Statistical Tool for Agricultural Research (STAR)
Thu Nov 17 16:26:22 2016

Analysis of Variance
Randomized Complete Block Design

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ANALYSIS FOR RESPONSE VARIABLE: DFP
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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE
Response Variable: DFP

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	126.4333	63.2167	11.28	0.0001
Genotypes	19	4317.0000	227.2105	40.55	0.0000
Error	38	212.9000	5.6026		
Total	59	4656.3333			

Summary Statistics

CV(%)	DFP Mean
1.88	**126.17**

Standard Errors

Effects	StdErr
Replication	0.75
Genotypes	1.93

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	5.6026
Critical Value	5.3760

Test Statistics 7.3467

Summary of the Result:

Genotypes	means	N	group
1	112.67	3	i
2	111.00	3	i
3	115.00	3	hi
4	130.67	3	bcd
5	132.00	3	bc
6	133.00	3	bc
7	121.67	3	fgh
8	137.33	3	b
9	117.33	3	ghi
10	123.33	3	defg
11	147.00	3	a
12	129.33	3	cde
13	133.33	3	bc
14	132.00	3	bc
15	124.33	3	defg
16	123.00	3	efg
17	121.00	3	fgh
18	126.00	3	cdef
19	126.67	3	cdef
20	126.67	3	cdef

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: HD

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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE
Response Variable: HD

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	1.9000	0.9500	0.11	0.8932
Genotypes	19	2470.7333	130.0386	15.50	0.0000
Error	38	318.7667	8.3886		
Total	59	2791.4000			

Summary Statistics

CV(%)	HD Mean
5.26	**55.10**

Standard Errors

Effects	StdErr
Replication	0.92
Genotypes	2.36

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	8.3886
Critical Value	5.3760
Test Statistics	8.9896

Summary of the Result:

Genotypes	means	N	group
1	57.33	3	bcde
2	54.33	3	cdef
3	54.67	3	cdef
4	67.33	3	a
5	43.33	3	g
6	48.67	3	efg
7	62.67	3	abc
8	49.33	3	efg
9	56.33	3	cde
10	47.33	3	fg
11	52.67	3	def
12	56.33	3	cde
13	49.33	3	efg
14	46.00	3	fg
15	52.00	3	defg
16	60.00	3	abcd
17	65.33	3	ab
18	61.67	3	abc
19	57.00	3	bcde
20	60.33	3	abcd

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: FFM

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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE
Response Variable: FFM

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	3.0333	1.5167	0.34	0.7112
Genotypes	19	2620.3167	137.9114	31.26	0.0000
Error	38	167.6333	4.4114		
Total	59	2790.9833			

Summary Statistics

CV(%)	FFM Mean
1.54	**135.98**

Standard Errors

Effects	StdErr
Replication	0.66
Genotypes	1.71

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	4.4114
Critical Value	5.3760
Test Statistics	6.5191

Summary of the Result:

Genotypes	means	N	group
1	129.00	3	ij
2	127.33	3	j
3	130.00	3	hij
4	133.00	3	fghij
5	137.33	3	cdefg
6	136.33	3	defgh
7	127.33	3	j
8	139.00	3	cdef
9	132.00	3	ghij
10	131.00	3	ghij
11	154.33	3	a
12	134.33	3	efghi
13	143.00	3	bc
14	146.33	3	b
15	137.33	3	cdefg
16	137.00	3	cdefg
17	131.00	3	ghij
18	132.67	3	fghij
19	141.00	3	bcd
20	140.33	3	bcde

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: HFM

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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE
Response Variable: HFM

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	133.4333	66.7167	14.75	0.0000
Genotypes	19	4294.8500	226.0447	49.97	0.0000
Error	38	171.9000	4.5237		
Total	59	4600.1833			

Summary Statistics

CV(%)	HFM Mean
1.18	179.78

Standard Errors

Effects	StdErr
Replication	0.67
Genotypes	1.74

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	4.5237
Critical Value	5.3760
Test Statistics	6.6015

Summary of the Result:

Genotypes	means	N	group
1	168.33	3	hi
2	164.67	3	i
3	168.33	3	hi
4	196.33	3	a
5	175.00	3	efg
6	179.00	3	cdef
7	180.00	3	bcde
8	185.00	3	bc
9	173.33	3	fgh
10	170.00	3	ghi
11	197.33	3	a
12	185.00	3	bc
13	182.00	3	bcd
14	178.00	3	def
15	174.33	3	efgh
16	182.67	3	bcd
17	184.67	3	bc
18	186.33	3	b
19	180.00	3	bcde
20	185.33	3	bc

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: PH
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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE
Response Variable: PH

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	190.4779	95.2389	1.54	0.2265
Genotypes	19	11344.7983	597.0946	9.68	0.0000
Error	38	2343.0677	61.6597		
Total	59	13878.3439			

Summary Statistics

CV(%)	PH Mean
11.00	**71.36**

Standard Errors

Effects	StdErr
Replication	2.48
Genotypes	6.41

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	61.6597
Critical Value	5.3760
Test Statistics	24.3724

Summary of the Result:

Genotypes	means	N	group
1	44.60	3	d
2	50.75	3	cd
3	53.42	3	cd
4	85.67	3	ab
5	93.72	3	a
6	82.27	3	ab
7	86.22	3	ab
8	45.12	3	d
9	72.08	3	abc
10	80.47	3	ab
11	78.33	3	ab
12	71.63	3	abc
13	73.67	3	abc
14	78.90	3	ab
15	65.48	3	bcd
16	86.26	3	ab
17	66.80	3	bcd
18	68.10	3	bcd
19	79.03	3	ab
20	64.67	3	bcd

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: NPB

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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE

Response Variable: NPB

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	26.5333	13.2667	2.20	0.1251
Genotypes	19	355.3333	18.7018	3.10	0.0015
Error	38	229.4667	6.0386		
Total	59	611.3333			

Summary Statistics

CV(%)	NPB Mean
17.14	**14.33**

Standard Errors

Effects	StdErr
Replication	0.78
Genotypes	2.01

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	6.0386
Critical Value	5.3760
Test Statistics	7.6272

Summary of the Result:

Genotypes	means	N	group
1	16.67	3	ab
2	12.00	3	ab
3	13.33	3	ab
4	14.33	3	ab
5	16.33	3	ab
6	13.67	3	ab
7	14.33	3	ab
8	18.00	3	ab
9	13.33	3	ab
10	10.67	3	b
11	19.00	3	a
12	14.33	3	ab
13	17.00	3	ab
14	11.67	3	ab
15	12.00	3	ab
16	12.67	3	ab
17	12.33	3	ab
18	11.67	3	ab
19	18.67	3	a
20	14.67	3	ab

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: X10.EFW

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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE
Response Variable: X10.EFW

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	152.7787	76.3893	0.35	0.7078
Genotypes	19	383739.4449	20196.8129	92.20	0.0000
Error	38	8324.2357	219.0588		
Total	59	392216.4593			

Summary Statistics

CV(%)	X10.EFW Mean
21.51	**68.80**

Standard Errors

Effects	StdErr
Replication	4.68
Genotypes	12.08

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	219.0588
Critical Value	5.3760
Test Statistics	45.9385

Summary of the Result:

Genotypes	means	N	group
1	240.29	3	ab
2	214.42	3	b
3	272.93	3	a
4	26.97	3	fg
5	14.69	3	g
6	14.35	3	g
7	110.24	3	c
8	18.71	3	fg
9	22.29	3	fg
10	21.05	3	fg
11	9.70	3	g
12	15.34	3	fg
13	12.97	3	g
14	106.18	3	cd
15	100.57	3	cde
16	17.98	3	fg
17	22.67	3	fg
18	19.10	3	fg
19	54.67	3	efg
20	60.96	3	def

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: X10.DFW

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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE

Response Variable: X10.DFW

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	2.9528	1.4764	3.87	0.0296
Genotypes	19	2071.7972	109.0420	285.56	0.0000
Error	38	14.5106	0.3819		
Total	59	2089.2606			

Summary Statistics

CV(%)	X10.DFW Mean
6.86	9.00

Standard Errors

Effects	StdErr
Replication	0.1954
Genotypes	0.5046

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	0.3819
Critical Value	5.3760
Test Statistics	1.9180

Summary of the Result:

Genotypes	means	N	group
1	23.55	3	a
2	19.29	3	b
3	16.47	3	c
4	3.72	3	gh
5	4.35	3	fg
6	4.45	3	fg
7	12.39	3	d
8	5.76	3	f
9	3.80	3	gh
10	4.41	3	fg
11	2.38	3	h
12	3.59	3	gh
13	3.51	3	gh
14	12.72	3	d
15	12.02	3	d
16	8.66	3	e
17	4.53	3	fg
18	8.61	3	e
19	12.90	3	d
20	12.94	3	d

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: FL
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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE
Response Variable: FL

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	0.1475	0.0737	0.09	0.9157
Genotypes	19	1126.3224	59.2801	70.98	0.0000
Error	38	31.7366	0.8352		
Total	59	1158.2065			

Summary Statistics

CV(%)	FL Mean
12.40	**7.37**

Standard Errors

Effects	StdErr
Replication	0.2890
Genotypes	0.7462

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	0.8352
Critical Value	5.3760
Test Statistics	2.8365

Summary of the Result:

Genotypes	means	N	group
1	16.52	3	a
2	14.46	3	a
3	13.90	3	a
4	5.51	3	def
5	2.35	3	g
6	3.15	3	fg
7	16.25	3	a
8	4.91	3	fg
9	4.97	3	fg
10	4.84	3	fg
11	3.25	3	fg
12	4.19	3	fg
13	4.69	3	fg
14	7.93	3	bcde
15	8.43	3	bc
16	5.62	3	cdef
17	5.20	3	ef
18	4.35	3	fg
19	8.87	3	b
20	8.05	3	bcd

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: FW

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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE
Response Variable: FW

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	0.0359	0.0179	2.03	0.1456
Genotypes	19	10.3631	0.5454	61.64	0.0000
Error	38	0.3362	0.0088		
Total	59	10.7352			

Summary Statistics

CV(%)	FW Mean
8.13	1.16

Standard Errors

Effects	StdErr
Replication	0.0297
Genotypes	0.0768

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	0.0088
Critical Value	5.3760
Test Statistics	0.2920

Summary of the Result:

Genotypes	means	N	group
1	1.89	3	a
2	1.91	3	a
3	2.10	3	a
4	0.74	3	f
5	1.11	3	cde
6	0.91	3	ef
7	1.24	3	bcd
8	0.85	3	ef
9	0.94	3	ef
10	0.90	3	ef
11	0.69	3	f
12	0.79	3	f
13	0.70	3	f
14	1.50	3	b
15	1.50	3	b
16	0.88	3	ef
17	0.98	3	def
18	0.96	3	def
19	1.14	3	cde
20	1.40	3	bc

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: NSF
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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE
Response Variable: NSF

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	405.6333	202.8167	8.34	0.0010
Genotypes	19	16798.1833	884.1149	36.35	0.0000
Error	38	924.3667	24.3254		
Total	59	18128.1833			

Summary Statistics

CV(%)	NSF Mean
8.07	61.12

Standard Errors

Effects	StdErr
Replication	1.56
Genotypes	4.03

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	24.3254
Critical Value	5.3760
Test Statistics	15.3083

Summary of the Result:

Genotypes	means	N	group
1	67.00	3	cd
2	69.00	3	bcd
3	58.33	3	defg
4	34.67	3	ij
5	71.00	3	bcd
6	73.67	3	abc
7	72.33	3	bcd
8	87.67	3	a
9	45.67	3	fghi
10	62.33	3	cde
11	24.67	3	j
12	44.67	3	ghi
13	51.67	3	efgh
14	36.67	3	hij
15	57.67	3	defg
16	84.00	3	ab
17	60.33	3	cdef
18	83.00	3	ab
19	64.33	3	cde
20	73.67	3	abc

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: WSF

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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE

Response Variable: WSF

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	0.0204	0.0102	12.88	0.0001
Genotypes	19	0.5574	0.0293	36.96	0.0000
Error	38	0.0302	0.0008		
Total	59	0.6080			

Summary Statistics

CV(%)	WSF Mean
9.45	0.2980

Standard Errors

Effects	StdErr
Replication	0.0089
Genotypes	0.0230

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	0.0008
Critical Value	5.3760
Test Statistics	0.0874

Summary of the Result:

Genotypes	means	N	group
1	0.3467	3	cde
2	0.4233	3	bc
3	0.3167	3	def
4	0.1733	3	hij
5	0.2667	3	efg
6	0.3000	3	def
7	0.4100	3	bc
8	0.2667	3	efg
9	0.2567	3	fgh
10	0.3033	3	def
11	0.1500	3	j
12	0.1633	3	ij
13	0.2100	3	ghij
14	0.2333	3	fghij
15	0.2433	3	fghi
16	0.4433	3	ab
17	0.2533	3	fgh
18	0.5300	3	a
19	0.3133	3	def
20	0.3567	3	bcd

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: NFP
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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE
Response Variable: NFP

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	354.6333	177.3167	0.73	0.4892
Genotypes	19	304786.9833	16041.4202	65.92	0.0000
Error	38	9247.3667	243.3518		
Total	59	314388.9833			

Summary Statistics

CV(%)	NFP Mean
17.08	91.32

Standard Errors

Effects	StdErr
Replication	4.93
Genotypes	12.74

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	243.3518
Critical Value	5.3760
Test Statistics	48.4188

Summary of the Result:

Genotypes	means	N	group
1	25.67	3	f
2	22.00	3	f
3	21.67	3	f
4	266.67	3	a
5	75.33	3	cde
6	82.67	3	cd
7	28.33	3	ef
8	90.33	3	cd
9	69.33	3	cdef
10	54.33	3	def
11	252.33	3	a
12	177.00	3	b
13	193.00	3	b
14	53.67	3	def
15	80.67	3	cd
16	48.67	3	def
17	49.33	3	def
18	66.00	3	cdef
19	110.00	3	c
20	59.33	3	def

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: X100.SW

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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE

Response Variable: X100.SW

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	0.0199	0.0099	16.28	0.0000
Genotypes	19	0.7155	0.0377	61.69	0.0000
Error	38	0.0232	0.0006		
Total	59	0.7586			

Summary Statistics

CV(%)	X100.SW Mean
5.01	0.4935

Standard Errors

Effects	StdErr
Replication	0.0078
Genotypes	0.0202

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	0.0006
Critical Value	5.3760
Test Statistics	0.0767

Summary of the Result:

Genotypes	means	N	group
1	0.5867	3	abc
2	0.6567	3	a
3	0.5500	3	cde
4	0.5033	3	def
5	0.4433	3	fgh
6	0.4333	3	fgh
7	0.4733	3	efg
8	0.4033	3	gh
9	0.2500	3	i
10	0.5000	3	def
11	0.2733	3	i
12	0.3900	3	h
13	0.4500	3	fgh
14	0.6567	3	a
15	0.5700	3	bcd
16	0.6333	3	ab
17	0.4533	3	fgh
18	0.5100	3	cdef
19	0.5767	3	bcd
20	0.5567	3	bcd

Means with the same letter are not significantly different.

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ANALYSIS FOR RESPONSE VARIABLE: FYP
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Summary Information

FACTOR	NO. OF LEVELS	LEVELS
Genotypes	20	1, 2, ..., 20
Replication	3	1, 2, 3

Number of Observations Read and Used: 60

ANOVA TABLE
Response Variable: FYP

Source	DF	Sum of Square	Mean Square	F Value	Pr(> F)
Replication	2	740.6133	370.3066	0.09	0.9161
Genotypes	19	2952118.9516	155374.6817	36.84	0.0000
Error	38	160286.3589	4218.0621		
Total	59	3113145.9237			

Summary Statistics

CV(%)	FYP Mean
19.44	334.15

Standard Errors

Effects	StdErr
Replication	20.54
Genotypes	53.03

Pairwise Mean Comparison of Genotypes

Tukeys's Honest Significant Difference (HSD) Test

Alpha	0.05
Error Degrees of Freedom	38
Error Mean Square	4218.0621
Critical Value	5.3760
Test Statistics	201.5827

Summary of the Result:

Genotypes	means	N	group
1	648.67	3	ab
2	483.29	3	bcd
3	606.62	3	ab
4	528.98	3	bc
5	108.36	3	fg
6	117.93	3	fg
7	306.69	3	def
8	155.44	3	fg
9	134.91	3	fg
10	114.25	3	fg
11	248.99	3	efg
12	268.35	3	efg
13	246.75	3	efg
14	606.14	3	ab
15	804.57	3	a
16	97.82	3	g
17	108.27	3	fg
18	125.32	3	fg
19	588.82	3	b
20	382.74	3	cde

Means with the same letter are not significantly different.