The GLIMMIX Procedure

Model Information	
Data Set	WORK.GLD
Response Variable	GLD
Response Distribution	Gaussian
Link Function	Identity
Variance Function	Default
Variance Matrix Blocked By	GLB
Estimation Technique	Restricted Maximum Likelihood
Degrees of Freedom Method	Kenward-Roger
Fixed Effects SE Adjustment	Kenward-Roger

Class Level Information		
Class	**Levels**	**Values**
Year	3	First Initial Second
Location	2	Hill Farm LA Tech
Block	4	1 2 3 4
Family	6	AGH2 AGH25 AGHS1 AGHS2 AGHS3 AGHS4
GLB	48	AGH25_Hill Farm_1 AGH25_Hill Farm_2 AGH25_Hill Farm_3 AGH25_Hill Farm_4 AGH25_LA Tech_1 AGH25_LA Tech_2 AGH25_LA Tech_3 AGH25_LA Tech_4 AGH2_Hill Farm_1 AGH2_Hill Farm_2 AGH2_Hill Farm_3 AGH2_Hill Farm_4 AGH2_LA Tech_1 AGH2_LA Tech_2 AGH2_LA Tech_3 AGH2_LA Tech_4 AGHS1_Hill Farm_1 AGHS1_Hill Farm_2 AGHS1_Hill Farm_3 AGHS1_Hill Farm_4 AGHS1_LA Tech_1 AGHS1_LA Tech_2 AGHS1_LA Tech_3 AGHS1_LA Tech_4 AGHS2_Hill Farm_1 AGHS2_Hill Farm_2 AGHS2_Hill Farm_3 AGHS2_Hill Farm_4 AGHS2_LA Tech_1 AGHS2_LA Tech_2 AGHS2_LA Tech_3 AGHS2_LA Tech_4 AGHS3_Hill Farm_1 AGHS3_Hill Farm_2 AGHS3_Hill Farm_3 AGHS3_Hill Farm_4 AGHS3_LA Tech_1 AGHS3_LA Tech_2 AGHS3_LA Tech_3 AGHS3_LA Tech_4 AGHS4_Hill Farm_1 AGHS4_Hill Farm_2 AGHS4_Hill Farm_3 AGHS4_Hill Farm_4 AGHS4_LA Tech_1 AGHS4_LA Tech_2 AGHS4_LA Tech_3 AGHS4_LA Tech_4

Number of Observations Read	144
Number of Observations Used	144

Dimensions	
G-side Cov. Parameters	2
R-side Cov. Parameters	1
Columns in X	84
Columns in Z per Subject	1
Subjects (Blocks in V)	48
Max Obs per Subject	3

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Optimization Information	
Optimization Technique	Dual Quasi-Newton
Parameters in Optimization	2
Lower Boundaries	2
Upper Boundaries	1
Fixed Effects	Profiled
Residual Variance	Profiled
Starting From	Data

Iteration History					
Iteration	**Restarts**	**Evaluations**	**Objective Function**	**Change**	**Max Gradient**
0	**0**	4	640.72210261	.	1.46E-13

Convergence criterion (ABSGCONV=0.00001) satisfied.

Fit Statistics	
-2 Res Log Likelihood	640.72
AIC (smaller is better)	646.72
AICC (smaller is better)	646.95
BIC (smaller is better)	652.34
CAIC (smaller is better)	655.34
HQIC (smaller is better)	648.84
Generalized Chi-Square	1275.07
Gener. Chi-Square / DF	11.81

Covariance Parameter Estimates			
Cov Parm	**Subject**	**Estimate**	**Standard Error**
Variance	GLB	2.5015	1.6529
AR(1)	GLB	0	.
Residual		11.8062	1.9677

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Type III Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
Year	2	72	1477.65	<.0001
Location	1	36	5.24	0.0280
Year*Location	2	72	29.73	<.0001
Family	5	36	3.78	0.0075
Year*Family	10	72	3.10	0.0025
Location*Family	5	36	0.56	0.7268
Year*Location*Family	10	72	0.65	0.7634

F Test for Year*Location Least Squares Means Slice				
Slice	Num DF	Den DF	F Value	Pr > F
Year First	1	101.8	4.04	0.0471

Simple Differences of Year*Location Least Squares Means Adjustment for Multiple Comparisons: Tukey								
Slice	Location	_Location	Estimate	Standard Error	DF	t Value	Pr > |t|	Adj P
Year First	Hill Farm	LA Tech	2.1942	1.0919	101.8	2.01	0.0471	0.0482

Tukey Grouping for Year*Location Least Squares Means Slice (Alpha=0.05)			
LS-means with the same letter are not significantly different.			
Slice	Location	Estimate	
Year First	Hill Farm	14.2584	A
Year First			
Year First	LA Tech	12.0642	B

F Test for Year*Location Least Squares Means Slice				
Slice	Num DF	Den DF	F Value	Pr > F
Year Initial	1	101.8	0.33	0.5645

Simple Differences of Year*Location Least Squares Means Adjustment for Multiple Comparisons: Tukey								
Slice	Location	_Location	Estimate	Standard Error	DF	t Value	Pr > |t|	Adj P
Year Initial	Hill Farm	LA Tech	0.6313	1.0919	101.8	0.58	0.5645	0.5650

The GLIMMIX Procedure

Tukey Grouping for Year*Location Least Squares Means Slice (Alpha=0.05)			
LS-means with the same letter are not significantly different.			
Slice	**Location**	**Estimate**	
Year Initial	Hill Farm	5.3606	A
Year Initial			A
Year Initial	LA Tech	4.7294	A

F Test for Year*Location Least Squares Means Slice				
Slice	**Num DF**	**Den DF**	**F Value**	**Pr > F**
Year Second	1	101.8	51.77	<.0001

Simple Differences of Year*Location Least Squares Means Adjustment for Multiple Comparisons: Tukey								
Slice	**Location**	**_Location**	**Estimate**	**Standard Error**	**DF**	**t Value**	**Pr > |t|**	**Adj P**
Year Second	Hill Farm	LA Tech	-7.8569	1.0919	101.8	-7.20	<.0001	<.0001

Tukey Grouping for Year*Location Least Squares Means Slice (Alpha=0.05)			
LS-means with the same letter are not significantly different.			
Slice	**Location**	**Estimate**	
Year Second	LA Tech	45.2951	A
Year Second			
Year Second	Hill Farm	37.4382	B

F Test for Year*Family Least Squares Means Slice				
Slice	**Num DF**	**Den DF**	**F Value**	**Pr > F**
Year First	5	101.8	0.77	0.5702

Simple Differences of Year*Family Least Squares Means Adjustment for Multiple Comparisons: Tukey								
Slice	**Family**	**_Family**	**Estimate**	**Standard Error**	**DF**	**t Value**	**Pr > |t|**	**Adj P**
Year First	AGH2	AGH25	-0.6944	1.8913	101.8	-0.37	0.7143	0.9991
Year First	AGH2	AGHS1	-2.7749	1.8913	101.8	-1.47	0.1454	0.6859
Year First	AGH2	AGHS2	-2.9718	1.8913	101.8	-1.57	0.1192	0.6198
Year First	AGH2	AGHS3	-1.9752	1.8913	101.8	-1.04	0.2988	0.9012
Year First	AGH2	AGHS4	-2.1454	1.8913	101.8	-1.13	0.2593	0.8654

The GLIMMIX Procedure

Simple Differences of Year*Family Least Squares Means Adjustment for Multiple Comparisons: Tukey								
Slice	Family	_Family	Estimate	Standard Error	DF	t Value	Pr > |t|	Adj P
Year First	AGH25	AGHS1	-2.0806	1.8913	101.8	-1.10	0.2739	0.8798
Year First	AGH25	AGHS2	-2.2774	1.8913	101.8	-1.20	0.2313	0.8334
Year First	AGH25	AGHS3	-1.2808	1.8913	101.8	-0.68	0.4998	0.9839
Year First	AGH25	AGHS4	-1.4510	1.8913	101.8	-0.77	0.4447	0.9721
Year First	AGHS1	AGHS2	-0.1969	1.8913	101.8	-0.10	0.9173	1.0000
Year First	AGHS1	AGHS3	0.7998	1.8913	101.8	0.42	0.6733	0.9982
Year First	AGHS1	AGHS4	0.6296	1.8913	101.8	0.33	0.7399	0.9994
Year First	AGHS2	AGHS3	0.9966	1.8913	101.8	0.53	0.5994	0.9949
Year First	AGHS2	AGHS4	0.8264	1.8913	101.8	0.44	0.6631	0.9979
Year First	AGHS3	AGHS4	-0.1702	1.8913	101.8	-0.09	0.9285	1.0000

Tukey Grouping for Year*Family Least Squares Means Slice (Alpha=0.05)			
LS-means with the same letter are not significantly different.			
Slice	Family	Estimate	
Year First	AGHS2	14.3728	A
Year First			A
Year First	AGHS1	14.1760	A
Year First			A
Year First	AGHS4	13.5464	A
Year First			A
Year First	AGHS3	13.3762	A
Year First			A
Year First	AGH25	12.0954	A
Year First			A
Year First	AGH2	11.4010	A

F Test for Year*Family Least Squares Means Slice				
Slice	Num DF	Den DF	F Value	Pr > F
Year Initial	5	101.8	0.02	0.9998

The GLIMMIX Procedure

Simple Differences of Year*Family Least Squares Means Adjustment for Multiple Comparisons: Tukey								
Slice	Family	_Family	Estimate	Standard Error	DF	t Value	Pr > |t|	Adj P
Year Initial	AGH2	AGH25	0.1218	1.8913	101.8	0.06	0.9488	1.0000
Year Initial	AGH2	AGHS1	-0.00609	1.8913	101.8	-0.00	0.9974	1.0000
Year Initial	AGH2	AGHS2	0.4117	1.8913	101.8	0.22	0.8281	0.9999
Year Initial	AGH2	AGHS3	0.006111	1.8913	101.8	0.00	0.9974	1.0000
Year Initial	AGH2	AGHS4	-0.1435	1.8913	101.8	-0.08	0.9397	1.0000
Year Initial	AGH25	AGHS1	-0.1279	1.8913	101.8	-0.07	0.9462	1.0000
Year Initial	AGH25	AGHS2	0.2899	1.8913	101.8	0.15	0.8785	1.0000
Year Initial	AGH25	AGHS3	-0.1157	1.8913	101.8	-0.06	0.9513	1.0000
Year Initial	AGH25	AGHS4	-0.2653	1.8913	101.8	-0.14	0.8887	1.0000
Year Initial	AGHS1	AGHS2	0.4178	1.8913	101.8	0.22	0.8256	0.9999
Year Initial	AGHS1	AGHS3	0.01220	1.8913	101.8	0.01	0.9949	1.0000
Year Initial	AGHS1	AGHS4	-0.1374	1.8913	101.8	-0.07	0.9422	1.0000
Year Initial	AGHS2	AGHS3	-0.4056	1.8913	101.8	-0.21	0.8306	0.9999
Year Initial	AGHS2	AGHS4	-0.5552	1.8913	101.8	-0.29	0.7697	0.9997
Year Initial	AGHS3	AGHS4	-0.1496	1.8913	101.8	-0.08	0.9371	1.0000

Tukey Grouping for Year*Family Least Squares Means Slice (Alpha=0.05)			
LS-means with the same letter are not significantly different.			
Slice	Family	Estimate	
Year Initial	AGHS4	5.2535	A
Year Initial			A
Year Initial	AGHS1	5.1161	A
Year Initial			A
Year Initial	AGH2	5.1100	A
Year Initial			A
Year Initial	AGHS3	5.1039	A
Year Initial			A
Year Initial	AGH25	4.9882	A
Year Initial			A
Year Initial	AGHS2	4.6983	A

The GLIMMIX Procedure

F Test for Year*Family Least Squares Means Slice				
Slice	Num DF	Den DF	F Value	Pr > F
Year Second	5	101.8	9.42	<.0001

Simple Differences of Year*Family Least Squares Means Adjustment for Multiple Comparisons: Tukey								
Slice	Family	_Family	Estimate	Standard Error	DF	t Value	Pr > |t|	Adj P
Year Second	AGH2	AGH25	-3.1702	1.8913	101.8	-1.68	0.0968	0.5517
Year Second	AGH2	AGHS1	-9.7229	1.8913	101.8	-5.14	<.0001	<.0001
Year Second	AGH2	AGHS2	-10.2074	1.8913	101.8	-5.40	<.0001	<.0001
Year Second	AGH2	AGHS3	-6.8012	1.8913	101.8	-3.60	0.0005	0.0075
Year Second	AGH2	AGHS4	-9.0848	1.8913	101.8	-4.80	<.0001	0.0001
Year Second	AGH25	AGHS1	-6.5527	1.8913	101.8	-3.46	0.0008	0.0112
Year Second	AGH25	AGHS2	-7.0372	1.8913	101.8	-3.72	0.0003	0.0051
Year Second	AGH25	AGHS3	-3.6310	1.8913	101.8	-1.92	0.0577	0.3987
Year Second	AGH25	AGHS4	-5.9146	1.8913	101.8	-3.13	0.0023	0.0294
Year Second	AGHS1	AGHS2	-0.4845	1.8913	101.8	-0.26	0.7983	0.9998
Year Second	AGHS1	AGHS3	2.9217	1.8913	101.8	1.54	0.1255	0.6368
Year Second	AGHS1	AGHS4	0.6381	1.8913	101.8	0.34	0.7365	0.9994
Year Second	AGHS2	AGHS3	3.4062	1.8913	101.8	1.80	0.0747	0.4716
Year Second	AGHS2	AGHS4	1.1226	1.8913	101.8	0.59	0.5541	0.9912
Year Second	AGHS3	AGHS4	-2.2836	1.8913	101.8	-1.21	0.2301	0.8319

Tukey Grouping for Year*Family Least Squares Means Slice (Alpha=0.05)				
LS-means with the same letter are not significantly different.				
Slice	Family	Estimate		
Year Second	AGHS2	45.0763		A
Year Second				A
Year Second	AGHS1	44.5918		A
Year Second				A
Year Second	AGHS4	43.9537		A
Year Second				A
Year Second	AGHS3	41.6701	B	A
Year Second			B	
Year Second	AGH25	38.0391	B	C

The GLIMMIX Procedure

Tukey Grouping for Year*Family Least Squares Means Slice (Alpha=0.05)				
LS-means with the same letter are not significantly different.				
Slice	**Family**	**Estimate**		
Year Second				C
Year Second	AGH2	34.8689		C

Family Least Squares Means					
Family	**Estimate**	**Standard Error**	**DF**	**t Value**	**Pr > |t|**
AGH2	17.1266	0.8970	36	19.09	<.0001
AGH25	18.3742	0.8970	36	20.48	<.0001
AGHS1	21.2946	0.8970	36	23.74	<.0001
AGHS2	21.3825	0.8970	36	23.84	<.0001
AGHS3	20.0501	0.8970	36	22.35	<.0001
AGHS4	20.9179	0.8970	36	23.32	<.0001

Differences of Family Least Squares Means Adjustment for Multiple Comparisons: Tukey							
Family	**_Family**	**Estimate**	**Standard Error**	**DF**	**t Value**	**Pr > |t|**	**Adj P**
AGH2	AGH25	-1.2476	1.2686	36	-0.98	0.3319	0.9202
AGH2	AGHS1	-4.1680	1.2686	36	-3.29	0.0023	0.0255
AGH2	AGHS2	-4.2558	1.2686	36	-3.35	0.0019	0.0214
AGH2	AGHS3	-2.9234	1.2686	36	-2.30	0.0271	0.2187
AGH2	AGHS4	-3.7912	1.2686	36	-2.99	0.0050	0.0524
AGH25	AGHS1	-2.9204	1.2686	36	-2.30	0.0272	0.2196
AGH25	AGHS2	-3.0082	1.2686	36	-2.37	0.0232	0.1934
AGH25	AGHS3	-1.6758	1.2686	36	-1.32	0.1948	0.7716
AGH25	AGHS4	-2.5436	1.2686	36	-2.01	0.0525	0.3594
AGHS1	AGHS2	-0.08785	1.2686	36	-0.07	0.9452	1.0000
AGHS1	AGHS3	1.2445	1.2686	36	0.98	0.3331	0.9210
AGHS1	AGHS4	0.3768	1.2686	36	0.30	0.7682	0.9997
AGHS2	AGHS3	1.3324	1.2686	36	1.05	0.3006	0.8974
AGHS2	AGHS4	0.4646	1.2686	36	0.37	0.7163	0.9991
AGHS3	AGHS4	-0.8678	1.2686	36	-0.68	0.4983	0.9826

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Tukey Grouping for Family Least Squares Means (Alpha=0.05)			
LS-means with the same letter are not significantly different.			
Family	**Estimate**		
AGHS2	21.3825		A
			A
AGHS1	21.2946		A
			A
AGHS4	20.9179	B	A
		B	A
AGHS3	20.0501	B	A
		B	A
AGH25	18.3742	B	A
		B	
AGH2	17.1266	B	