*, KH-923  $\times$  KH-113, PH-44-1-2  $\times$  KH-120, KH-120  $\times$  KH-923 and PH-44-1-2  $\times$  KH-923 exhibited significant positive heterosis over mid parent, better parent and standard check for seed cotton yield per plant.

## **New genetic variability in cotton**

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**ABSTRACT** : Creation of genetic variability plays a crucial role in the development of varieties. Out of various methods induced, mutations are the potential source of creating genetic variability in cotton. The present study was carried out to find out the effects of mutagens (proper dose) on pollen fertility, stomata size, boll size and leaf size of two varieties of cotton cv. HS-6 and HD-107 and these were given combined mutagenic treatment of 10 KR+0.25 per cent EMS and 20 KR+0.25 per cent EMS and  $M_1$  was raised. Selection was made from  $M_2$  generation for pollen fertility, stomata size, boll size, earliness and resistance to cotton leaf curl virus (CLCuV).  $M_3$  was raised from  $M_2$  generation alongwith control. In  $M_3$ , the mutant of HD 107 was found to have bigger stomata, higher boll weight and earliness as compared to control. Mutant of HS 6 was more resistant to cotton leaf curl virus (CLCuV) as compared to control.

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## **Heterosis for yield and fibre properties in upland cotton, *Gossypium hirsutum* L.**

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**ABSTRACT** : Eight crosses with three females and three males were studied with an objective to improve yields and fibre characters in cotton. Heterosis for yield and five fibre properties were estimated in nine cross combinations. Maximum heterosis for seed cotton yield was observed in L 788 x BWR 25 (28.34) followed by L 65-1 x HYPS 152 (27.16) and L 65-2 x BWR 25 (25.72) over the better parent. For 2.5 per cent span length, the cross L 65-1 x BWR 25 (9.99%) followed by LAHH 4 (11.18%); for strength L 788 x BWR 25 (3.73%) followed by L 65-2 x HYPS 152 (3.71%); for micronaire L 65-2 x BWR 25 (1.69%) and all eight crosses have shown negative heterosis for uniformity ratio. The *per se* seed cotton yield of eight crosses was significantly higher than the check hybrid LAHH 4.

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## **Genetic divergence for lint characters for upland cotton (*Gossypium hirsutum* L.)**

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**ABSTRACT** : Sixty cotton genotypes were evaluated for genetic divergence using Mahalanobis  $D^2$  statistics. Nine characters *viz.*, boll number, boll weight, seed index, lint index, ginning per cent, 2.5 per cent span length, micronaire, fibre strength and seed cotton yield were evaluated for their contribution to total divergence. These 60 genotypes were grouped into eight clusters. The characters, boll weight, boll number and 2.5 per cent length contributed maximum towards total divergence. Genotypes in cluster V and VI could be utilized in the breeding programme for improvement.

## **Inheritance studies on environment sensitive genetic male sterile gene in cotton (*Gossypium hirsutum* L.)**

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**ABSTRACT** : Inheritance studies on environment sensitive genetic male sterile (EGMS) gene were carried out during 2007-2008. Analysis of F<sub>2</sub> population of two crosses showed that EGMS character was controlled by single recessive gene.

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## **Influence of rainwater management through different agro-techniques on yield, yield attributing characters and economics of cotton**

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**ABSTRACT** : Influence of rainwater management through different agro-techniques on yield, yield attributing characters and economics of cotton was studied during 2003-2004, 2005-2006 and 2006-2007 at Department of Agronomy, Marathwada Agricultural University, Parbhani. The results revealed that intercropping of cotton with soybean produced higher seed cotton equivalent yield followed by cotton+blackgram and cotton+greengram and were superior over sole cotton. Gross returns, net returns and benefit : cost ratio of 2.68 were higher under cotton+soybean intercropping system. Among all the *in situ* soil moisture conservation techniques, opening of furrows in every row recorded highest water use efficiency (3.15 kg/ha-mm), followed by cotton+soybean/blackgram/greengram intercropping system. However, quality parameters were not influenced by different *in situ* soil moisture conservation technique.

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## **Effect of irrigation levels through drip on growth, yield and quality of cotton**

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**ABSTRACT** : A field experiment was conducted at Regional Agricultural Research Station, Nandyal, Kurnool district, Andhra Pradesh during *kharif* seasons of 2005-2007 for three years on vertisols. The treatments consisted of three irrigation levels of 40, 60 and 80 per cent ET through drip under two methods of planting (normal and paired row) compared with surface method of application (check basin) laid out in randomised block design with three replications. On the basis of three years' mean, it was found that higher seed cotton yield and oil percentage were obtained with paired row planting with 80 per cent ET (2698 kg/ha) by reducing the cost of lateral to half and by single rows 80 per cent ET (2680 kg/ha).

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## **Influence of integrated nutrient management practices on physico-chemical properties of cotton growing soils**

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**ABSTRACT :** The effect of green manures, organic manures and fertilizers on changes in physical and chemical properties of a medium black soil with cotton crop was studied from 2000-2001 to 2001-2002 at RARS, Raichur. The results of mean of two years indicated that physical parameters *viz.*, bulk density and infiltration rate of soil were favourably affected by either green manures or organic manures application. Green manuring with sunnhemp which appeared better decreased the bulk density (1.29 Mg/m<sup>3</sup> at 0-15 cm and 1.2 Mg/m<sup>3</sup> at 15-30 cm layer) of soil but increased the infiltration rate (1.03 cm/h) of soil as compared to control (1.3 and 1.3 Mg/m<sup>3</sup> at 0-15 and 15-30 cm soil layer and 0.83 cm/h). Similarly, application of FYM @ 10 t/ha among organic manures influenced these parameters favourably. Of green manures, sunnhemp was found highly beneficial in improving the fertility status of soil (Organic carbon, available N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O). While FYM in organics followed the similar trend. Increase in fertilizer levels from 50 to 100 per cent RDF increased the fertility status of the soil. Combinations of green manures, organic manures and chemical fertilizers showed higher improvement in soil physical and chemical properties as compared to application of organics or inorganics alone.

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## **Effect of depth of tillage and land configuration on yield and quality of cotton (*Gossypium hirsutum* L.) under south Gujarat condition**

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**ABSTRACT :** Field experiment was conducted on deep black soil of Navsari Agricultural University, Main Cotton Research Station, Surat during the *kharif* seasons of 2005 and 2006 to study the effect of depth of tillage and land configuration on yield and quality of cotton (*Gossypium hirsutum* L.) under south Gujarat conditions. The experiment was laid out in split plot design with six treatment combinations comprising three depths of tillage *viz.*, 10 cm (D<sub>1</sub>), 20 cm (D<sub>2</sub>) and 30 cm (D<sub>3</sub>) as main plot treatment and two land configuration techniques *viz.*, ridge & furrow (L<sub>1</sub>) and broad bed and furrow (L<sub>2</sub>) as sub-plot treatment with six replications. The pooled data showed that the fibre quality parameters as well as seed cotton yield was influenced significantly due to depth of tillage. Significantly the higher seed cotton yield (2509 kg/ha) was recorded with 30 cm depth of tillage (D<sub>3</sub>) over 10 cm (D<sub>1</sub>) which was 19.76 per cent higher than the 10 cm (D<sub>1</sub>). Significantly the higher values of seed index (9 g), 2.5 per cent span length (26.46 mm), fibre strength (24.64 g/tex), maturity ratio (0.82), elongation per cent (6.25%) and fibre fineness (3.33 mv) were recorded with 30 cm depth of tillage (D<sub>3</sub>), whereas other quality parameters remained non-significant.

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## **Benzotriazole—a new chemical hybridizing agent for *Gossypium hirsutum* and *Gossypium arboreum* L.**

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**ABSTRACT :** Efficacy of benzotriazole (C<sub>6</sub>H<sub>5</sub>N<sub>3</sub>) a copper-chelator as a chemical hybridizing agent (CHA) in *Gossypium hirsutum* L. var. Pusa-846 and *Gossypium arboreum* L. var. RG-8 was tested. Foliar sprays of aqueous solutions of 0.5, 1.0 and 1.5 per cent (w/v) benzotriazole induced pollen sterility ranging between 97-100 per cent lasting for 20 days. All the treatments with this CHA caused significant reduction in plant height, number of flowers, length of pistil, number of ovules/ovary, number of bolls/plant, fruit-set percentage, boll diameter, boll weight, number of seeds/plant, seed-set percentage, 100-seed weight, total yield (seed with fibre) and lint weight/boll as compared to their control plants of both the species. However, days taken to first flower and pollen fertility significantly increased as compared to their control plant. On the other hand, the plants treated once with 0.5 per cent benzotriazole exhibited high degree of pollen sterility with less reduction in yield parameters in both the species and these plants can be exploited for hybrid seed production. The number of ovules/ovary also increased in *G. hirsutum* plants sprayed with 0.5, 1.0 per cent and only one spray of 1.5 per cent benzotriazole. However, this increase was insignificant.

## **Soil moisture and water use studies under drip and furrow irrigation methods in hybrid cotton**

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**ABSTRACT :** Field experiments were carried out at Tamil Nadu Agricultural University, Coimbatore during winter (August 1998-February 1999) and summer (March-August 1999) seasons to study the water use, soil moisture availability, water use efficiency (WUE) and productivity of hybrid cotton (TCHB 213) under two irrigation methods (drip and furrow) and different levels and methods of nitrogen (N) application. The experiments were laid out in split plot design with three replications. The treatments consisted of three drip irrigation regimes (100, 75 and 50% of furrow irrigation) in main plots and four levels of N application (drip fertigation at 120, 90 and 60 kg/ha and 120 kg/ha as drip band application) in sub-plots with an absolute control of furrow irrigation with band application of N at 120 kg/ha for comparison. The results revealed that drip irrigation substantially increased the seed cotton yield (9.3 and 13.6%) during winter and summer seasons, respectively, as compared to control. Drip fertigation and drip band application of N increased the seed cotton yield by 10.8 and 9.7 per cent in winter and 15.0 and 10.9 per cent in summer seasons, respectively, over furrow band application. By adopting drip fertigation, saving of irrigation water upto 43 per cent and nitrogen utilization by 50 per cent were achieved in hybrid cotton in both the seasons of study. The available soil moisture (ASM) was found always nearer to field capacity (90.5 to 72.6%) under drip irrigation, whereas furrow irrigation showed deep decline of ASM. The mean daily water use and crop coefficient values were higher with higher irrigation and were found lesser during early stages of crop growth and reached a peak during flowering and boll formation stages in winter and boll maturity stage in summer. Drip irrigation and drip fertigation substantially increased the water use efficiency as compared to furrow irrigation with band application in both the seasons.

## **Assessing relative drought tolerance in cotton (*Gossypium* spp.) using line source sprinkler technique. I. Vegetative growth and yield**

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**ABSTRACT :** Fifty-two genotypes of cotton belonging to *Gossypium hirsutum*, *G. herbaceum* and *G. arboreum* were screened for drought tolerance using line source sprinkler irrigation technique. The relative drought tolerance was tested by regressing the biomass yields and seed cotton yield with gradients of water deficits. Based on the intercept values and the degree of slope in comparison to mean and checks, the genotypes Laxmi, LRA-5166, Sharada, CPD-473, CPD-418, Anjali and HLS-321729 in *G. hirsutum*, DB-3-12, RAHS-14, H-6, R-51, H-135, H-124 and Jayadhar in *G. herbaceum* and A-82-1-1 and AK-235 in *G. arboreum* were found to be drought tolerant.

## **Influence of foliar application of certain nutrients on yield and quality of cotton in black cotton soils under rainfed conditions**

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**ABSTRACT :** A field experiment was conducted at Regional Agricultural Research Station, Guntur during 2004-2006 for three years in black cotton soils with Mg, Zn, Fe, Mn and B in different concentrations to know their effect on yield and quality of cotton variety L-761. The pooled analysis of the data for the three years indicated that all the treatments increased the yield significantly when compared to control except

MnSO<sub>4</sub> @ 0.4 per cent, FeSO<sub>4</sub> @ 0.4 per cent and water spray. Regarding fibre quality parameters, fibre strength and fibre length were influenced due to foliar nutritional spray.

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## **Response of cotton (*Gossypium hirsutum* L.) to protective irrigation at different critical growth stages**

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**ABSTRACT :** A field experiment on response of cotton (*Gossypium hirsutum* L.) to protective irrigation at different critical growth stages was conducted during 2003-2004, 2005-2006 and 2006-2007 at the Department of Agronomy, MAU, Parbhani. The results revealed that scheduling of protective irrigation to cotton either at 0.8 IW/CPE ratio (75 mm CPE) or at three critical growth stages i. e. at square formation+flowering+boll development was found beneficial for higher seed cotton yield, water use efficiency and economic returns.

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## **Bt cotton response to plant geometry and fertilizer levels**

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**ABSTRACT :** Field experiments were conducted during winter irrigated and summer irrigated season of 2005-2006 to study the effect of plant spacing and fertilizer levels on yield of *Bt* cotton hybrids. MECH 162 and RCH 2 *Bt* hybrids adopted at a plant spacing of 90 x 60 cm applied with fertilizer level of 160 : 80 : 80 kg NPK/ha had recorded significantly higher sympodia, boll setting percentage and boll number and seed cotton yield.

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## **Response of hybrid cotton (*Gossypium hirsutum* L.) to different levels of drip irrigation on Vertisol**

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**ABSTRACT :** An experiment was conducted during *kharif* seasons of 2001 and 2003 at MAU, Parbhani to study response of hybrid cotton (*Gossypium hirsutum* L.) to different levels of drip irrigation on Vertisol. The seed cotton yield under drip irrigation based on ETc did not differ but was found significantly superior over furrow irrigation system. The seed cotton yield under drip irrigation was higher to the tune of 39 per cent over ridges and furrow irrigation. The mean consumptive use of water and WUE in drip irrigation was more as compared to ridges and furrow irrigation.

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## **Effect of methanolic leaf extract and fractions of *Datura metel* on biological traits of spotted bollworm of cotton**

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**ABSTRACT :** *Datura metel* leaves were used to prepare methanol at 2.5, 5.0, 7.5 and 10.0 per cent concentrations and its fractions in hexane, chloroform and acetone at 0.5, 1.0, 1.5 and 2.0 per cent for



evaluation against spotted bollworm *Earias vittella* (Fabricius). Contact toxicity of extract/fractions as evaluated by dry film technique indicated 10 per cent methanol extract and 2 per cent hexane and chloroform fraction as most effective treatments. The larval mortality after 4 and 8 h exposures to dry film of these treatments ranged from 53.34 to 66.67 and 76.67 to 86.67 per cent, respectively. Larval survival on treated food was minimum (43.34%) in 10 per cent methanol extract and maximum (76.67%) in 0.5 per cent acetone fraction. Biological traits of *E. vittella viz.*, larval period, pupation, adult emergence and fecundity were adversely affected on account of larval feeding on food treated with extract/fractions for 48 h. Methanol extract (7.5-10.0%) and hexane (2%) also manifested significant deleterious effects on various consumption-utilization indices of larvae. Methanol extract 10.0 per cent and chloroform 2.0 per cent also caused strong larval feeding deterrence *i. e.* 64.24 and 48.28 per cent, respectively.

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## **Impact analysis of genetically modified (Bt) cotton cultivars on natural enemies**

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**ABSTRACT :** The response of six genotypes *i. e.* two *Bt* hybrids (RCH 134 and RCH 317), two non-*Bt* hybrids (RCH 134 and RCH 317), one hybrid (HHH-223) and one variety (H-1226) to natural enemies was evaluated at Research Farm of Haryana Agricultural University, Plant Breeding Department, Hisar during the *kharif* season of 2006. Spiders, coccinellids, green lacewings and others (yellow wasp, dragonflies, damselflies, etc.) were main natural enemies observed on cotton genotypes. Natural enemies population/plant in different genotypes did not vary significantly throughout the period of study. However, the population was more in *Bt* genotypes in comparison with the non-*Bt* genotypes. Under unsprayed conditions, maximum mean population was recorded on RCH-134 *Bt* (0.22/plant), followed by RCH-317 *Bt* (0.20/plant) and HHH-223 (0.20/plant) and minimum on RCH-317 non-*Bt* (0.15/plant). While under sucking pests sprayed condition maximum population was recorded on RCH-134 *Bt* (0.28/plant) and minimum on H-1226 (0.17/plant). On the other hand under both sucking and bollworm pests sprayed conditions, the maximum population was recorded in RCH-317 non-*Bt* (0.33/plant) and RCH-134 *Bt* (0.33/plant) and minimum on H-1226 (0.22/plant). The correlation analysis of mean of following season revealed that the natural enemies population was positively correlated with temperature ( $r= 0.76$ ), relative humidity ( $r=0.35$ ), rainfall ( $r=0.14$ ), wind speed ( $r=0.57$ ) and leafhopper population ( $r= 0.19$ ) while negatively correlated with sunshine hours ( $r= -0.06$ ) and whitefly population ( $r=-0.76$ ).

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## **Population dynamics of major insect-pests of cotton and their natural enemies**

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**ABSTRACT :** Studies were conducted at Cotton Research Station, Marathwada Agricultural University, Parbhani during *kharif* 2004-2005 and 2005-2006. The incidence of aphid (*Aphis gossypii* Glover), leafhopper (*Amrasca biguttula biguttula* Ishida), thrips (*Thrips tabaci* Lind) and whitefly (*Bemisia tabaci* Gennadius) started in second fortnight of July during both the years. The aphid population reached the peaks in August, September and November during 2004 and 2005. Leafhopper attained its peak during September and October, while thrips attained its peak in August and November in both the years. The whitefly incidence was low during 2004, while it attained its peak in second week of November during 2005. The aphid and leafhopper incidence showed significant negative correlation with relative humidity. Thrips exhibited significant positive correlation with bright sunshine hours and whitefly showed significant negative correlation with wind velocity. Fruiting bodies damage due to American bollworm and spotted bollworm was maximum during first week of September 2004 and in second week of September and third week of November during 2005. Incidence of bollworm in green bolls was maximum during third week of September and that of spotted bollworm in first week of December during 2004. The maximum population of ladybird beetle (*Coccinella* spp.) was recorded in second week of September and November during both the years, while green lace wing (*Chrysopa* spp.) population was maximum in the second week of October.

## **Progression and prediction of pink bollworm incidence on cotton based on pheromone trap catch**

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**ABSTRACT** : The seasonal incidence and progression of pink bollworm, *Pectinophora gossypiella* Saunders were observed through pheromone trap catch and destructive sampling of green bolls at RARS, Guntur. The trap catch revealed the early appearance of adults, since adult catch was observed from the month of October during 2001-2002, while it was from August itself during 2005-2006. The peak adult emergence was observed during December and January during first three years of study, while it was from mid October to January in subsequent years. The severe threat of pink bollworm was evident through the high seasonal average moth catch and locule damage in green bolls. The correlation and regression studies revealed that there was a significantly positive correlation between moth catch, larval incidence and locule damage in green bolls. The trap catch and larval incidence together had high significant influence on per cent locule damage in green bolls under field conditions. The validation of regression equation developed for locule damage based on pheromone trap catch and larval incidence over three years with observed data of 2006-2007 revealed that the regression equation could be used for prediction of pink bollworm incidence under field conditions.

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## **Integration of fungicides with micronutrients and *Azotobacter* for management of square drying of cotton**

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**ABSTRACT** : Twenty-one varieties of cotton were sown to ascertain the extent of square drying of cotton, in which maximum square drying due to unknown cause was observed in AKA-7 (65.39%) and minimum in MECH-12 *Bt* (9.73%). Effect of various treatments on square drying, other infestation and yield of seed cotton was recorded. The total square drying was minimum in T<sub>0</sub>, i. e. seed treatment with carboxin 1 g+thiram 3 g+streptocycline 100 mg+*Azotobacter* 25 g/kg (51.33%). Maximum yield (1262 kg/ha) and maximum seed cotton yield (55%) were obtained from T<sub>0</sub> treatment.

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## **Management of *Alternaria* leaf spot (*Alternaria macrospore* Zimm) on cotton by biological approach**

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**ABSTRACT** : A field trial was conducted to test the efficacy of *Pseudomonas fluorescens* against *Alternaria* leaf spot on cotton at Regional Agricultural Research Station, Guntur, during *kharif* season of 2003-2004 and 2004-2005. Seed treatment with *P. fluorescens* CHAOS @ 10 g/kg followed by foliar spray @ 0.2 per cent (T<sub>2</sub>) significantly reduced *Alternaria* leaf spot (*Alternaria macrospore* Zimm) on cotton with 30.05 (2003-2004) and 61.6 per cent (2004-2005) increase in the yield, respectively. Hence, it was concluded that biocontrol could be a part of integrated disease management in cotton.

## **Chemical management of grey mildew caused by *Ramularia areola* Atk. of diploid cotton**

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**ABSTRACT :** A field trial was conducted during 2003-2004 to 2005-2006 for evaluating the efficacy of different chemicals against Dahiya disease of cotton caused by *Ramularia areola* Atk. The disease pressure ranged between 12.53 to 49.63 per cent during the experimentation. Two sprays of propiconazole (0.05%) stood first and recorded maximum reduction of the disease (49.50%). Tridemorph (0.07%) recorded 19.92 per cent disease intensity, while it was equally effective with other test chemicals except mancozeb (0.25%) and neem seed extract (5%). Maximum seed cotton yield (7.89 q/ha) followed by (7.18 q/ha) was achieved due to tridemorph and propiconazole treatments, respectively. Thiophanate M (0.2%) and carbendazim (0.1%) recorded 6.90 and 6.89 q/ha seed cotton yield, respectively. Tridemorph recorded highest (CBR 3.97) followed by propiconazole (3.80 CBR) with monetary returns of Rs. 4347 and 3707/ha, respectively.

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## **Impact of adopting IPM technologies on pest control and yield of irrigated cotton**

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**ABSTRACT :** Validation of IPM technology in cotton was carried out under NATP Mission Mode Project by KVK, Fatehabad and CCSHAU, Hisar during 2001-2002 to 2004-2005. The studies revealed that adoption of cultural practices like deep ploughing, seed treatment, sowing of certified seeds in time at recommended spacing, balanced use of fertilizers, clean cultivation, proper management of weeds in and around cotton fields, monitoring based pest specific use of pesticides including bio-pesticides at ET resulted in reduced pest population and increased yield of seed cotton. The mean population of various pests in IPM fields reduced by 19.64 to 59.09 per cent while that of natural enemies increased by 31.03 to 75.00 per cent as compared to non-IPM fields. In IPM fields, the number of sprays, combination sprays, synthetic pyrethroid sprays, quantity of insecticidal formulations used and expenditure incurred on insecticides reduced by 35.65, 59.61, 53.70, 29.39 and 35.89 per cent, respectively. However, in IPM fields as compared to non-IPM there was an increase of the order of 24.58, 23.92, 103.38 and 175.17 per cent in yield of seed cotton, gross income, net returns and cost : benefit ratio, respectively, which confirmed the superiority of IPM technology over the non-IPM.

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## **Bio-efficacy of newer insecticides against sucking pests of cotton**

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**ABSTRACT :** Bio-efficacy of imidacloprid 17.8 SL (0.004, 0.006, 0.008 and 0.01%), acetamiprid 20 SP (0.003 and 0.006%) and thiamethoxam 25 WG (0.005 and 0.01%) alongwith recommended insecticides *viz.*, methyl oxydemeton 25 EC (0.02%), dimethoate 30 EC (0.03%) and imidacloprid 70 WS @ 10 g/kg seed was evaluated against early season sucking pests of cotton during *kharif* season of 2004-2005 at Cotton Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M. S.) India. The results revealed that imidacloprid seed treatment (10 g/ kg seed), both concentrations of acetamiprid and thiamethoxam were most and equally effective against aphid. Imidacloprid, acetamiprid and thiamethoxam at all the concentrations recorded equal efficacy against jassid. Imidacloprid (0.004 to 0.01%) and acetamiprid (0.003 and 0.006%) were most effective against thrips.

## **Evaluation of some insecticide molecules against pink bollworm, *Pectinophora gossypiella* (Saunders) on cotton**

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**ABSTRACT :** The field experiment was conducted to study the relative efficacy of some insecticide molecules *viz.*,  $\square$ -cyhalothrin 5 EC @ 25 g a. i.,  $\square$ -cyfluthrin 5 EC @ 18 g a. i., thiodicarb 75 SP @ 750 g a. i., profenophos 50 EC @ 500 g a. i. alongwith other insecticides like chlorpyriphos 20 EC @ 500 g a. i., quinalphos 25 EC @ 500 g a. i./ha and deltamethrin 2.8 EC @ 15 g a. i./ha against pink bollworm. On the basis of pink bollworm larvae/20 infested green bolls, per cent damaged green bolls and loculi, open bolls and locules damage and yield of seed cotton,  $\square$ -cyhalothrin 5 EC, chlorpyriphos 20 EC and quinalphos 25 EC were recorded the best treatments followed by  $\square$ -cyfluthrin 5 EC, thiodicarb 75 SP, profenophos 50 EC and deltamethrin 2.8 EC.

## **Effect of organic manuring to rainfed cotton with biopesticidal control on bollworm incidence and damage in green fruiting bodies**

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**ABSTRACT :** A field experiment was conducted at Cotton Research Unit of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during *khariif* 2005-2006 to evaluate effect of organic manuring to rainfed cotton with biopesticidal control on bollworm incidence and damage in green fruiting bodies. There were significant differences amongst various treatments as regards bollworm complex damage in green fruiting bodies, pink bollworm damage and larval population in green bolls. Minimum bollworm complex damage in green fruiting bodies was recorded in the treatment T<sub>6</sub> (Neem cake 1 t/ha+ETL based 250 LE/ha) and this treatment was found at par with T<sub>2</sub> (FYM 10 t/ha+ETL based HaNPV 250 LE/ha). Minimum pink bollworm damage in green bolls was recorded in T<sub>4</sub> (Vermicompost 2.5 t/ha+ETL based *Bt* (Dipel) 2 g/l) and larval population in T<sub>6</sub> (Neem cake 1 t/ha+ETL based HaNPV 250 LE/ha), pink bollworm damage and larval population were less in organic manuring treatments as compared to recommended dose of fertilizer and biopesticidal control was found at par with chemical control. Significantly highest yield of seed cotton than all other treatments was recorded in treatment T<sub>7</sub> (Recommended dose of fertilizer (50 : 25 : 0 NPK kg/ha+ETL based endosulfan 35 EC @ 0.06%) followed by T<sub>2</sub> (FYM 10 t/ha+ETL based HaNPV 250 LE/ha).

## **Survey for diseases of *Bt* cotton in north Karnataka**

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**ABSTRACT :** The survey has revealed that the grey mildew was present in all cotton cultivated areas and the disease incidence ranged from 5-30 per cent, further it was more pronounced in Dharwad, Haveri and Gadag districts. The next disease in order was both *Alternaria* blight and *Verticillium* wilt which ranged from 5-40 per cent and these were more prevalent at Dharwad and Gulburga districts. Bacterial blight and *Fusarium* wilt were least in order and also with respect to their prevalence at various places of north Karnataka.

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## **Evaluation of cotton genotypes for grey mildew and Alternaria blight diseases**

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**ABSTRACT :** One hundred ninety-six cotton hybrids/varieties/genotypes were screened under field conditions during *kharif* season of June 2007 at Agricultural Research Station, Dharwad Farm. Among all these test entries DCH 32, RAMSHH 7, GSHB 895, CCHB 2628, CCCHB 07-2, DHB 0782, NSPL 414, HAGHB 12 and Ajeet 999 were found resistant to both *i. e.* grey mildew and Alternaria.

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## **Role of farm women in cotton growing areas with special reference to Nanded district in Maharashtra**

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**ABSTRACT :** Cotton is an important cash crop. In Marathwada region, the Nanded district ranks first in cotton production. From ancient times, women played a key role in farming. Moreover, without women's participation farming system cannot be run. Hence, this study was aimed at knowing the role of farm women in cotton cultivation in Nanded district of Maharashtra. It revealed that women participated in maximum activities in cotton cultivation. They had knowledge of cotton varieties, spacing and other cotton related practices. They also participated in post-harvest care of cotton.

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## **Techno-economic impact of Bt cotton technology in Karnataka state—An empirical evidence**

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**ABSTRACT :** A study was carried out to assess the economic impact of *Bt* cotton technology in Karnataka state of south India during 2004-2005. The input use pattern showed that the reduction in expenditure on pesticides used in *Bt* cotton (Rs. 4351/ha) was substantially lower (41.56%) than that of non-*Bt* cotton. Similarly, the extent of labour used was also reduced (18.74%) by 26 person days per hectare in *Bt* over non-*Bt* cottons. However, the extent of yield obtained by *Bt* cotton growers (19.68/ha) was higher (16.24%) by 2.75 q per hectare over non-*Bt* cotton (16.93 q/ha), resulting in an additional net return of Rs. 8684.00 per hectare (193%). Thus, the benefits from reduced pesticide use and gain in yield to *Bt* cotton growers amounted to Rs. 26904 millions in Karnataka state of south India during 2006-2007 with almost 80 per cent of cotton area covered by *Bt* cotton.

## **Experience of collective farming for cotton production in Vidarbha (Maharashtra)**

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**ABSTRACT :** In Maharashtra state, efforts were made for cotton production through collective farming during three years (2003-2005). Experience showed that cotton farmers were benefitted by way of technical guidance and supply of quality farm inputs. Adoption of improved practices resulted in increased yield (23.6-25.6%), reduction in cultivation cost (4-6%), and extra net monetary profit (42-43%) compared to conventional farming. Collective farming should, therefore, be encouraged to make it sustainable and commercial.