

ABSTRACTS

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Assessment of genetic diversity in diploid cotton (*Gossypium arboreum*) through dissimilarity index technique

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ABSTRACT : A wide range of variation was observed among seven germplasm lines for all the metric descriptor traits under study. Among the traits of economic importance maximum variation has been recorded for seed cotton yield/plant (CV 13.49%), followed by ginning outturn (CV 10.47%), 2.5% span length (CV 9.01%) and bundle strength (CV 8.50%). For morphological traits, values for coefficients of variation were recorded to be more than 20 per cent. Among the nominally measured traits, pedicel length, petal claw, anther colour, filament length, bracteole size and bract serration contributed maximum towards inter genotypic dissimilarity. Germplasm lines G 135-49 and 30826 were found to be most divergent (dissimilarity value 19.99). In the present study majority of genotype combinations recorded more variations in dissimilarity values due to qualitative traits in comparison to quantitative traits.

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AMMI analysis of cotton varietal yield trial

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ABSTRACT : The analysis of seed cotton yield data to draw acute inference is an important aspect of the plant breeding programmes. Seed cotton yield data on 10 *Gossypium hirsutum* varieties tested over 15 environments (years/locations) were subjected to the Additive Main effects and Multiplication Interactive (AMMI) analysis. The results indicated a significant genotype-environment interaction (GEI) that influenced the relative ranking of the varieties across the environment. It was evident from AMMI analysis that genotype environment and the first principle component of interaction effect accounted for 81.13 per cent of treatment sum of squares and first three principle components of interaction effect were found significant. As per the AMMI model two varieties viz., RHC-1694 and RHC 688, were identified as having general adaptability. Further, the environments Summer, 1998 (Rahuri) and Summer, 1999 (Kopergaon) were found ideal for stable performance of the varieties tested.

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Assessment of micro mutations in F_2M_2 generations of coloured cotton genotypes

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ABSTRACT : The F_2 and F_2M_2 populations of sixteen coloured cotton hybrids were analysed for the mean performance, variability and heritability estimates. The yield component characters, namely, number of sympodia/plant and number of bolls/plant, boll weight, ginning percentage and fibre quality characters

such as 2.5% span length were analysed along with seed cotton yield. The genetic variability in the irradiated population was relatively higher than the non-irradiated population. A combination of high mean performance, high genetic variance, high heritability and genetic advance was evident in the F_2M_2 crosses of Algerian brown x MCU 5, Nankeen brown x MCU 9 and Algerian brown x MCU 9 for seed cotton yield and fibre length which can serve as the basic material for further selection.

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Stability analysis of north Indian cultivars of upland cotton (*Gossypium hirsutum* L.)

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ABSTRACT : Studies to estimate the relative stability of the upland cotton genotypes commonly grown in the northern part of the country revealed that except one character, major component of genotype x environment interaction was a liner function of the environment. The environment I (Normal sown Hisar 1st year) was found most conducive for most of the characters, followed by environment IV (Late sown Hisar 2nd year). Estimates of the mean (\bar{x}), regression coefficient (b_i) and deviation from regression (S^2_{di}) exhibited that genotype GC 182 was stable for all the characters.

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Pre-sowing seed soaking treatments for improving seed quality in cotton (*Gossypium* spp.)

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ABSTRACT : Pre sowing seed soaking treatments with various chemicals to good and low quality seed lots of four varieties of cotton (two American and two *desi*) were given for upgrading their viability and vigour and to ensure their rapid and uniform field emergence. Some of the treatments were found effective in improving various parameters in all the varieties and in both the seed lots but these were more effective in ameliorating poor seed lots as compared to good seed lots. Out of various chemicals treatments given, KNO_3 was found to be more effective in enhancing seedling emergence and its vigour, followed by NaCl and H_2O +Thiram, but gibberellic acid and ascorbic acid were found ineffective.

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Economics of cotton hybrid seed production in Punjab

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ABSTRACT : A two study on economics of hybrids seed production of upland cotton (*G. hirsutum*) revealed that cotton hybrid seed production may not flourish as a profitable enterprise in Punjab since manual hybridization is very expensive. Also, high pest incidence particularly of American bollworm, causes severe damage to the flowering buds and immature bolls which further makes it unprofitable. Only CMS based hybrid seed production seems to hold promise from commercial angle in Punjab.

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Studies on salt tolerance of cotton (*Gossypium hirsutum* L)

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ABSTRACT : Laboratory and pot culture studies were conducted on salt tolerance of 8 cultivars *viz.*, L 759, GBhv 145, SCS 101, CPD 742, CA 899, KH 117, Sumangala and GShv 99/305, keeping 4 salinity levels : best available water (BAW) i. e. 0 EC, 4 EC, 8 EC and 12 EC. Percent germination declined significantly with increased salinity levels under laboratory. At seedling stage, the cultivars KH 117, GShv 99/305, GBhv 145 and CA 899 showed highest tolerance with highest mean percent germination and mean vigour index. Pot culture studies indicated that with increased salinity levels there was a significant reduction in shoot length, total dry matter production at different growth stages and seed cotton yield. Sumangala, CA 899 and GBhv 145 were found to be salt tolerant.

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Effect of growth regulators, sulphur fertilization and crop geometry on cotton productivity and returns

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ABSTRACT : Field experiment conducted at Sriganaganagar from 1996-1997 to assess the effect of growth regulators, sulphur fertilization and crop geometry on net returns, benefit/cost (B:C) ratio and cotton productivity indicated that maximum returns and B : C ratio were obtained from NAA spray, followed by triacontanol. Similarly application of 50 kg S/ha gave additional return of Rs. 4667 over control and this treatment also gave higher B : C ratio (1.90) over control (1.62). Square planting gave mean additional return of Rs. 1209 and Rs.3628 over planting at 67.5 x 30 cm² and 90 x 22.5 cm², respectively. Combined effect of different treatments showed that square planting with 100 and 50 kg S/ha with NAA and triacontanol sprays proved to be the best proposition in terms of maximum net returns and high B : C ratio, Foliar spray of NAA and triacontanol significantly affected the crop growth rate, relative growth rate, sympodial branches/plant and seed cotton yield during both years. Application of NAA gave 19.7 per cent more yield over control. Sulphur fertilization @ 50 and 100 kg/ha gave higher mean seed yield by 20.0 and 20.1 per cent over no sulphur treatment. Square planting of 45 x 45 cm² significantly increased the seed cotton yield by 13.8 and 4.3 per cent, respectively over rectangular planting of 90 x 22.5 cm² and 67.5 x 30 cm².

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Kinetics of fibre growth and correlations among fibre quality parameters and macrolelements in *Gossypium* cultivars

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ABSTRACT : Seven cultivars (LH 900, LH 886, F 1054, LH 1134, F 505, J 205, J 205 and LD 327) of *Gossypium* were studied. The period of fibre elongation was recorded more in long (LS) than in short staple (SS) cultivars. Growth rate increased upto 15 DAA and declined thereafter in both. Variation in fibre length in relation to boll age had highly significant correlation coefficient. Longest span length was observed in *hirsutum* cvs. LH 1134 and J 205 and micronaire value was maximum in *arboretum* cv. LD 327. SS possessed comparatively lower content K⁺ but higher contents of Mg⁺⁺ and Ca⁺⁺ as compared with

LS. K⁺ content had significant and positive correlations with span length and fibre strength though significant negative correlation with fineness of fibre. Ca⁺⁺ and Mg⁺⁺ contents were in significantly correlated with all fibre quality parameters.

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Growth retardants in cotton-a review

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ABSTRACT : Cotton (*Gossypium* Sp.) when grown in fertile, well watered and suitable environment produces excessive vegetative growth. Excessive growth reduces seed cotton yields and encourages attack of insect-pests. Various growth retardants like Pix (mepiquat chloride), cycocel (chlorocholine chloride), Alar (daminozide), Ethrel (ethephon) have been found to reduce vegetative growth such as plant height, leaf area, root weight, internodal distance and increase number of sympodia/plant, number of bolls/plant, boll opening percentage, ginning percentage, seed oil and protein content, lint index, 100 seed weight, boll weight and seed cotton yield etc. But response varies with the location, climatic conditions and doses and time of application of various growth retardants. The present review deals with the effect of growth retardants on growth, yield and quality of cotton.

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Hormonal response of osmoregulation in cotton under waterlogging and drought

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ABSTRACT : Response of plant hormones (IAA, GA₃, BAP, ABA and ethrel) on stress injury, water content, osmotic potential, osmotic adjustment in cotton (*Gossypium hirsutum* L. Cv. H-777) under waterlogging and/or drought were studied. At vegetative stage (35 DAS) and reproductive stage (60 DAS), various plant growth regulators at 5µM concentration were sprayed one day prior to imposition of stress. Waterlogging, drought and their interaction increased relative stress injury but relative water content decreased. Osmotic potential increased under waterlogging but declined under drought, however, osmotic adjustment remained the same. Total soluble carbohydrate and reducing sugars concentration increased dramatically under drought that contributed significantly to osmotic adjustment. Foliar application of GA₃, BAP and ABA exhibited alleviatory effect of drought and waterlogging on above parameters.

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Status of American bollworm, *Helicoverpa armigera* (Hubner) on cotton in Haryana

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ABSTRACT : Fortnightly surveys of cotton crop for the incidence of *Helicoverpa armigera* (Hubner) (Lepidoptera : Noctuidae) carried out in the cotton growing belt of Haryana during July-October for six years (1993-1998) indicated that the pest was present on the crop in low numbers (about one larva/100 plants) as early as in the middle of July. However, the population continued to multiply further reaching its peak in second fortnight of September to early October. During this period as high as 79-91 per cent fields were found infested with the larvae and the population in 7-35 per cent fields was above 50 larvae/100 plants. The pest's incidence was relatively more in years having higher and frequent rains.

Based on pest's incidence certain endemic pockets in different districts of the state were identified. Factors affecting the pest's incidence on gthe crop are discussed.

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Impact of certain leaf morphological characters of cotton on population of whitefly, *Bemisia tabaci* Genn.

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ABSTRACT : Field trial conducted during 2001 on evaluation of morphological characters of cotton against whitefly, *Bemisia tabaci* Genn., showed that okra/semiokra leaf genotypes SO 13, O 14, OK 4-2 and normal leaf type Ganganagar Ageti (GA) were resistant (<5 adults/leaf), OK 13-2 and normal leaf types Pusa 8-6 moderately resistant (5-10 adults/leaf), and the normal leaf types LRA 5166 and LH 1556 susceptible (>10 adults/leaf) to this pest. Studies under glass house conditions during 2002 revealed that resistant genotypes SO 13, O 14 and GA recorded significantly lesser number of whitefly adults (3.66, 4.00 and 4.56/leaf, respectively), nymphs (15.44, 15.66 and 16.78/leaf, respectively) and eggs (7.2, 6.4 and 7.6/3 cm², respectively). The susceptible genotypes, LRA 5166 and LH 1556, recorded the highest population of adults (164.8 and 158.8/leaf, respectively), nymphs (45.92 and 36.74/leaf, respectively) and eggs (19.2 and 19.4/3 cm², respectively). A positive correlation of various morphological characters like hair density, hair length and leaf area with different stages of the pest was established whereas number of gossypol glands on leaves exhibited a negative correlation. Results suggested that okra and semiokra leaf shape alongwith glabrousness and lower number of adults, eggs and nymphs as compared to normal leaf genotypes indicating the potential of okra leaf genetic traits for reducing population of this pest.

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Effect of some insecticide mixtures on crop phenology and seed cotton yield in *Gossypium hirsutum* L.

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ABSTRACT : Effect of three insecticide mixtures, cypermethrin+profenophos @ 50+500 g, cypermethrin+ethion @ 50+400 g and cypermethrin+chlorpyrifos @ 50+500 g a. i./ha, and individual insecticides on crop phenology and seed cotton yield in *Gossypium hirsutum* was studied at Ludhiana and Bathinda, during *kharif* 1999. Six sprays were done at 10 day interval at both the locations. The crop matured early in the mixtures, cypermethrin and chlorpyrifos treatments than in ethion, profenophos and control at both the locations. At Ludhiana, the mean plant height in control was significantly higher than the treated plots. While at Bathinda, profenophos and cypermethrin alone and in combination had significantly higher plant height than other treatments including control. The number of pickable bolls at Ludhiana was significantly higher in mixtures than individual insecticides; however, at Bathinda it was true only in ethion+cypermethrin. Boll weight at both the locations was significantly higher in mixtures than individual insecticides. At Ludhiana, ethion+cypermethrin had significantly lower yield than other mixtures, while all the mixtures were superior to their respective components. At Bathinda, the seed cotton yield in all the mixtures, chlorpyrifos and profenophos was on a par, and higher than cypermethrin, ethion and control. The insecticides alone or in combination had no effect on fibre quality.

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Effect of some new insecticides on whitefly population and CLCuV incidence in cotton

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ABSTRACT : A field experiment was conducted during 2000 and 2001 crop seasons to study the bio-efficacy of some new chemicals, thiomethoxam (Actara 25 WG), acetamiprid (Pride 20 SP), difenturon (Polo 50 WP) and imidacloprid (Confidor 200 SL) against whitefly on cotton. These were compared with the standard checks, oxydemeton-methyl and triazophos. It was found that thiomethoxam @ 100 g. a. i. and difenturon @ 300 and 400 g a. i./ha significantly reduced whitefly population than the standard checks. However, no effective control of CLCuV disease was obtained by spraying the above insecticides against its vector (i.e. whitefly).

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Studies on the interaction of cotton leaf curl virus (CLCuV) with its vector, *Bemisia tabaci* (Gennadius)

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ABSTRACT : Studies on relationship of cotton leaf curl virus (CLCuV) with its vector, *Bemisia tabaci* (Gennadius), were carried out at Punjab Agricultural University, Ludhiana from 1998 to 2000. The whitefly required an acquisition threshold period of 20 minutes, inoculation threshold period of 10 minutes and a latent period of 8 hours for successful transmission of the virus. Per cent virus transmission increased with increase in acquisition and inoculation access periods. Pre-and post-acquisition fasting of whitefly up to four hours did not exhibit any effect on the transmission of virus.

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Relative abundance of Noctuids (Lepidoptera) associated with cotton and other crops in Haryana

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ABSTRACT : The prevalence of important noctuids, associated with cotton and other crops grown in arid Haryana was ascertained through light trap catches during two consecutive years. Out of 19 species observed, *Helicoverpa armigera* (Hubner) out numbered all others, whereas *Parallelia torrida* Guenee was least abundant. The population of *Agrotis flammata* Schiffermuller, *A. ipsilon* (Rottenburg), *H. armigera*, *H. assulta* (Guenee), *Spodoptera exigua* (Hubner), *S. litura* (Fabricius) attained peak twice i.e. in March-April and September-November. The other species viz., *Achaea janata* (Linnaeus), *Anomis flava* (Guenee), *Earias insulana* Boisduval, *E. vittella* Fabricius, *Mythimna loreyi* (Duponchel), *M. unipuncta* Haworth, *P. torrida* had peak in October, *Grammode stolidia* Fabricius in Aug.-Sept., *Autographa nigrisigna* (Walker) and *Thysanoplusia arichalcea* Fabricius were most abundant during April. *Sesamia inferens* Walker and *Spirama retorta* Cramer were relatively more abundant during August and September, respectively.

Inter state relationship for implementation of IPM demonstration cum training components under ICDP-Cotton Scheme

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ABSTRACT : Inter state relationship of achievements of the IPM demonstration cum training components under ICDP Cotton scheme in eight states viz., Haryana, U. P., Gujarat, M. P., Maharashtra, Orissa, Karnataka and Tamilnadu estimated for the period 1994-95 to 2000-01 revealed that per cent achievement of all the states had positive association with each other, except U. P. Significant positive association was recorded between Haryana and Orissa; Gujarat and M. P.; and Karnataka and Tamilnadu. Percent achievements of the IPM demonstration and training component ranged from 11.00 to 110.70%. Analysis of variance indicated significant year to year and non-significant state to state differences. For implementation of field demonstrations during 1992-93 to 2001-01 the inter state relationship was estimated between six states viz., Rajasthan, U. P., Gujarat, Maharastra, Tamilnadu and Karnataka. Percent achievement of Rajasthan had significant positive association with U. P. and Tamilnadu. Association of the achievement of Gujarat was significant and negative with the states of Maharastra and Tamilnadu. maharastra, however, gave positive association with Tamilnadu. Achievement of field demonstration varied between 20.00 and 437.50 per cent. Analysis of variance for achievement revealed non-significant differences between states and the years.