

ABSTRACTS

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J. Cotton Res. Dev. 19 (2) 131-133 (July, 2005)

Evaluation of long linted *Gossypium arboreum* genotypes suitable for rainfed ecology

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ABSTRACT : Study was undertaken to evaluate newly developed long linted *desi* cotton genotypes for their suitability under rainfed agro-ecological conditions of Madhya Pradesh. Highest seed cotton yield was recorded by *Gossypium arboreum* variety PA 464 (1107 kg/ha), followed by MDL 2463 (1011 kg/ha), Jawahar Tapti (976 kg/ha) and DLSA 24 (907 kh/ha). On the basis of overall performance under rainfed condition the varieties PA 464, MDL 2463, Jawahar, Tapti and DLSA 17 showed superior performance. Ignoring the seed cotton yield, comparison on the basis of fibre qualities was made. KWA-N 6 and KWA N 3 were found to be excellent and can be utilized in future breeding programme for transfer of these characters into high yielding *G. arboreum* varieties.

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Combining ability and heterosis for yield and its components under different environments in upland cotton (*Gossypium hirsutum* L.)

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Abstract: Investigations were carried out to study the heterosis and combining ability for yield and yield related traits by using line x tester mating design. Analysis of variance revealed significant differences among genotypes for all characters in all the environments. Partitioning of the variance in line, tester and line x tester revealed significant difference among GCA of lines for all the characters. Significant differences among SCA of hybrids were observed for all the characters in all the environments. Vagad Kalyan (T₂) and line Mysore Vijya (L₁₉) were good general combiners for most of the economic traits. Cross Bikaneri Nerma x Arizona Super Okra leaf green (T₃ x L₁₂) showed economic heterosis, significant SCA and involved one good general combiner parent under irrigated, high fertility for total seed cotton yield/plant.

J. Cotton Res. Dev. 19 (2) 140-144 (July, 2005)

Correlation and path analysis among different traits in upland cotton (*Gossypium hirsutum* L.)

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Abstract: Association and path analysis was estimated in 10x10 diallel (excluding reciprocals). Seed cotton yield/plant exhibited significant and positive association with number of bolls/plant, plant height, number of sympodia/plant and number of seeds/boll. Ginning percentage showed significant negative correlation in all the three environments. Path analysis revealed that characters such as number of bolls/plant, plant height, number of sympodial branches/plant and number of seeds/boll were most

important characters for selection of high yielding genotypes as they exerted positive direct effect as well as showed positive association with seed cotton yield/plant under all the three environments. Selection based on these characters may contribute considerably to improvement in seed cotton yield.

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Genetic divergence studies in introgressed lines of *desi* cotton (*Gossypium arboreum* L.)

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ABSTRACT : Nature and magnitude of genetic divergence was assessed among 37 *arboreum* genotypes (including two checks) developed through introgression with wild sources of *Gossypium* species for tolerance to biotic, abiotic stresses and fibre quality. The genotypes were grouped into nine clusters based on Mahalanobis D² statistic using Tocher's method (1936). Maximum number of genotypes were grouped in cluster I (14), followed by cluster II (10) and cluster III (7) whereas clusters IV, V, VI, VII, VIII and IX had one genotype each. Maximum cluster distance of 53.13 was observed between cluster III and VIII, followed by cluster III and cluster IX (52.99), cluster I and cluster III (50.71) and cluster III and cluster IV (50.67). Number of bolls/plant contributed a maximum of 31.08 per cent to the divergence followed by micronaire (19.37%) and boll weight (16.97%). The study indicated that geographical diversity need not always be associated with the genetic diversity.

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Genetic variability, correlation and path analysis in *Gossypium herbaceum* cotton under saline soils

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ABSTRACT : Estimates of variability, heritability, genetic advance, correlations and path analysis were carried out in *Gossypium herbaceum* cotton for 15 traits under saline soil condition. The studies were conducted at farmers' holdings at two locations *viz.*, Konanki and Uppugundur villages of Prakasam district in Andhra Pradesh during *kharif*, 2000-2001 under NATP CES project on *herbaceum* cottons. Pooled analysis revealed that phenotypic coefficient of variation was high for number of bolls/plant (52.49), followed by seed cotton yield/plant (38.46). In both the traits, difference between GCV and PCV was high, revealing the role of environment as evidenced by their moderate heritability and genetic advance values. Correlations and path coefficient analysis suggested that simultaneous selection for plant height, maturity coefficient number of sympodia, number of bolls/plant, seed index and 2.5 per cent span length were important for improvement of *herbaceum* cottons suitable for saline situation. However, the negative and direct association of days to 50 per cent flowering and lint index should also be kept in view in improvement programmes.

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Efficacy of ethrel and benzotriazole as chemical hybridizing agents in cotton (*Gossypium hirsutum* L.)

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Abstract : Efficacy of ethrel (2-chloroethyl phosphonic acid) and benzotriazole (1, 2, 3 - benzotriazole) as chemical hybridizing agents for *Gossypium hirsutum* L. var. Pusa 846 was tested. Various treatments with both the chemical induced pollen sterility ranging between 96.8 and 100 per cent. It was associated

with the significant reduction in yield parameters. However, there was non significant reduction in yield in plants sprayed with the lower concentration of ethrel (0.1%, v/v). On the other hand, the boll weight and 100 seed weight was slightly enhanced by single spray of 0.1 per cent ethrel. Thus, ethrel could be used as a potential hybridizing agent for *Gossypium hirsutum*.

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Combining ability studies for seed cotton yield and fibre quality characters in *Gossypium hirsutum*

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ABSTRACT : Line x tester analysis was carried out involving 4 lines and 11 testers for seed cotton yield and fibre quality traits. Significant differences among genotypes was observed for all the traits under study meaning thereby considerable amount of genetic variability. The magnitude of gca variances was higher than sca variance suggesting pre-ponderance of additive gene effects for almost all the traits. The genotypes GC182, RS810 and HI180 were found good general combiner for seed cotton yield. The cross combinations B59 x G67 and J34 x HS6 had significant sca effects for seed cotton yield across the environment whereas, none of the cross combinations had shown significant fibre quality parameters across the environments. Therefore, the breeder should compromise at acceptable values of seed cotton yield and fibre quality parameters. It is advocated that the genotypes having such values for these traits could be used in further breeding programme.

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Line x tester analysis for seed cotton yield and its component traits in *Gossypium hirsutum*

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ABSTRACT : The nature and magnitude of gene action were studied in a line x tester analysis comprising 4 lines and 11 testers. RS 810 exhibited significant gca effects for number of bolls/plant, boll weight and seed cotton yield. Among females IAN 579-1 also showed significant gca effects for seed cotton yield. The crosses IAN 579-1 x CNH 1012 for boll number, B 59 x J₂P₇ for boll weight, B 59 x G 67 and J 34 x HS 6 for seed cotton yield showed significant sca effects across the environments. It is advocated that the genotypes which had shown significant gca effects could be used in crossing programme and the crosses having significant sca effects should be tested over the locations and years before commercial exploitation.

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Heterosis in single cross hybrids of *Gossypium hirsutum* L in cotton

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ABSTRACT : In cotton (*Gossypium hirsutum* L) single cross hybrids were produced and estimates were made on heterosis breeding for quantitative traits to obtain information regarding selection of parents in well-adapted genotypes of diverse geographic origin. Heterosis for yield and its quantitative traits was estimated in 58 cross combinations. Maximum heterosis for seed cotton yield was observed in the cross-

combination HS 6 x RST 9 (68.23%), for number of monopods in Vikram 11 F x Vikram 11 M (138.230%), for number of sympods in RST 9 x PIL 8 (30.71), for number of bolls/plant was found in HS 6 x RST 9 (46.03%) and for boll weight it was found in PIL 8 x Jhorar (6.98%). The mean value among the cross-combination for seed cotton yield ranged from 537 to 5269 kg/ha, for number of bolls/plant varied from 18.0 to 92.0 and boll weight from 2.8 to 4.7 g.

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Evaluation of germplasm lines and different cultures of cotton (*Gossypium hirsutum*) for identifying the sources of high oil content

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ABSTRACT : Oil estimation was carried out in 59 cultures for identifying the source of high oil content in *Gossypium hirsutum* cotton. A wide range of variation was observed for oil content in different cultures of cotton. It varied from 12.80 to 23.30 per cent. Single plant selection V3-73/355 P6, SH 2379 P22, SH 2379 P39, VCH (M) and CSH 25 should higher oil content as compared to H 1098, RS 875, RS 810 and RS 2013 varieties being cultivated in northern zone.

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Induced mutants show genetic variability in quantitative characters of *desi* cotton (*Gossypium arboreum*) and American cotton (*Gossypium hirsutum*)

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ABSTRACT : Studies to analyze genetic variability in 41 induced mutants of *desi* cotton cvs. HD 123, HD 107 and American cotton cv. HS 6 with their respective checks were conducted. Observations were recorded on quantitative character in all mutant genotypes. The minimum plant height was observed in HD 107-M13 (173.33 cm), HS 6-M (120.86 cm), days to 50 per cent flowering in HD 123-MI (66.87), HS 6-M (75.00), HD 107-M13 (75.06), days to 50 per cent maturity in HD 123-MI (128.80), HS 6-M (145.86), HD 107-M28 (143.06), maximum number of monopodial branches/plant was observed in HS 6-M (6.4), HD 107-M11 (6.66), more number of sympodial branches/plant in HD 107-M6 (30.73), number of bolls/plant in HD 123-M1 (45.26), HS 6-M (39.46), HD 107-M21 (54.33), boll weight in HD 123-M2 (2.59g), HS 6-M (3.72g), HD 107-M6 (3.02g) and seed cotton yield/plant in HD 123-M1 (112.03 g), HD 107-M21 (146.47g), HS 6-M (110.36g). More seed cotton yield and improvement in all other characters were obtained by the treatment of gamma rays and EMS produced induced mutants.

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Determination of isolation distance in CMS based cotton hybrid

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ABSTRACT : A field experiment was conducted during *kharif* 2003 and summer 2004 to assess the distance of cross pollination and to decide the safe isolation distance for hybrid seed production using male sterility. Restuts obtained indicated 40 meter isolation distance is sufficient for certified seed production programme of CMS based cotton hybrid.

Productivity potential and economics of different cotton genotypes in relation to intercrops and fertilizer levels under rainfed conditions

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ABSTRACT : Results indicated that all cotton genotypes (NHH 44, PHH 316 and PH 348) were found equally effective in producing seed cotton yield. Intercrop yields were not influenced significantly due to different cotton genotypes. In spite of year to year variations on account of climatic factors, pooled results of these genotypes did not differ in their performance with respect to cotton equivalent yield, gross monetary returns and economic returns. Cotton intercropped with blackgram produced higher seed cotton yield than cotton intercropped with soybean. However, cotton intercropped with soybean produced higher seed yield than cotton intercropped with blackgram, but it did not reflect on cotton equivalent yield, gross monetary returns and also on economic returns, except during 2001-2002 when blackgram performed better than soybean intercrop. Every higher level of fertilizer application resulted in significant increase in seed cotton yield, intercrop yield, cotton equivalent yield, gross monetary returns and economic returns. Cotton genotypes grown as sole crop produced significantly higher seed cotton yield than intercropped cotton. Sole soybean produced higher seed yield than sole blackgram and intercropped cotton. In respect of cotton equivalent yield, gross monetary returns and economic returns, intercropped cotton was found better than sole cotton genotypes, sole blackgram and soybean.

Integrated weed management in American cotton (*Gossypium hirsutum* L.)

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ABSTRACT : To study the effect of non selective post emergence herbicides on weeds and yield of cotton, a field experiment was conducted during two consecutive seasons on *kharif*, 2002 and 2003 at CCS Haryana Agricultural University, Hisar. Pre-emergence or pre-plant incorporation (PPI) of pendimethalin being *on a par* provided effective control of carpet weed (*Trianthema portulacastrum* L.) and jungle rice (*Echinochloa colona* L.) up to 60 DAS (Days after sowing). Protected spray of glyphosate (0.5%) or paraquat (0.3%) at 65 DAS helped in reducing population and dry weight of the weeds up to 90 DAS. Pendimethalin integrated with dry hoeing or non selective herbicides proved superior over pendimethalin alone. Among herbicide treatments, maximum seed cotton yield was obtained with pendimethalin at 1.0 kg/ha *fb* protected spray of glyphosate (0.5%) which was *on a par* with two hoeings at 25 and 50 DAS. Presence of weeds through out the crop growing season reduced seed yield by 81 and 62 per cent during 2002 and 2003, respectively.

Effect of drip irrigation intervals and dripper capacities in cotton

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ABSTRACT : A field experiment was carried out for three years at Regional Agricultural Research Station, Nandyal on vertisols during *kharif*, 2000-01 to 2002-03 to find out optimum drip irrigation interval and dripper capacity in cotton (hybrid NHH 144). The treatments consisted of three irrigation intervals (irrigation daily, once in two days and once in three days) as main plots and dripper capacity (one, two and four litres per hour) as sub plots. The drip irrigation treatments were compared with ridge and furrow

irrigation. In all the years of study irrigation interval did not exert any significant influence on plant height, bolls/plant and *kapas* yield of cotton. Irrigation once in 3 days sufficient to produce the same *kapas* yield with 66 and 33 per cent of water saving with once in 2 days irrigation interval when compared to daily irrigation. Dripper having capacity to deliver 1 litre of water/hour produced significantly lower *kapas* yields compared to dripper capacity of 2 and 4 litres per hour. Drip irrigation was far better than ridge and furrow irrigation in all aspects in terms of yield and water saving. The study revealed that drip irrigation once in three days with two litres/hour dripper was ideal for higher *kapas* yield in cotton.

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Nutrient concentration and uptake of different cotton (*Gossypium hirsutum* L.) genotypes as influenced by intercrops and fertilizer level under rainfed conditions

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ABSTRACT : A field experiment was carried during *kharif* season of 2001 and 2002, to evaluate the effect of intercrops and fertilizer levels on NPK concentration and uptake by cotton genotypes under rainfed conditions. Amongst cotton genotypes, cotton hybrid PHH 316 recorded higher NPK concentration and uptake than NHH 44 and PH 348 during first year whereas PH 348 noted higher NPK concentration and uptake than NHH 44 and PHH 316 during second year. Cotton intercropped with blackgram recorded significantly higher NPK concentration and uptake than cotton intercropped with soybean. The NPK concentration and uptake by cotton increased significantly with increase in level of fertilizer application from 50 to 75 per cent and 75 to 100 per cent recommended dose of NPK of both the crops on area basis. NPK concentration was not influenced significantly either by growing cotton as a sole or intercrop. However, all sole cotton genotypes removed significantly higher NPK than intercropped cotton.

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Response of cotton cultivars to varying spacing and fertility levels

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ABSTRACT : Field experiment was conducted during summer seasons of 2002-2003, 2003-2004 at Cotton Improvement Project, Mahatma Phule Krishi Vidyapeeth, Rahuri to study the response of cotton cultivars to varying spacing and fertility levels. The data indicated that amongst the hybrids trestd, NHH 44 gave the highest seed cotton yield (18.27 q/ha) and it was significantly superior over remaining hybrids. Amongst the spacing tried, 90 x 60 cms spacing recorded the highest seed cotton yield (17.42 q/ha) and it was significantly superior over remaining treatments. Fertilizer level of 120:60:60 NPK kg/ha recorded the highest seed cotton yield (18.33 q/ha) and it was significantly superior over remaining treatments. It was concluded that NHH 44 produced maximum benefit-cost ratio than Ankur 5642 and Ajeet AHH 90-20 when planted at a spacing of 90 x 60 cm and fertilized with 120 : 60 : 60 N, P₂O₅ and K₂O kg/ha.

Bioefficacy of new herbicide molecules on weed control in summer irrigated cotton (*Gossypium hirsutum*)

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ABSTRACT : A field experiment was carried out during summer 2003 and 2004 to evaluate the bio efficacy of trifloxysulfuron at 7.5 g/ha and 10.0 g/ha as early post emergence herbicide and clomozone (15%) + pendimethalin (30%) combination product (Galaxy® at 2.0 lit/ha 2.5 lit/ha as pre emergence herbicide in summer irrigated cotton. Both the herbicides at test doses gave an excellent control of weeds at 30 days after sowing compared to the standard check of fluchloralin 1.0 kg/ha. Weed free check registered the highest seed cotton yield of 1392 kg/ha and was comparable with Galaxy at 2.5 lit/ha and hand weeding twice. Considering the economics of cotton cultivation, application of Galaxy at 2.0 lit/ha was found optimum.

Influence of different spacings on yield and yield attributes of cotton (*Gossypium hirsutum* L.)

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ABSTRACT : A field experiment was conducted at Punjab Agricultural University, Ludhiana during the *khari*, seasons of 2003 and 2004 on a sandy loam soil with neutral pH, low in organic carbon and high in available phosphorus and potash. The experiment was laid out in split plot design with three replications. The treatments consisted of 4 plant spacings (67.5 x 45, 60, 90 x 45 and 90 x 60 cm) in main plots and 3 genotypes (LH 1556, LH 1961 and LH 1995) in the sub plots. The results revealed that closer spacing of 67.5 x 45 and 67.5 60 cm produced the highest seed cotton yield as compared to wider spacings (90 x 45 and 90 x 60 cm), despite a decrease in number of bolls/plant, boll weight and yield/plant in the former. Similarly, closer spacing had maximum plant population during both the years. Amongst the genotypes, LH 1961 was found to be superior (18.40 q/ha in pooled data of two years) over LH 1556 (15.03 q/ha) and LH 1995 (16.75 q/ha).

Effect of fertilizer and spacing on interspecific hybrid Phule 388 under summer irrigated conditions

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ABSTRACT :A field experiment was conducted during 2000-2001, 2002-2003 and 2003-04 at Cotton Improvement Project, MPKV, Rahuri. Among the two hybrids tested, Phule 388 produced maximum number of bolls/plant (54.0), boll weight (3.41 g), yield/plant (106.0 g) and seed cotton yield (20.53 q/ha) and it was significantly superior over hybrid (DCH 32 (19.36 q/ha) in producing seed cotton yield. Application of higher dose of fertilizer 120:60:60 NPK kg/ha was significantly superior in producing seed cotton yield (20.89 q/ha) to that of recommended dose of 100:50:50 NPK kg/ha and also to the lower dose of 80:40:40 NPK kg/ha. Among the three spacing levels tested 90 x 120 cm was found to be significantly superior (21.49 q/ha) over remaining treatments and it was followed by 90 x 150 cm and 90 x 90 cm. The interaction effects were found to be non significant when Phule 388 was planted at a distance of 90 x 120 cm spacing and supplemented with fertilizer dose of 120:60:60 NPK kg/ha.

Survey on fertility status of cotton growing soils of Guntur district in Andhra Pradesh

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ABSTRACT : Survey and analysis of 100 soil samples of nine different *mandals* in Guntur district was carried out to assess an overall picture of physico chemical properties and fertility status of the cotton growing soils of Guntur district. Soil samples were analysed for pH, E.C., O.C., ammonical form of nitrogen, available phosphorus, potassium, magnesium and zinc. The pH, E.C. and O.C. of the soils ranged from 7.54-8.69, 0.095-3.25 dSm⁻¹ and 1900-9700 ppm with a mean value of 8.16, 0.37 dSmin⁻¹ and 6700 ppm, respectively. Available P, K, Zn and ammonical form of nitrogen were found to be in the range of 4.60-20.33, 73.54-372.2, 190-2400, 0.6-3.4 and 33.8-180 ppm with an average of 7.82, 230.75, 1089, 1.70 and 92.26 ppm, respectively. In general, the soils were alkaline in reaction having low to high O.C. Available P, K, Zn in medium to high range and ammonical form of nitrogen was in low to medium range. Soil organic carbon and available phosphorus exhibited medium nutrient indices, while available potassium and zinc exhibited high nutrient indices. Therefore, judicious fertilization of N, P and micronutrients was required for sustainable cotton production.

Screening of cotton (*Gossypium* sp.) genotypes to salinity at germination under laboratory conditions

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ABSTRACT : A laboratory experiment was conducted with 13 cotton varieties under the salinity levels of 1.5, 6.0, 10.0, 15.0 and 18.0 dS/m. Germination percentage decreased with increase in salinity and American varieties had invariably higher germination percentage at higher salinity levels over control than *desi* varieties. Shoot length was drastically reduced than root length. American varieties, LH 886 and F 846, had higher shoot length than *desi* varieties. Fresh weight of the seedling was also higher in these varieties than *desi* varieties. American cotton varieties had higher dry weight at all salinity levels. Hence, it was concluded that American varieties, LH 886 and F 846, were more tolerant than *desi* varieties at germination and early seedling growth in cotton.

Influence of supplementary foliar spray of micro nutrients on seed yield and seed quality characters of cotton

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ABSTRACT : A field experiment was conducted during 2003-2004 at Cotton Research Station, Nanded to study the effect of foliar spray of micronutrients on seed yield and seed quality characters on cotton cv. NH-452. Nutrient spray, namely, DAP (2%), DAP (2%) + B, DAP (2%) + Zn and DAP (2%) + B+Zn significantly improved seed and ginning percentage, percentage of mature healthy seed, seed vigor index, seed germination percentage and viability of seed as compared to water spray and control (no spray).

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Effect of sowing dates, planting methods and irrigation scheduling on the growth and yield of American cotton (*Gossypium hirsutum*)

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ABSTRACT : A field experiment was conducted during *kharif*, 2002 and 2003 to study the effect of different sowing dates, irrigation schedules and methods of planting-cum-irrigation application on the seed-cotton yield of American cotton. The higher mean seed-cotton yield was recorded in early sown crop as compared to late sown crop. Irrigation application as per COTTAM model is comparable with the irrigation scheduling as per PAU recommendations. However, the mean seed-cotton yield recorded in irrigation scheduling as per COTTAM model was slightly less as compared to PAU recommended irrigation scheduling. However, the response varies with the crop season. The higher mean seed cotton yield was recorded in ridge sowing crop as compared to flat sown crop and the response was consistent during both the years of study.

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Effect of sowing time and quality of irrigation water on the growth and yield of American cotton (*Gossypium hirsutum*)

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ABSTRACT : A field experiment was conducted during *kharif*, 2002 and 2003 to study the effect of different sowing dates, and quality of irrigation water on the growth and seed cotton yield of American cotton. The higher seed cotton yield was recorded in April sown crop as compared to March and May sown crop. The higher mean seed cotton yield was recorded when irrigations were applied to the crop alternately with canal and tubewell water. However, this response vary with the crop season.

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Production potential of cotton to growth regulators, sulphur fertilization and spacing

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ABSTRACT : A field experiment was conducted during 1996 and 1997 at Agricultural Research Station, Rajasthan Agricultural University, Sriganganagar on cotton (*Gossypium hirsutum* L.). Three levels of each of growth regulators, sulphur and crop geometry were laid out in partial confounding design. Foliar spray of NAA @ 10 ppm at flowering initiation and 20 days after first spray gave significantly 17.2 and 25.0 per cent higher cotton seed yield and lint yield over no spray, respectively. Application of 50 kg S ha⁻¹ remained *on a par* with 100 kg S ha⁻¹, produced significantly 17.6 and 25.4 per cent higher cotton seed yield and lint yield over control. Planting of cotton at 45 x 45 cm² spacing remained at par with 67.5 x 30 cm spacing, produced significantly 12.7, 13.6 and 14.0 per cent higher cotton seed yield, lint yield and oil yield over spacing of 90 x 22.5 cm, respectively.

Response of cotton to farm yard manure in deep black cotton soils under rainfed conditions

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ABSTRACT : A field experiment was conducted at Regional Agricultural Research Station, Lam, Guntur, during 2002-03 crop season in deep cotton soils under rainfed conditions to find out the effect of farm yard manure along with the different combinations of recommended dose of chemical fertilizers on yield and yield attributes of cotton in a factorial randomized block design with three replications. With FYM (F_1) and without FYM (F_2) as main treatments and different combinations of N, P and K fertilizers were taken as sub-treatments. Two cotton entries *viz.*, variety (L 604) and hybrid bunny (NCS 145) were selected for this study. Addition of FYM significantly increased the boll weight (L 604), number of bolls plant⁻¹, seed index, ginning percentage and seed cotton yield were significantly higher in T_1 (recommended levels of NPK i.e. $N_{90}:P_{45}:K_{45}$ for L 604 and $N_{120}:P_{60}:K_{60}$ for NCS 145) followed by T_4 treatment ($N_{90}:P_{45}:K_0$ for L 604 and $N_{120}:P_{60}:K_0$ for NCS 145) when compared to T_5 ($N_0:P_0K_0$).

Bollworm incidence, maximum yield contribution period and productivity of five *Gossypium hirsutum* cotton hybrids in Punjab

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ABSTRACT : The phenology of five *Gossypium hirsutum* cotton hybrids i.e. Ankur 651, Whitegold, Dhaval 2, Ganga Kaveri 151 and LHH 144 was studied in relation to incidence of bollworms during 2001-02 crop season under both unsprayed and sprayed conditions. The number of green bolls/plant and boll age varied from 59.27 ± 19.14 to 95.25 ± 30.81 and 30.32 ± 2.13 to 36.90 ± 2.59 days under unsprayed and sprayed conditions, respectively. The shedding of green bolls due to bollworms attack did not differ significantly in different hybrids. The number of harvestable bolls produced/plant varied from 13.24 ± 4.87 to 32.92 ± 12.10 under unsprayed and from 27.58 ± 11.15 to 55.92 ± 22.60 under sprayed conditions. Bollworms incidence in harvestable bolls on bolls and loculi basis respectively differed significantly in unsprayed condition only, being lower in Dhaval 2 ($29.35 \pm 6.77\%$ and $12.24 \pm 1.89\%$) and higher in LHH 144 ($62.85 \pm 14.50\%$ and $26.24 \pm 4.05\%$). The seed cotton yield differed significantly in both the conditions being higher in Whitegold (9.06 ± 0.39 /ha) and LHH 144 (20.39 ± 0.59 q/ha) under unsprayed and sprayed condition, respectively. The maximum yield contribution period (>90%) was from June 10 to August 25 in all the test hybrids under both unsprayed and sprayed conditions, except in LHH 144 where it was from July 1 to September 15 under unsprayed and July 1 to September 1 under sprayed conditions.

Relationship between nutrients in plants and incidence of major pests of cotton

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ABSTRACT : Carbohydrates, reducing sugars, proteins and total free amino acids were biochemically analyzed in different parts *viz.*, leaves, squares and bolls in selected cotton varieties/hybrid to determin

pest reaction. In general, carbohydrate and reducing sugar contents were more in bolls followed by squares and leaves. The protein content was more in leaves followed by bolls and squares. Total free amino acids did not follow any specific rule in this respect. Carbohydrates, reducing sugars and total free amino acids had strong positive correlations with pest incidence and whereas proteins had strong negative correlations.

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Evaluation of bioefficacy of flubendiamide 20 WDG (Ril 038) against bollworms on cotton

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ABSTRACT : Field experiments were conducted for two years to evaluate the bioefficacy of flubendiamide 20 WDG (Ril-038) @ 12.5, 25, 50, 60 and 100 a. i./ha along with lambda-cyhalothrin 5 per cent EC @ 40 g a.i./ha, spinosad 45 per cent EC and ilindoxacarb 14.5 per cent EC @ 75 g a. i./ha against cotton bollworms during *kharif*, 2003-04 and 2004-05 at Regional Agricultural Station, Khandwa. The results revealed that Flubendiamide 20 WDG at all doses significantly reduced bollworm complex infestation over untreated control and also registered higher seed cotton yield during both the years. Flubendiamide 20 WDG (Ril-038) @ 50 g a.i./ha was found to be highly effective in minimizing the bollworms damage and in increasing the yield of seed cotton. Based on the results it was suggested that flubendiamide 20 WDG (Ril-038) @ 50 g a. i./ha could be considered as the optimum dose for controlling cotton bollworms.

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Efficacy of newer synthetic pyrethroid insecticide bulldock 025 SC (□□- Cyfluthrin), against *Earias* spp. on cotton

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ABSTRACT : Bioefficacy of □ - Cyfluthrin was evaluated on cotton during 2000, 2002 and 2004 crop seasons against *Earias* spp. The treatment □ - Cyfluthrin @ 18.75 g a.i./ha recorded the lowest shedding of fruiting bodies (i.e. 2.4, 2.8 and 3.5%), lowest boll damage (i.e. 4.8, 4.3 and 3.3%), lowest loculi damage (i.e. 1.8, 2.3 and 1.4%) due to *Earias* spp. during 2000, 2002 and 2004 crop seasons, respectively. □ - Cyfluthrin @ 18.75 g a.i./ha recorded the highest seed cotton yield during all the years.

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Relative susceptibility of *Spodoptera litura* F. population from two locations to monocrotophos

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ABSTRACT : The Guntur population of *S. litura* larvae acquired 4.14 and 14.03 fold resistance in comparison with Chittoor population at LD₅₀ and LD₉₀ respectively by topical application. In the leaf sandwich technique, the same population developed 4.36 and 14.85 fold resistance as compared to Chittoor population. Monocrotophos was not synergised by Piperonyl butoxide but Tri Phenyl Phosphate (1 : 10) showed the synergistic factors of 1.98 and 3.42 by topical application and 1.45 and 1.66 by leaf sandwich method at LD₅₀ and LD₉₀ respectively. The acquisition of resistance by *S. litura* to monocrotophos is not to MFO but slightly due to esterases and other mechanisms.

Studies on field evaluation of imidacloprid (Confidor 17.8 SL) against sucking pests of cotton in rainfed conditon

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ABSTRACT : Bioefficacy of imidacloprid (Confidor 17.8 SL) as foliar application against sucking pests of cotton was evaluated at Cotton Research Station, Khandwa during 2003-04 and 2004-05. Four doses of imidacloprid (Confidor 350 SC @ 60 and 75 ml/ha and Confidor 70 WG @ 30 and 35 gm/ha) were compared with clothianidine 50 WDG @ 30 g/ha and an untreated control. Three foliar sprays were applied on the basis of economic threshold level. Confidor 350 SC @ 75 ml/ha was found to be superior over all the treatments in controlling aphid and jassid population on the crop. Higher yield (1259.6 kg/ha) were recorded from the plot treated with confidor 350 SC @ 75 ml/ha, followed by confidor 350 SC @ 60 ml/ha (1188.8 kg/ha).

Effect of microclimatic parameters on population dynamics of leafhopper in cotton

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ABSTRACT : A field experiment was conducted at the Research Farm of the Department of Entomology, CCS Haryana Agricultural University, Hisar, to study the effect of microclimatic parameters on population dynamics of leafhopper in cotton crop. The diurnal profiles of temperature and relative humidity and leafhopper population were measured at different phenophases inside the crop canopy. The vapour pressure deficit was calculated using the actual vapour pressure and relative humidity values. The microclimatic parameters were correlated with leafhopper population. It was observed that leafhopper population showed a direct and linear response with temperature and relative humidity, whereas it was negatively related with vapour pressure deficit. The regression models were developed for prediction of leafhopper population using microclimatic parameters i.e. air temperature, relative humidity and vapour pressure deficit which collectively explained the variability in leafhopper population upto 77 per cent. The optimum ranges of temperature, relative humidity and vapour pressure deficit for build up of leafhopper population were 32.0 to 34.0°C, 81-92 per cent and 1.0 to 6.0 mm of Hg, respectively.

Population variation of sucking pests at different phenophases in cotton

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ABSTRACT : A field trial was conducted at the Research Area of the Department of Entomology, CCS Haryana Agricultural University, Hisar to study the population variation of sucking pests at different phenophases in cotton. The variations in temperature, relative humidity and pest population inside the crop canopy during different phenophases of the crop were worked out by averaging the weekly diurnal profiles and pest population in a particular phenophase. The vapour pressure deficit was calculated using the actual vapour pressure and relative pressure deficit was calculated using the actual vapour pressure was higher at all the canopy levels during the period from vegetative to fruiting phenophase as compared to the period from fruiting to boll opening. On the other hand, population of whitefly was more during the later period as comparison to that in the former period. Leafhopper population was

positively and highly associated with relative humidity, whereas the whitefly population was negatively associated with vapour pressure deficit.

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Prevalence of races of *Xanthomonas axonopodis* pv. *malvacearum* in Marathwada region of Maharashtra State

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ABSTRACT : Twenty seven isolates of *Xanthomonas axonopodis* pv. *malvacearum* Vouterin *et al.*, the incitant of bacterial blight disease of cotton were made from the infected leaves collected from eight districts of Marathwada region during 2002-2003 for monitoring the prevalence of races. The single colony purified isolates of the pathogens were tested on a set of 11 host differentials for knowing the prevalence of races. Testing of these isolates indicated the prevalence of two races i.e. race 7 and 18 in cotton growing area of Marathwada region. Race 7 and 18 were obtained from the samples collected from Jalna, Osmanabad and Aurangabad districts. However, only race 18 was obtained from Hingoli, Beed, Parbhani, Nanded and Lature districts. Out of 27 isolates of the pathogen, 88.89 per cent isolates belonged to race 18 indicating the predominance of this race.

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Efficacy of local isolates of *Trichoderma* spp. against *Sclerotium rolfsii*

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ABSTRACT : In the present study, 50 promising isolates of *Trichoderma* spp. were obtained from different places of Marathwada region and Malegaon of Nashik district. Isolations were carried out on *Trichoderma* selective medium C. Efficacy of *Trichoderma* isolates inhibited growth of the pathogen as compared to control. At 4 days after incubation, minimum growth of the pathogen was observed in *Trichoderma* isolate 19, followed by 9. *Trichoderma* isolates 31, 40, 44, 8 and 25 were fast growing as compared to other *Trichoderma* isolates.

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Prediction model for bacterial blight of cotton (Var. PA 183)

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ABSTRACT : Protected and unprotected plots of cotton variety PA 183 were grown during the year 2002-03 in the field of Marathwada Agricultural University, Parbhani. Intensity of bacterial blight was recorded from occurrence of the disease till harvest of the crop at weekly interval. Meteorological parameters such as temperature (°C), relative humidity (%), rainfall (mm), wind velocity (kmph) and blight sunshine (hrs) were used to develop multiple regression equation for prediction of bacterial blight intensity. Results indicated that prediction equations developed on the basis of meteorological parameters prevailing 4 and 7 days prior to bacterial blight intensity suffer from high prediction error. When prediction equation were developed based on cumulative sum of meteorological parameters had high value of coefficient of determination and low prediction error.

Efficacy of local isolates of *Trichoderma* spp. against *Macrophomina phaseolina*

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ABSTRACT : In the present study, 50 promising isolates of *Trichoderma* spp. were obtained from different places of Marathwada region and Malegaon of Nashik district. Isolations were carried out on *Trichoderma* selective medium C. efficacy of *Trichoderma* isolates against *Macrophomina phaseolina* was tested in the laboratory by dual culture technique on potato destrose agar (PDA) medium. Results indicated that, in general, *Trichoderma* isolates inhibited growth of the pathogen. Isolates 29, 18, 9 had growth of the pathogen less than 10 mm at 9 days after incubation. *Trichoderma* isolates 20, 48, 22, 12, 1, 4, 5, 21, 38, 15 and 40 were fast growing as compared to other *Trichoderma* isolates.

Evaluation of *desi* cotton genotypes for grey mildew

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ABSTRACT : A field experiment was conducted during 2000-01 and 2001-02 at Agricultural Research Station, Dharwad Farm and at Regional Research Station, Raichur under completely unprotected conditions to screen the genotypes against grey mildew of cotton. Out of 31 genotypes screened none of the genotypes showed immune reaction. DLSa 8, DLSa 9, RAHS 101 and AKA-5 showed resistant reaction under both locations consistently for both the seasons against grey mildew. While the genotypes PA 375, PA 183, PA 302, DLSa 8, DLSa 9, RAHS 2, RAHS 101 and AKA 5 showed consistently resistant reaction at Agricultural Research Station, Dharwad Farm during both the seasons i. e. 2000-01 and 2001-02. Genotypes H 125, H 192, DH 4, Dh 22, DLSa 8, DLSa 9, RAHS 129, RAHS 101 and AKA 5 showed consistently resistant reaction at Regional Research Station, Raichur during both the seasons. While other genotypes exhibited resistant reaction at one center and moderately resistant reaction at other center.

Dermal and oral toxicity of certain commonly used insecticides against larval population of *Spodoptera litura* F

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ABSTRACT : All the four conventional insecticides tested *viz.*, endosulfan, monocrotophos, carbaryl and cypermethrin were less toxic to the *S. litura* population of Guntur district as compared to the population of Chittoor district whether applied topically or through leaf sandwich. There was marginal increase in the mortality of larvae of both Guntur and Chittoor districts as time elapsed in both the methods of application of all the four insecticides. The toxicity of endosulfan and carbaryl was relatively high when applied through ingestion than topical application where as the converse was true in case of monocrotophos and cypermethrin.

Evaluation of insecticides against *Spodoptera litura* (Fab.) attacking cotton

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ABSTRACTS : Thirteen insecticides were evaluated in the laboratory for their efficacy against tobacco caterpillar, *Spodoptera litura* (Fab.) (Noctuidae : Lepidoptera), during October, 2004. For this, three tests were conducted : untreated larvae feeding on insecticide treated leaves, treated larvae feeding on untreated leaves and treated larvae feeding on treated leaves. Larval mortality was recorded after 24, 48 and 72 h of treatment. It was concluded that thiodicarb (Larvin 75 WP) (0.075%) was the best insecticide giving 100 per cent kill of the larvae within 24 h when untreated larvae were offered treated leaves. When both larvae and leaves were treated, thiodicarb provided complete kill of the larvae within 48 h even at lower concentration (0.037%). The next promising insecticides were chlorpyrifos (Hyban 20 EC) (0.06%), endosulfan (Sohna Endosulfan 35 EC) (0.11%), indoxacarb (KN 128, 15 EC) (0.03%) and profenophos (Celcron 50 EC) (0.15%) giving 90.0, 76.7, 73.3 and 73.3 per cent larval mortality, respectively within 72 h when treated leaves were provided to the treated larvae. Spinosad (Tracer 45 SC) (0.014 and 0.018%), cypermethrin (0.01, 0.02 and 0.03%), deltamethrin (0.003, 0.006 and 0.008%) and neem (Fortune Aza 0.15 EC) (0.00075%) proved poor against this pest.

Incidence of bollworms in promising cultivars of cotton in Haryana

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ABSTRACT : The response of 4 *Gossypium hirsutum* genotypes (H 1117, HS 6, H 1098 and H 1226), an *intra hirsutum* hybrid (HHH 223) and 2 *G. arboreum* genotypes (HD-123 and HD-324) to bollworms infestation was evaluated at Hisar, Haryana during the *kharif* season of 2004. Weekly observations on larval population of *Earias* spp. and *Helicoverpa armigera* in green fruiting bodies and combined bollworms incidence (including pink bollworms, *Pectinophora gossypiella*) in open bolls of cotton at harvest were made in all the genotypes mentioned above. While the population of spotted bollworms (*Earias vittella* and *E. insulana*) started building up in the month of June in *hirsutum* genotypes and peaked in end September, that of American bollworm (*Helicoverpa armigera*) started in second week of August and peaked in second week of October. *H. armigera* population showed strong negative correlation with temperature while no such correlation was visible in the case of *Earias* spp. *G. arboreum* genotypes recorded comparatively lower bollworms population than *hirsutum* ones. On the basis of per cent incidence of bollworms and number of diapausing pink bollworm larvae in open bolls, genotypes H 1226 and the hybrid HHH 223 performed better than the remaining genotypes.

Evaluation of efficacy of acetamiprid (Pride 20SP) against whitefly, *Bemisia tabaci* (Genn.) on American cotton

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ABSTRACT : Three dosages of acetamiprid (Pride 20 SP) i.e @ 100, 150 and 200 g/ha were compared with the recommended dosages of oxydemeton methylal (Metasystox 25EC) @ 750 ml/ha, triazophos (Hostathion 40 EC) @ 1500 ml/ha and ethion (Phosphite 50 EC) @ 2000 ml/ha for the control of whitefly, *Bemisia tabaci* (Genn.) on American cotton during *kharif*, 2003. Pride 20SP @ 150 and 200 g/ha, being *on a par* with each other proved significantly better for the control of *B. tabaci* upto 7 days after spray. Maximum reduction in *B. tabaci* population (-50.00 to -77.67%) occurred only one day after spray. After

that its population showed an increasing trend though remained at a low level than that observed before spray in all the treatments, except Metasystox 25 EC where it started resurging 3 days after spray. A decrease of 38.16, 34.83, 19.13, 9.89 and 9.25 per cent in *B. tabaci* population was observed 7 days after spray in treatments with Pride 20 SP @ 200g, Pride 20 SP @ 150g, Hostathion 40 EC @ 1500 ml, Phosmite 50 EC @ 2000 ml and Pride 20 SP @ 100g/ha, respectively. However, an increase of 55.38 and 71.25 per cent in its population was observed 7 days after spray in treatments with Metasystox 25 EC @ 750 ml/ha and control, respectively.

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Status of cotton leaf curl disease and bacterial blight on American cotton in the Punjab

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ABSTRACT : Cotton leaf curl and bacterial blight are the two major disease in the Punjab. Leaf curl is transmitted by whitefly (*Bemisia tabaci*). Bacterial blight is caused by *Xanthomonas axonopodis* sp. *malvacearum*. In Punjab most of the cotton varieties/hybrids (including undercrop) were susceptible to these diseases. An extensive monitoring of the entire state was undertaken to examine the position of these diseases from kharif 2000 to 2004 crop seasons. Incidence of leaf curl varied from traces to 8 per cent alongwith traces to 2.0 grade severity of bacterial blight on different varieties/hybrids at different farmers field and research farms.

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Resource productivity, resource use efficiency and optimum resource use in NCS 145 cotton production

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ABSTRACT : Investigation was carried out during the year 2003-04 in order to study the marginal productivity, economic efficiency and optimum resource use in NCS 145 cotton production in Parbhani district of Maharashtra. Results revealed that regression coefficient of hired human labour (0.182) was highly significant at 1 per cent level while regression coefficients of area of NCS 145 cotton (0.221), family human labour (0.137) and manure (0.077) were positive and statistically significant at 5 per cent level. Thus, it was inferred that these resources were under utilized and there was scope to increase them in the cotton production. Regarding resource use efficiency, a rupee investment on each of the resources, namely, hired human labour, manure, family human labour and area of NCS-145 cotton, was highly profitable. The optimum use of each of the resources was higher than the existing specific resources except bullock labour and potash.