Analysis Report

This report is structured as follows.

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Normality Assessment

The normality of the data was assessed by calculating skewness and kurtosis for each variable. Variables with skewness and/or kurtosis values exceeding 1 are indicative of deviations from normality, as suggested by established guidelines. The results are reported as follows:

Variable	Skewness	Kurtosis
uniformity	0.499	-0.505
Early.vigor	-0.112	-0.517
Average.Plant.Height	0.452	-1.068
Average.Ear.Height	0.421	-0.200
Stalk.ECB	2.178	10.569
Fusarium	1.140	2.416
Stay.Green	0.490	0.280
Harvesyed.plants	-0.608	-1.382
Kg_str_15.	0.382	-0.312
E1	0.379	-0.555
gs1	1.025	1.652
A1	0.232	-0.938
E2	0.393	-0.446
gs2	0.693	0.704
A2	0.495	-0.552
E3	0.252	-0.504
gs3	1.105	2.895
A3	0.338	-0.703
E4	0.415	-0.298
gs4	0.380	-0.300
A4	0.372	-0.371
E5	0.605	-0.136
gs5	0.735	0.594
A5	0.640	-0.069
E6	0.890	0.439
gs6	0.069	-0.488
A6	0.686	-0.229

Skewness values higher than 1.5 were observed for Stalk.ECB (2.178). Kurtosis values higher than .51 were also noted for Stalk.ECB (10.569), Fusarium (2.416), gs1 (1.652), and gs3 (2.895).

These findings suggest that Stalk.ECB, Fusarium, gs1, and gs3 demonstrate significant deviations from normality in terms of both skewness and kurtosis, which may necessitate transformations for further analysis. All other variables presented skewness and kurtosis values below the threshold of 1, indicating that their distributions approximate normality.

Outlier Assessment

All datasets were combined, and Z-scores were calculated for the variables gs, A, and E. Two values of E exhibited Z-scores greater than 3.5, specifically 3.6 and 4.0. For gs, 33 values exceeded this threshold, with the highest being 5.76. No values of A were identified as outliers. The total number of observations with Z-scores higher than 3.5 represented less than 1% of the dataset, which consists of 5,089 observations. Given the low frequency of these potential outliers and their status as plausible data points, their removal was deemed unnecessary. Therefore, all data points were retained for subsequent analyses to ensure the integrity of the dataset. The complete Z-score datasets can be found in the Excel file delivering along with this document.

The influence of Hybrid on Uniformity, Early Vigor, Average Plant and Ear Heights

The influence of Hybrid on uniformity, early vigor, average plant height, and average ear height was evaluated using one-way ANOVA. The analyses were conducted in R using the dplyr, broom, and agricolae libraries. Duncan's post-hoc test was applied to assess pairwise differences between hybrid groups. The results are presented below.

Variable	Term	df	Sum Sqs	Mean Sqs	F	p
uniformity	Hybrid	2	49.694	24.847	12.960	0.000
	Residuals	285	546.417	1.917		
Early.vigor	Hybrid	2	9.194	4.597	9.678	0.000
	Residuals	285	135.385	0.475		
Average.Plant.Height	Hybrid	2	75741.022	37870.511	500.901	0.000
	Residuals	285	21547.343	75.605		
Average.Ear.Height	Hybrid	2	18071.244	9035.622	131.850	0.000
	Residuals	285	19530.876	68.529		

Duncan's posthoc test

Variable	Group	Sig. Diff.	Scores
uniformity	Tall Hybrids(75cm)	a	4.479
	SSC Hybrids 40cm	a	4.229
	SSC Hybrids(75cm)	b	3.500
Early.vigor	Tall Hybrids(75cm)	a	4.260
	SSC Hybrids 40cm	b	4.031
	SSC Hybrids(75cm)	c	3.823
Average.Plant.Height	Tall Hybrids(75cm)	a	217.875
	SSC Hybrids 40cm	b	184.021
	SSC Hybrids(75cm)	b	182.951
Average.Ear.Height	Tall Hybrids(75cm)	a	76.767
	SSC Hybrids 40cm	b	60.281
	SSC Hybrids(75cm)	b	59.663

For uniformity, the one-way ANOVA revealed a significant effect of Hybrid, $F(2, 285) = 12.96$, $p < .001$, indicating that different hybrids had a significant impact on uniformity. Duncan's post-hoc test showed that the Tall Hybrids (75cm) (M = 4.479) and SSC Hybrids 40cm (M = 4.229) were grouped together with no significant difference between them (group 'a'). However, the SSC Hybrids (75cm) (M = 3.500) showed a significant difference, forming group 'b'.

For early vigor, the ANOVA also indicated a significant effect of Hybrid, $F(2, 285) = 9.68$, $p < .001$. Duncan's post-hoc test found that Tall Hybrids (75cm) (M = 4.260) belonged to group 'a', while SSC Hybrids 40cm (M = 4.031) and SSC Hybrids (75cm) (M = 3.823) were placed in groups 'b' and 'c', respectively, showing distinct differences among all groups.

For average plant height, Hybrid had a highly significant effect, $F(2, 285) = 500.90$, $p < .001$. Post-hoc comparisons showed that Tall Hybrids (75cm) (M = 217.88) formed a distinct group 'a', whereas SSC Hybrids 40cm (M = 184.02) and SSC Hybrids (75cm) (M = 182.95) were grouped together in group 'b', indicating that both SSC hybrid types had similar average plant heights but were significantly different from the tall hybrids.

For average ear height, the one-way ANOVA revealed a significant influence of Hybrid, $F(2, 285) = 131.85$, $p < .001$. Duncan's test indicated that Tall Hybrids (75cm) (M = 76.77) belonged to group 'a', while SSC Hybrids 40cm (M = 60.28) and SSC Hybrids (75cm) (M = 59.66) were placed in group 'b', showing significant differences between the tall hybrids and the SSC hybrids, but not between the SSC hybrid groups.

The influence of Hybrid on E, A and gs

The influence of Hybrid on E, A, and gs was evaluated using one-way ANOVA and Duncan's post-hoc test.

Variable	Term	df	Sum Sqs	Mean Sqs	F	p
E1	Hybrid	2	1.340	0.670	0.192	0.825
	Residuals	285	992.795	3.483		
gs1	Hybrid	2	0.009	0.004	0.775	0.462
	Residuals	285	1.574	0.006		
A1	Hybrid	2	8.615	4.307	0.079	0.924
	Residuals	285	15488.180	54.344		

For E1, the one-way ANOVA revealed no significant effect of Hybrid, $F(2, 285) = 0.192$, $p = 0.825$, indicating that the hybrid groups did not significantly differ in their E values. Duncan's post-hoc test confirmed that all groups—SSC Hybrids (75cm) (M = 10.308), SSC Hybrids 40cm (M = 10.243), and Tall Hybrids (75cm) (M = 10.142)—formed a single group, showing no significant differences.

For gs1, the ANOVA similarly found no significant effect of Hybrid, $F(2, 285) = 0.775$, $p = 0.462$. Duncan's post-hoc test again grouped all hybrids together, with SSC Hybrids (75cm) (M = 0.405), Tall Hybrids (75cm) (M = 0.394), and SSC Hybrids 40cm (M = 0.393) showing no significant differences.

For A1, the results of the ANOVA indicated no significant effect of Hybrid, $F(2, 285) = 0.079$, $p = 0.924$, suggesting that hybrid type did not influence A. Duncan's post-hoc test confirmed this by placing SSC Hybrids 40cm (M = 27.262), Tall Hybrids (75cm) (M = 26.947), and SSC Hybrids (75cm) (M = 26.860) in the same group, indicating no significant differences among the hybrid groups for A.

In summary, there were no significant differences between the hybrid groups in terms of E1, gs1, and A1, with all hybrid types displaying similar values across these measures.

Duncan's posthoc test

Variable	Group	Sig. Diff.	Scores
E1	SSC Hybrids(75cm)	a	10.308
	SSC Hybrids 40cm	a	10.243
	Tall Hybrids(75cm)	a	10.142
gs1	SSC Hybrids(75cm)	a	0.405
	Tall Hybrids(75cm)	a	0.394
	SSC Hybrids 40cm	a	0.393
A1	SSC Hybrids 40cm	a	27.262
	Tall Hybrids(75cm)	a	26.947
	SSC Hybrids(75cm)	a	26.860

The influence of Hybrid and Irrigation on Stalk.ECB, Fusarium, Stay.Green, Harvesyed.plants and Kg_str_15.

The influence of Hybrid and Irrigation on Stalk.ECB, Fusarium, Stay.Green, Harvesyed.plants, and Kg_str_15 was evaluated using two-way ANOVA. Analyses were conducted in R using the dplyr, broom, and agricolae libraries, with Duncan's post-hoc test applied to assess pairwise differences between groups.

Variable	Term	df	Sum Sqs	Mean Sqs	F	p
Stalk.ECB	Hybrid	2	6974.674	3487.337	49.899	0.000
	Irrigation	1	2117.920	2117.920	30.305	0.000
	Hybrid:Irrigation	2	524.590	262.295	3.753	0.025
	Residuals	282	19708.229	69.887		
Fusarium	Hybrid	2	612.528	306.264	97.787	0.000
	Irrigation	1	51.681	51.681	16.501	0.000
	Hybrid:Irrigation	2	17.694	8.847	2.825	0.061
	Residuals	282	883.208	3.132		
Stay.Green	Hybrid	2	2.111	1.056	1.000	0.369
	Irrigation	1	28.753	28.753	27.253	0.000
	Hybrid:Irrigation	2	15.361	7.681	7.280	0.001
	Residuals	282	297.521	1.055		
Harvesyed.plants	Hybrid	2	696998.353	348499.177	2289.942	0.000
	Irrigation	1	177.096	177.096	1.164	0.282
	Hybrid:Irrigation	2	119.620	59.810	0.393	0.675
	Residuals	282	42916.713	152.187		
Kg_str_15.	Hybrid	2	563072.714	281536.357	11.928	0.000
	Irrigation	1	2278485.244	2278485.244	96.530	0.000
	Hybrid:Irrigation	2	7388.558	3694.279	0.157	0.855
	Residuals	282	6656314.975	23603.954		

Duncan's posthoc test

Variable	Factor	Group	Sig. Diff.	Scores
Stalk.ECB	Hybrid	SSC Hybrids 40cm	a	19.115
		Tall Hybrids(75cm)	b	10.875
		SSC Hybrids(75cm)	c	7.375
	Irrigation	2	a	15.167
		1	b	9.743
Fusarium	Hybrid	SSC Hybrids 40cm	a	5.000
		Tall Hybrids(75cm)	b	2.063
		SSC Hybrids(75cm)	b	1.771
	Irrigation	2	a	3.368
		1	b	2.521
Stay.Green	Hybrid	SSC Hybrids 40cm	a	5.177
		SSC Hybrids(75cm)	a	5.052
		Tall Hybrids(75cm)	a	4.969
	Irrigation	2	a	5.382
		1	b	4.750
Harvesyed.plants	Hybrid	SSC Hybrids 40cm	a	306.084

		SSC Hybrids(75cm)	a	303.981
		Tall Hybrids(75cm)	b	200.690
	Irrigation	1	a	271.036
		2	a	269.468
Kg_str_15.	Hybrid	SSC Hybrids 40cm	a	1101.396
		SSC Hybrids(75cm)	b	1056.502
		Tall Hybrids(75cm)	c	993.588
	Irrigation	1	a	1139.441
		2	b	961.549

For Stalk.ECB, both Hybrid and Irrigation had a significant effect, $F(2, 282) = 49.90$, $p < .001$ for Hybrid and $F(1, 282) = 30.31$, $p < .001$ for Irrigation. The interaction between Hybrid and Irrigation was also significant, $F(2, 282) = 3.75$, $p = .025$. Post-hoc analysis showed that SSC Hybrids 40cm (M = 19.115) formed group 'a', Tall Hybrids (75cm) (M = 10.875) formed group 'b', and SSC Hybrids (75cm) (M = 7.375) formed group 'c', indicating significant differences across all hybrid groups. For Irrigation, level 2 (M = 15.167) was significantly higher than level 1 (M = 9.743).

For Fusarium, the ANOVA revealed significant main effects for both Hybrid, $F(2, 282) = 97.79$, $p < .001$, and Irrigation, $F(1, 282) = 16.50$, $p < .001$. The interaction effect was marginally significant, $F(2, 282) = 2.83$, $p = .061$. Post-hoc tests indicated that SSC Hybrids 40cm (M = 5.000) formed group 'a', while Tall Hybrids (75cm) (M = 2.063) and SSC Hybrids (75cm) (M = 1.771) formed group 'b'. For Irrigation, level 2 (M = 3.368) was significantly higher than level 1 (M = 2.521).

For Stay.Green, Hybrid did not have a significant effect, $F(2, 282) = 1.00$, $p = .369$, while Irrigation had a significant effect, $F(1, 282) = 27.25$, $p < .001$. The interaction between Hybrid and Irrigation was also significant, $F(2, 282) = 7.28$, $p = .001$. Duncan's post-hoc test showed no significant differences between the hybrids, with SSC Hybrids 40cm (M = 5.177), SSC Hybrids (75cm) (M = 5.052), and Tall Hybrids (75cm) (M = 4.969) all forming group 'a'. However, Irrigation level 2 (M = 5.382) was significantly higher than level 1 (M = 4.750).

For Harvesyed.plants, Hybrid had a significant effect, $F(2, 282) = 2289.94$, $p < .001$, while Irrigation did not, $F(1, 282) = 1.16$, $p = .282$. The interaction between Hybrid and Irrigation was also non-significant, $F(2, 282) = 0.39$, $p = .675$. Duncan's post-hoc test revealed that SSC Hybrids 40cm (M = 306.084) and SSC Hybrids (75cm) (M = 303.981) formed group 'a', while Tall Hybrids (75cm) (M = 200.690) formed group 'b'. No significant differences were found between the irrigation levels.

For Kg_str_15, both Hybrid and Irrigation had significant effects, $F(2, 282) = 11.93$, $p < .001$ for Hybrid and $F(1, 282) = 96.53$, $p < .001$ for Irrigation. The interaction effect was not significant, $F(2, 282) = 0.16$, $p = .855$. Post-hoc analysis showed that SSC Hybrids 40cm (M = 1101.396) formed group 'a', SSC Hybrids (75cm) (M = 1056.502) formed group 'b', and Tall Hybrids (75cm) (M =

993.588) formed group 'c'. For Irrigation, level 1 (M = 1139.441) was significantly higher than level 2 (M = 961.549).

Given that Stalk.ECB and Fusarium had previously showed to depart from the normal distribution, the test was replicated after log-transforming the variable and the results are shown below.

Variable	Term	df	Sum Sqs	Mean Sqs	F	p
Stalk.ECB	Hybrid	2	45.388	22.694	48.179	0.000
	Irrigation	1	10.623	10.623	22.552	0.000
	Hybrid:Irrigation	2	0.206	0.103	0.219	0.803
	Residuals	282	132.830	0.471		
Fusarium	Hybrid	2	39.691	19.845	72.133	0.000
	Irrigation	1	2.765	2.765	10.049	0.002
	Hybrid:Irrigation	2	0.174	0.087	0.316	0.729
	Residuals	282	77.584	0.275		

For Stalk.ECB (log-transformed), significant effects were found for Hybrid, $F(2, 282) = 48.18$, $p < .001$, and Irrigation, $F(1, 282) = 22.55$, $p < .001$. However, the interaction between Hybrid and Irrigation was no longer significant, $F(2, 282) = 0.22$, $p = .803$.

For Fusarium (log-transformed), Hybrid and Irrigation continued to show significant effects, $F(2, 282) = 72.13$, $p < .001$ for Hybrid and $F(1, 282) = 10.05$, $p = .002$ for Irrigation. The interaction effect remained non-significant, $F(2, 282) = 0.32$, $p = .729$.

The influence of Hybrid and Irrigation on A, E and gs

The two-way ANOVA assessing the influence of Hybrid and Irrigation on **E**, **gs**, and **A** revealed that the majority of the variables did not exhibit significant effects across both main factors and their interaction. Specifically, for **E**, **gs**, and **A** at time points 2 through 6, neither Hybrid nor Irrigation consistently showed significant effects, nor were the interaction terms between Hybrid and Irrigation statistically significant in most cases.

For **E4**, a marginally significant main effect of Hybrid was observed ($F(2, 282) = 2.89$, $p = .057$), with a significant Hybrid × Irrigation interaction ($F(2, 282) = 5.38$, $p = .005$). Similarly, for **gs4**, the effect of Irrigation was significant ($F(1, 282) = 4.06$, $p = .045$), though Hybrid and the interaction were not significant. Notably, **A5** and **A6** displayed significant effects of Irrigation, with $F(1, 282) = 6.43$, $p = .012$ for **A5** and $F(1, 282) = 5.18$, $p = .024$ for **E6**. The corresponding Duncan post-hoc tests for these measures further supported the observed non-significance across most group comparisons, as no consistent differentiation was found between Hybrid or Irrigation groups.

Overall, the data demonstrated non-significance across the majority of tested measures for **E**, **gs**, and **A**, indicating limited interaction effects between Hybrid and Irrigation in these variables. The results suggest that neither factor alone, nor their interaction, consistently affected these measures across time points.

Variable	Term	df	Sum Sqs	Mean Sqs	F	p
E2	Hybrid	2	4.499	2.250	0.525	0.592
	Irrigation	1	1.565	1.565	0.365	0.546
	Hybrid:Irrigation	2	13.730	6.865	1.603	0.203
	Residuals	282	1207.750	4.283		
gs2	Hybrid	2	0.007	0.003	0.521	0.594
	Irrigation	1	0.021	0.021	3.272	0.072
	Hybrid:Irrigation	2	0.006	0.003	0.479	0.620
	Residuals	282	1.840	0.007		
A2	Hybrid	2	106.779	53.390	0.896	0.409
	Irrigation	1	17.145	17.145	0.288	0.592
	Hybrid:Irrigation	2	48.442	24.221	0.407	0.666
	Residuals	282	16796.270	59.561		
E3	Hybrid	2	6.438	3.219	0.735	0.480
	Irrigation	1	1.918	1.918	0.438	0.509
	Hybrid:Irrigation	2	9.224	4.612	1.054	0.350
	Residuals	282	1234.387	4.377		
gs3	Hybrid	2	0.010	0.005	0.746	0.475
	Irrigation	1	0.010	0.010	1.411	0.236
	Hybrid:Irrigation	2	0.010	0.005	0.723	0.486
	Residuals	282	1.959	0.007		
A3	Hybrid	2	18.658	9.329	0.178	0.837
	Irrigation	1	5.062	5.062	0.096	0.756
	Hybrid:Irrigation	2	163.031	81.516	1.554	0.213
	Residuals	282	14796.420	52.470		
E4	Hybrid	2	13.278	6.639	2.894	0.057
	Irrigation	1	3.055	3.055	1.331	0.250
	Hybrid:Irrigation	2	24.682	12.341	5.379	0.005
	Residuals	282	646.972	2.294		
gs4	Hybrid	2	0.021	0.010	2.347	0.098
	Irrigation	1	0.018	0.018	4.057	0.045
	Hybrid:Irrigation	2	0.012	0.006	1.361	0.258
	Residuals	282	1.255	0.004		
A4	Hybrid	2	48.287	24.143	0.607	0.546
	Irrigation	1	31.814	31.814	0.800	0.372
	Hybrid:Irrigation	2	67.101	33.550	0.843	0.431
	Residuals	282	11219.316	39.785		
E5	Hybrid	2	0.491	0.246	0.063	0.939
	Irrigation	1	7.094	7.094	1.806	0.180
	Hybrid:Irrigation	2	11.102	5.551	1.414	0.245
	Residuals	282	1107.436	3.927		
gs5	Hybrid	2	0.013	0.006	1.185	0.307
	Irrigation	1	0.048	0.048	8.776	0.003
	Hybrid:Irrigation	2	0.003	0.001	0.248	0.780
	Residuals	282	1.527	0.005		
A5	Hybrid	2	62.926	31.463	0.807	0.447
	Irrigation	1	250.470	250.470	6.425	0.012
	Hybrid:Irrigation	2	136.300	68.150	1.748	0.176
	Residuals	282	10993.875	38.985		
E6	Hybrid	2	3.114	1.557	0.913	0.402
	Irrigation	1	8.834	8.834	5.182	0.024
	Hybrid:Irrigation	2	5.888	2.944	1.727	0.180
	Residuals	282	480.774	1.705		
gs6	Hybrid	2	0.003	0.001	0.208	0.812
	Irrigation	1	0.052	0.052	7.620	0.006

Variable	Term	df	Sum Sqs	Mean Sqs	F	p
	Hybrid:Irrigation	2	0.009	0.004	0.629	0.534
	Residuals	282	1.924	0.007		
A6	Hybrid	2	16.880	8.440	0.350	0.705
	Irrigation	1	8.293	8.293	0.344	0.558
	Hybrid:Irrigation	2	222.345	111.172	4.608	0.011
	Residuals	282	6803.477	24.126		

Duncan's posthoc test

Variable	Factor	Group	Sig. Diff.	Scores
E2	Hybrid	SSC Hybrids(75cm)	a	10.552
		Tall Hybrids(75cm)	a	10.410
		SSC Hybrids 40cm	a	10.246
	Irrigation	2	a	10.476
		1	a	10.329
gs2	Hybrid	SSC Hybrids 40cm	a	0.413
		SSC Hybrids(75cm)	a	0.404
		Tall Hybrids(75cm)	a	0.402
	Irrigation	2	a	0.415
		1	a	0.398
A2	Hybrid	SSC Hybrids(75cm)	a	27.554
		Tall Hybrids(75cm)	a	27.398
		SSC Hybrids 40cm	a	26.191
	Irrigation	1	a	27.292
		2	a	26.804
E3	Hybrid	SSC Hybrids 40cm	a	10.934
		SSC Hybrids(75cm)	a	10.643
		Tall Hybrids(75cm)	a	10.596
	Irrigation	2	a	10.806
		1	a	10.643
gs3	Hybrid	SSC Hybrids 40cm	a	0.437
		Tall Hybrids(75cm)	a	0.430
		SSC Hybrids(75cm)	a	0.423
	Irrigation	2	a	0.436
		1	a	0.424
A3	Hybrid	SSC Hybrids(75cm)	a	26.526
		SSC Hybrids 40cm	a	26.168
		Tall Hybrids(75cm)	a	25.905
	Irrigation	1	a	26.332
		2	a	26.067
E4	Hybrid	SSC Hybrids 40cm	a	10.059
		Tall Hybrids(75cm)	ab	9.709
		SSC Hybrids(75cm)	b	9.544
	Irrigation	2	a	9.873
		1	a	9.667
gs4	Hybrid	SSC Hybrids 40cm	a	0.389
		Tall Hybrids(75cm)	a	0.371
		SSC Hybrids(75cm)	a	0.370
	Irrigation	2	a	0.385
		1	b	0.369
A4	Hybrid	Tall Hybrids(75cm)	a	27.886
		SSC Hybrids 40cm	a	27.251
		SSC Hybrids(75cm)	a	26.896

| Variable	Factor	Group	Sig. Diff.	Scores
	Irrigation	1	a	27.677
		2	a	27.012
E5	Hybrid	SSC Hybrids 40cm	a	9.959
		SSC Hybrids(75cm)	a	9.947
		Tall Hybrids(75cm)	a	9.866
	Irrigation	1	a	10.081
		2	a	9.767
gs5	Hybrid	Tall Hybrids(75cm)	a	0.452
		SSC Hybrids 40cm	a	0.441
		SSC Hybrids(75cm)	a	0.436
	Irrigation	2	a	0.456
		1	b	0.430
A5	Hybrid	SSC Hybrids(75cm)	a	23.901
		SSC Hybrids 40cm	a	23.431
		Tall Hybrids(75cm)	a	22.762
	Irrigation	1	a	24.297
		2	b	22.432
E6	Hybrid	SSC Hybrids(75cm)	a	8.967
		Tall Hybrids(75cm)	a	8.775
		SSC Hybrids 40cm	a	8.726
	Irrigation	2	a	8.998
		1	b	8.648
gs6	Hybrid	SSC Hybrids 40cm	a	0.391
		SSC Hybrids(75cm)	a	0.388
		Tall Hybrids(75cm)	a	0.383
	Irrigation	2	a	0.401
		1	b	0.374
A6	Hybrid	SSC Hybrids(75cm)	a	22.297
		SSC Hybrids 40cm	a	21.818
		Tall Hybrids(75cm)	a	21.755
	Irrigation	2	a	22.126
		1	a	21.787

All tests were replicated using log-transformed variables to address any potential violations of normality assumptions. The results of these log-transformed analyses yielded the same conclusions as the original tests. Specifically, there were no significant changes in the patterns of significance or the non-significance observed in the effects of Hybrid, Irrigation, and their interaction on **E**, **gs**, and **A** across the time points. This confirms that the overall conclusions remain robust even after transformation.

Repeated-Measures ANOVA

The repeated measures ANOVA was conducted to analyze the effect of time on the measures E, A, and gs across six weeks. The results revealed significant time effects for all three measures, indicating changes over time in the observed variables. The line plots representing the average values of each measure across time points are also provided for visual interpretation of these changes.

| Variable	Stratum	Term	df	Sum Sqs	Mean Sqs	F	p
E	ID	Residuals	1	13.034	13.034		
	ID:Time	Time	5	547.068	109.414		
	Within	Time	5	145.779	29.156	8.764	0.000
	Within	Residuals	1716	5708.828	3.327		
gs	ID	Residuals	1	0.220	0.220		
	ID:Time	Time	5	1.090	0.218		
	Within	Time	5	1.033	0.207	39.770	0.000
	Within	Residuals	1716	8.913	0.005		
A	ID	Residuals	1	1050.432	1050.432		
	ID:Time	Time	5	9919.129	1983.826		
	Within	Time	5	4975.963	995.193	24.832	0.000
	Within	Residuals	1716	68771.862	40.077		

For E, the ANOVA indicated a significant effect of time, $F(5,1716)=8.764$, $p<.001$. The line plot shows that the average value of E increased from Time 1 to Time 3, followed by a gradual decline until Time 6.
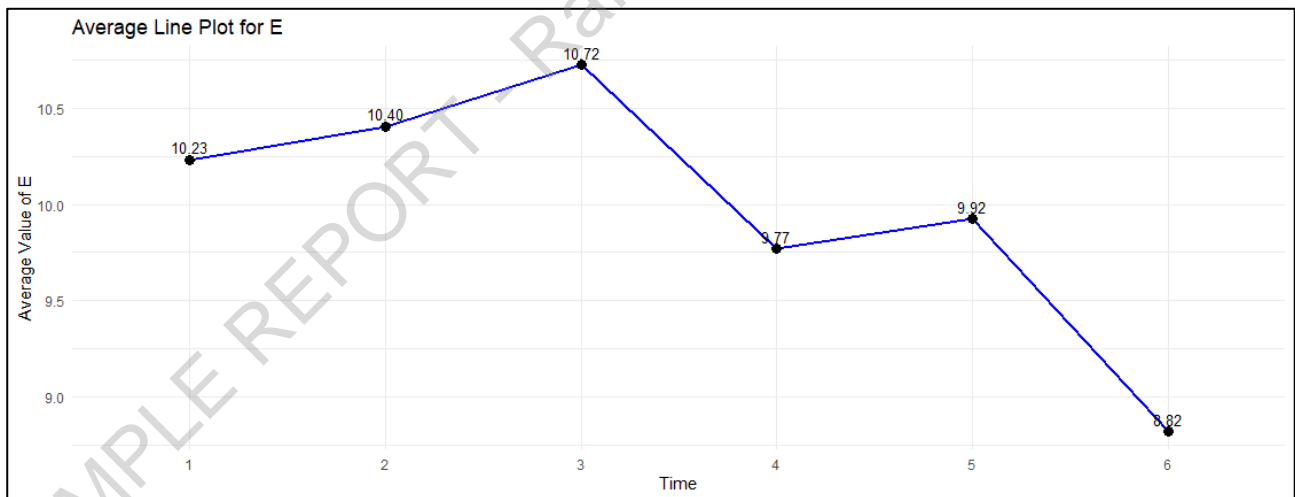
For gs, the results demonstrated a highly significant effect of time, $F(5,1716)=39.770$, $p<.001$. The line plot illustrates fluctuating values of gs, with peaks at Time 3 and Time 5 and a sharp decline towards Time 6.

Average Line Plot for gs
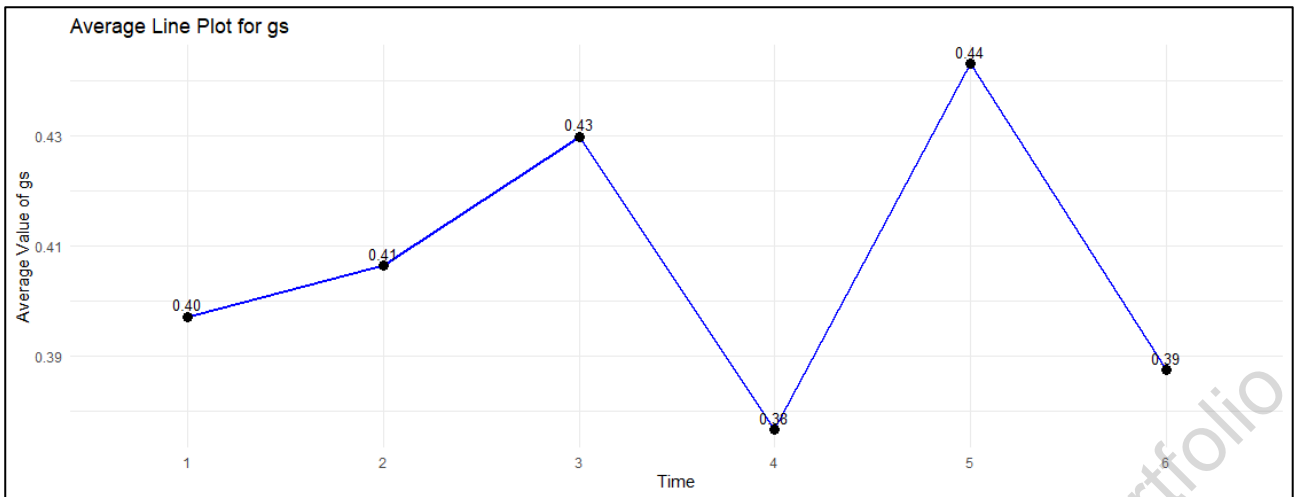
For A, the ANOVA revealed a significant effect of time, $F(5,1716)=24.832$, $p<.001$. The line plot for A shows relatively stable values from Time 1 to Time 3, followed by a sharp decrease at Time 6.

Average Line Plot for A
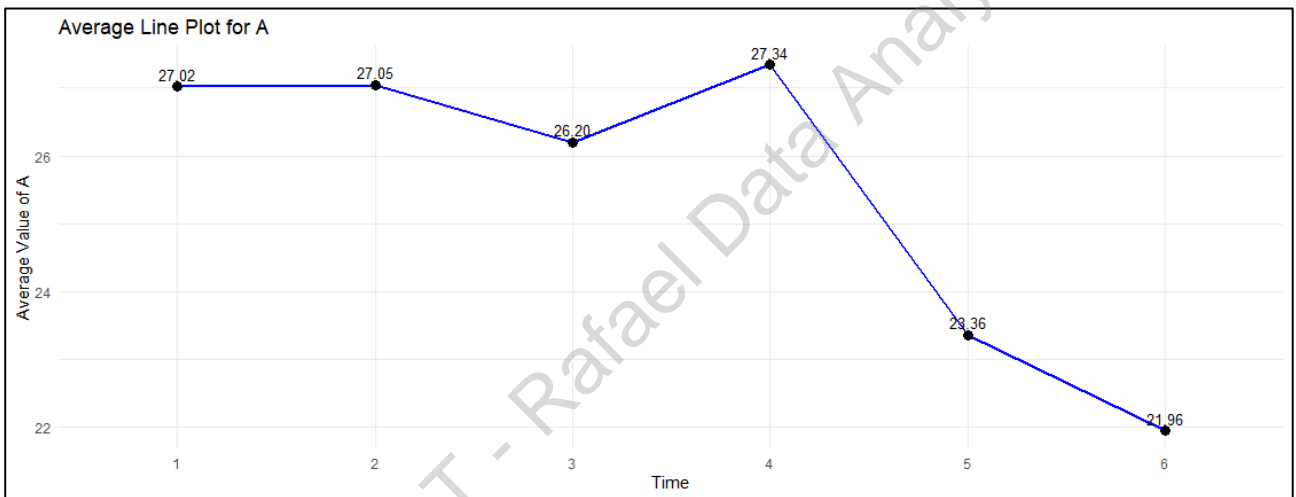
These findings highlight that time had a significant impact on the observed variables, suggesting dynamic changes across the six-week period.