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Genetic diversity analysis of cotton (*Gossypium*) hybrids

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ABSTRACT : An important area of cotton (*Gossypium*) is germplasm characterization and utilization. In this present study, *Gossypium hirsutum, G. arboreum* and hybrid of *G. hirsutum x G. barbadense* have been selected for RAPD analysis. RAPD was found to be useful in detection of DNA polymorphism, development of unique RAPD marker and genetic diversity analysis among selected cotton hybrids.

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Genetic diversity studies in intra-specific *desi* cotton (*G. arboreum*) through DNA marker

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ABSTRACT : Random amplified polymorphic DNA (RAPD) analysis was employed in 20 genotypes of diploid cotton (*G. arboreum*). Total 40 primers were screened out of which 20 primers failed to amplify any genotype, 11 primers showed good band profile in few genotypes and ramaining nine primers succeeded in amplifying all the 20 genotypes. The informative nine primers generated a total number of 71 scorable amplified products. Out of the total amplified products, 52 bands showed 70.58 per cent polymorphism, while remaining products were monomorphic across the genotypes. Based on the pair-wise comparison of amplification products, Dice genetic similarity coefficient was calculated for the 20 genotypes using NTSYS-pc software. The value of similarity coefficient ranged from 0.70 to 0.96. Based on dice similarity coefficient, a dendrogram was generated by UPGFMA for cluster analysis. Two main clusters, namely, A and B were obtained. The cluster A comprised genotypes Cross H_1 (PA 255 x G. COT 19), Cross H_2 (PAIG 8/1 x G. COT 19), Cross H_3 (PA 405 x G. COT 19) and their parents and three AH 65, MDL 2582 and ZC (AKA 7) genotypes. Cluster B comprised PA 402, CINA 343, GAM 115, GAM 141, KWA 227, DLSA 1001, KWA 225, AKA 9703, HLSA 802 and GAM 67.

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Factors affecting crossed boll setting in hand emasculation and pollination techniques in *Gossypium arboreum*

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ABSTRACT : Emasculation and pollination is an important operation in any crop improvement programme. Crossed boll setting in hand emasculation and pollination technique is very low particularly in *G. arboreum* cotton and is influenced by number of factors. Efforts have been made to pin point the factors responsible for low crossed boll setting. In the present study, crossed boll setting ranged from 2.5 per cent (HD 495 x HD 432) to 49.5 per cent (HD 491 x HD 451) in different cross combinations. Present study findings indicated important role of genotypic differences in crossed boll setting. Higher crossed boll setting per cent was observed in the month of August and afterwards it showed a declining trend. The variation in crossed boll setting in the month of August within a genotype may be due to variation in environmental conditions. The overall crossed boll setting in *G. arboreum* cotton was worked out to be 15.9 per cent.

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Variability and correlation analysis by using various quantitative traits in released *Bt* cotton hybrids

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ABSTRACT : Variability and correlation analysis was carried out in 57 *Bt* cotton hybrids of *Gossypium hirsutum* with diverse origin. The phenotypic coefficient of variation (PCV), which measures the total variation, was found to be greater than genotypic coefficient of variation (GCV). High heritability coupled with high genetic advance was noticed for the characters plant height, seed cotton yield/plant, number of bolls/plant and lint yield indicating the presence of additive gene action in the expression of these traits. Genotypic and phenotypic correlation showed that seed cotton yield/plant had significant positive association with number of bolls/plant, boll weight and ginning outturn (%). Number of bolls had significant and positive association with lint yield, ginning outturn (%) and number of sympodia. The positive significant correlation was observed for both the characters *viz.,* seed index (g) and lint index (g) with number of bolls/plant and number of sympodia/plant, at phenotypic level. Thus, for increasing seed cotton yield/plant in cotton, due emphasis should be given to number of bolls/plant, boll weight and ginning outturn (%). Moreover, all the characters which had high heritability and highly significant positive association with seed cotton yield/ plant and hence those can be increased through selection in cotton.

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Performance of different short compact genotypes of American cotton (*Gossypium hirsutum* L.) to closer intra-row spacings

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ABSTRACT : An experiment was conducted to identify the short compact genotypes for getting maximum yield during *kharif* seasons of 2001, 2002 and 2003. In first year, the experiment was laid out in split design with 25 genotypes of variable plant type in main plots and three intra-row spacings of 10, 20 and 30 cm in sub-plots keeping inter-row spacing at 90 cm with three replications. The short compact genotypes like H 1117, GSH 4, LH 1993, etc. gave more seed cotton yield at closer intra-row spacing as compared to wider intra-row spacing. The number of sympods per plant remained unchanged at different intra-row spacing or even it increased at 10 cm intra-row spacing which ultimately resulted in higher seed cotton yield in such genotypes. Based on the yield performance and their plant characters, seven genotypes (GSH 4, H 1226, H 1252, H 1117, LH 1993, SGNR 6 and SGNR 8 alongwith two checks *i. e.* F 1861 and LH 1556) were selected for further evaluation at closer intra-row spacing of 10 cm for two more years during *kharif* 2002 and 2003. On the basis of average of two years, it was observed that H 1117 gave the highest seed cotton yield of 1810 kg/ha followed by GSH 4 (1756 kg/ha), F 1861 (1748 kg/ha) and LH 1993 (1712 kg/ha). It can be concluded that short compact genotypes can be grown successfully with narrow intra-row spacing of 10 cm keeping wider inter-row spacing of 90 cm.

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Evaluation of some new *Bt* cotton hybrids for seed cotton yield and fibre quality traits under rainfed conditions

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ABSTRACT : Sixty seven *Bt* cotton hybrids including five *Bt* checks and three non *Bt* checks were evaluated for yield and fibre quality performance under rainfed conditions at Cotton Research Station, Nanded during 2007-2008 season. Bollworm incidence was low and season was favourable for cotton crop. Only four *Bt* cotton hybrids out of 62 tested recorded significantly higher seed cotton yield over best non *Bt* check hybrid (Bunny, 1833 kg/ha). *Bt* cotton hybrids depicted wide range for seed cotton yield (855-2397 kg/ha). None of the test hybrids recorded significantly higher seed cotton yield over the highest yielding *Bt* check (Bunny, 2397 kg/ha). Whereas only one hybrid, KCH 135 BG II (2309 kg/ha) significantly outyielded another *Bt* check, RCH 2 *Bt* (1919 kg/ha). Six hybrids showed significant superiority for yield over the non *Bt* check, NHH 44 (1761 kg/ha). The percentage increase in seed cotton yield over check, Bunny (non-*Bt*) ranged from 0.60-25.97. Ginning outturn of intra-*hirsutum* hybrids ranged from 28.17-39.22 per cent and 2.5 per cent span length ranged from medium (23.59 mm) to long (34.72 mm). Fibre strength of hybrids ranged between 20.2 g/ tex (weak) to 26.7 g/tex (strong), whereas micronaire value ranged between fine (2.9) to medium (4.78). Considering the ratio of fibre strength and length, only 22 test hybrids depicted desirable (>0.80) values. Earliness index ranged from 0.59 to 0.88. The study revealed the need to undertake extensive testing of *Bt* cotton hybrids for recommending region specific hybrid having high yield potential and superior fibre quality.

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Genetic variability, character association and component analysis in upland cotton (*Gossypium hirsutum* L.) under rainfed condition

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ABSTRACT : To asses the extent of genetic variability, heritability and genetic advance per cent in eight cytoplasmic genetic male sterile hybrids of upland cotton evaluated in RBD with three replications at RRTTS, Bhawanipatna, revealed that the GCV, heritability in broad sense and genetic advance as per cent of mean values were comparatively high for yield/plant (g), seed cotton yield/ha (q), number of monopodia/plant, seeds/boll, seeds/locule and boll weight (g) indicating the operation of additive gene action for these traits. The correlation analysis indicated that number of sympodia/plant (0.917) and number of bolls/plant (0.964) had positive and significant correlation, while locules/boll had negative and significant association with seed cotton yield/plant. Path coefficient analysis revealed that bolls/plant (0.997) and fibre strength (0.382) should be given greater emphasis in cotton yield improvement programme as well as for modern ginning and spinning mills as it contributes maximum direct effect, while number of sympodia/plant contributed maximum indirect effect through the trait bolls/plant.

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Possibilities of intercropping in G. Cot. Hy. 10 under irrigated condition

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ABSTRACT : An experiment was conducted during *kharif* seasons of 2001-2002 to 2007-2008 at Regional Cotton Research Station, S. D. A. U., Talod to study the possibilities of intercropping in G. Cot. Hy. 10 under irrigated condition. The results revealed that significantly highest cotton equivalent yield (2282 kg/ha) was obtained when cotton was planted at 120 x 45 cm (normal planting) with one row of sesame as intercrop or cotton planted in paired row (180-60 x 45 cm) with two rows of sesame (2264 kg/ha) followed by cotton planted in pried row with two rows of greengram (2037 kg/ha). The economic analysis of systems revealed that highest monetary advantages in terms of net return (Rs. 35050/ha) and B : C ratio (1.59) was obtained with normal cotton planting with one row of sesame. The next best treatment was paired row planting with intercropping of sesame (two rows) recording net return of Rs. 34600/ha and 1.57 B : C ratio.

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Effect of wounding methods on regeneration and transformation in *Gossypium herbaceum* and *Gossypium hirsutum* cotton genotypes

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ABSTRACT : The efficiency of transformation can be enhanced by supplementing the wounding methods. Several experiments were conducted to find out the effect of wounding methods (scalpel wounding, vaccum infiltration, blot drying, chilling injury and sand injury) on regeneration and transformation of Jayadhar (*Gossypium herbaceum*) and Surabhi (*G. hirsutum*) genotypes using *Agrobacterium* strain EHA 105 harbouring binary vector pBINAR, carrying *cry2Aa* gene. Scalpel wounding followed by colonization with agroculture resulted in 60 and 61.25 per cent regeneration as compared to non wounded plants of 78.75 and 80 per cent in both Jayadhar and Surabhi genotypes, respectively. Per cent regeneration for vacuum infiltration of 10 and 20 min was on par in both the genotypes. Regeneration response reduced with blot drying and sand injury. Explants chilled for >48 h showed lower regeneration response. Out of 7530 explants cocultivated, only three were PCR positive one in Jayadhar genotype with scalpel wounding and colonization for 10 min and two in Jayadhar genotype with 30 min of chilling treatment.

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Effect of organic manures, inorganic fertilizers and plant protection on quality and economics of *desi* cotton

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ABSTRACT : A field experiment was conducted at Agronomy Farm, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during *kharif* 2004-2005 and 2005-2006 to study the effect of various sources of nutrients *i. e.* organics and inorganics alongwith different plant protection measures on quality and economics of *desi* cotton. Experimental results revealed that the treatment combinations of FYM @ 10 t/ha or vermicompost @ 2 t/ha alongwith 50 : 25 : 25 kg NPK/ha being *at par* recorded significantly greater values of gross monetary returns/ ha during both the years. However, treatment combination of seed inoculation with *Azotobacter*+ PSB with 50 : 25 : 25 kg NPK/ha registered higher net monetary returns/ha during 2004-2005 and 2005-2006 and benefit : cost ratio during 2004-2005 only. Earliness index was affected significantly and recorded inconsistent trend due to various treatments of organics, inorganics and plant protection measures during 2004-2005 and 2005-2006. Seed index affected significantly due to inorganics and treatment received application of 50 : 25 : 25 kg NPK/ha recorded maximum seed index over rest of the treatments during both the years of study. Mean halo length, ginning percentage and various fibre technological properties like 2.5 per cent span length, micronaire value, bundle strength and uniformity ratio were not affected at level of significance in both the years due to use of different organics, inorganics and plant protection measures.

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Effect of fertilizer levels and plant densities on yield, gross and net monetary returns of *Bt* cotton hybrids

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ABSTRACT : Field trials were conducted consecutively four years during 2005-2006 to 2008-2009 with object to find out suitable plant density and fertilizer level for *Bt* cotton hybrids under rainfed conditions of Marathwada at Cotton Research Scheme, Marathwada Agricultural University, Parbhani. Results clearly indicated that hybrid NCS 145 (Bunny) *Bt* planted at higher plant density of 27777 plants/ha with higher fertilizer dose of 100 : 50 : 50 NPK kg/ha recorded significantly more seed cotton yield, gross and net monetary returns as compared to RCH 2 *Bt.*

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Effect of irrigation methods and phosphorus on *desi* (*Gossypium arboreum*) and American cotton (*Gossypium hirsutum*) in recently reclaimed waterlogged soils of north-western Rajasthan

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ABSTRACT : The field experiment was conducted during the rainy (*kharif*) seasons of 2002-2004 at Khetawali Distributory, Hanumangarh to study the effect of irrigation methods and phosphorus levels on seed cotton yield, sustainability index and water use efficiency of *desi* (*Gossypium arboreum*) cv. RG 8 and American (*Gossypium hirsutum* L.) cotton cv. RS 2013 under recently reclaimed waterlogged soils. Among the methods of irrigation, flood irrigation gave the highest seed cotton yield of 14.12 and 21.84 q/ha in *desi* and American cotton, respectively. Similarly, both the cotton species also recorded significantly highest yield components, bolls (46.1, 60.3/plant) and boll weight (3.2, 3.3 g) with flood irrigation. *Desi* and American cotton also resulted in highest water use of 394.3 and 534.3 mm and water use efficiency of 3.58 and 4.09 kg/ha mm with flood irrigation, respectively. Recommended level of phosphorus significantly increased seed cotton yield of both *desi* (12.04 q/ha) and American (169.2 q/ha) cotton over control. Higher water use efficiencies of 3.56 and 3.84 kg/ha mm were also recorded with recommended phosphorus level in *desi* and American cotton, respectively.

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Response of *Bt* cotton hybrid RCH 134 to varied spacing and fertility levels under Punjab conditions

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ABSTRACT : A field experiment was conducted during the *kharif* seasons of 2006-2007, 2007-2008 and 2008-2009 at Punjab Agricultural University, Ludhiana to study the effect of different fertility and intra- and inter-row spacing levels on the growth and yield of *Bt* cotton hybrid RCH 134. The experiment was laid out in split plot design with three spacings (67.5 x 75 cm, 100 x 60 cm and 100 x 75 cm) in main plots and three fertility levels (75% of recommended dose of fertilizer (RDF) (112.5 : 22.5 : 22.5 NPK kg/ha), RDF (150 : 30 : 30 NPK kg/ha) and 125 per cent of RDF (187.5 : 37.5 : 37.5 NPK kg/ha) in sub-plots with four replications. The results revealed that *Bt* cotton hybrid RCH 134 sown at closer spacing of 67.5 x 75 cm produced significantly higher seed cotton yield of 3045 kg/ha as compared to the crop sown at the other two spacings during 2007-2008. However, the differences among various plant spacings were non significant during the other two years of study. The per cent increase in mean seed cotton yield in closer spacing of 67.5 x 75 cm was 8.1 and 9.3 per cent over the wider spacing of 100 x 60 and 100 x 75 cm, respectively. The number of bolls/plant was significantly more in wider spacing of 100 x 75 cm as compared to the closer spacing of 67.5 x 75 and 100 x 60 cm during 2007-2008 and 2008-2009 and did not affect significantly during 2006-2007. The application of different fertilizer levels did not exert any significant effect on growth, yield parameters and seed cotton yield of *Bt* cotton hybrid RCH 134.

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Effect of different nutrients on growth, yield attributes and yield of cotton under varying cotton cultivars

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ABSTRACT : Field experiment was carried out during *kharif* seasons of 2004 and 2005 to see the effect of different nutrients on growth, yield attributing characters and seed cotton yield under different cotton genotypes. Data vividly showed that significantly maximum seed cotton yield (1032 and 1173 kg/ha) was recorded with the RS 2013 than rest of the genotypes. Application of RD of NPK and S produced highest seed cotton yield (1039 and 1107 kg/ha) as compared to control during both the years of investigation. The increase in seed coton yield with the application of RD of NPK and S was to the extent of 42 and 41 per cent than control during first and second years of study, respectively. All the growth, yield attributing and quality parameters were improved with the application of RD of NPK and S than control during both the years of study.

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Economic viability of transplanting of *Bt* cotton in irrigated situation

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ABSTRACT : The field experiment was conducted at Agricultural Research Station, Bheemarayanagudi, to assess the economics of planting of *Bt* cotton by transplanting technique. Significantly higher seed cotton yield (3828 to 4266 kg/ha) was obtained in transplanting of seedlings compared to farmers' practice of hand dibbling (3277 kg/ha).Though higher cost of cultivation was incurred in transplanting, the gross returns were higher which ranged from Rs. 95,700 and 1,06,650/ha in transplanted cotton. Among the different transplanting geometries, spacing of 90 x 90 cm recorded the highest gross return (Rs. 1,06,650/ha) followed by 120 x 60 and 120 x 90 cm spacings. As a result of higher yield and gross returns in transplanted cotton, monetary advantage was of the order 12.5 to 32 per cent compared to dibbling (Rs. 57625/ha). Benefit/ rupee investment (B : C ratio) in transplanted treatment ranged from Rs. 3.47 to 3.94, while in dibbling B : C ratio was Rs. 3.64.

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Long term effects of manures and fertilizers on productivity of rainfed cotton and soil fertility in Vertisols

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ABSTRACT : A long term experiment to study the effect of different manures and fertilizers on productivity of rainfed cotton was initiated at Regional Agricultural Research Station, Guntur, during *kharif* 1991.The *kapas* yield averaged over 15 cropping seasons (1991-1992 to 2005-2006) and also the yield obtained during *kharif* 2006-2007 indicated an increase in *kapas* yield due to different treatments over control. There was progressive increase in yield with graded levels of NPK from 50 to 150 per cent recommended dose. The overall pooled mean yield of cotton *kapas* was the highest (13.85 q/ha) in the treatment of 100 per cent NPK+FYM 10 t/ha followed by 150 per cent NPK (13.07 q/ha). Application of different manures and fertilizers did not alter the soil reaction significantly, whereas considerable decrease in soluble salt content in soil was noticed in all the treatments compared to control. The highest organic carbon (0.460%) content was noticed in the treatment of 100 per cent NPK+FYM 10 t/ha. No drastic reduction in soil available nitrogen status due to different treatments was noticed, while build-up in the soil available P was observed in the treatments of 100 per cent NPK+FYM and 150 per cent NPK over the period of experimentation. The leaf analysis at flowering stage during *kharif* 2006-2007 did not show significant effect of treatments on nutrient composition of leaf. Regarding the fibre quality parameters, treatments showed no significant influence.

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Efficacy of organic bio-fertilizer as influenced by different *Bt* cotton hybrids sown under various locations in Punjab

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ABSTRACT : The experiment was conducted at PAU Regional Station, Bathinda and PAU, Ludhiana during *kharif* 2007 and 2008, respectively, to study the effect of organic bio-fertilizer on seed cotton yield in different *Bt* cotton hybrids sown under various locations of Punjab. The results showed that seed cotton yield was non-significantly affected with the application of Biovita at both the locations during both the years of study.

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Effect of different spacing and potassium levels on yield attributes, yield and economics of *hirsutum* cotton

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ABSTRACT : Field experiment was conducted during *kharif* seasons of 2007 and 2008 to study the effect of spacing and potassium levels on growth, yield attributes, seed cotton yield and economics of cotton. Significantly highest seed cotton yield (1209 kg/ha) was obtained with 67.5 x 30 cm spacing than 67.5 x 60 cm and 100 x 30 cm spacing and difference was to the extent of 16.9 and 9.3 per cent, respectively. Application of potassium significantly enhanced yield attributing characters *viz.,* number of bolls/plant and boll weight over control. Significantly higher seed cotton yield (1165 kg/ha) was recorded with the potassium application of 20 kg/ha than control and *at par* with application of 40 kg potassium/ha. Higher gross return (Rs. 34444/ha), net return (Rs. 12591/ha) and B : C ratio (1.58) were achieved with application of 20 kg potassium/ha than control.

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Response of *Bt* cotton hybrids to different plant spacings under rainfed condition

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ABSTRACT : The field experiment was conducted at the research farm of Department of Agronomy, Marathwada Agricultural University, Parbhani during *kharif* season of 2008-2009 to find out the response of *Bt* cotton hybrids to different plant spacings. The results indicated that sowing of *Bt* cotton hybrids with the spacing of 180 x 30 cm and 150 x 30 cm was found *at par* with each other and recorded significantly higher value for plant height as compared with rest of the plant spacings. Significantly higher number of sympodial branches, leaf area, total dry matter, number of picked bolls, seed cotton yield/plant and seed cotton yield/ha were reported with the closer spacing of 90 x 60 cm and 120 x 45 cm than 180 x 30 cm and 150 x 30 cm. Among the *Bt* cotton hybrids, Ajit 55 *Bt* recorded significantly higher values for growth attributes, yield attributes than RCH 2 *Bt* and Bunny *Bt*. Ginning percentage, lint index, seed index and harvest index were not significantly influenced due to different plant spacings and *Bt* cotton hybrids. The interaction effect was found to be non-significant.

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Spacing studies in genetically modified cotton

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ABSTRACT : A field experiment was conducted during *kharif* season of 2006 at RARS, Warangal to find out optimum spacing for genetically modified cotton (Brahma) in Aflisols under irrigated condition. Adoption of spacing of 90 x 30 cm significantly recorded higher boll number/square metre (85.67) and seed cotton yield (3824 kg/ha). Sowing cotton plants at 90 x 30 cm recorded on par yields with 90 x 45 cm (3561 kg/ha), 90 x 60 cm (3321 kg/ha) and 90 x 75 cm (3250 kg/ha) and significantly superior over 90 x 90 cm (2973 kg/ha) and 90 x 105 cm (2648 kg/ha) and 90 x 120 cm (2425 kg/ha). Plant height, number of monopodia, sympodia/plant, boll weight and ginning percentage were significantly not influenced by different plant populations in cotton.

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Bioefficacy of chromafenozide (Matric 80 WP) against *Spodoptera litura* (Fab.) on cotton

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ABSTRACT : Bioefficacy of chromafenozide (Matric 80 WP)**,** an insect-ecdysone agonist, was tested at 50, 75, 100, 150 and 200 g a. i./ha and compared with other insecticides, namely, thiodicarb, quinalphos, novaluron and chlorpyrifos during 2006-2008 against the tobacco caterpillar, *Spodoptera litura* (Fab.) (Noctuidae : Lepidoptera). The trials were laid out at farmers' field in a randomized block design, keeping a plot size of 50-100 m^2 with three replications. Larval counts of the pest were made before and after spray of insecticides from tagged plants and the soil surface below each such plant. Chromafenozide at 200 g a. i./ha was equally effective as thiodicarb 375 g a. i. and the standard check, novaluron 50 g a. i./ha, in reducing the larval population and increasing the yield of seed cotton.

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Studies on genetic variability, heritability and genetic advance in parental populations of green lace wing, a predator of cotton pests

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ABSTRACT : The present investigation was carried out to study the genetic variability, heritability and genetic advance in the six parental populations of *Chrysoperla carnea* Stephens (Neuroptera : Chrysopidae) originally collected from six different geographical regions of India at Biological Control Laboratory of Gujarat Agricultural University, Anand Campus during 1993-1995. The results on genetic variability revealed the presence of wide genetic variability for most of the biological traits in the parental populations of *C. carnea*. High heritability coupled with high genetic advance observed for post-oviposition period, fecundity and oviposition period suggested that phenotypic selection would be very effective for the improvement of these traits. Overall study revealed the presence of great deal of genetic variability and diversity for majority of biological traits.

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Prediction model for bacterial blight of cotton hybrid NHH 44

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ABSTRACT : Observations of bacterial blight intensity were recorded on protected and unprotected plots of cotton hybrid NHH 44 grown at Marathwada Agricultural University Campus, Parbhani and farmers' field at Asola during the year 2003-2004. Meteorological parameters such as temperature, relative humidity, rainfall, wind speed and bright sunshine hours were considered to develop prediction model for bacterial blight intensity. Meteorological parameters existing 4 and 7 days prior to bacterial blight intensity and their cumulative sum were tried in the prediction system consisting of multiple regression equation. Results indicated that regression equations based on cumulative sum of meteorological parameters were more reliable because of high coefficient of determination and low prediction error.

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Estimation of crop losses due to Helminthosporium leaf spot on cotton

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ABSTRACT : A field trial was conducted at Regional Agricultural Research Station, Guntur during *kharif* seasons of 2007-2008 and 2008-2009 to estimate the losses due to Helminthosporium leaf spot in cotton var. LRA 5166. Propiconazole 0.1 per cent was sprayed at 15 days interval starting from 35 to 95 days after sowing (DAS). Lowest mean PDI of 14.17 was recorded with propiconazole 0.1 per cent sprays at 35, 50, 65, 80 and 95 DAS. Pooled data showed reduction of disease in all treatments. Yield data from different treatments showed that protection by spraying 0.1 per cent propiconazole from 35 DAS at 15 days interval upto 95 days resulted in avoidable losses to the tune of 33.76 per cent

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Biochemical studies in *Bt* and non *Bt* cotton genotypes against foliar diseases

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ABSTRACT : Biochemical studies were carried out on non *Bt* genotypes Laxmi, Abhadita, DCH 32 and *Bt* genotypes RCH 2 *Bt*, JKCH 1 *Bt* and JKCH 2 *Bt*. All the test genotypes were found susceptible to the foliar diseases. The results indicate that non-*Bt* genotypes recorded high amount of total protein (5.61 to 17.59%) as compared to *Bt* genotypes, but total phenol (0.87 to 35.92%), total sugar (2.80 to 21.54%) and reducing sugar (8.99 to 9.32%) recorded in lower amount compared to *Bt* genotypes. High amount of non-reducing sugar (13.18%) content at early stage (90 DAS) and low amount (27.04%) at later stage (120 DAS) were observed in non-*Bt* as compared to *Bt* genotypes. Further, there was decrease in total protein (23.41 to 25.38%), total phenol (30.84 to 33.37%), total sugar (23.68 to 34.68%), reducing sugar (26.09 to 29.26%) and non-reducing sugar (27.99 to 41.44%) in infected leaves (grand mean of non *Bt* and *Bt*) as compared to healthy leaves for foliar diseases under study.

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Efficacy of taqat against fungal leaf spot diseases of cotton

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ABSTRACT : Efficacy of taqat 75 WP, a combination fungicide product of captan (contact) and hexaconazole (systemic), was tested at two doses of 500 and 750 g/ha in comparison with propiconazole (0.1%) at Regional Agricultural Research Station, Guntur during *kharif* 2007 and 2008 against fungal leaf spot diseases of cotton. Taqat at 750 g/ha was *on par* with 0.1 per cent propiconazole in controlling Alternaria, Helminthosporium and Cercospora leaf spots, while superior to propiconazole against Myrothecium leaf spot. Between the doses, taqat at 750 g/ha gave better control of Helminthosporium and Cercospora leaf spots. Both taqat and propiconazole significantly increased the yield to the tune of 22.6 per cent. In conclusion, taqat at 500 g/ha was economical with benefit : cost ratio of 1.42.

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Effect of abiotic factors on incidence and development of aphids, *Aphis gossypii* (Glover) in different varieties of cotton under unsprayed conditions

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ABSTRACT : The studies were conducted at Pandit Jawaharal Nehru College of Agriculture and Research Institute, Karaikal during 2007 to record the effect of abiotic factors on incidence and development of aphids, *Aphis gossypii* at five different dates of sowing on three varieties of cotton under unsprayed conditions. The aphid population was started from fourth week of February on four weeks old crop and acquired its peak in fourth week of March on six weeks old crop. Maximum aphid population (16.55 aphids/3 leaves) was built up at temperature ranges from 33.7^0 to 21.7^0C, relative humidity between 95 and 60 per cent, zero rainfall and wind velocity 4.6 km/h. The highest incidence of aphid population was recorded in MCU 7 followed by SPCH 22 and SVPR 3. Aphid population build-up showed a significant and positive correlation with maximum temperature, morning relative humidity and sunshine hours, whereas it was significant and negative association with minimum temperature, evening relative humidity, wind speed and rainfall. The determination of effects of different weather factors on population aphids in cotton was essential for effective pest management.

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Population dynamics of major insect-pests on *desi* cotton (*Gossypium arboreum* L.) in Maharashtra

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ABSTRACT : Studies on population dynamics of major pests of *desi* cotton were carried out at Marathwada Agricultural University, Parbhani. It was observed that *Aphis gossypii* Glover had two peak periods of incidence *i. e.* first peak from second week of August to first week of September and second from first week of November to last week of November. The peak period of incidence of *Amrasca biguttula biguttula* Ishida and *Scirtothrips dorsalis* Hood was observed from last week of August to second week of September. Peak incidence of *Bemisia tabaci* Gennadius was observed from third week of October to second week of November. While regarding bollworms, peak infestation of *Helicoverpa armigera* Hubner was observed from third week of September to first week of October and that of *Earias vittella* Fabricius was observed from last week of October to third week of November, while the incidence of pink bollworm was very low.

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Relative incidence of American bollworm, *Helicoverpa armigera* (Hubner) in *Bt* and their corresponding non *Bt* cotton genotypes

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ABSTRACT : Performance of eight *Bt* and non *Bt* cotton genotypes for American bollworm, *Helicoverpa armigera* (Hubner) infestation and its larval population was evaluated at Research Farm of CCS Haryana Agricultural University, Hisar. The infestation due to American bollworm and its larval population was nil in *Bt* cotton genotypes both under unprotected and protected conditions. The infestation in non *Bt* genotypes under unprotected conditions was maximum in RCH 134 (2.39%) and minimum in RCH 317 (0.88%), while under protected conditions it was maximum in ANKUR 651 (0.67%) and minimum in RCH 317 (0.10%). The larval population in non *Bt* genotypes was recorded maximum in ANKUR 2534 (1.24) and minimum in RCH 134 (0.52) under unprotected conditions. However, under protected conditions, the larval population was recorded maximum in RCH 138 (0.89) and minimum in ANKUR 651 (0.33). The maximum yield in *Bt* genotype was recorded in RCH 134 (27.84 and 30.04 q/ha) under unprotected and protected conditions, respectively. While in non *Bt* genotypes, maximum yield in ANKUR 2226 (12.75 q/ha) under unprotected conditions and in RCH 134 (25.37 q/ha) under protected conditions was recorded.

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Feeding potential of *Cryptolaemus montrouzieri* Mulsant on *Maconellicoccus hirsutus* and *Phenococcus solenopsis*

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ABSTRACT : The experiment conducted at Laboratory of Insect Parasitology Research Scheme, Department of Agricultural Entomology, Marathwada Agricultural University, Parbhani during *kharif* 2008 on feeding potential of *Cryptolaemus montrouzieri* Mulsant on two species of mealy bug, namely, *Maconellicoccus hirsutus* and *Phenococcus solenopsis* revealed that the predatory grub consumed on an average 752.60, 742.80 eggs and 242.00, 222.80 nymphs of *M. hirsutus* and *P. solenopsis,* respectively. Adult female consumed 4340.20 eggs+235.20 nymphs, and 4355.00 eggs and 241.20 nymphs of *P. solenopsis* and *M. hirsutus*, respectively. While male beetle devoured 3586.00 eggs+149.60 nymphs and 3519.20 eggs+148.00 nymphs of *M. hirsutus* and *P. solenopsis*, respectively.

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Morphological and growth characters of *Pseudomonas fluorescens* and *Bacillus subtilis* for their interaction against major pathogens of cotton

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ABSTRACT : Colony characters and growth of each isolate varied at six days after inoculation (DAI) among eight isolates, *P. fluorescens* (A1) produced pale yellow and thick pigment of colony character, *P. fluorescens* (A3) produced yellow and thick pigment of colony character, *P. fluorescens* (A6) produced light yellow and thick pigment of colony character, *P. fluorescens* (A8) produced yellow greenish and thick pigment of colony character, *P. fluorescens* (P2) produced pale yellow and thick pigment of colony character, *P. fluorescens* (P3) produced creamy yellow and medium thick pigment of colony character, *P. fluorescens* (B55) produced light yellow and very thin pigment of colony character and *Bacillus subtilis* produced yellow and thin pigment of colony character. Similarly, growth character of the isolates also varied at 6 DAI and the isolates *P. fluorescens* (A1), *P. fluorescens* (A3), *P. fluorescens* (A6), *P. fluorescens* (A8) and *P. fluorescens* (P2) grew fast growth character. Overall among the seven isolates of *P. fluorescens* and one isolate of *B. subtilis* tested for minimum mean per cent growth of major pathogens of cotton were observed in case of *P. fluorescens* (A1) (56.80%) per cent inhibition followed *P. fluorescens* (A3) (56.94%) and *P. fluorescens* (A8) (58.20%).

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Survival of *Xanthomonas axonopodis* pv. *malvacearum* in infected cotton leaves at different conditions

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ABSTRACT : Survival of *Xanthomonas axonopodis* pv. *malvacearum* (*Xam*) in the leaves of hybrid cotton under pot culture and in field under natural condition was carried out during 2002-2003. Survival of the bacterium was more when infected leaves were placed on surface soil under dry than under moist conditions. Survival of the bacterium was maximum when leaves were placed on surface soil or at shallow than deeper depths. Irrespective of shade or their burial in soil, infected leaves harboured bacterial infection upto 135 days. However, leaves buried in host debris and on bunds and in field under shade have shown more recovery of bacterial population as compared to other conditions.

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Evaluation of cotton genotypes against Alternaria blight and bacterial blight diseases

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ABSTRACT : One hundred forty-one cotton genotypes/hybrids/varieties in different *Gossypium* species were screened under field conditions during *kharif* season of 2008 at Agricultural Research Station, Dharwad Farm. Among three (CCA 4, FDK 172 and FDK 173) of the *G. arboreum* genotypes showed moderately resistant reaction to Alternaria blight and remaining genotypes found moderately and highly susceptible reaction. With respect to the bacterial blight, all the *G. arboreum* and *G. herbaceum* genotypes showed immune reaction to bacterial blight, and six *G. hirsutum* genotypes (RAH 332, BS 79, SCS 404, NDLH 1905, LC and NDLH 1938) showed moderately resistant reaction.

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Social dynamics of cotton farmers in distress areas : A case of Andhra Pradesh

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ABSTRACT : The present study was conducted in Guntur and Warangal districts in Andhra Pradesh. An attempt has been made in this study to look at the social dynamics of cotton growers in distress areas. Social dynamics was based on the parameters like landholding pattern, cropping pattern, inputs and infrastructure availability, labour process, migration, gender issues, decision making process and strategic behaviour. Respondents had more than 50 per cent of their land (1.23 ha) under seasonal irrigation followed by rainfed (0.92 ha) and the land taken on lease was more compared to leased out land. About 57 per cent of the land was under cotton during *kharif*. Regarding input infrastructure 100 per cent of the respondents expressed seed quality as adequate. Regarding other issues like fertilizers (89%), insecticides (98%), weedicides (70.5%), labour (76.5%), sprayers and dusters (75%) majority expressed as adequate. In respect of information infrastructure great majority expressed as adequate on issues like post office (85%), schools (92%), radio (94%), relevision (98.5%), news papers (91%), telephone (74%) and mobile phone (92.5%). Regarding, post-harvest infrastructure, great majority expressed as not available. In contrast regarding transport infrastructure vast majority expressed as adequate. Adequacy of family and hired labour was expressed by 71 and 76.5 per cent of the respondents, respectively. Vast majority (92.5%) of the respondents expressed that the cost of labour was too high. Majority of the respondents agreed for the stagements on gender issues. In issues like purchasing inputs (39%), obtaining bank loans and construction of well (34.5%), creating other irrigation sources (39%) little more than one third of the respondents took decisions on their own.