

JMP Output for the Analysis of a Split Plot Arrangement for an RCBD Analyzed Using Default Method (EMS)

Response Yield Effect Summary

Source	LogWorth	PValue
A	10.065	0.00000
B	8.465	0.00000
A*B	2.918	0.00121
Rep	1.917	0.01211
Rep*A	1.376	0.04206

Summary of Fit

RSquare	0.985975
RSquare Adj	0.97312
Root Mean Square Error	0.776656
Mean of Response	20.72083
Observations (or Sum Wgts)	24

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	11	508.88125	46.2619	76.6949
Error	12	7.23833	0.6032	Prob > F
C. Total	23	516.11958		<.0001*

Error (b) MS

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	20.720833	0.158534	130.70	<.0001*
Rep[1]	-0.483333	0.224201	-2.16	0.0521
Rep[2]	-0.320833	0.224201	-1.43	0.1780
A[0]	-3.304167	0.158534	-20.84	<.0001*
Rep[1]*A[0]	0.3666667	0.224201	1.64	0.1279
Rep[2]*A[0]	0.2791667	0.224201	1.25	0.2368
B[0]	-4.3375	0.274589	-15.80	<.0001*
B[1]	-1.1375	0.274589	-4.14	0.0014*

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Term	Estimate	Std Error	t Ratio	Prob> t
B[2]	3.3625	0.274589	12.25	<.0001*
A[0]*B[0]	0.4208333	0.274589	1.53	0.1513
A[0]*B[1]	-1.045833	0.274589	-3.81	0.0025*
A[0]*B[2]	1.2208333	0.274589	4.45	0.0008*

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Rep	2	2	7.86583	6.5201	0.0121*
A	1	1	262.02042	434.3880	<.0001*
Rep*A	2	2	5.03583	4.1743	0.0421*
B	3	3	215.26125	118.9563	<.0001*
A*B	3	3	18.69792	10.3327	0.0012*

Notice these are SS, not MS.

Effect Details

Rep

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
1	20.237500	0.27458934	20.2375
2	20.400000	0.27458934	20.4000
3	21.525000	0.27458934	21.5250

A

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
0	17.416667	0.22420126	17.4167
1	24.025000	0.22420126	24.0250

This is Error(a)

- By default, JMP uses the last error term, Error(b) in this case as the denominator of all *F*-tests. Thus, the *F*-values for Rep, B and A*B are correct.
- You will need to calculate the *F*-value by hand for A using Rep*A MS as the denominator of this *F*-test.

Use LSD #1 for comparing these two means

**JMP Output for the Analysis of a Split Plot Arrangement for an RCBD
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B
Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
0	16.383333	0.31706846	16.3833
1	19.583333	0.31706846	19.5833
2	24.083333	0.31706846	24.0833
3	22.833333	0.31706846	22.8333

Use LSD #2 for comparing these two means

A*B
Least Squares Means Table

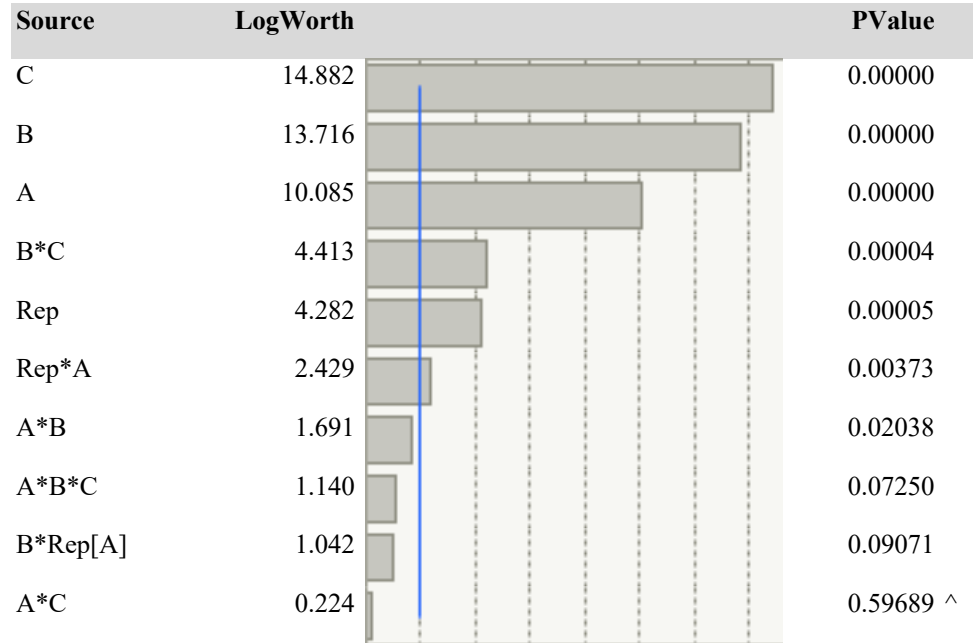
Level	Least Sq Mean	Std Error
0,0	13.500000	0.44840251
0,1	15.233333	0.44840251
0,2	22.000000	0.44840251
0,3	18.933333	0.44840251
1,0	19.266667	0.44840251
1,1	23.933333	0.44840251
1,2	26.166667	0.44840251
1,3	26.733333	0.44840251

Use LSD #3 for comparing these two means, two different subplot levels within the same whole plot level.

Use LSD #4 for comparing these two means, two different whole plot levels with the same or different subplot levels.

JMP Output for the Analysis of a Split-split Plot Arrangement for an RCBD Analyzed Using Default Method (EMS)

Response Yield Effect Summary



Summary of Fit

RSquare	0.940682
RSquare Adj	0.883012
Root Mean Square Error	2.163448
Mean of Response	30.93611
Observations (or Sum Wgts)	72

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	35	2672.1078	76.3459	16.3115
Error	36	168.4983	4.6805	Prob > F
C. Total	71	2840.6061		<.0001*

Error (c) MS

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	30.936111	0.254965	121.33	<.0001*
Rep[1]	1.7694444	0.441612	4.01	0.0003*

**JMP Output for the Analysis of a Split-split Plot Arrangement for an RCBD
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Term	Estimate	Std Error	t Ratio	Prob> t
Rep[2]	0.975	0.441612	2.21	0.0337*
Rep[3]	-1.125	0.441612	-2.55	0.0153*
A[0]	1.4180556	0.360575	3.93	0.0004*
A[1]	2.0722222	0.360575	5.75	<.0001*
Rep[1]*A[0]	-0.806944	0.624534	-1.29	0.2046
Rep[1]*A[1]	2.5388889	0.624534	4.07	0.0002*
Rep[2]*A[0]	1.1041667	0.624534	1.77	0.0855
Rep[2]*A[1]	-1.783333	0.624534	-2.86	0.0071*
Rep[3]*A[0]	0.6041667	0.624534	0.97	0.3398
Rep[3]*A[1]	-0.233333	0.624534	-0.37	0.7109
B[0]	-3.133333	0.254965	-12.29	<.0001*
A[0]*B[0]	-1.0625	0.360575	-2.95	0.0056*
A[1]*B[0]	0.5	0.360575	1.39	0.1741
A[0]:B[0]*Rep[1]	1.5791667	0.764895	2.06	0.0462*
A[0]:B[0]*Rep[2]	0.4625	0.764895	0.60	0.5492
A[0]:B[0]*Rep[3]	-0.4375	0.764895	-0.57	0.5709
A[1]:B[0]*Rep[1]	0.25	0.764895	0.33	0.7457
A[1]:B[0]*Rep[2]	0	0.764895	0.00	1.0000
A[1]:B[0]*Rep[3]	0.9833333	0.764895	1.29	0.2068
A[2]:B[0]*Rep[1]	1.2541667	0.764895	1.64	0.1098
A[2]:B[0]*Rep[2]	0.7375	0.764895	0.96	0.3414
A[2]:B[0]*Rep[3]	-0.3125	0.764895	-0.41	0.6853
C[0]	-4.515278	0.360575	-12.52	<.0001*
C[1]	0.0763889	0.360575	0.21	0.8334
A[0]*C[0]	-0.551389	0.50993	-1.08	0.2868
A[0]*C[1]	0.1444444	0.50993	0.28	0.7786
A[1]*C[0]	0.7569444	0.50993	1.48	0.1464
A[1]*C[1]	-0.084722	0.50993	-0.17	0.8690
B[0]*C[0]	0.9958333	0.360575	2.76	0.0090*
B[0]*C[1]	0.8875	0.360575	2.46	0.0188*

JMP Output for the Analysis of a Split-split Plot Arrangement for an RCBD Analyzed Using Default Method (EMS)

Term	Estimate	Std Error	t Ratio	Prob> t
A[0]*B[0]*C[0]	0.1375	0.50993	0.27	0.7890
A[0]*B[0]*C[1]	-0.166667	0.50993	-0.33	0.7457
A[1]*B[0]*C[0]	-1.4125	0.50993	-2.77	0.0088*
A[1]*B[0]*C[1]	0.6958333	0.50993	1.36	0.1809

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Rep	3	3	143.45611	10.2166	<.0001*
A	2	2	443.68861	47.3975	<.0001*
Rep*A	6	6	111.75806	3.9796	0.0037*
B	1	1	706.88000	151.0263	<.0001*
A*B	2	2	40.68750	4.3465	0.0204*
B*Rep[A]	9	9	78.34250	1.8598	0.0907
C	2	2	962.33528	102.8024	<.0001*
A*C	4	4	13.10972	0.7002	0.5969
B*C	2	2	127.83083	13.6557	<.0001*
A*B*C	4	4	44.01917	2.3512	0.0725

Notice these are SS, not MS.

- By default, JMP uses the last error term, Error(c) in this case as the denominator of all F-tests. Thus, the F-values for Rep, C, A*C, B*C, and A*B*C are correct.
- You will need to calculate the F-value by hand for A using Rep*A MS as the denominator of this F-test.
- You will need to calculate the F-value by hand for B and A*B using B*Rep(A) MS as the denominator of this F-test

Effect Details

A Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
0	32.354167	0.44161207	32.3542
1	33.008333	0.44161207	33.0083
2	27.445833	0.44161207	27.4458

This is Error(b)

This is Error(a)

Use LSD #1 for comparing these two means

B Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
0	27.802778	0.36057474	27.8028
1	34.069444	0.36057474	34.0694

Use LSD #2 for comparing these two means

JMP Output for the Analysis of a Split-split Plot Arrangement for an RCBD Analyzed Using Default Method (EMS)

A*B
Least Squares Means Table

Level	Least Sq Mean	Std Error
0,0	28.158333	0.62453378
0,1	36.550000	0.62453378
1,0	30.375000	0.62453378
1,1	35.641667	0.62453378
2,0	24.875000	0.62453378
2,1	30.016667	0.62453378

Use LSD #4 for comparing means for two different subplot levels within the same whole plot level.

Use LSD #5 for comparing means for two different whole plot levels with the same or **different subplot levels**.

C
Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
0	26.420833	0.44161207	26.4208
1	31.012500	0.44161207	31.0125
2	35.375000	0.44161207	35.3750

Use LSD #3 for comparing these two means

A*C
Least Squares Means Table

Level	Least Sq Mean	Std Error
0,0	27.287500	0.76489454
0,1	32.575000	0.76489454
0,2	37.200000	0.76489454
1,0	29.250000	0.76489454
1,1	33.000000	0.76489454
1,2	36.775000	0.76489454
2,0	22.725000	0.76489454
2,1	27.462500	0.76489454
2,2	32.150000	0.76489454

Use LSD #6 for comparing means for two different sub-subplot levels within the same whole plot

Use LSD #7 for comparing means for two different whole plot levels with the same or **different subplot levels**.

JMP Output for the Analysis of a Split-split Plot Arrangement for an RCBD Analyzed Using Default Method (EMS)

B*C
Least Squares Means Table

Level	Least Sq Mean	Std Error
0,0	24.283333	0.62453378
0,1	28.766667	0.62453378
0,2	30.358333	0.62453378
1,0	28.558333	0.62453378
1,1	33.258333	0.62453378
1,2	40.391667	0.62453378

Use LSD #8 for comparing means for two different sub-subplot levels within the same subplot plot

Use LSD #9 for comparing means for two different whole plot levels with the same or **different subplot levels.**

A*B*C
Least Squares Means Table

Level	Least Sq Mean	Std Error
0,0,0	24.225000	1.0817242
0,0,1	29.100000	1.0817242
0,0,2	31.150000	1.0817242
0,1,0	30.350000	1.0817242
0,1,1	36.050000	1.0817242
0,1,2	43.250000	1.0817242
1,0,0	26.200000	1.0817242
1,0,1	31.950000	1.0817242
1,0,2	32.975000	1.0817242
1,1,0	32.300000	1.0817242
1,1,1	34.050000	1.0817242
1,1,2	40.575000	1.0817242
2,0,0	22.425000	1.0817242
2,0,1	25.250000	1.0817242
2,0,2	26.950000	1.0817242
2,1,0	23.025000	1.0817242
2,1,1	29.675000	1.0817242
2,1,2	37.350000	1.0817242

Use LSD #10 for comparing sub-subplot means at the same combination of whole plot and subplot treatments.

Use LSD #11 for comparing subplot means at the same combination of whole plot and sub-subplot treatments.

Use LSD #12 for comparing whole plot means at the same combination of subplot and sub-subplot treatments.

JMP Output for the Analysis of a Split Block Arrangement for an RCBD Analyzed Using Default Method (EMS)

Response Yield Effect Summary

Source	LogWorth	PValue
A	5.748	0.00000
B	4.658	0.00002
A*B	1.774	0.01683
Rep	1.271	0.05360
A*Rep	0.940	0.11477
B*Rep	0.110	0.77670

Summary of Fit

RSquare	0.990776
RSquare Adj	0.96464
Root Mean Square Error	0.890771
Mean of Response	20.72083
Observations (or Sum Wgts)	24

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	17	511.35875	30.0799	37.9092
Error	6	4.76083	0.7935	Prob > F
C. Total	23	516.11958		0.0001*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	20.720833	0.181828	113.96	<.0001*
Rep[1]	-0.483333	0.257143	-1.88	0.1092
Rep[2]	-0.320833	0.257143	-1.25	0.2586
A[0]	-3.304167	0.181828	-18.17	<.0001*
A[0]*Rep[1]	0.3666667	0.257143	1.43	0.2038
A[0]*Rep[2]	0.2791667	0.257143	1.09	0.3193
B[0]	-4.3375	0.314935	-13.77	<.0001*

Error (c) MS

**JMP Output for the Analysis of a Split Block Arrangement for an RCBD
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Term	Estimate	Std Error	t Ratio	Prob> t
B[1]	-1.1375	0.314935	-3.61	0.0112*
B[2]	3.3625	0.314935	10.68	<.0001*
B[0]*Rep[1]	0.65	0.445385	1.46	0.1947
B[0]*Rep[2]	-0.3125	0.445385	-0.70	0.5092
B[1]*Rep[1]	-0.25	0.445385	-0.56	0.5949
B[1]*Rep[2]	0.3375	0.445385	0.76	0.4773
B[2]*Rep[1]	-0.45	0.445385	-1.01	0.3513
B[2]*Rep[2]	-0.0125	0.445385	-0.03	0.9785
A[0]*B[0]	0.4208333	0.314935	1.34	0.2299
A[0]*B[1]	-1.045833	0.314935	-3.32	0.0160*
A[0]*B[2]	1.2208333	0.314935	3.88	0.0082*

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Rep	2	2	7.86583	4.9566	0.0536
A	1	1	262.02042	330.2200	<.0001*
A*Rep	2	2	5.03583	3.1733	0.1148
B	3	3	215.26125	90.4301	<.0001*
B*Rep	6	6	2.47750	0.5204	0.7767
A*B	3	3	18.69792	7.8549	0.0168*

Notice these are SS, not MS.

- By default, JMP uses the last error term, Error(c) in this case as the denominator of all F-tests. Thus, the F-values for Rep and A*B are correct.
- You will need to calculate the F-value by hand for A using Rep*A MS as the denominator of this F-test.
- You will need to calculate the F-value by hand for B using B*Rep MS as the denominator of this F-test

Effect Details

**A
Least Squares Means Table**

Level	Least Sq Mean	Std Error	Mean
0	17.416667	0.25714332	17.4167
1	24.025000	0.25714332	24.0250

This is Error(a)

This is Error(b)

Use LSD #1 for comparing two horizontal means

JMP Output for the Analysis of a Split Block Arrangement for an RCBD Analyzed Using Default Method (EMS)

B
Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
0	16.383333	0.36365557	16.3833
1	19.583333	0.36365557	19.5833
2	24.083333	0.36365557	24.0833
3	22.833333	0.36365557	22.8333

Use LSD #2 for comparing two vertical means

A*B
Least Squares Means Table

Level	Least Sq Mean	Std Error
0,0	13.500000	0.51428663
0,1	15.233333	0.51428663
0,2	22.000000	0.51428663
0,3	18.933333	0.51428663
1,0	19.266667	0.51428663
1,1	23.933333	0.51428663
1,2	26.166667	0.51428663
1,3	26.733333	0.51428663

Use LSD #3 for comparing two horizontal means at the same level of the vertical factor.

Use LSD #4 for comparing two vertical means at the same level of the horizontal factor.

Use LSD #5 for comparing two horizontal means at different levels of the horizontal factor.