ABSTRACTS
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J. Cotton Res. Dev. **21** (1) 1-5 (January 2007)

Quantitative improvement of seed-oil through desired traits association in rainfed cotton (*Gossypium arboreum* L.)

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ABSTRACT : Exploitation of genetic potential from well-adapted germplasm line(s) provides sufficient scope for sustainable crop improvement. Studies were conducted with 12 phenotypically diverse genotypes of diploid cotton (Gossypium arboreum L.) in a field trial in Khandwa, with the objective to determine genetic variability of seed oil contributing traits. High phenotypic coefficients of variation for oil content (20.61) and morphological traits alongwith high genotypic coefficient of variation (20.53) and low environmental coefficient of variation (1.84) for oil content were analysed. When the data were expressed on the correlation coefficients basis, significantly negative correlation coefficient (-0.824) was estimated between seed cotton yield (SCY) and oil content. Other morphological traits viz., internode length and number of bolls per plant had positive correlation, whereas plant height, number of nodes per plant and number of sympodia per plant exhibited negative correlation with oil content. High values of expected genetic advance expressed in highly heritable traits viz., number of bolls per plant (57.035), SCY (38) and number of sympodia per plant (30.491) were due to the involvement of additive gene action. A cotton ideotype is proposed, which should have less number of sympodia per plant, increased number of bolls per plant and reduced SCY, with the aim to develop improved oilseed cotton cultivars/hybrids through heterosis breeding programme under sustainable oilseed cotton production technology.

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Genetics of yield and other traits over environments in American cotton (*Gossypium hirsutum* L.)

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ABSTRACT : A half diallel set (10 x 10) of hirsutum cotton was undertaken to evaluate combining ability and their interactions with environments. Pooled ANOVA showed highly significant differences for all the traits studied (except bolls/plant). Significant G x E interactions indicated that all the characters were influenced by the environments. Significant gca and sca x environments interactions were observed for the characters. Variance ratio revealed the preponderance of non-additive genetic variance. C-2602-WIR-6109 was found best general combiner for sympodia/plant, monopodia/plant and seed cotton yield; PIL-8-5 for high GOT; LH 1836 for early flowering and high and seed index; and H 1123 for span length and fine fibres. Crosses exhibiting highest sca effects coupled with high *per se* performance were F 1867 x LH 1836 for days to flowering, plant height, sympodia/plant and seed cotton yield; and F 1867 x LH 1896 and PIL 8-5 x LH 1861 for 2.5% span length and fibre fineness, respectively.

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Heterosis and combining ability analysis for plant and seed characters in upland cotton (*Gossypium hirsutum* L.)

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ABSTRACT : A line x tester analysis, including 13 male sterile lines and six restorer lines, was conducted. Data were recorded for seed cotton yield and related traits viz., lint yield, ginning outturn, number of bolls plant^{-1} and boll weight. The general combining ability of various genotypes alongwith their use for future hybrid development has been discussed. So far as seed cotton yield per se is concerned, use of at least one good general combining parent in a particular cross is advocated. Estimates of heterosis over the commercial check indicated high heterosis for seed cotton yield and other traits. Cross RCMSA 1 x LR 29 had highest heterosis and sca effects for seed cotton yield and lint yield. Other cross combinations viz., CAK 32A x AKH 01R and GCMS 1 x AKH 01R were also promising. Presence of high heterosis for seed cotton yield and other traits indicated possibility of exploitation of CMS system to develop commercial hybrids in cotton.

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Correlation study of yield contributing characters in American cotton

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ABSTRACT : Analysis of variance is significant for most of the yield contributing characters. Phenotypic and genotypic correlations are significant for almost all the characters like number of bolls/plant, days to 50% flowering, boll weight, bolls brusting and yield/plant in American cotton (Gossypium hirsutum L.).

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Undescriptive cotton cultivars of north zone : An evaluation

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ABSTRACT : The performance of 22 undescriptive cotton varieties being grown by the farmers of north zone was compared during 2003-04 and 2004-05 with released north zone varieties H 1098 and RS 2013 with respect to seed cotton yield, fibre quality traits and susceptibility to cotton leaf curl virus disease. The yield potential of undescriptive cultivars was generally lower than the check varieties. However, the undescriptive varieties matured 10-15 days earlier than the released ones. The undescriptive varieties exhibited medium fibre length (22.8-25.9 mm), good micronaire (3.6-5.2 10^{-6} g/in) but mostly showed poor strength (16.6-21.7 g/tex). The undescriptive cultivars were highly susceptible to cotton leaf curl virus disease, whereas H 1098 and RS 2013 varieties showed tolerant and resistant reaction, respectively.

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Determination of isolation distance in CMS based cotton hybrid seed production

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ABSTRACT : An experiment was conducted for determination of isolation distance in CMS based cotton hybrid PKV-4 at Marathwada Agricultural University, Parbhani during 2002-03, 2003-04 and 2004-05. The isolation distances were varified from 5 to 50 m towards south and north direction. The harvested seed from 'A' line was sown in summer 2003, 2004 and 2005 for taking observations on genetic contamination. The mean pooled data over three years indicated that the maximum genetic contamination was observed at 5 m isolation distance–12.81% towards south and 12.80% towards north. As the distance of test plot increased from the contaminant plot, genetic contamination decreased on both the directions. Genetic contamination was observed upto 40 m isolation distance i. e. 0.67% towards south and 0.93% towards north. Present results indicated that 45 m was the minimum safe isolation distance required for production of certified seed in cytoplasmic male sterile system.

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Genetic variability studies in F_2 populations of upland cotton (*Gossypium hirsutum* L.)

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ABSTRACT : The experimental material comprised 14 genotypes which included F_2 progenies of seven crosses alongwith five parents and two checks. The analysis of variance showed that the genotypes differed significantly among themselves for all the characters indicating the presence of sufficient level of variability. Estimates of genotypic and phenotypic coefficient of variation were highest for number of monopodia/plant. Though the magnitude of phenotypic coefficient of variation was higher than that of genotypic coefficient of variation, there was narrow variation in the PCV and GCV values.

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Anatomical parameters of apomictic lines in cotton

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ABSTRACT : Anatomical studies carried out in apomictic lines viz., IS-244/4/1 and IS-181/7/1 revealed that distance to phloem from lower epidermis was 31 and 33.2 µ, respectively, which was on par with Gossypium arboreum check PA-183 (36.4 µ). G. hirsutum check (NH-545) had significantly less (23.6 µ) distance to phloem from lower epidermis compared to other genotypes. Parenchymatous cells were more compact in G. arboreum check PA-183 and apomictic lines (IS-244/4/1 and IS-181/7/1) than G. hirsutum check NH-545. Palisade compactness, parenchyma tissue width of apomictic lines IS-244/4/1 and IS-181/7/1 were similar to that of G. arboreum check but were less in G. hirsutum check. Similarly, in interspecific hybrid derivatives with PA-183 for phloem distance from upper epidermis confirmed the resistance of these lines to sucking pest complex.

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Comparison of two seed germination testing substratum for cotton (*Gossypium* sp.)

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ABSTRACT : Germination of eight cotton hybrids was tested at Seed Technological Research Unit. A total of 400 seeds of each hybrid were kept for germination in both BP and sand media. Germination percentage, seedling length, vigour index and seedling dry weight vigour index of all the hybrids differed significantly due to substratum. Germination of all the hybrids was higher in sand medium than BP. Seedling length and dry weight vigour indices were also higher in sand media than BP.

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American cotton varieties as influenced by plant densities and fertility levels under rainfed conditions

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ABSTRACT : A field experiment was carried out to study the performance of American cotton (Gossypium hirsutum) varieties under varying plant densities and fertility levels under rainfed conditions for two

consecutive kharif seasons of 2002 and 2003. The treatment combination comprised three varieties, namely, KH-111 (VI), KH-117 (V2) and Khandwa 3 (V3) as check and three plant densities, 45 x 45 cm (D1), 60 x 45 cm (D2) and 60 x 60 cm (D3) in the main plots and three levels of fertility viz., 60 : 30 : 15 (F1), 80 : 40 : 20 (F2) and 100 : 50 : 25 (F3) NPK kg/ha allocated to sub-plots in split-plot design with three replications. The row genotype of cotton, KH-117 on pooled basis recorded significantly highest (1363.91 kg/ha) seed cotton yield over rest of the varieites. The closest plant density of 45 x 45 cm gave 12.22 and 28.45% more yield/ha over 60 x 45 cm and 60 x 60 cm, respectively. First increment of 20 : 10 : 5 NPK kg/ha contributed 155.54 kg/ha more seed cotton yield compared to second increment (93.57 kg/ha).

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Performance of *Bt* cotton hybrids under different geometrical arrangements

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ABSTRACT : A field experiment was couducted at PAU Regional Station, Faridkot during kharif 2005 to evaluate the relative performance of Bt cotton hybrids under different geometrical arrangements. The experiment comprising six Bt cotton hybrids (RCH 134, RCH 317, Ankur 651, Ankur 2534, MRC 6301 and MRC 6304) in main plots and four plant geometries (67.5 x 75 cm, 67.5 x 90 cm, 90 x 75 cm and 90 x 90 cm) in sub-plots of split plot design was replicated thrice. The results indicated that among the six tested hybrids, RCH 134 (3729 kg/ha) recorded highest yield but was statistically on par with RCH 317 and MRC 6301, though significantly superior to Ankur 651, Ankur 2534 and MRC 6304. Ankur 651 recorded significantly low yield as compared to all other hybrids, while Ankur 2534 and MRC 6304 were on par with each other. Among various spacing combinations significantly lowest seed cotton yield was recorded in 90 x 90 cm combination. Significantly higher seed cotton yield was recorded in plant geometry of 67.5 x 90 cm over that of 90 x 75 cm and 90 x 90 cm, although it was on par with 67.5 x 75 cm. The magnitude of seed cotton yield was 3281, 3448, 3186 and 2965 kg/ha for a spacing level of 67.5 x 75 cm, 67.5 x 90 cm, 90 x 75 cm and 90 x 90 cm, respectively. Similarly, significantly higher boll weight (4.93 g) as well as statistically least number of opened bolls (49.9) was recorded by hybrid MRC 6304. The whitefly population was significantly higher on MRC 6304 than all the other test genotypes. No significant differences in jassid population and bollworms incidence among test genotypes were found. The jassid population was minimum (0.54 nymphs/plant) in dense crop i. e. at spacing of 67.5 x 75 cm. The whitefly incidence, boll basis damage remained non-significant at all the spacing levels. The number of bollworm larvae in each treatment was negligible.

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Effect of integrated nutrient management on fibre quality and yield of cotton (*Gossypium hirsutum* L.)

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ABSTRACT : A field experiment was conducted for two successive years i. e. 2004 and 2005 at Research Farm of CCS Haryana Agricultural University, Hisar to find out the location specific integrated nutrient management modules for improving the fibre quality and yield of cotton. The experiment was conducted in the irrigated condition under cotton-wheat cropping system in the permanent plots. Different nutrient combinations (N, P, S, Zn and Fe) were applied after first irrigation (45 DAS), however, pressmud used as organic source of nutrients was applied before sowing of cotton crop. The effect of different nutrient combinations on fibre quality (2.5 mm span length, UR, MIC value and tenacity) was found non-significant. However, seed cotton yield significantly increased with the application of nutrients. The highest seed cotton yield (2652.47 kg ha^{-1}) was obtained where S @ 25 kg ha^{-1} alongwith RDF was applied.

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Effect of date of sowing and plant spacing on the growth and yield of *desi* cotton (*Gossypium arboreum* L.)

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ABSTRACT : The findings of the experiment conducted at Regional Station, Bathinda during kharif 2003 and 2004 revealed that significantly higher seed cotton yield of desi cotton was obtained when the crop was sown on April 10 as compared to April 25 and May 10 during both the years of study. The seed cotton yield increased upto 60 cm intra plant spacing. However, the difference in 45 and 60 cm intra plant spacing was non-significant. But the yield recorded under 45 and 60 cm intra plant spacing was significantly higher as compared to 30 cm intra plant spacing. However, the number of sympods and bolls per plant decreased with delayed sowing and increased with wider intra plant spacing of 60 cm as compared with 45 and 30 cm intra plant spacing.

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Yield, yield attributes and quality of cotton as influenced by foliar application of potassium

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ABSTRACT : A field experiment was conducted during *kharif* 2003 and 2004 at Agricultural Research Station, Banswara to find out the effect of foliar application of potassium on yield, yield attributes and fibre quality of cotton. Five treatments comprised control, soil applied K_2O and 2% foliar application of K_2O at initiation of boll formation (70-80 DAS), peak boll formation and both at initiation+peak boll formation were replicated four times in randomized block design. Foliar application of 2% K_2O @ 5 kg ha^{-1} at initiation+peak boll formation significantly increased seed cotton yield, number of open bolls/plant, boll weight, K content and uptake. Fibre quality parameters i. e. ginning percentage, staple length, length uniformity, micronaire value, fibre strength, elongation and SFC per cent were also improved with foliar application of K_2O.

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Phenology and quality of different recommended *Bt* hybrids of American cotton (*Gossypium hirsutum* L.) cultivated in Punjab

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ABSTRACT : A field experiment was conducted at PAU Regional Station, Bathinda to study the phenology and quality of different Bt cotton hybrids grown under Punjab conditions during kharif 2005. The results showed that the highest seed cotton yield was recorded in RCH 134 and the lowest in MRC 6301. Significantly late flowering and physiological maturity were recorded in RCH 134 and significantly early maturity was reported in MRC 6301. There was not much variation among different Bt cotton hybrids with respect to quality characters.

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Performance of cotton and pigeonpea under different row proportions

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ABSTRACT : Performance of cotton and pigeonpea in comparison with different row proportions of cotton and pigeonpea was studied during 1998-99 to 2000-01 at Cotton Research Scheme, Parbhani. The results revealed that sole crop of cotton recorded highest seed cotton yield which proved significantly superior over all the cotton+pigeonpea intercropping treatments. Similarly, sole crop of pigeonpea recorded significantly higher grain yield and gross monetary returns as compared to other treatments. Further, sole crop of pigeonpea recorded significantly higher seed cotton equivalent yield and gross monetary returns than all the cotton+pigeonpea intercropping treatments and sole crop of cotton. Cotton+pigeonpea intercropping treatments (10 : 2, 8 : 2, 6 : 1 and 6 : 2 row proportion) proved equally effective in enhancing seed cotton equivalent yield and gross monetary returns than growing of one row of pigeonpea after 10 rows of cotton and sole crop of cotton. Sole crop of cotton resulted in lowest gross monetary returns.

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Sustaining cotton productivity in sodic vertisols with gypsum bed technique under alkali water irrigation

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ABSTRACT : A field experiment in randomised block design was carried out on cotton hybrid-PKV HY-2 grown in sodic Haplusterts (pHs 7.68-8.11, ECe 0.55-0.81 dSm^{-1}, SAR 13.5-17.08, ESP 13.69-19.5, HC 0.13-0.15 cm h^{-1} and G. R. 5 t ha^{-1}) of Purna valley in Vidarbha-region during 1999-2001. The ground water of valley is also alkaline in nature (pH 8.6, EC 1.8 dSm^{-1}, SAR 21.27 and RSC 11.0). Treatments consisted of soil application of gypsum @ 0, 25 and 50 per cent GR, alkali water irrigation after passing through 15 and 30 cm thick gypsum bed and their various combinations. Soil application of gypsum @ 25 per cent GR+surface irrigation with alkali water after passing through 30 cm gypsum bed sustained the seed cotton yield (18.2 q ha^{-1}) by 56.5 per cent over no gypsum with higher B : C ratio (3.36). This combination further reduced the detrimental characteristics like pHs, ECe, SAR, ESP and also improved HC of soil significantly over control. A significantly positive relationship of seed cotton yield with exch. Ca (r=0.6583**) and HC (r=0.6472**), while significantly negative relationship with SAR (r= -0.6557**) and ESP (r=-0.3532*) was registered. Path analysis indicated that exch. Ca and available K had maximum direct effect, whereas HC and SAR had maximum indirect effect on seed cotton yield. The MLR equation Y=4.82-0.270* SAR+0.294** exch. Ca+0.013* avail. K (R^2=0.5958*) was found to be best in predicting seed cotton yield in these soils.

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Nutrients uptake in cotton as influenced by management practices under late sown conditions

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ABSTRACT : A field experiment on cotton was conducted at University of Agricultural Sciences Regional Agricultural Research Station, Raichur for two consecutive years (2000-01 and 2001-02). The trial consisted of two levels of plant populations and eight growth regulators and nutrient sprays, consisting 16 treatment combinations under late planted conditions. The pooled results indicated that 33 per cent higher plant density did not influence total N, P and K uptake of cotton significantly. Growth regulators and nutrient sprays viz., NAA+DAP, cytozyme+DAP and NAA sprays significantly increased the nutrients uptake of N, P and K. All these nutrients uptake had linear relation with dry matter production and seed cotton yield with the application of growth regulators and nutrient.

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Effect of balanced fertilization on seed cotton yield and nutrient uptake by cotton (*Gossypium hirsutum* L.) under irrigated condition

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ABSTRACT : Field experiment was conducted during two successive years i. e. 2001 and 2002 at Research Farm of Cotton Section, CCSHAU, Hisar to study the effect of different nutrient combinations ($N_{80}P_{30}K_{30}$, $N_{80}P_0K_{30}$, $N_0P_{30}K_{30}$, $N_{80}P_{30}K_0$ and $N_0P_0K_0$) with and without FYM @ 5 t ha^{-1} on seed cotton yield and nutrient uptake by cotton. Application of FYM significantly increased the seed cotton yield from 1282.2 to 1413.8 kg ha^{-1} and the extent of increase was about 10 per cent. Application of different nutrient combinations significantly increased the seed cotton yield from 1140.5 kg ha^{-1} over absolute control to 1499 kg ha^{-1} and the extent of increase was 31 per cent. Effect of RD of NP on seed cotton yield was statistically on a par with that of NPK. The FYM application significantly increased the uptake of NPK from 56.37 to 74.35, 9.03 to 12.01 and 83.11 to 107.62 kg ha^{-1}, respectively, over without FYM. The highest NPK uptake (82.87, 13.27 and 121.04 kg ha^{-1}) was obtained with the application of $N_{80}P_{30}K_{30}$. The effect of K application on seed cotton yield was non-significant, however, it significantly increased the NPK uptake.

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Performance of *desi* cotton genotypes under different spacings and fertilizer levels

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ABSTRACT : A field experiment was conducted for two seasons (2000-01 and 2001-02) under rainfed conditions at Regional Agricultural Research Station, Raichur to assess the productivity of desi cotton genotypes under different spacings and fertilizer levels. It was observed that cotton genotypes, Rahs-14, Ddhc-11 and Rahs-131 were on par with respect to yield giving 8.2 to 20.0 per cent higher seed cotton yields as compared to check entry DB-3-12 (290 kg/ha). Wider row spacing of 90 x 20 cm gave on par seed cotton yield (321 kg/ha) with other narrow spacings of 75 x 20 (314 kg/ha) and 60 x 30 cm (322 kg/ha). Increasing the fertilizer levels from RDF to 150 per cent RDF marginally increased the seed cotton yields.

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Effect of different spacings and nitrogen levels on growth and yield attributes of *desi* cotton (*Gossypium arboreum* L.) hybrids

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ABSTRACT : A field experiment was conducted at PAU Regional Station, Faridkot during kharif 2005 to evaluate the performance of two arboreum hybrids under different spacing and nitrogen levels. The experiment comprising two arboreum hybrids (FMDH 3 and Moti) in main plots, two plant spacings (67.5 x 60 and 67.5 x 75 cm) in sub-plots and three nitrogen levels (i. e. 112.5, 150 and 187.5 kg N/ha) in sub-sub plots of split plot design was replicated thrice. The data indicated significantly higher seed cotton yield for new hybrid FMDH 3 (2991 kg/ha) over the check hybrid Moti (2683 kg/ha). FMDH 3 gave significantly higher seed cotton yield by 11.5 per cent over that of Moti. Yield differences among spacing of 67.5 x 60 cm and 67.5 x 75 cm were not statistically significant. Differences among spacing levels for all other recorded parameters were non-significant, except for plant stand, which was higher in closer spacing. The highest seed cotton yield was recorded with a N level of 150 kg/ha (3034 kg/ha) which was on par with 187.5 kg of N (2928 kg/ha) but significantly higher than 112.5 kg N (2550 kg/ha) per hectare. The yield levels at 150 and 187.5 kg N/ha were on par. So, 150 kg N/ha and a spacing of 67.5 x

60 cm seemed to be ideal for new hybrid FMDH 3 for realizing higher productivity under the specific agro-climatic conditions of Faridkot. All the interaction effects were found to be non-significant.

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Diapause in *Helicoverpa/Heliothis* spp. (Lepidoptera : Noctuidae)–A review

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ABSTRACT : Members of the noctuid genera Helicoverpa and Heliothis undergo pupal dispause in response to the unfavourable environmental conditions and resume development only after the conditions become favourable. Diapause helps in synchronization of insect life activities with the favourable climate. Practically pupae are considered to be in diapause when adults do not emerge upto 35 days and retain pigmented eye spots within this period. Helicoverpa undergoes both winter as well as summer diapause. Winter diapause is induced in response to decreasing temperature (≤20°C) and photoperiod (≤10 h), while summer diapause is induced in response to increasing temperature (≥32°C) and photoperiod (>13 h). Although the induction and termination of diapause is influenced by environmental factors, yet its manifestation in directly controlled by the nervous system. Neurosecretory cells in the brain and ganglia of central nervous system control the induction and temination of diapause by stimulating the endocrine glands to secrete hormones. Level of 20-hydroxyecdysone (20 E) gets lowered in diapausing pupae, whereas artificial injection of this hormone can terminate the diapause. In addition to 20-hydroxyecdysone, diapause hormone (DH), pheromone biosynthesis activating neuropeptide (PBAN), alpha-SGNP, beta-SGNP and gamma-SGNP (Suboesophageal ganglion neuropeptide) are responsible for termination of diapause. During diapause the pupae undergo various physiological changes such as reduced metabolic and respiratory rate, secretion of waxy layers to reduce water loss and increased concentration of trehalose in the haemolymph to prevent freezing at supercooling temperatures. In the tropics, populations breed continuously, except for short periods when the larvae enter diapause. However, in sub-tropical and temperate regions, most individuals enter diapause. Information on occurrence of diapause is important for future forecasting of pest outbreaks and in the development of predictive models which can be used for decision making in pest management.

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Insecticide resistance in *Spodoptera litura* F.–A review

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ABSTRACT : The status of resistance in Spodoptera litura is presented in the review. S. litura developed resistance to various classes of insecticides including pyrethroids. The resistant populations had higher MFO and carboxylesterases. Higher level of resistance to synthetic pyrethroids indicated the need of immediate attention and caution in the usage of older chemistries of insecticides.

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Evaluation of antagonists for management of sucking pests and their effect on natural enemies

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ABSTRACT : The incidence of sucking pest was minimum when the crop was applied with FYM and treated with imidacloprid+Pseudomonas fluorescens. It was statistically superior over all other treatments. Incidence of sucking pest ranged from 0.75 to 10.2 nymphs/leaf, 1.00 to 9.35 adults/leaf and 1.10 to 31.05 nymphs & adults/leaf of leafhopper, whitefly and thrips, respectively. There was 22.5 to 33.3 per cent reduction in nymphal population of leafhopper, 35 to 45.9 per cent reduction in the adult population of whitefly and 30.9 to 49.4 per cent reduction of nymphs and adults of thrips due to seed

protectants. These antagonists had no side effect against natural enemies. Overall performance of FYM treated with imidacloprid+P. fluorescens was superior to other treatments.

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Seasonal incidence of insect-pests of cotton in the scarce rainfall zone of Andhra Pradesh

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ABSTRACT : About 20 species of pests infected upland cotton crop in an overlapping manner. Nine species of natural enemies damaged various stages of pests during 1999-01 in Andhra Pradesh. Only five species viz., Amrasca biguttula biguttula, Aphis gossypii, Earias spp., Helicoverpa armigera, Pectinophora gossypiella and Bemisia tabaci attained the status of major pests. In the case of natural enemies, Coccinella septempunctata, Menochilus sexamaculatus, Chrysoperla carnea, Syrphus serarius, Platygomphos dolobratus and Cantheconidea furcellata were found to feed on the sucking pests attacking cotton. Trichogramma chilonis, Bracon gelechiae, Apanteles flavipes and Apanteles colomani were found in the ecosystem to lesser extent.

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Evaluation of different bio-pesticides against cotton bollworms

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ABSTRACT : Studies on evaluation of different bio-pesticides on bollworm infestation revealed that the minimum bollworm damage was observed in Karanj (Methanol extract) @ 10 ml/1 water followed by plant extract Babchi @ 10 ml/1 water and root extract of Babchi @ 10 ml/1 water. Bollworm infestation ranged between 5.44 to 11.21 per cent. Seed cotton yield (1850.3 kg/ha) was realized in plots treated with Karanj (Methanol extract) @ 10 ml/1 water followed by Babchi (Plant extract) @ 10 ml/1 water (1406.7 kg/ha). Overall performance of bio-pesticides, Karanj and Babchi was superior to other treatments.

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Evaluation of *Bt* and non-*Bt* version of two cotton hybrids under different spacings against sucking insect-pests and natural enemies

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ABSTRACT : The response of two Bt hybrids (RCH 134 and RCH 317) and two non-Bt hybrids (RCH 134 and RCH 317) to sucking pests and natural enemies was evaluated at Research Farm of Punjab Agricultural University Regional Station, Bathinda during the kharif season of 2005. Jassid, Amrasca biguttula biguttula (Ishida), whitefly, Bemisia tabaci (Gennadius), thrips, Thrips tabaci Lindeman and mite, Tetranychus spp. (L.) were the main sucking insect-pests that were active during the months of July and August. Spiders, coccinellids, green lacewing and predatory bugs were the main natural enemies observed on cotton hybrids. The jassid population/3 leaves was maximum on RCH 134 Bt (5.82), followed by RCH 317 Bt (5.63), RCH 317 non-Bt (2.65) and minimum on RCH 134 non-Bt (2.46) hybrid. Population of whitefly adults/3 leaves also showed the similar trend. The population of thrips/3 leaves varied from 1.61 to 2.70 in different test hybrids. The population of mites was though low during the entire season but it varied significantly (0.29 to 0.49) among the various hybrids. It was maximum on RCH 317 Bt (0.49) and minimum on RCH non-Bt (0.29). Natural enemies population/plant also varied significantly during the crop season, being highest in RCH 134 Bt cotton and lowest in RCH 317 non-Bt cotton. Among the natural enemies, spiders were more predominant on all the hybrids in comparison to other predators. The number of sucking pests and natural enemies did not vary in different hybrids under different spacings. However, they were maximum in 67.5 x 75 cm spacing. Under the present

circumstances, there is need to monitor the technology carefully on different Bt cotton hybrids on a larger scale in farmer's participatory mode and also according to the climatic and pest situations arising in subsequent years.

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Screening of cotton genotypes against whitefly, *Bemisia tabaci* Genn.

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ABSTRACT : An experiment was conducted at Agricultural Research Station, Sriganganagar to find out resistant genotypes against whitefly (Bemisia tabaci Genn.) under natural conditions. The pooled data of two years (2001-02) showed that out of 25 entries from different state and coordinated trials, four genotypes, namely, RS-875, RS-2013, CSH-911 and BBR-1934 recorded significantly lower population of whitefly throughout the season, while genotypes CSH-526612, CCH-2117 and RS-810 recorded significantly higher population of whitefly. Based on their relative field reaction to whitefly, the genotypes were categorized into four distinct classes viz., resistant/tolerant, moderately resistant, moderately susceptible and susceptible. The genotypes RS-875, RS-2013, CSH-911 and BBR-1934 were categorized as resistant to whitefly, while eight genotypes were found susceptible.

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Effect of *Bt* cotton on survivability and development of *Campoletis chlorideae* (Uchida) parasitising *Helicoverpa armigera* (Hubner)

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ABSTRACT : An experiment was undertaken to study the effect of Bt cotton on survivability and development of larval endoparasitoid, Campoletis chlorideae (Uchida) on Helicoverpa armigera (Hubner) under laboratory conditions. Results indicated that on Bt cotton there was no development of endoparasitoid as the host larvae itself killed immediately after feeding.

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Influence of *Bt* cotton fed aphids on the feeding potential and development of *Chrysoperla carnea* (Stephens)

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ABSTRACT : An experiment was conducted to study the effect of Bt cotton fed aphids on the feeding potential and development of predator Chrysoperla carnea (Stephens). Results clearly indicated no variation in the feeding potential and development period of both < 5 day and > 5 day old grubs of C. carnea when fed on aphids feeding on Bt and non-Bt cotton plants.

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Screening of cotton genotypes for resistance to leafhopper, *Amrasca biguttula biguttula* Ishida in Tamil Nadu

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ABSTRACT : A total of 140 cotton genotypes from AICCIP (All India Co-ordinated Cotton Improvement Project) were evaluated in the field under unsprayed conditions for their reaction to leafhopper, Amrasca biguttula biguttula Ishida. The entries were sown in two rows with 10 plants/row. Okra (Abelmoschus esculentus L.) was grown as infestor row at the rate of one row for every four rows of cotton. On the basis of injury rating scale of 0-3, 36 entries were rated as moderately resistant, 58 as susceptible and 46 as highly susceptible, while none of the entries was rated as resistant.

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In vitro evaluation of botanicals against *Fusarium oxysporum* f. sp. *vasinfectum* (Atk) Snyder and Hansen causing wilt of diploid cotton

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ABSTRACT : Crude extract of 11 botanicals having antifungal properties was tested in vitro for their bioefficacy against Fusarium oxysporum f. sp. vasinfectum, causing wilt of diploid cottons in India. Plant extracts of Allium sativum, Zingiber officinale and Eucalyptus spp. were significantly effective and showed maximum per cent inhibition of the mycelial growth of pathogen as compared to untreated check. However, extract of Allium cepa showed least inhibition of pathogen.

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Cultural and morphological variability in *Fusarium oxysporum* f. sp. *vasinfectum* causing wilt of *desi* cotton (*Gossypium arboreum* L.) in Maharashtra

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ABSTRACT : Six isolates of Fusarium oxysporum f. sp. vasinfecturm isolated from wilted plant of cotton from different locations in Maharashtra viz., Jalgaon (Isoate FOV 1), Pune (Isolates FOV 2 and 3), Aurangabad (Isolate FOV 4), Nagpur (Isolate FOV 5) and Rahuri (Isolate FOV 6) were used for studying variability in cultural, morphological and pathogenecity characters. On the basis of morphological characters i. e. mycelial growth pattern, mycelial colouration, growth rate and sporulation, at least two groups exhibited significant variability. Wilt incidence caused by these six isolates exhibited considerable variability and seedling mortality ranged between 58.96 to 100 per cent Isolate FOV 5 caused 100 per cent wilting within 25 days in DH 2, a highly susceptible variety and was observed to be the most virulent among all the isolates.

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Common rhizosphere fungi, virulence and variation among fusarial isolates of cotton

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ABSTRACT : A potential pathogen is often blessed with biodiversity within its population. Basically variation in pathogen is a desirable trait for its existence in nature. In the present study, the amount of variability in Fusarium solani isolates was studied on the basis of their morphological and cultural characters. There was definite variability in the isolates with their morphological and sporulation characters. Variability within the species was observed with respect to the colony characters and sporulation. Among the nine isolates of F. solani, isolate from Raichur was more virulent than others. Seven fungi were found commonly occurring in the rhizosphere of cotton.

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Performance and economics of *Bt* cotton hybrids at farmer's field in Maharashtra state

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ABSTRACT : Transgenic cotton plays a vital role in cotton pest management in the world. The field experiments were conducted to study the performance and economics of Bt cotton hybrids during 2003-04 to 2005-06 at farmer's field and compared with non-Bt cotton hybrids grown by the farmers over an area of 0.40 ha. The collected data were analysed to assess the performance of Bt cotton. Results indicated that pooled average of seed cotton yield of three years was harvested to the extent of 14.92 q ha^{-1} in Bt cotton against 11.27 q ha^{-1} in non-Bt cotton. An average enhancement in seed cotton yield from Bt cotton was 32.88 per cent over non-Bt. Cost of plant protection in non-Bt was higher by Rs. 3176 ha^{-1} than Bt cotton. Average net returns from Bt cotton were higher by Rs. 6309 ha^{-1} than non-Bt cotton. The results clearly showed that Bt cotton technology was economically viable.