ABSTRACTS
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J. Cotton Res. Dev. **14**(2) 133-137 (July, 2000)

Wide hybridization in *Gossypium* species through ovule culture

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ABSTRACT : The interspecific hybrid seedling obtained from diploid cultivated cotton with *G. thurberi* and *G. anomalum* through ovule culture. The MS+IAA (2.0 mg/l) + Kin (0.2 mg/l) + CH (300 mg/l) + Sucrose (3%) responded best for germination of seedlings from ovules (3 DAP). Ovule derived seedlings were weak and cotyledon were malformed. For proper root development hybrid seedlings were transferred to ½ MS+IBA (2.0 mg/l) + Sucrose (1%). The *in vitro* hardening treatment h mannitol (3%) and subsequently covering transplanted seedlings with polythene bags for one week enhanced survival rate of seedlings upon their transfer to soil. The F_1 interspecific hybrids showed some dominant character of wild species.

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Heterosis and combining ability for yield and its component traits in upland cotton

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ABSTRACT : Sixteen promising F_1 combinations were made using diverse parents K 34007 and F 891 as female and eight well adapted genotypes of North and South zone as male parents. Observations on seed cotton yield, its component traits and mean fibre length and ginning out turn were recorded on parental lines and F_1 during the year 1996-97. Among the female parents K 34007 was found to be good general combiner for seed cotton yield, sympodial branches, and ginning out turn and F 891 for rest of the traits studied. Amongst male parents, LH 900 best general combiner for seed cotton yield and ranked second on the basis of *per se* performance, whereas, LRK 516 and LRA 5166 in general were found to be best for most of the yield components, mean fibre length and ginning out turn. Ten crosses were identified as best crosses on the basis of *per se* performance, combining ability and heterosis. High heterotic hybrid combinations viz. F 891 x F 1183, K 34007 x HS 6, F 891 x H 777, F 891 x LH 900 and K 34007 x F 1184 which have shown more than 50 per cent heterosis for yield and its component traits could be exploited for increasing cotton production.

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Studies on variability, correlation and path analysis in *desi* cotton (*Gossypium arboreum* L.)

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ABSTRACT : Studies on variability, correlation and path coefficient were conducted in 27 genotypes of *desi* cotton using sixteen characters including seed cotton yield, yield attributes and quality parameters. Additiveness was observed for characters like number of bolls per plant, number of monopods, boll weight, internode length and number of sympods. Number of bolls per plant and ginning out turn showed a positive correlation with seed cotton yield. Direct effects on seed cotton yield were high for number of

seeds per locule, number of bolls per plant, plant height, lint index and number of locules per boll. Suitable breeding strategy was suggested for further improvement programmes.

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Influence of macronutrients on seed and seed cotton yield of cotton

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ABSTRACT : A field trial was raised during August 1996-97 for tracing the respones to different NPK fertilizer combinations on seed and seed cotton yield of cotton cv. MCU 5 and hybrid TCHB 213, respectively. The yield attributing characters viz. plant height, number of sympodia and number of fruiting nodes were enhanced by applied N and P, while boll number and seed number was maximized with addition of K. For maximizing the seed yield of MCU 5 applied fertilizer dose of 200 : 150 : 100 kg ha^{-1} NPK was found to be ideal. The response of hybrid was 9 per cent more than variety for improving the seed cotton yield with the same level of NPK fertilizers. Hence application of NPK 200 : 150 : 100 kg ha^{-1} is recommended for maximizing the seed cotton and seed yield of cotton cv. MCU 5 and seed cotton yield of hybrid TCHB 213.

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Physiological parameters associated with drought tolerance in cotton

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ABSTRACT : A study was conducted in pot culture to find out the physiological parameter associated with drought tolerance in 4 genotypes of *G. hirsutum* cotton viz. 'Deltapine (CJ)', 'Ewing x Tidewater', 'Indore 6' and 'H 14' x Jai; and 4 of *G. arboreum,* which were earlier reported drought tolerant, viz. AK 277, LD 135, Lohit and AKH 4. Drought stress was considered with mean leaf revative water content (RWC) of 54.6 per cent against 80 per cent RWC in control (no stress) at early boll development stage (75 days after sowing). Moisture stress reduced leaf RWC, stomatal transpiration rate (TR) and enzyme nitrate reductage (NR) activity and, on the other hand, increased the free-amino acid pool (FAA) and epicuticular leaf wax content (WC) in all the genotypes. Reduction in TR was observed to be associated with the increase in leaf WC (r= -0.53), stomatal resistant (r = -0.56) and leaf temperature (LT) (r = -0.92). Increase in LT led to enhance the stress degree day (SDD). Higher NR activity and RWC (relatively lower reduction under stress) in all the tolerant genotypes were observed to be associated with high leaf WC, and relatively low TR under drought situations. This enabled them to maintain high RWC and SDD under drought conditions. In general, drought tolerant behaviour of the genotypes was observed to be associated with NR activity, RWC, SDD, leaf WC and TR.

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Response of compact and early maturing cotton genotypes to plant densities in tunga bhadra project (TBP) area

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ABSTRACT : A field experiment was conducted at Agricultural Research Station Siruguppa to find out the optimum spacing for compact and early maturing cotton genotypes for TBP area during two consecutive seasons of 1996-97 and 1997-98 under irrigated conditions. It was observed that, among the compact genotypes CPD-448 has recorded significantly higher seed cotton yield (961 kg/ha) and seed cotton yield/plant over other compact genotypes except AH-107 (944 kg/ha). Among the spacings 60 x 15 cm provided significantly higher seed cotton yield (920 kg/ha) over paired row planting and 45 x 15 cm.

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Symptomatological observations under three causes of malformation in *Gossypium hirsutum* cotton

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ABSTRACT : Sometimes, during the vegetative phase, the cotton leaves, bracts of the buds and floral parts get elongated into finger like projections after insecticidal application. One established cause for such malformation in cotton leaves in 2, 4-D. Spurious or expiry-date insecticides and their higher doses also cause deformations in cotton. Observations on the difference or resemblance in the symptoms of malformation due to 2, 4-D (@ 5 g/ha), Expiry-Date Demethoate (@ 4 ml/l) and Expiry-Date Monocrotophos (@ 5 ml/l) in the above ground parts of flowering *hirsutum* cotton plants are described.

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Integrated management of root rot of cotton caused by *Rhizoctonia solani*

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ABSTRACT : Out of six fungicides carboxin (0.2% w/w) protected seedlings about 77 per cent in both the cotton varieties followed by carbendazim (0.2% w/w) which protected 76.9 and 74.4 per cent seedling in HS 6 and HD 5 respectively. Seed treatment with carboxin and soil application of *T. harzianum* (125 mg/kg soil) biomass protected HS 6 cotton seedlings better than as compared to other treatments. Under field conditions this treatment was found superior irrespective of varieties among the various combination tested. Intercropping with *Moth* bean+soil application of *T. harzianum* (125 mg/hill) protected seedlings by 81.3 and 80.8 in HS 6 and HD 5, respectively under field conditions.

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Role of soil amendments on root rot of cotton (*Gossypium* species) caused by *Rhizoctonia* species under screen house conditions

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ABSTRACT : The different level of each soil amendments viz., farm yard manure (FYM), biogas slurry (BGS); both @ 20, 30, 40 ton/ha and saw dust (SD) @ 2, 3, 4 ton/ha were tried to see the effect on root rot of cotton. The sterilized soil was amended with different levels of each soil amendments. The mixed inocula of *Rhizoctonia solani* Kihn and *Macrophomina phaseolina* (Tassi.) Goid=*Rhizoctonia bataticola* (Taub.) Butler were incorporated in the amended soil prior to sowing. Three varieties/hybrid viz., HS-6 (*G. hirsutum* L.), HD-107 (*G. arboreum* L.) and hybrid HHH-81 (Intra *hirsutum* hybrid) were tested. The germination as well as mortality percentage were recorded upto 30 days after sowing (DAS). It was found

that as the level of each of the soil amendments increases, there were significant increase in disease over control.

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Integrated management of cotton leaf curl virus

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ABSTRACT : Of many factors responsible for ever decreasing area, production andproductivity of cotton in Punjab state, the spread of cotton leaf virus (CLCuV) is the most important. CLCuV is a gemini virus transmitted by whitefly (*Bemisia tabaci*). Even though it is difficult to control this disease, but its incidence can be minimized by manging the vector whitefly at the initial stage of the crop. Therefore the field experiments were conducted during kharif 1998 and 1999 and PAU, Regional Research Station, Faridkot, with the objective to test the efficacy of seed treatment with Imidacloprid (Gaucho) 70 WS as a component of IPM module and recommended spray schedule against CLCuV. The spraying of insecticides in IPM module and recommended spray schedule was initiated at 65 days after sowing during both the years. CLCuV incidence, whitefly population and leafhopper injury grade upto 65 days after sowing in IPM module in both the years was significantly lower than recommended spray schedule and untreated control. This decrease could be attributed to the effect of seed treatment with Imidacloprid 70 WS. CLCuV incidence, whitefly population and leafhopper injury grade during the entire crop season in IPM module was significantly lower than the recommended spray schedule and untreated control. IPM module recorded higher seed cotton yield than recommended spray schedule and untreated control during both the years.

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Relationship of bacterial blight resistance for quality and biochemical parameters of cotton (*Gossypium hirsutum* L.)

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ABSTRACT : Bacterial blight of cotton (*Xanthomonas axonopodis* pv. *malvacearum* (Smith) Vauterin *et al.*) is most serious internally seed borne disease in India. The infection passes on deep into lint, turning it yellowish and deteriorating the quality of lint. Correlation between bacterial blight severity and different quality, biochemical and yield parameters were studied in resistant cultivars (Reba B-50 and Suman), susceptible cultivars (HS-6 and H-1098) and their crosses comprised of six generations P_1, P_2, F_1, F_2, B_1 and B_2 were studied. The negative significant correlation of bacterial blight severity with ginning outturn, mean fibre length, lint index, seed index and healthy seed cotton yield (g)/plant clearlhy indicated that baterial blight severity drastically reduce the quality of the fibre and seed cotton yield. The baterial blight severity also had negative and negative and significant correlation with total phenols and O. D. phenol in both healthy and diseased leaves. Moreover, positive significant correlation with damaged seed cotton yield (g)/plant was observed.

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Estimation of avoidable losses due to pest complex in hybrid cotton under need based pesticides application during various growth periods

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ABSTRACT : Field experiment conducted with G. Cot. H-6 hybrid cotton cultivar at Sardar Krushinagar in North Gujarat conditions during 1992-93 clearly demonstrated that need based plant protection helped in reducing number of insecticide applications, cost of plant protection and prevented pest populations from reaching damaging proportions ultimately lowering the avoidable losses due to pest complex. Adoption of need based plant protection throughout crop season resulted in maximum net profit. Most of the pests crossed ET frequently during first flush of flowering (9th-21st WAS). Thus, from view point of environmental safety and higher net profit, need based pesticide application upto first flush of flowering is advisable. The population of sucking pests remained below ET during vegetative stage (upto 7th WAS) therefore, pesticide should not be applied during this period. The marginal farmers with scarce resources can protect their G. Cot. H-6 starting spraying after the first flush on need base by three sprays and earn marginal profit.

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Impact of swath width and spray angle on cotton insect pests

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ABSTRACT : Relative performance of different nozzle types on cotton insect pests was studied during 1996-97 by using floodiet, flat fan and hollow cone nozzles. Three and five sprays of insecticides were applied to curb leafhopper, *Amarssca biguttula biguttula* Ishida and bollworm incidence, respectively. Floodjet nozzle having smallest swath width with off-target spray angle was found to be the most unsuitable proposition for cotton insect pest control as it recorded the highest leafhopper population and bollworm incidence as also the lowest seed cotton yield.

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Impact of weather parameters on cotton pests

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ABSTRACT : Studies on the correlation of weather parameters with Cotton leafhopper, *Amrasca biguttula biguttula* and bollworm, *Helicoverpa armigera* incidence on rainfed cotton during 1994-1996 cropping season have revealed that maximum and minimum temperatures, wind velocity and rainfall were negatively correlated with leafhopper, *A. biguttula biguttula* and bollworm, *H. armigera* incidence, whereas relative humidity was positively correlated. Whitefly incidence was negatively correlated with maximum temperature and wind velocity and positively correlated with relative humidity.

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IPM for *Liromyza trifolii* (Burgess) (Diptera : Agromyzidae) in cotton

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ABSTRACT : The black gram (*Vigna mungo* (L.)), as inter crop sown 20 days in advance to the base crop, cotton (*Gossypium hirsutum* L.) is effective in the management of *Liriomyza trifolii* (Burgess) damage on cotton by recording 2.3 and 1.9 mines per leaf at 30 and 45 days after sowing (DAS) respectively.

Whereas, synchronised sowing of soybean (*Glycine max.* L.) as inter crop along with cotton was found to be more effective with 1.9 and 2.1 mines per leaf on cotton at 30 and 45 DAS, respectively. The yellow sticky trap attracted more number of leaf miner adults as compared to white. Under field conditions, the botanicals viz. neem oil 3 per cent, NSKE 5 per cent, iluppai oil 3 per cent and pungam oil 3 per cent recorded 0.28, 0.62, 0.35 and 0.61 times decrease in number of mines per leaf, respectively. Synthetic chemicals viz., phosalone 35 EC, triazophos 40 EC, quinalphos 20 AF and chlorypyriphos 20 EC in the management of *L. trifolii* recorded in the decreasing order.

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Evaluation of trap crops in the management of cotton bollworm *Helicoverpa armigera* (Hubner)

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ABSTRACT : Different trap crops viz., bhendi marigold (red & yellow) redgram, sunflower and *Nicotiana rustica* were tested in cotton ecosystem during 1994 and 1995 seasons to evaluate the efficacy in trapping eggs and larvae of *H. armigera.* Observations were made on per cent bollworm incidence, good opened bolls bad opened bolls and yield were recorded. Among the trap crops redgram (ICPL-87) proved superior as it trapped highest number of eggs (14.48/plant) and larvae (4.28/plant) which revealed less bollworm incidence (6.57%), maximum good opened bolls (22.57/plant), minimum bad opened bolls (7.97/plant) and highest yield of seed cotton (8.74 q per ha).

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Biosystematics, mode, preference and efficiency of prediation of a pentatomid bug, *Cantheconidea furcellata* (Wolff) on lepidopterous pests of cotton

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ABSTRACT : Studies on biosystematics of a predatory bug [*Cantheconidea furcellata* (Wolff)] [Pentatomidae : Asopinae); as well as mode of predation, its preference and efficiency against immatures of Lepidopterous pests of cotton, viz., *Amsacta moorei* Butler, *Earias insulana Boisd., Helicoverpa armigera* (Hb.) and a storage pest, *Corcyra cephalonica* Stn. were carried out. The bug species has been described in detail, alongwith illustraions of genitalia and morphometric analysis of taxonomically important characters of tagmata and appendages. Biology of *C. furcellata* on caterpillars of *H. armigera* indicated completion of total nymphal stage through 5 nymphal instars in 11-15 days and development to adult stage was completed faster on *H. armigera* and *E. insullana* than other prey species. Eggs of *A. moorei* were comparatively preferred more by nymphs and adult bugs while its bigger larval instars were discarded; pupal stage of all Lepidoptera escaped predation by feeding stages of bug. Early instars of bug were found feeding gregariously in groups of 2-5 on single prey larva while latter instars were solitary feeders. Fifth instars/adult bugs sucked body fluid of a prey larva (III/IV instar) within 2-3 min by inserting stylets of proboscis near posterior end of larva and may drag the prey, when disturbed while feeding. Freshly formed V instar of bug consumed 12-33 catepillars of *H. armigera* before ecdysis to imago stage. The cannibalism was also observed amongst different instars of *C. furcellata* in absence/scanty prey species. The predatory habits of this bug have been demostrated with appropriate photographs.

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Factors affecting economic aspects of NHH-44 cotton

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ABSTRACT : Investigation was conducted during 1998-99 to study different economic aspects of NHH-44 cotton which were being influenced on one side by condition factor (i. e. irrigated and rainfed) and other and more important side, farm size factor (i. e. small, medium and large) on farmers' fields in Maharashtra. Results revealed that NHH-44 cotton under irrigated condition produced the seed cotton yield of 17.83 q/ha, cotton stalk yield of 33.90 q/ha, gross receipt of Rs. 34768.90/ha, cost-'A' of Rs. 13143.34/ha, cost-'C' of Rs. 21927.34/ha, gross profit of Rs.21625.56/ha and net profit of Rs. 12841.56/ha and all the aspects were statistically higher than those under rainfed condition at 5 per cent level of significance. In regard to farm size, results showed that NHH-44 cotton on small farm produced the seed cotton yield of 15.39 q/ha, cotton stalk yield of 29.48, gross receipt of Rs. 30007.11/ha, cost-'C' of Rs.19250.93/ha, gross profit of Rs. 18883.63/ha and net profit of Rs. 10756.18/ha and all the aspects were significantly higher than those on the medium and large farms except cost-'A'. Interaction effects of condition and farm size in relation to all the economic aspects were non-significant.

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Costs and returns of cotton cultivation with integrated pest management in Raichur District, Karnataka

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ABSTRACT : The analysis of costs and returns of cotton cultivation with the adoption of Integrated Pest Management (IPM) during 1997-98 in Raichur district, Karnataka clearly showed that there was considerable saving (21.11%) in the total cost of cultivation over the conventional methods of plant protection measures. The total cost of cultivation of cotton in IPM farmers was Rs. 21,675.76 per hectare as against Rs. 26,253 per hectare in Non-IPM farmers. The cost on labour was found to be marginally higher (10.65%) in IPM farmers (Rs. 8,523/ha) than that of Non-IPM farmers (Rs. 7,616/ha). The higher cost on labour may be mainly due to the intensive cultivation and adoption of recommended package of practice by IPM farmers. The analysis of impact of IPM on yield also indicated that the farmers who have adopted IPM (24.74 q/ha) have harvested hihger yield (16.32%) than those who have not adopted (20.70 q/ha). As a result, the returns obtained by IPM farmers was also higher than those of Non-IPM farmers. The net returns in IPM farmers (Rs. 29,783.44/ha) was significantly higher (43.50%) than that of Non-IPM farmers (Rs. 16,803/ha). In order to reduce the cost on plant protection measures, the use of non-chemical pesticides needs to be increased. For increased adoption of IPM technology, the supply of adequate quantity of biological agents as well as non-chemical pesticide materils needs to be ensured by developing necessary infrastructure like laboratory for multiplication of biological agents at Raichur.