

ABSTRACTS

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Studies on combining ability in some dwarf genotypes of upland cotton (*G. hirsutum* L.)

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ABSTRACT : Studies in combining ability in some dwarf genotypes of *G. hirsutum* revealed importance of both additive and non-additive variances for yield and other traits. 'NISD-2' and 'LRK-516' were found good general combiner for yield and its component traits. 'WH-216-2' showed desirable gca for plant height and harvest index. Potential crosses for exploitation in breeding programme were identified and breeding strategy to be adopted is discussed.

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Phenotypic stability in cotton genotypes of different species composition

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ABSTRACT : Eight cotton genotypes of different species composition were grown in ten environments and analysed for stability of seed cotton yield/plot. The genotypes responded nonlinearly to the change in environment. Predominance of unpredictable component contributing towards the differences in stability of genotypes was revealed. Most of genotypes except DCH-32 showed average response with average stability.

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Heterotic expression for yield and yield components in 9 x 9 diallel in upland cotton

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ABSTRACT : A diallel cross involving 9 varieties of upland cotton was studied for heterosis. Out of 36 crosses, only three crosses over better parent and two crosses over standard variety depicted significant heterosis for seed cotton yield. The highest heterotic effects were recorded in the hybrid, AC-938 x NH 428 with 46.4 and 40.4 per cent increase over better parent and standard variety, respectively. Increase in boll number per plant was mainly responsible for the increase in productivity of the hybrids. Low to moderate heterosis was observed for boll weight, seed index, plant height, ginning outturn and harvest index.

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Effect of different irrigation schedules under varying levels of nitrogen and plant population on yield, water use efficiency and nutrient uptake of cotton

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ABSTRACT : A field experiment conducted on sandy loam soil of North-west Rajasthan revealed that maximum seed cotton yield was obtained when irrigation was applied at CPE 100 mm, in conjunction with 80 kg N/ha. Optimum dose of nitrogen was found to be 80 kg N/ha. Closer spacing (45 x 30 cm²) resulted in higher seed cotton production as compared to 60 x 30 cm² spacing, consumptive use of water increased with higher frequency of irrigation, application of nitrogen and spacing of 60 x 30 cm². Highest uptake of N, P & K was recorded with scheduling irrigation at CPE 100 mm. N uptake increased with application of nitrogen upto 100 kg N/ha whereas P & K uptake increased upto 80 kg N/ha. N, P & K uptake was significantly higher under closer spacing (45 x 30 cm²).

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Effect of Azotobacter strains on nitrogen use efficiency in cotton genotypes under rainfed conditions

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ABSTRACT : Efficiency of Azotobacter strains was studied in two cotton genotypes in rainfed conditions for their Nitrogen Use Efficiency in presence of fertilizer nitrogen. Significant differences in yields were observed in both genotypes viz. LRA 5166 and AKA 5 due to Azotobacter strains. Mean seed cotton yield of 21.3 q/ha was recorded at 45 kg N/ha with Azotobacter followed by 20.8 and 20.5 q/ha at 60 & 75 kg N/ha respectively with Azotobacter. Both strains of Azotobacter significantly improved the N uptake in both cotton genotypes over no Azotobacter. There were no significant differences between seed and soil inoculation methods with respect to yield and N uptake. Azotobacter strain C 2 was found superior to M 4 in both cotton genotypes. Increase in nitrogen levels upto 45 kg/ha with Azotobacter increases the nitrogen utilization in cotton, thereby showing that 15-20 kg, nitrogen per hectare can be saved by the use of Azotobacter. Maximum recovery of N i. e. 32% from applied fertilizer was obtained at 45 kg N/ha with Azotobacter. Both strains improved the available N content of soil at active growth period i. e. during 75 days after germination of crop, resulting in better growth and development of bolls.

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Dry matter and nutrient uptake by cotton under different irrigation schedules, nitrogen levels and plant density

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ABSTRACT : In a field trial, dry matter accumulation and nutrient uptake were studied in cotton under three levels of irrigation schedules (100, 150 and 200 mm CPE), three nitrogen levels (60, 80 and 100 kg ha⁻¹) and two plant spacings (60 x 30 cm² and 45 x 30 cm²). Dry matter production was observed to be highest at all the stages by applying irrigation at 100 mm CPE N, P and K content decreased with increasing frequency of irrigation and being lowest with irrigation scheduling at CPE 100 mm. Maximum uptake of nutrients were recorded at CPE 100 mm irrigation. Increasing rates of nitrogen improved the dry matter production and nutrient uptake significantly. Lowest plant density at 60 x 30 cm² produced

significantly higher dry matter per plant as compared to plant spacing at 45 x 30 cm². Total uptake of nitrogen and phosphorus by plant was observed to be higher under higher plant density (45 x 30 cm²).

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Effect of nitrogen and potassium on the seed cotton yield and tissue composition

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ABSTRACT : Field experiment was conducted for three consecutive years (1989-1991) at CCS HAU research farm in sandy loam soils using cotton variety (H 777) as a test crop. Application of potassium significantly influenced the seed cotton yield to the extent of 26.5 and 34.5% at 60 and 120 kg N ha⁻¹ and 17.1, 26.8 at 30, 60 and 90 kg K₂ ha⁻¹ over control. Nitrogen and potassium concentration significantly influenced in leaves, stem and bur of both the stages. No significant effect was observed in case of phosphorus concentration in plant with the application of nitrogen and potassium.

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Leaf-age dependent responses of adaxial and abaxial stomata of cotton (*Gossypium hirsutum* L.) to rapid water-stress

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ABSTRACT : Detached young and old leaves of American cotton (*Gossypium hirsutum* L. cv. H-777) were used to determine adaxial and abaxial stomatal diffusive resistance in response to rapid water-stress. Diffusive resistance of adaxial stomata was always higher irrespective of leaf-age. Immediately after excision stomata on both surfaces opened for a short period. Opening of adaxial in young and abaxial in old leaves was more sensitive. Closing of adaxial stomata was very abrupt and early in old leaf. However, abaxial stomata closed slowly and after 40 minutes of excision diffusive resistance remained almost comparable in both types of leaves. Transpiration upto 16 minutes after excision was rapid in old leaf and subsequently it was more in young leaf. Regain of moisture after rehydration was high in old leaf.

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Effect of herbicides on seed cotton yield, drymatter of weeds and yield attributing parameters of American cotton

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ABSTRACT : Field experiments were conducted in *kharif* 1991 and 1992 with the objective to find out the feasibility of chemical weed control, either alone or in combination with one interculture in the cotton growing area of the Rajasthan State at Agricultural Research Station, Sriganaganagar. An effective control (84.79%) of annual weeds was obtained with the pre-emergence application of Pendimethalin @ 1.5 kg/ha, followed one hand weeding at 35 DAS. Farmers practice i. e., one hand hoeing at 35 DAS followed by two interculturing operation also gave 85.85 per cent reduction in the dry matter accumulation of weeds as against (42.70%) by Pendamethalin @ 1.5 kg/ha alone.

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Changes in sugars, aromatic amino acids and chlorophyll content in cotton leaves during interaction with *Xanthomonas campestris* pv. *Malvacearum*

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ABSTRACT : Total soluble sugars and free aromatic amino acids i. e. phenylalanine and tyrosine, in general, were found to be in higher amounts in leaves of control (uninoculated) plants of resistant cv. (Suman) as compared to those of the susceptible cv. (H 937) in both growth phase I (30d) and growth phase II (60d) while chlorophyll content of control leaves of Suman were little higher in G. P. I. and much lower in G. P. II as compared to those of H 937. Following inoculation though a variation in soluble sugars was observed yet the data indicated much lower values in the susceptible cv. H. 937 as compared to the resistant cv. Suman especially in G. P. I. On the other hand infection resulted in a general decrease in the levels of both phenylalanine and tyrosine in the two cvs. the decrease being higher in the resistant cv. A significant decrease in chlorophyll content concomitant with the appearance of blight spots was also noticed in the susceptible H 937 while in the resistant 'Suman' no change and an increase in chlorophyll content was observed in GP I and GP II, respectively, following inoculation.

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Nutrient management in cotton-wheat rotation in North-west Rajasthan

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ABSTRACT : Field experiments were conducted for the four consecutive years of 1979 to 1982 to study the nutrient management in cotton-wheat rotation in North-west Rajasthan. Pooled results revealed that the yield of cotton increased significantly when the N dose was applied extra either alone or with combination of 30 kg P₂O₅/ha. However, different level of N and P applied to wheat in rotation did not influence the yields of the subsequent cotton crop. Wheat also responded only to direct application of N and P. Higher yields of wheat were recorded when 120 kg N was applied in conjunction with 60 kg P₂O₅/ha.

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Evaluation of various sampling techniques and sample size for recording bollworm incidence in cotton

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ABSTRACT : Experiments were conducted with five sampling methods and four sample sizes to standardize the sampling method and sample size for recording bollworm incidence in green bolls of cotton. Studies revealed that bolls collected both by moving diagonally and at random in the field had higher bollworm incidence but statistical accuracy was more with the former method. However, bolls collected from the sides had low incidence and wider variations (standard deviation and coefficient of variation). Accuracy in estimating bollworm incidence increased with increase in the number of bolls sampled per plot. The best accuracy and efficacy of bollworm incidence was observed when 20-25 bolls per plot were collected by moving diagonally in field.

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Incidence of cotton bollworms in relation to meteorological factors in Marathwada Region (MS)

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ABSTRACT : A simple correlation and regression analysis of different environmental factors was made with the incidence of different bollworms for the three year (1990-92). No significant correlation was observed in respect of incidence of spotted bollworm for individual years and as well as in pooled data of three years. Significantly positive relation was observed in *Heliothis* incidence with relative humidity and minimum temperature. As regards pink bollworm the year-wise response was partial. Negative co-relations of pink bollworm were significant with rainfall, minimum temperature and relative humidity, whereas positive co-relations of sunshine hours was significant for 1990-91. In case of 1992-93 maximum and minimum temperature were significant and negatively co-related with pink bollworm incidence. However, when the data of three years were pooled, only relative humidity showed negative co-relation with pink bollworm incidence.

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Impact of synthetic pyrethroids on arthropod diversity and productivity of upland cotton, *Gossypium hirsutum*

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ABSTRACT : The impact of five synthetic pyrethroids viz., fenvalerate, cypermethrin, flucythrinate, permethrin and deltamethrin at the recommended and double the recommended doses was observed on diversity on non target pests and beneficial arthropods, bollworms complex and productivity of seed cotton. Cypermethrin and flucythrinate were found to be more toxic to jassid and thrip while deltamethrin and fenvalerate to whitefly and dusky cotton bug. All the SPs were toxic to natural enemies causing 68.8-92.8% reduction in their population. Higher doses were more toxic than the lower ones. Deltamethrin, cypermethrin and fenvalerate were more effective against bollworms complex. Flucythrinate was comparatively less effective against spotted bollworms and permethrin against pink bollworm. Yield of seed cotton was comparatively high in cypermethrin and deltamethrin. Comparison of fibre quality revealed that different SPs affected the fibre fineness, maturity and strength but have no effect on fibre length.

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An indirect approach to combat *Heliothis armigera* a polyphagous pest

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ABSTRACT : The present study high lights types of and consequences of abnormalities at pupal and adult stages of *Heliothis armigera* when exposed to diflubenzuron (50 to 125 g a. i./ha) either directly or through treated leaves. Out of 160 larvae exposed in the field, only 114 could pupate, of which 55 were deformed. Of the deformed pupae, 91 per cent were dead. Out of 45 unexposed larvae, 41 pupated with only 2 deformed pupae. Of 106 larvae which were not exposed but fed on treated leaves, 79 pupated, among these, 31 were deformed out of which 87 per cent were dead. In control, 16 pupated including 3

deformed, out of 21 larvae. Among various deformities in the field collected larvae, deformities such as pupae with exposed head and last larval skin attached, pupae with black band or spot ventrally on the thorax and pupae with dorsoventrally compressed thorax and exposed appendages contributed 18.1, 18.1 and 9.1 per cent of the total deformities. While in larvae which were fed on treated leaves only, deformities viz. rough surface of the pupae, wet and/or larval skin attached and exceptionally small with rough surface or compressed contributed 50.0, 20.6 and 11.7 per cent of the total deformities. The treatment could cause 53.9 and 34.6 per cent reduction in the generation in field exposed and only fed on treated leaves respectively.

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Boll rot of cotton as influenced by dates and methods of sowing

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ABSTRACT : Experiments on three dates of sowing (April, May, June) and two methods of sowing (normal sowing, paired row or skip row sowing) were conducted with two varieties i. e. H-777 (*Gossypium hirsutum* L.) and G-27 (*G. arboreum* L.) during 1988 and 1989 at Haryana Agricultural University, Hisar. Early crop had maximum infection on boll as well as on locule basis where as minimum incidence was recorded in late sowing in both the varieties during 1988 and 1989. The incidence on boll as well as locule basis was quite low on paired row of planting as compared to normal planting. However, the yield was low in paired row of sowing.

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Effect on different biochemical characters of cotton bolls affected by boll rot

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ABSTRACT : Healthy and diseased bolls were collected at four intervals for biochemical estimations like total sugars, reducing sugars, total phenol, flavonol, gossypol etc. *Gossypium hirsutum* varieties had more total sugar than *G. arboreum* varieties. The total sugar content was more in healthy bolls than diseased in both the species. The sugar contents decreased with the increase in the age of the boll. Like total sugars, reducing sugars pattern was also of the same trend. More total phenol was recorded by HS 45 in healthy bolls at all stages than diseased bolls, whereas among *arboreum*, DS 1 recorded the higher content in healthy as well as in diseased bolls. Flavonol was observed more in *hirsutum* than *arboreum* varieties and it also reduced with the increase in the age of the variety. Gossypol also like other biochemical contents was recorded more in *hirsutum* than *arboreum* varieties.