

JMP Output for the REML Analysis of an RCBD with a Split Plot Arrangement

Response Yield Effect Summary

Source	LogWorth		PValue
B	8.465		0.00000
A*B	2.918		0.00121
A	2.023		0.00947

Summary of Fit

RSquare	0.985057
RSquare Adj	0.978519
Root Mean Square Error	0.776656
Mean of Response	20.72083
Observations (or Sum Wgts)	24

$$\begin{aligned}
 CV &= (RSME/\text{Mean}) * 100 \\
 &= (0.7767/20.7208) * 100 \\
 &= 3.75\%
 \end{aligned}$$

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Parameter Estimates

Term	Estimate	Std Error	DFDen	t Ratio	Prob> t
Intercept	20.720833	0.40481	2	51.19	0.0004*
A[0]	-3.304167	0.323903	2	-10.20	0.0095*
B[0]	-4.3375	0.274589	12	-15.80	<.0001*
B[1]	-1.1375	0.274589	12	-4.14	0.0014*
B[2]	3.3625	0.274589	12	12.25	<.0001*
A[0]*B[0]	0.4208333	0.274589	12	1.53	0.1513
A[0]*B[1]	-1.045833	0.274589	12	-3.81	0.0025*
A[0]*B[2]	1.2208333	0.274589	12	4.45	0.0008*

REML Variance Component Estimates

Random Effect	Var Ratio	Var Component	Std Error	95% Lower	95% Upper	Wald p-Value	Pct of Total
Rep	0.2932305	0.176875	0.5837344	-0.967223	1.3209735	0.7619	14.052
A*Rep	0.7935759	0.4786806	0.6324825	-0.760962	1.7183234	0.4492	38.028
Residual		0.6031944	0.2462531	0.31017	1.6436605		47.920
Total		1.25875	0.612255	0.5842403	4.4109094		100.000

-2 LogLikelihood = 63.804724481

Note: Total is the sum of the positive variance components.

Total including negative estimates = 1.25875

Covariance Matrix of Variance Component Estimates

Random Effect	Rep	A*Rep	Residual
Rep	0.3407459	-0.198122	3.469e-15
A*Rep	-0.198122	0.4000341	-0.01516
Residual	3.469e-15	-0.01516	0.0606406

Error (b) MS

Fixed Effect Tests

Source	Nparm	DF	DFDen	F Ratio	Prob > F
A	1	1	2	104.0624	0.0095*
B	3	3	12	118.9563	<.0001*
A*B	3	3	12	10.3327	0.0012*

Correct results of *F*-tests on fixed effects using the proper denominators

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Effect Details

A

Least Squares Means Table

Level	Least Sq Mean	Std Error
0	17.416667	0.51844452
1	24.025000	0.51844452

LSMeans Differences Student's t

$\alpha=0.050$

LSMean[i] By LSMean[j]

Mean[i]-Mean[j]	0	1
Std Err Dif		
Lower CL Dif		
Upper CL Dif		
0	0	-6.6083
	0	0.64781
	0	-9.3956
	0	-3.821
1	6.60833	0
	0.64781	0
	3.82105	0
	9.39562	0

Standard error of the difference $s_{\bar{y}_1 - \bar{y}_2}$ for calculating the LSD for comparison of the A main effect (e.g. a_0 vs. a_1).

Level		Least Sq Mean
1	A	24.025000
0	B	17.416667

Levels not connected by same letter are significantly different.

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B

Least Squares Means Table

Level	Least Sq Mean	Std Error
0	16.383333	0.48915318
1	19.583333	0.48915318
2	24.083333	0.48915318
3	22.833333	0.48915318

LSMeans Differences Student's t

$\alpha=0.050$

LSMean[i] By LSMean[j]

Mean[i]-Mean[j] Std Err Dif Lower CL Dif Upper CL Dif	0	1	2	3
0	0	-3.2	-7.7	-6.45
	0	0.4484	0.4484	0.4484
	0	-4.177	-8.677	-7.427
	0	-2.223	-6.723	-5.473
1	3.2	0	-4.5	-3.25
	0.4484	0	0.4484	0.4484
	2.22301	0	-5.477	-4.227
	4.17699	0	-3.523	-2.273
2	7.7	4.5	0	1.25
	0.4484	0.4484	0	0.4484
	6.72301	3.52301	0	0.27301
	8.67699	5.47699	0	2.22699
3	6.45	3.25	-1.25	0
	0.4484	0.4484	0.4484	0
	5.47301	2.27301	-2.227	0
	7.42699	4.22699	-0.273	0

Standard error of the difference $s_{\bar{y}_1 - \bar{y}_2}$ for calculating the LSD for comparison of the B main effect (e.g. b_0 vs. b_1).

Level		Least Sq Mean
2	A	24.083333
3	B	22.833333
1	C	19.583333
0	D	16.383333

Levels not connected by same letter are significantly different.

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A*B

Least Squares Means Table

Level	Least Sq Mean	Std Error
0,0	13.500000	0.64775252
0,1	15.233333	0.64775252
0,2	22.000000	0.64775252
0,3	18.933333	0.64775252
1,0	19.266667	0.64775252
1,1	23.933333	0.64775252
1,2	26.166667	0.64775252
1,3	26.733333	0.64775252

Standard error of the difference $s_{\bar{y}_1 - \bar{y}_2}$ for calculating the LSD for comparison of different subplots within the same whole plot (e.g. a_0b_0 vs. a_0b_1).

Standard error of the difference $s_{\bar{y}_1 - \bar{y}_2}$ for calculating the LSD for comparison of different whole plot levels for the same or different subplots (e.g. a_0b_0 vs. a_1b_0 or a_0b_0 vs. a_1b_1).

LSMeans Differences Student's t

$\alpha=0.050$

LSMean[i] By LSMean[j]

Mean[i]-Mean[j]	0,0	0,1	0,2	0,3	1,0	1,1	1,2	1,3
Std Err Dif								
Lower CL Dif								
Upper CL Dif								
0,0	0	-1.73167	-8.5	-5.43333	-5.76667	-10.43333	-12.667	-13.233
	0	0.63414	0.63414	0.63414	0.84926	0.84926	0.84926	0.84926
	0	-3.115	-9.8817	-6.815	-7.8978	-12.564	-14.798	-15.364
	0	-0.3517	-7.1183	-4.0517	-3.6356	-8.3022	-10.536	-11.102
0,1	1.73333	0	-6.7667	-3.7	-4.0333	-8.7	-10.933	-11.5
	0.63414	0	0.63414	0.63414	0.84926	0.84926	0.84926	0.84926
	0.35167	0	-8.1483	-5.0817	-6.1644	-10.831	-13.064	-13.631
	3.115	0	-5.385	-2.3183	-1.9022	-6.5689	-8.8022	-9.3689
0,2	8.5	6.76667	0	3.06667	2.73333	-1.9333	-4.1667	-4.7333
	0.63414	0.63414	0	0.63414	0.84926	0.84926	0.84926	0.84926
	7.11833	5.385	0	1.685	0.60223	-4.0644	-6.2978	-6.8644
	9.88167	8.14833	0	4.44833	4.86444	0.19777	-2.0356	-2.6022
0,3	5.43333	3.7	-3.0667	0	-0.3333	-5	-7.2333	-7.8
	0.63414	0.63414	0.63414	0	0.84926	0.84926	0.84926	0.84926
	4.05167	2.31833	-4.4483	0	-2.4644	-7.1311	-9.3644	-9.9311
	6.815	5.08167	-1.685	0	1.79777	-2.8689	-5.1022	-5.6689
1,0	5.76667	4.03333	-2.7333	0.33333	0	-4.6667	-6.9	-7.4667
	0.84926	0.84926	0.84926	0.84926	0	0.63414	0.63414	0.63414
	3.63556	1.90223	-4.8644	-1.7978	0	-6.0483	-8.2817	-8.8483
	7.89777	6.16444	-0.6022	2.46444	0	-3.285	-5.5183	-6.085
1,1	10.4333	8.7	1.93333	5	4.66667	0	-2.2333	-2.8
	0.84926	0.84926	0.84926	0.84926	0.63414	0	0.63414	0.63414
	8.30223	6.5689	-0.1978	2.8689	3.285	0	-3.615	-4.1817
	12.5644	10.8311	4.06444	7.1311	6.04833	0	-0.8517	-1.4183
1,2	12.6667	10.9333	4.16667	7.23333	6.9	2.23333	0	-0.5667
	0.84926	0.84926	0.84926	0.84926	0.63414	0.63414	0	0.63414
	10.5356	8.80223	2.03556	5.10223	5.51833	0.85167	0	-1.9483
	14.7978	13.0644	6.29777	9.36444	8.28167	3.615	0	0.815
1,3	13.2333	11.5	4.73333	7.8	7.46667	2.8	0.56667	0
	0.84926	0.84926	0.84926	0.84926	0.63414	0.63414	0.63414	0
	11.1022	9.3689	2.60223	5.6689	6.085	1.41833	-0.815	0
	15.3644	13.6311	6.86444	9.9311	8.84833	4.18167	1.94833	0

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Level		Least Sq Mean
1,3	A	26.733333
1,2	A	26.166667
1,1	B	23.933333
0,2	B	22.000000
1,0	C	19.266667
0,3	C	18.933333
0,1	D	15.233333
0,0	E	13.500000

Levels not connected by same letter are significantly different.