5. Plant Physiology/Chemistry Section

The research work/experiments conducted during the year 2014-15 are summarized is under:

1. Influence of potassium fertilizer on the incidence of CLCuV disease and its effect on seed cotton yield.
2. Cotton response to exogenous application of Boron and Zinc in conjunction with Urea.
3. Screening of new strains for heat tolerance.
4. Screening of Genotypes for drought tolerance.

The summary of results of the experiments is given below:

5.1. Influence of Potassium on the Incidence of CLCuV Disease and its Effect on Seed Cotton Yield.

Cotton is a cash crop of our country therefore efforts are being utilized to increase seed cotton yield per unit area. Because of high cost of farm input, there is increasing need and emphasis for enhancing the efficiency of fertilizer usage. Potassium (K) is an essential nutrient, which plays an important role for plant growth and development besides in fiber quality. Potassium deficiency results decreased in fiber quality and lowered yields. If potassium is limited during active fiber growth, there is a reduction in the turgor pressure of the fiber, resulting in less cell elongation and shorter fibers at maturity. To obtain the better yield, the efficient and balanced application of potassium fertilizer is essential to increase crop yield and farmer's income by controlling CLCuV disease.

Keeping in view, the importance of above subject, the studies have been carried out to evaluate the effect of potassium fertilizer on the incidence of CLCuV disease and seed cotton yield. New cotton cultivar Bt.CRIS-508 sown on 18th May, 2014 in Randomized Complete Block Design (RCBD) with four replications. All phosphorus in the form of DAP at the rate of 60 kg P_2O_5 ha^{-1} and potassium in the form of SOP were applied at seedbed preparation and incorporated in the upper plough layer. Nitrogen at the rate of 170 kg ha^{-1} was given in three split doses, i.e., one-third at the time of planting and remaining quantity in two equal split doses at flower initiation and peak flowering. Standard agronomic practices and plant protection measures were adopted regularly throughout season on need basis. The details of treatments were as follow:

Treatment No.	K_2O doses (kg ha^{-1})
T1	0 (control)
T2	50
T3	100
T4	150

Composite soil samples from plough layer were collected before planting. Physical and chemical characteristics of the soil were analyzed. Analytical results revealed that the soil is alkaline in reaction (8.01), free from excess of salts (1.47 dSm^{-1}) and moderately calcareous in nature (12.0 %). It's low in organic matter (0.79 %), available nitrogen (8.6 mg kg^{-1}), phosphorus (3.5 mg kg^{-1}) and medium in potassium (175.0 mg kg^{-1}). The experimental site belongs to Pacca soil series and is classified fine, mixed, Hperthermic Ustollic Camborthids (Table 5.1).

Table 5.1 Soil characteristics of the experimental plot before planting of experiment at CCRI-Sakrand during 2014

pH	EC (dS m^{-1})	Organic Matter (%)	Lime content ($CaCO_3$) %	Available nutrients (mg kg^{-1})			Textural Class
				NO_3-N	P	K	
8.01	1.47	0.79	12.0	8.6	3.5	175.0	Silty clay loam

The data regarding plant height and boll formation at 75, 105 and 150 days after planting (DAP) were recorded and presented in Table 5.2. The result indicated that the plant height was increased with the increasing rate of potassium level at 75 to 150 DAP. Higher dose of potassium application (T4 -150 kg ha^{-1}) significantly increased plant height at 75 DAP, the growth also increased but statistically it was non-significant. While the boll formation was increased significantly (except 105 DAP) with increasing rate of potassium fertilizer application up to 150 DAP. The maximum (5.76, 29.30 and 36.54) values were noted from T4 and minimum (2.04, 20.90 and 27.14) values were observed from T1 (control) plot at 75, 105 and 150 DAP respectively.

Application of potassium fertilizer in cotton crop significantly increase the seed cotton yield from 1720 to 2620 kg ha^{-1} and it was increased 5.2, 19.7 and 52.3 percentage when applied @ 50, 100 and 150 K_2O ha^{-1} respectively than control (Table 5.3). Seed cotton yield components like boll weight and seed index were also increased with increasing the level of potassium (Table 5.3). In case of CLCuV incidence, it was positive response on cotton crop. The maximum and minimum incidence of CLCuV values ranged from 15.0 to 24.0 % and 10.0 to 18.0 % were recorded from T1 (control) and T4 (150 kg ha^{-1}) respectively from the month of July to October (Table 5.3 & Fig. 5.1).

Table 5.2 Effect of potassium fertilizer on plant height and boll formation at various growth stages

Treatment (kg K_2O ha^{-1})	Plant Height (cm)			Boll Formation Plant^{-1}		
	75 DAP	105 DAP	150 DAP	75 DAP	105 DAP	150 DAP
T1 = (0 Control)	77.0	105.5	120.4	2.04	20.90	27.14
T2 = (50)	79.2	108.6	123.2	3.44	23.64	29.92
T3 = (100)	84.7	116.1	126.3	4.47	27.49	32.76
T4 = (150)	86.0	117.8	128.7	5.76	29.30	36.54
LSD Values (5%)	6.16	NS	NS	1.25	NS	5.88

Table 5.3 Impact of potassium fertilization on seed cotton yield and its component at maturity and CLCuV incidence

Treatment (kg K_2O ha^{-1})	Boll Weight (g)	Seed Index (g)	Seed Cotton Yield (kg ha^{-1})	CLCuV incidence (%)			
				July	August	September	October
T1 = (0 Control)	3.2	6.9	1720	15.0	20.0	22.0	24.0
T2 = (50)	3.3	7.2	1810	14.0	17.0	20.0	21.0
T3 = (100)	3.4	7.8	2059	12.6	14.0	19.0	22.0
T4 = (150)	3.5	7.9	2620	10.0	12.4	17.0	18.0
LSD Value (5%)	NS	NS	195.5	1.98	2.87	NS	2.94

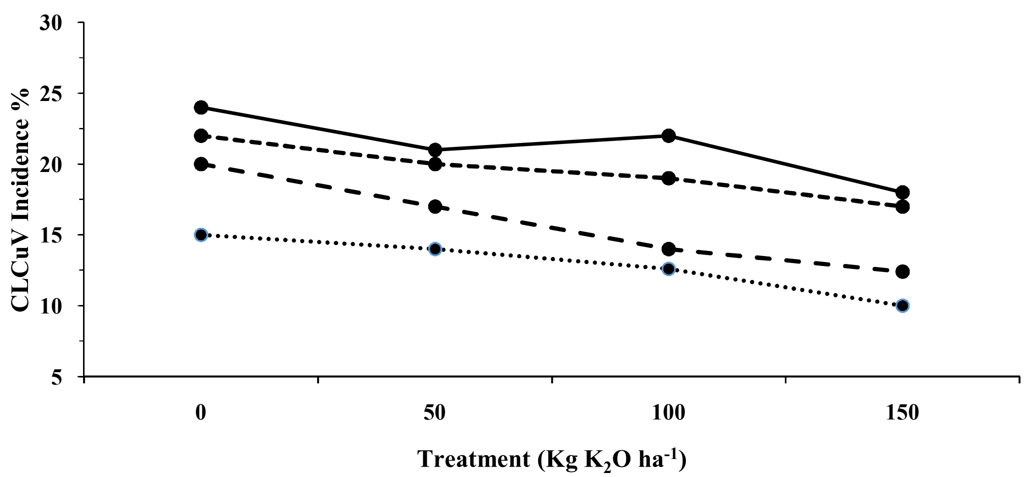

Fig. 5.1 Impact of potassium fertilization on CLCuV incidence

The whole plants were collected at maturity, separated into leaf, stalk, seed and lint portions and analyzed for potassium concentration. The results indicated (Table 5.4) that the concentration of potassium in leaves, stalk, seed and lint increased both with the increasing rate of potassium application. Potassium concentration in different plant parts was found in the order to leaves>seed>stalk>lint.

Table 5.4 Impact of potassium fertilization on potassium concentration (%) in plant tissues at maturity

Treatment No.	Potassium Applied (kg ha^{-1})	Potassium content (%)			
		Leaves	Stalk	Seed	Lint
T1	0 (Control)	1.3	1.0	1.2	0.6
T2	50	1.4	1.1	1.3	0.7
T3	100	2.3	1.2	1.5	0.9
T4	150	2.6	1.2	1.6	1.2
Mean		**1.87**	**1.14**	**1.40**	**0.88**

5.2. Cotton Response to Exogenous Application of Boron and Zinc in Conjunction with Urea

The soils of Pakistan are alkaline-calcareous in nature and widespread deficiencies of macro-and-micro-nutrients have been reported in crops. The nutrient indexing of cotton growing areas have revealed the deficiencies of nitrogen (N), phosphorus (P), potassium (K), boron (B) and zinc (Zn). Nitrogen and some extent phosphorus are the most commonly used fertilizers for cotton crop to achieve the required yield. Deficiency of essential nutrients reduces plant growth and yield. Thus getting maximum yield of seedcotton, balanced use of macro and micronutrients, based on soil testing reports is an important factor because availability of above said nutrients are low in our soils as they are alkaline in reaction. The adequate boron is required for fertilization and translocation of phosphate from leave to fruit and its deficiency causes stunted growth showing shortening of internodes along with thickening of leaves and abnormal reproductive development. The zinc deficiency shows symptoms of reduced leaf size and inward curling of young leaves. Nutrient management in calcareous soils differs from that in non-calcareous soils because of the effect of soil pH on soil nutrient availability and chemical reactions that affect the loss or fixation of almost all nutrients. Foliar application of macro and micro nutrients plays an important role in changing growth and physiological characteristics of cotton. In optimizing fertilization strategies, inclusion of foliar application improves fertilizer use efficiency and reduces environmental pollution. Foliar application of micronutrient mixtures during flower and boll development stages have been shown to be effective in efficient utilization of nutrients by cotton and thereby reduce boll shedding and increase the yield. The studies were carried out to conduct field experiment on above micronutrients to see the impact of these nutrients through foliar application on the yield of seed cotton.

Keeping in view the above objectives an experiment was conducted to investigate efficacy of foliar application of boron and zinc fertilizer with and without added of Urea. Cotton cultivar Bt.CRIS-508 was planted on 18th May, 2014 in Randomized Complete Block Design (RCBD) with four replications.

The details of treatments as follow:

Treatments	Boron	Zinc	Urea
T1.	0	0	0
T2.	0.1%	0	0
T3.	0	0.1%	0
T4.	0.1%	0.1%	0
T5.	0.1%	0	3.0%
T6.	0	0.1%	3.0%
T7.	0.1%	0.1%	3.0%

The foliar application was done as per calculated dose of (60 gm per treatment of boric acid) and (35 gm per treatment of Zinc sulphate) were dissolved in 10 liters of water to make 0.1% solution. Whereas 300 gm per treatment of Urea were dissolved in 10 liters of water to make 3.0% solution and sprayed at 45, 60, 75 and 90 days after sowing. Phosphorus in the form of DAP (P_2O_5 18%) was applied at the rate of 60 kg ha^{-1} during the time of land preparation. While nitrogen in the form of urea was applied at the rate of 170 kg ha^{-1} in three equal split doses. Zinc sulphate ($ZnSO_4$ 35%) was applied as zinc source and Boric acid ($H_3BO_3$17%) as boron source.

Soil samples were collected from plough layer before application of fertilizer to study nutrient status of soil. Chemical characters of the soil were; 8.11 pH, 1.45 dS m^{-1} ECe, 0.77 % organic matter, 12.1% lime content ($CaCO_3$), 8.5 mg kg^{-1} available nitrate nitrogen (NO_3-N), 3.45 mg kg^{-1} available phosphorus, 180 mg kg^{-1} available potassium, and silty clay loam textural class. These values demonstrated that the soil was heavy textured, alkaline in reaction, free of excessive soluble salts, moderately calcareous, low in organic matter, nitrogen and phosphorus, and moderately in potassium concentration. The experimental site belongs to Pacca soil series and is classified fine, mixed, Hperthermic Ustollic Camborthids.

All the recommended cultural practices and protection measures were followed during the growth period of the crop. The field was kept free from weeds. Randomly ten plants selected from each treatment and were noted plant height and number of boll per plant at 75, 105 and 150 day after planting (DAP). At maturity the crop was harvested and observations like boll weight, seed index and seed cotton yield were taken. After harvest, the samples of leaves, stalk, bur, lint and seed were collected and then washed, oven dried (at 68 ^{0}C for 48 hours), powdered and stored in plastic bags for analyzing zinc, boron and nitrogen concentration.

The results presented in Table 5.5 demonstrated that, the plant height and number of bolls plant^{-1} were significantly increased when combine foliar application of zinc and boron with urea fertilizer at 75, 105 and 150 DAP was applied as compared to each single application. Maximum plant height and number of bolls plant^{-1} were observed for T7 (B+Zn+Urea), followed by T6 (Zn+Urea), T5 (B+Urea), T4 (B+Zn), T2 (B), T3 (Zn) and T1 (control) at 75, 105 and 150 DAP.

Table 5.5 Plant height and boll formation as affected by foliar application of boron and zinc with urea

Treatments	Foliar Fertilizer Application*	Plant Height (cm)			Boll Formation Plant^{-1}		
		75 DAP	105 DAP	150 DAP	75 DAP	105 DAP	150 DAP
T1	Control	86.0	111.8	124.9	2.43	18.35	29.22
T2	B	93.5	121.6	133.4	3.64	21.12	33..44
T3	Zn	90.2	117.3	129.7	3.80	24.12	36.24
T4	B+Zn	94.1	122.3	131.5	4.24	27.80	36.92
T5	B+Urea	95.9	124.7	136.8	4.60	26.48	37.04
T6	Zn+Urea	96.7	125.7	137.4	4.64	28.08	37.64
T7	B+Zn+Urea	98.0	127.4	138.5	4.88	29.44	40.48
LSD Value (5%)		**2.39**	**3.09**	**7.53**	**0.47**	**3.51**	**3.98**

* Foliar Fertilizer Application; Boron (0.1%), Zinc (0.1%), Urea (3.0%)

Cotton crop showed highly significant response to the foliar application of born and zinc micronutrient with or without urea (Table 5.6). Among both the micronutrient elements, boron was found more effective than zinc. However, maximum yield of seed cotton was (2499 kg ha^{-1}) obtained with combined foliar application of born + zinc + urea (T7) and it was increased 60% over control, 30% T2 (B), 44% T3 (Zn), 23% T4 (B+Zn), 8% T5 (B+Urea), and 12% with T6 (Zn+Urea). Furthermore, the results reveal that foliar application of B and Zn combine with urea was better than single application. These results are very encouraging and advocate that balanced fertilizer application with macro and micronutrient has significant impact on increase in yield and there are great chances for exploiting maximum potential of our soils through the use of these nutrients if integrated plant nutrition management is properly adopted.

Similarly yield components like boll weight and seed index also showed increasing trend due to application of above nutrients. It is hoped that proper fertilizer application under integrated plant nutrition management may improve per unit production of cotton of our country.

Table 5.6 Seed cotton yield and its components as affected by foliar application of boron and zinc with urea

Treatments	Foliar Fertilizer Application*	Boll Weight (g)	Seed Index (g)	Seed cotton Yield (kg/ha)
T1	Control	2.68	6.0	1560
T2	B	2.86	6.6	1922
T3	Zn	2.82	6.4	1730
T4	B+Zn	2.88	6.8	2037
T5	B+Urea	3.13	7.8	2306
T6	Zn+Urea	3.00	7.0	2229
T7	B+Zn+Urea	3.22	8.2	2499
LSD Value (5%)		**0.16**	**0.24**	**123.0**

*Foliar Fertilizer Application; B (0.1%), Zn (0.1%), Urea (3.0%)

5.3. Screening of New Strains for Heat Tolerance.

Cotton cultivars shed larger portion of fruiting parts during its early stage of season due to high temperature and result in yield loss. The yield potential of the cotton crop is determined by the period available for effective boll setting which is comparatively shorter under Pakistan conditions. There is scope of extending effective boll setting towards the warmer part of the season by introducing heat tolerant cultivars. Keeping in view the above subject, studies were conducted to screen out the cultivars developed by this institute for heat tolerance, Bt.CRIS-508 and Std. (CRIS-342) were sown in split plot design with four replications. Varieties were sown on 15th April, 2014 so that reproductive phase may coincide with rising temperature in May to the end of July and was compared with 1st May Planting. The sowing dates were kept as main plots and cultivar as sub plots. One bag of DAP fertilizer per acre was applied at the time of sowing and 3 bags of urea per acre were applied in four split doses i.e., 1^{st} at the time of 1^{st} irrigation after thinning; 2^{nd} at 3^{rd} irrigation; 3^{rd} at peak flowering; and 4^{th} at boll formation stage. The cultural practices such as weeding, interculturing, irrigation and plant protection measures were taken according to need of the crop. Ten plants from each sowing date each variety were tagged to collect the data for fruit retention/boll setting and other physiological traits relevant to heat tolerance.

Composite soil samples from plough layer were collected before sowing. Physical and chemical characteristics of the soil were determined. Analytical results showed that the soil of the experimental plot was calcareous in nature, non- saline and alkaline in reaction. It is low in organic matter, available nitrogen, phosphorus, and medium in potassium. The experimental site belongs to Pacca soil series and is classified fine, mixed, Hperthermic Ustollic Camborthids (Table 5.7)

Table 5.7 Soil characteristics of the experimental plot before planting of heat tolerant experiment at CCRI-Sakrand during 2014.

pH	EC (dS m^{-1})	Organic Matter (%)	Lime content ($CaCO_3$) %	Available nutrients (mg kg^{-1})			Textural Class
				NO_3-N	P	K	
7.95	1.41	0.68	11.9	8.4	3.8	95.46	Silty clay loam

The data regarding number of bolls formation recorded at 75, 90 and 105 days after planting (DAP) shows that, the new cotton cultivar Bt.CRIS-508 produced significantly higher number of bolls in both sowing dates viz., 15^{th} April and 1^{st} May as compared to standard variety CRIS-342 (Table 5.8). However, both cotton varieties sowing on 15^{th} April produced significantly higher boll formation up to 105 DAP, after that it was increased but statistically non-significant as compared to late sowing (S2).

The seed cotton yield data is presented in Table 5.9, maximum differences were observed in seed cotton yield between the cultivars as well as among the sowing dates. The values ranged from 1726 to 2700 kg ha^{-1} with CRIS-342 sown on 1^{st} May and Bt. CRIS-508 on 15^{th} April respectively. The sowing dates and varieties differences were also found highly significant. Both varieties sown on 1^{st} April (S1) produced significantly higher yield as compared to 1^{st} May (S2). On average Bt. CRIS-508 was proved better and gave highest seed cotton yield with (2370 kg ha^{-1}) as compared to Std. CRIS-342 (1950 kg ha^{-1}). As regard yield components, the maximum number of bolls per plant (35.5), boll weight (3.0 g) and seed index (7.0 g) produced significantly higher with Bt.CRIS-508 whereas the minimum with Std. CRIS-342 (27.4, 2.7 g and 6.4 g) respectively. While in sowing date, both varieties sown on early season (1^{st} April) the yield component observed slightly higher as compared to late sown (1^{st} May) though results were non-significant (Table 5.9).

Table 5.8 Boll setting as influenced by sowing dates at different growth stages

Sowing date	Variety	No. of Boll Formation plant^{-1}		
		75 DAP	90 DAP	105 DAP
S1- 15th April	Bt. CRIS-508	1.9	7.0	15.6
	CRIS-342 (Std.)	1.2	5.8	11.3
	Average	**1.6**	**6.4**	**13.4**
S2- 1st May	Bt. CRIS-508	1.0	4.6	13.6
	CRIS-342 (Std.)	0.7	3.4	10.6
	Average	**0.9**	**3.99**	**12.1**
Variety Average	Bt. CRIS-508	1.4	5.81	14.6
	CRIS-342 (Std.)	1.0	4.58	10.9
LSD Value (5%)	Sowing Date	0.47	1.06	NS
	Variety	0.19	1.21	2.92
	S × V	0.27	NS	NS

Table 5.9 Effect of sowing dates and cultivars on seed cotton yield and its components

Sowing date	Variety	No. of Bolls plant^{-1}	Boll weight (g)	Seed index (g)	Seed cotton yield (kg ha^{-1})
S1- 15th April	Bt. CRIS-508	36.0	3.1	7.2	2700
	CRIS-342 (Std.)	27.7	2.9	6.6	2174
	Average	**31.9**	**3.0**	**6.9**	**2437**
S2- 1st May	Bt. CRIS-508	35.0	2.8	6.9	2040
	CRIS-342 (Std.)	27.0	2.5	6.2	1726
	Average	**31.0**	**2.6**	**6.5**	**1883**
Variety Average	Bt. CRIS-508	35.5	3.0	7.0	2370
	CRIS-342 (Std.)	27.4	2.7	6.4	1950
LSD Value (5%)	Sowing	NS	NS	NS	273.1
	Variety	3.84	0.21	0.15	149.6
	S × V	NS	NS	NS	NS

The data regarding physiological traits like sympodial node number bearing last effective boll, sympodial node height bearing last effective boll, and number of bolls on 1st and last sympodia were found to be related to heat tolerance in cotton. Bt.CRIS-508 proved better tolerance to the heat as compared to Std. CRIS-342 (Table 5.10).

Table 5. 10 Physiological traits for determining heat tolerance of new cultivar Bt.CRIS-508 and Std. cultivar CRIS-342

Sr. No.	Physiological traits	Bt. CRIS-508	CRIS-342	LSD (P 0.05)
1.	No. of sympodial branch plant^{-1}	22.8	21.7	N.S.
2.	First sympodial node number	6.8	7.4	N.S.
3.	First sympodial node height (cm)	16.5	16.3	N.S.
4.	Sympodial node number bearing 1st effective boll	10.3	10.6	N.S.
5.	Sympodial node height (cm) bearing 1st effective boll	24.0	22.3	N.S.
6.	Sympodial node number bearing last effective boll	31.7	30.0	1.3
7.	Sympodial node height bearing last effective boll	110.4	105.1	4.8
8.	No. of bolls on 1st sympodia	3.7	2.6	0.7
9.	No. of bolls on last sympodia	2.7	2.3	0.3
10.	No. of bolls opening plant^{-1}	13.4	13.98	N.S.
11.	Plant height (cm)	121.5	113.8	N.S.

5.4. Screening of new Cotton Cultivar CRIS-508 for Water Stress Tolerance

Shortage of irrigation water is increasing day to day in Pakistan as well as in Sindh Province and with the passage of time, it may have resulted reduction in seed cotton yield. On one side, there is high temperature at most cotton growing areas and on other side, there is water shortage in many areas of Sindh Province. As irrigation water is regulating element for the growth and development of cotton plant and these both factors i.e. excessive irrigation or water stress may reduce the growth and yield of the crop. The efficient use of available irrigation water associated with a cotton variety tolerant to stress will help in minimizing the losses of this valuable input and compensate the yield.

Keeping in view the prevailing condition of irrigation water, studies were conducted to investigate plant development and yield of seed cotton of new cultivar developed by CCRI-Sakrand. This year the new cultivar Bt.CRIS-508 along with control CRIS-342 were tested in field experiment sown on 21st May, 2014, in Split Plot Design with four replications. The treatments were kept as main plot and cultivars were as sub plots. The treatments were (T1) = Four irrigation, (T2) = Six irrigation, and (T3) = Eight irrigations. One bag of DAP per acre was applied at the time of sowing and 3 bags of Urea per acre were applied in four split doses i.e., 1st at 1st irrigation after thinning; 2nd at 3rd irrigation; 3rd at peak flowering; and 4th at boll formation. Cultural practices such as weeding, interculturing and plant protection measures taken according to need of the crop. The crop was regularly irrigated according to schedule.

Composite soil samples from plough layer were collected before planting. Physical and chemical characteristics of the soil were analyzed. Analytical results revealed that the soil is alkaline in reaction (8.01), free from excess of salts (1.31 dS m^{-1}) and moderately calcareous in nature (11.82 %). Its low in organic matter (0.851 %), available nitrogen (7.8 mg kg^{-1}), phosphorus (3.6 mg kg^{-1}), and medium in potassium (112.35 mg kg^{-1}). The experimental site belongs to Pacca soil series and is classified fine, mixed, Hperthermic Ustollic Camborthids (Table 5.11).

Table 5.11 Soil characteristics of the experimental plot before planting of drought tolerant experiment at CCRI-Sakrand during 2014

pH	EC (dS m^{-1})	Organic Matter (%)	Lime content ($CaCO_3$) %	Available nutrients (mg kg^{-1})			Textural Class
				NO_3-N	P	K	
8.01	1.31	0.851	11.82	7.8	3.6	112.35	Clay loam

The data regarding plant height and boll formation at 90, 120 and 150 days after planting (DAP) were recorded and presented in Table 5.12. The data shows that, on average the plant height was significantly decreased with the increased of water stress by both varieties. It was greatly reduced from 109.5 cm at no stress to 100.1 cm with high stress recorded at 150 DAP. Boll formation at 90, 120 and 150 DAP indicated that irrigation stress has significant impact on boll formation and as increase in stress drastically decreased the boll formation. Varieties also showed significant variation in boll formation and Bt. CRIS-508 produced more bolls at high water stress as compared to CRIS-342.

Seed cotton yield and its components were significantly reduced with impose of water stress (Table 5.13). thus at no water stress seed cotton was produced 2833 kg ha^{-1}, it was reduced to 2692 kg ha^{-1} at moderately water stress and further it was reduced to 2545 kg ha^{-1} at severe water stress. On an average new strain Bt. CIRS-508 gave significant highest yield (2823 kg ha^{-1}) as compared to std. CRIS-342 (2557 kg ha^{-1}). Other yield component followed similar trend and each increase in stress resulted in significant decrease. The results advocate that Bt. CRIS-508 variety may produce comparatively more yield in water stress conditions and may be preferred for sowing in those areas where scarcity of irrigation water is experienced. The experiment will be repeated further for 3rd year to confirm the results.

Table 5.12 Effect of drought condition on plant height and boll formation at various growth stages

Treat. (No. of Irrigation)	Variety	Plant Height (cm)			Boll Formation Plant^{-1}		
		90 DAP	120 DAP	150 DAP	90 DAP	120 DAP	150 DAP
T1=4 (29 days intervals)	CRIS-508	66.3	109.4	111.8	8.4	18.1	26.4
	CRIS-342	51.2	84.1	88.4	6.3	16.4	20.8
	Average	**58.7**	**96.7**	**100.1**	**7.4**	**17.3**	**23.6**
T2=6 (22 days intervals)	CRIS-508	71.2	118.2	121.4	10.0	22.2	30.3
	CRIS-342	51.8	85.7	89.1	8.4	20.7	27.9
	Average	**61.5**	**101.9**	**105.2**	**9.2**	**21.4**	**29.1**
T3=8 (15 days intervals)	CRIS-508	74.6	123.7	126.2	10.9	25.2	34.7
	CRIS-342	53.1	87.9	92.7	8.5	21.6	29.5
	Average	**63.8**	**105.8**	**109.5**	**9.7**	**23.4**	**32.1**
Average	CRIS-508	70.7	117.1	119.8	9.8	21.8	30.5
	CRIS-342	52.0	85.9	90.1	7.7	19.6	26.1
	Average	**61.4**	**101.5**	**104.9**	**8.8**	**20.7**	**28.3**
LSD Value (5%)	Treat. (T)	2.63	4.81	5.62	1.71	NS	8.08
	Variety (V)	4.13	6.06	6.22	1.25	NS	3.48
	T×V	5.69	10.50	10.78	NS	NS	NS

Table 5.13 Effect of drought condition on seed cotton yield and its component at maturity

Treat. (No. of irrigation)	Variety	Boll Weight (g)	Seed Index (g)	Seed cotton Yield (kg ha^{-1})
T1=4 (29 days intervals)	CRIS-508	3.1	5.6	2650
	CRIS-342	2.7	5.1	2440
	Average	**2.9**	**5.4**	**2545**
T2=6 (22 days intervals)	CRIS-508	3.3	6.8	2830
	CRIS-342	2.8	6.3	2553
	Average	**3.1**	**6.6**	**2692**
T3=8 (15 days intervals)	CRIS-508	3.3	7.2	2990
	CRIS-342	2.9	6.8	2677
	Average	**3.1**	**7.0**	**2833**
Average	CRIS-508	3.2	6.5	2823
	CRIS-342	2.8	6.1	2557
	Average	**3.0**	**6.3**	**2690**
LSD Value (5%)	Treat. (T)	0.11	0.73	151.2
	Variety (V)	0.12	0.36	218.2
	T × V	NS	NS	NS