ABSTRACTS
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J. Cotton Res. Dev. **7** (2) 179-192 (July, 1993)

Distant hybridization in cotton breeding-intergeneric hybridization (A overview)

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ABSTRACT : Intergeneric hybridization involving cotton with other genera has been attempted successfully by using different pollination techniques. There are various causes of cross incompatability. The sterility observed in F_1 generation was overcommed by backcrossing with either of the parents. The strains selected and varieties developed with both agronomically technologically superior characteristics and also combined with resistance to diseases and pests following intergeneric hybridization are reviewed.

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Interrelationships in segregating *arboreum* populations

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ABSTRACT : Correlation, multiple regression and path coefficient studies were carried out in 50 F_4 diverse progenies of cotton, *G. arboreum* to determine the relative importance of different yield contributing factors. Seed-cotton yield was positively significantly associated with boll number, plant height, boll weight, halo length and seed index. Partial regression coefficients were significant only for boll number, boll weight and plant height which explained for 79.4 per cent of the variation in yield. Path coefficient analysis revealed that to improve seed-cotton yield, more weightage should be given to boll number and boll weight followed by plant height while making selections in the populations.

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Heterosis in upland cotton and its possibilities for commercial utilization

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ABSTRACT : A set of 54 crosses. Involving six female parents (Suman, LRA 5166, H 777, BH 2379, 22-79 HS and PKR-4145) and nine male parents (16-26 HS, K 34, JK 276, Acale Q-6 Supriya, LRK 516, IC 461 and IC 469) of upland cotton (*Gossypium hirsutum* L.) were made. Heterosis over local check variety H 777 was estimated and it was observed in both the direction for most of the characters. It was high and positive for plant height, number of bolls/plant, boll weight, number of monopodia and ginning out turn and could be attributed to gentic diversity of parents. Heterosis was observed in negative direction of most of crosses for number of sympodia and seed index. Haterosis in seed cotton yield was reflected through heterosis in yield components especially through heterosis in yield components especially through number of bolls and boll weight. The following cross combinations Suman x K 54, Suman x IC 426, LRA 166 x JK 276, LRA 166 x Acala Q-6 and SH 2391 x IC 461 showing the maximum economic heterosis for yield and its attributes, hold promise as important breeding material and should be tested over locations.

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Diallel analysis for combining ability in upland cotton (*Gossypium hirsutum* L.)

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ABSTRACT : General and specific combining ability variances and effects were studied in a 10 parent diallel cross (without reciprocals) for 8 characters. The gca effects were predominant than sca effects for all traits. The gca effects indicated that Auburn 56 was the best general combiner for all the characters except halo length; Laxmi for boll number; EC 112852 for ginning percentage; Bhagya for boll number, yield and seed index; MCU 5 for boll number, yield, halo length, and seed index; Acala glandless for boll weight, yield and halo length; Br_2 for all traits except ginning percentage; 108F for boll weight, ginning percentage and earliness; DPL 16 for boll number, ginning percentage and lint index and EC 110605 for boll weight, ginning percentage, lint index, seed index and earliness. The hybrids Laxmi x EC 112852, Acala glandless x DPL 16, Acala glandless x Auburn 56 and MCU-5 x EC 110605 can be tested in multilocation trials before recommendation for general cultivation.

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Linex tester analysis for yield and other economic traits in asiatic cotton (*Gossypium arboreum* L.)

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ABSTRACT : The nature and magnitude of gene action were studied in a line x tester analysis comprising 10 lines and 4 testers. Additive type of gene action was significant for all the characters. S44-6-2 exhibited significant gca effects for number of bolls/plant, CN 44 for seed index, S44-6 and S44-6-2 for boll weight, G 96 for seed cotton yield/plant, whereas S44-6 and S44-6-2 for ginning out turn and CN 44 and OS 216-2 for halo length showed highly significant gca effects. Among the testers, RG 1 for number of bolls, seed index and ginning outturn, whereas Lohit for seed index, boll weight and halo length exhibited significant gca effects. The crosses, G 96 x G 27 for number of bolls, D 48-154 x Lohit for seed index, OS 216-2 x Lohit for boll weight, D 48-154 x Shamil for seed cotton yield, S 65-1258 x Shamli for ginning outturn and S 44-6-2 x RG_1 for halo length exhibited significant specific combining ability effects.

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Generation mean analysis for certain characters in upland cotton

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ABSTRACT : Gene effects were estimated by generation mean analysis for six characters in a 5 x 5 diallel cross of upland cotton. Epistasis played a major role in the inheritance of days to flowering, boll weight and ginning percentage over main effects. While, main effects had a significant role over epistasis for boll number, halo length and seed cotton yield. Dominance (h), additive (d) gene effects alongwith dominance x dominance (l) additive x additive (i) and additive x dominance (j) epistasis were involved in the expression of boll number and seed cotton yield. Dominance (h), (l), (d), (i) and (j) effects in that order were important for days to flowering. Additive (d), (h) alongwith (l), (i) and (j) epistasis were control the ginning percentage and boll weight. While dominance (h), additive (d) and additive x additive (i), additive x dominance (j) and dominance x dominance were predominant for halo length.

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Line x tester analysis of combining ability in *desi* (asiatic) cotton (*Gossypium arboreum* L.)

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ABSTRACT : A study of line x tester analysis in *Gossypium arboreum* L. indicated that for seed cotton yield bolls/plant and boll weight, additive genetic variance was predominant whereas for halo length and ginning outturn, both additive and non-additive genetic variances were equally important. Among the lines, AKH-4 and among the testers, Lohit were found good general combiners for seed cotton yield, bolls/plant and halo length. AKH-4 x Lohit was also the best specific cross for yield as well as bolls/plant and halo length; and involved high x high general combiners indicating thereby the chances of throwing of desirable segregants in the segregating generations. Reciprocal recurrent selection method is suggested for the simultaneous improvement of halo length and ginning outturn.

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Studies on nitrogen management in American cotton *Gossypium hirsutum* L.

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ABSTRACT : Studies on rate, time and method of N application were conducted with American cotton Cv. F 414 in 1982 and 1983 at the Punjab Agricultural University, Ludhiana. Nitrogen application significantly increased the seed cotton yield over control. The highest seed cotton yield was obtained with 60 kg N/ha. The plant height and the number of bolls per plant were also significantly influenced with nitrogen application. Earliness index x of the crop was significantly lower due to nitrogen. The maximum seed cotton yield within all the nitrogen levels was recorded when a part of the total nitrogen was applied as foliar spray at flowering. The foliar application treatments within all nitrogen levels improved the boll number per plant.

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Root growth pattern of cotton in sodic soil as affected by the pattern of gypsum incorporation

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ABSTRACT : Under sodic soil conditions, the yield of cotton is reduced on account of poor root proliferation and penetration. Field studies were conducted with an aim to improve root and crop growth of cotton through gypsum incorporation to a calcareous sodic clay soil in different modes. The treatments consisted of (a) cotnrol (no gypsum applied), (b) gypsum top dressed at the rate of 80 per cent of gypsum requirement (GR) and then mixed in top 20 cm soil depth through cultivation and (c) gypsum at the rate of 100 per cent GR mixed uniformly with excavated soil of 60 cm wide and 30 cm deep furrows spaced 30 cm apart and then furrow back filled. The crop was planted following recommended spacing and fertilization such that treated furrow accomodated two rows. The results revealed that the root growth and crop yield were significantly higher under furrow application of comparable quantity of gypsum. This was a consequence of reduced soil bulk density and improved physical and chemical nature of the soil to extended depths due to gypsum incorporation and tillage. Results suggest that rather than conventionally followed mode of gypsum application that is mixing uniformly in plough layer the furrow application of

gypsum at 100 per cent GR to extended soil depths under cropped rows can be more effective if the aim is only to partially reclaim the soils.

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Dry matter production of cotton in relation to weather parameters

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ABSTRACT : An experiment was conducted for obtaining relationship between heat unit (HU), accumulated pan evaporation (CPE) accumulated heliothermal unit, accumulated photo thermal unit and dry matter production in three cotton cultivars. The correlation between dry matter production and these parameters were found to be highly significant for all the cultivars in both the season. Second degree equation were not found much better for explaining these relationship. Among the cultivars, H-854 was more significantly related to these parameters as compared to other cultivars.

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Effect of moisture stress on physiological parameters and yield in cotton

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ABSTRACT : A field experiment was conducted during *kharif* 1979 and 1980 on 6 cotton genotypes to study the effect of moisture stress on physiological parameters. Moisture stress reduced available soil moisture content, AGR, PGR, LAI and NAR. JK 125-2-42 exhibited high AGR (1.88 g/day) and NAR (61 mg/dm square/day) under moisture stress and relatively less reduction in these parameters due to stress. Seed cotton yield significantly reduced due to stress. Variations in fruiting coefficient were not significant, however, it increased in JK 125-2-42 and marginally reduced in SRT 1 and CPD 8-1 under stress. Reduction in seed cotton yield was significantly low in JK 125-2-42 (13%), followed by SRT 1 (23%). This was observed to be positively associated with fruiting coefficient (r=0.80). Among all genotypes, SRT 1 & JK 125-2-42 displayed stability in fruiting coefficient and seed cotton yield, under moisture stress. However, JK 125-2-42 maintained high AGR, NAR, fruiting coefficient and seed cotton yield under moisture stress, thereby indicating drought tolerance than SRT 1.

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Studies on the effect of different production factors on yield of seed cotton of *G. hirsutum* (Var. RHV-1) under summer conditions

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ABSTRACT : An experiment entitled, "Studies on the effect of different production factors on yield of seed cotton of *G. hirsutum* (Var. RHV-1) under summer conditions" was conducted at Cotton Improvement Project, Mahatma Phule Agril. University, Rahuri during summer season of 1988, 1989 and 1990. The results revealed that the yield differences exhibited by different treatments were significant. The treatment of full package of practices recorded significantly higher seed cotton yield (1969 kg/ha), than rest of the treatments. Among the production factors studied, weeding (82%) fertilizer (35.26%) and plant protection (34.94%) were found to be major in contribution to the yield under summer irrigated conditions and are therefore required to be adopted timely.

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Response of American cotton varieties to plant spacings and nitrogen levels on yield attributes

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ABSTRACT : A field experiment consisting of two varieties (H-777 and HS-50), three plant spacings (60 x 30, 60 x 22.5 and 60 x 15 cm) and five nitrogen levels (50, 75, 100, 125 and 150 per cent of the recommended dose on the basis of soil test) was conducted at the Cotton Research Station, Sirsa of Haryana Agricultural University, Hisar during the *kharif* seasons of 1983 and 1984. It was laid out in split plot design with combinations of varieties and plant spacings as main treatments and nitrogen levels as sub-plot treatments and replicated three times. Significantly higher number of opened bolls, seed cotton per plant and consequently higher seed cotton yield per hectare were recorded in variety H-777 although boll size remained larger in variety HS-50. Optimum dose of nitrogen was worked out to be 76.8 and 73.1 kg/ha for varieties H-777 and HS-50, respectively under the soil which is medium in nitrogen. Optimum dose is very close to the 125 per cent of the recommended dose i. e. 75 kg N/ha based on soil test value. With the decrease in plant spacings, number of opened bolls and seed cotton yield per plant decreased significantly but seed cotton yield per hectare increased. Increasing levels of nitrogen increased the number of opened bolls, boll size, seed cotton yield per plant and finally seed cotton yield per hectare.

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Foral and fruiting reaction of American cotton (*G. hirsutum* L.) to irrigation, nitrogen and plant density

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ABSTRACT : Managing irrigation at CPE 100 mm increased the number of squares and flowers and their shedding percentage significantly in comparison to irrigation at CPE 150 and 200 mm. Maximum number of bolls, mature bolls, opened and unopened bolls and boll shedding were recorded with irrigation at CPE 100 mm. Number of squares and flowers per plant and their shedding percentage increased with application of nitrogen and it was maximum with application of 100 kg N/ha. Maximum number of total bolls, matured bolls and unopen bolls and boll shedding were recorded with application of 100 kg N/ha. Number of squares and flowers and their shedding was at lower plant density (60 x 30 cm^2) as compared to that recorded under 45 x 30 cm^2 spacings. Likewise number of bolls, opened and unopened bolls and boll shedding were observed to be higher at 60 x 30 cm^2 spacings.

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Integration of moulting inhibitor in the management of cotton bollworms

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ABSTRACT : Studies to integrate teflubenzuron 15 SC, a moulting inhibitor, in the management of cotton bollworms on DCH-32 hybrid cotton was undertaken during 1990-91 cotton season at Regional Research Station, Raichur, Karnataka. Its application at 100 g a. i./ha with endosulfan 35 EC or phosalone 35 EC each at 1050 g a.i./ha twice in the spray schedule record lower bollworm incidence and higher seed cotton yield.

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Economic threshold for bollworms control on *arboreum* cotton

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ABSTRACT : For conducting sprays against bollworms, four levels of infestation (5, 10, 20 and 30%) as observed in the freshly shed fruiting bodies of *arboreum* cotton were compared for three years with the recommended spray criterion (spray at 10-day intervals starting when 25% plants produce squares till 2 weeks before the first picking). The infestation level of 5 per cent for conducting various sprays proved better than the other levels of infestation in reducing infestation and in increasing yield. However, it was inferior to the recommended spray criterion.

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Bioefficacy of moulting inhibitors against cotton bollworm *Helicoverpa armigera* (Hubner)

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ABSTRACT : To findout the bioefficacy of moulting inhibitors on larvae of cotton bollworm. *Helicoverpa armigera* (Hb.) different age grouped larvae were treated with different moulting inhibitors at different concentrations. The treatments resulted in dose related mortality. Teflubenzuron 15 sc at 100 gm a.i./ha was the most effective recording highest larval mortality.

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Bioefficacy of different chemicals against red spider mite, *Tetranychus macfarlanei* baker and pritchard

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ABSTRACT : Bioefficacy studies conducted with different chemicals against red cotton Mite, *Tetranychus macferlanei* B. and P. On cotton revealed that the chemicals : dicofol, tetradifon and wettable sulphor grauped as acaricides were significantly superior to rest of the chemicals in controlling the mites. However, fluvalinate and fenproyathrin have shown greater acaricidal properties. Similarly Neemrich I and II have also recorded acaricidal effect while flufenuxuron a moulting inhibitor has recorded little acaricidal effect.

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Progress of important cotton diseases during crop period in north zone

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ABSTRACT : Pacterial blight happended to be the major foliar disease causes maximum damage both on *hirsutum* and *arboreum* varieties. Ganganagar ageti is most susceptible and the symptoms start appearing as early as in June. Among of her fungal foliar diseases like Myrothecium leaf spot and Alternaria leaf spot, Myrothecium causes much damage to the crop both in early as well as in late season. Wilt recorded only on *arboreum* varieties and RG 8 happened to be more susceptible than others.

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Biological control of bacterial blight of cotton in north zone

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ABSTRACT : Bacterial blight of cotton caused by *Xanthomonas campest* is pv. *malvacearum* is one of the most important diseases of cotton causing considerable damage to the produce, both qualitatively and quantitatively. The antagonistic bacteria was comparatively less effective than the fungicides and antibiotics in controlling the bacterial blight.

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Chemical control of green boll rot phase of cotton

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ABSTRACT : Boll rot complex is of world wide importance and in certain warm and humid areas become limiting factor for production. Three combinations (R l.+Carbendazim+Streptomycin sulphate; R. 1.+Copper oxychloride and R. 1.+Carbendazim) reduced boll infection in H 777 as well as in G 27. In case of locule infections of R. l.+Copper oxychloride; R. l.+Carbendazim and R. l.+Carbendazim+Streptomycin sulphate proved to be the better combinations. Minimum damaged and maximum seed cotton yield was recorded in the combination of R. l.+Carbendazim+Streptomycin sulphate, R. l.+Copper oxychloride; R. l.+Carbendazim.

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Aerospora of cotton (*Gossypium hirsutum*) *vis-a-vis* meteorological conditions

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ABSTRACT : Aerospora in cotton fields was identified at Central Institute for Cotton Research, Nagpur 1989 and during 1990. A total of 1077 and 730 fungal pores were observed in 1989 and 1990, respectively. A positive correlation existed between total spore load with average temperature and relative humidity while negotive correlation was found with difference in temperature (°C) and sunshine hours

during the two years. A positive correlation existed between total spore load and difference in relative humidity in 1989 and rainfall in 1990.

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Degration of different cotton fabrics by *Asperigillus Fumigatus*

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ABSTRACT : The study was carried out to find the extent of degradation of different cotton fabrics by Asperigius Fumigates. The higher staining of the samples was obtained mainly in petri-dish method. But fabrics samples have shown less loss in strength. The higher loss in strength showed in flask method reveal that enzymatic reaction was higher as compared to petri-dish method. The submerged and mobile conditions of culture and samples in flask method may be sultable for higher growth and cellulolytic activity. Therefore, it may be imployed that for better serviceability to consumers, varieties requiring no treatment should be evolved and grown.