Stomata conductance

Data imported from Clipboard
on: 30-Oct-2008 20:37:18

```
  97  DELETE [REDEFINE=yes] Stomata_conductance
  98  UNITS [NVALUES=*]
  99  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 100  ; REFERENCE=1] UV_B
 101  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 104  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 105  ; REFERENCE=1] Iron
 106  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 109  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 110  ; REFERENCE=1] Salt
 111  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 114  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 115  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
 118  VARIATE [NVALUES=48] Stomata_conductance
 119  READ Stomata_conductance
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Stomata_conductance	0.1180	0.6936	1.410	48	0

```
 124
 125  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
 126  reml [pr=wa,me,co] Stomata_conductance
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.01818	0.01537

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.0602	0.01555

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	3.20	1	3.20	10.0	0.104
Iron	14.44	1	14.44	30.0	<0.001
Salt	1.43	1	1.43	30.0	0.241
UV_B.Iron	4.76	1	4.76	30.0	0.037
UV_B.Salt	0.30	1	0.30	30.0	0.588
Iron.Salt	0.13	1	0.13	30.0	0.716
UV_B.Iron.Salt	1.69	1	1.69	30.0	0.204

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	1.69	1	1.69	30.0	0.204

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

0.6936 Standard error: 0.05264

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	0.7878	0.5995

Standard error of differences: 0.1053

Table of predicted means for Iron

Iron	+ Fe	- Fe
	0.8282	0.5590

Standard error of differences: 0.07085

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	0.6512	0.7360

Standard error of differences: 0.07085

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	0.9997	0.5758
- UV-B	0.6568	0.5422

Standard errors of differences

Average:	0.1180
Maximum:	0.1269
Minimum:	0.1002

Average variance of differences: 0.01408

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.1002	0.1269
Maximum:	0.1002	0.1269
Minimum:	0.1002	0.1269

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	0.7259	0.8496
- UV-B	0.5765	0.6225

Standard errors of differences

Average:	0.1180
Maximum:	0.1269
Minimum:	0.1002

Average variance of differences: 0.01408

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.1002	0.1269
Maximum:	0.1002	0.1269
Minimum:	0.1002	0.1269

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	0.7988	0.8577
- Fe	0.5036	0.6144

Standard error of differences: 0.1002

Table of predicted means for UV_B.Iron.Salt

	Salt	+ NaCl	- NaCl
UV_B	Iron		
+ UV-B	+ Fe	0.9968	1.0025
	- Fe	0.4550	0.6967
- UV-B	+ Fe	0.6008	0.7128
	- Fe	0.5522	0.5322

Standard errors of differences

Average:	0.1531
Maximum:	0.1617
Minimum:	0.1417

Average variance of differences: 0.02354

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	0.1417	0.1550	0.1550
Maximum:	0.1417	0.1617	0.1617
Minimum:	0.1417	0.1417	0.1417

Average variance of differences:

0.02008	0.02412	0.02412

```
 127  vplot
 128   VCOMPONENTS [FIXED=Iron*Salt*UV_B; FACTORIAL=9] RANDOM=UV_B.Block;
INITIAL=1; CONSTRAINTS=none
 129  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 130   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20] Stomata_conductance
```

REML variance components analysis

Response variate: Stomata_conductance
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.01818	0.01537

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.0602	0.01555

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	3.20	1	3.20	10.0	0.104
Iron	14.44	1	14.44	30.0	<0.001
Salt	1.43	1	1.43	30.0	0.241
UV_B.Iron	4.76	1	4.76	30.0	0.037
UV_B.Salt	0.30	1	0.30	30.0	0.588
Iron.Salt	0.13	1	0.13	30.0	0.716
UV_B.Iron.Salt	1.69	1	1.69	30.0	0.204

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	1.69	1	1.69	30.0	0.204

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

0.6936 Standard error: 0.05264

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	0.7878	0.5995

Standard error of differences: 0.1053

Table of predicted means for Iron

Iron	+ Fe	- Fe
	0.8282	0.5590

Standard error of differences: 0.07085

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	0.6512	0.7360

Standard error of differences: 0.07085

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	0.9997	0.5758
- UV-B	0.6568	0.5422

Standard errors of differences

Average:	0.1180
Maximum:	0.1269
Minimum:	0.1002

Average variance of differences: 0.01408

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.1002	0.1269

Maximum:	0.1002	0.1269
Minimum:	0.1002	0.1269

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	0.7259	0.8496
- UV-B	0.5765	0.6225

Standard errors of differences

Average:	0.1180
Maximum:	0.1269
Minimum:	0.1002

Average variance of differences: 0.01408

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.1002	0.1269
Maximum:	0.1002	0.1269
Minimum:	0.1002	0.1269

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	0.7988	0.8577
- Fe	0.5036	0.6144

Standard error of differences: 0.1002

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	0.9968	1.0025
	- Fe	0.4550	0.6967
- UV-B	+ Fe	0.6008	0.7128

- Fe	0.5522	0.5322	

Standard errors of differences

Average:	0.1531
Maximum:	0.1617
Minimum:	0.1417

Average variance of differences: 0.02354

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.1417	0.1550	0.1550
Maximum:	0.1417	0.1617	0.1617
Minimum:	0.1417	0.1417	0.1417

Average variance of differences:

0.02008	0.02412	0.02412

```
131  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	0.2346	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	0.1447	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	0.1447	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	0.2233	*		
UV_B - UV-B.Iron + Fe	3	0.2827	0.2827	*	
UV_B - UV-B.Iron - Fe	4	0.2827	0.2827	0.2233	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	0.2233	*		
UV_B - UV-B.Salt + NaCl	3	0.2827	0.2827	*	
UV_B - UV-B.Salt - NaCl	4	0.2827	0.2827	0.2233	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	0.2046	*		
Iron - Fe.Salt + NaCl	3	0.2046	0.2046	*	
Iron - Fe.Salt - NaCl	4	0.2046	0.2046	0.2046	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	0.3157	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	0.3157	0.3157	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	0.3157	0.3157	0.3157

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.3603	0.3603	0.3603
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.3603	0.3603	0.3603
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.3603	0.3603	0.3603
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.3603	0.3603	0.3603
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.3603	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.3603	0.3157	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.3603	0.3157	0.3157
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.3603	0.3157	0.3157
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.3157	*
		7	8

Photosynthesis

Data imported from Clipboard
on: 30-Oct-2008 20:35:24

```
  56  DELETE [REDEFINE=yes] UV_B,Iron,Salt,Block,Photosynthesis
  57  UNITS [NVALUES=*]
  58  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
  59  ; REFERENCE=1] UV_B
  60  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
  63  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
  64  ; REFERENCE=1] Iron
  65  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
  68  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
  69  ; REFERENCE=1] Salt
  70  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
  73  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
  74  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
77  VARIATE [NVALUES=48] Photosynthesis
78  READ Photosynthesis
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Photosynthesis	0.2790	13.73	28.30	48	0

```
83
84  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
85  reml [pr=wa,me,co] Photosynthesis
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.72	2.70

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	18.73	4.84

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.12	1	0.12	10.0	0.733
Iron	118.83	1	118.83	30.0	<0.001
Salt	3.93	1	3.93	30.0	0.057
UV_B.Iron	1.48	1	1.48	30.0	0.233
UV_B.Salt	0.43	1	0.43	30.0	0.515
Iron.Salt	0.01	1	0.01	30.0	0.925
UV_B.Iron.Salt	1.63	1	1.63	30.0	0.211

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	1.63	1	1.63	30.0	0.211

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

13.73 Standard error: 0.671

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	13.96	13.49

Standard error of differences: 1.342

Table of predicted means for Iron

Iron	+ Fe	- Fe
	20.54	6.92

Standard error of differences: 1.249

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	14.97	12.49

Standard error of differences: 1.249

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	21.53	6.39
- UV-B	19.54	7.44

Standard errors of differences

Average:	1.811
Maximum:	1.833
Minimum:	1.767

Average variance of differences: 3.282

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	1.767	1.833
Maximum:	1.767	1.833
Minimum:	1.767	1.833

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	14.79	13.13
- UV-B	15.14	11.84

Standard errors of differences

Average:	1.811
Maximum:	1.833
Minimum:	1.767

Average variance of differences: 3.282

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	1.767	1.833
Maximum:	1.767	1.833
Minimum:	1.767	1.833

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	21.72	19.36
- Fe	8.22	5.62

Standard error of differences: 1.767

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B + UV-B	+ Fe	23.10	19.97
	- Fe	6.48	6.30
- UV-B	+ Fe	20.33	18.75
	- Fe	9.95	4.94

Standard errors of differences

Average:	2.526
Maximum:	2.546
Minimum:	2.499

Average variance of differences: 6.381

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	2.499	2.531	2.531
Maximum:	2.499	2.546	2.546
Minimum:	2.499	2.499	2.499

Average variance of differences:

6.244	6.404	6.404

```
  86  vplot
  87   VCOMPONENTS [FIXED=Iron*Salt*UV_B; FACTORIAL=9] RANDOM=UV_B.Block;
INITIAL=1; CONSTRAINTS=none
  88  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
  89   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20] Photosynthesis
```

REML variance components analysis

Response variate: Photosynthesis
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.72	2.70

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	18.73	4.84

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.12	1	0.12	10.0	0.733
Iron	118.83	1	118.83	30.0	<0.001
Salt	3.93	1	3.93	30.0	0.057
UV_B.Iron	1.48	1	1.48	30.0	0.233
UV_B.Salt	0.43	1	0.43	30.0	0.515
Iron.Salt	0.01	1	0.01	30.0	0.925
UV_B.Iron.Salt	1.63	1	1.63	30.0	0.211

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	1.63	1	1.63	30.0	0.211

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

13.73 Standard error: 0.671

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	13.96	13.49

Standard error of differences: 1.342

Table of predicted means for Iron

Iron	+ Fe	- Fe
	20.54	6.92

Standard error of differences: 1.249

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	14.97	12.49

Standard error of differences: 1.249

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	21.53	6.39
- UV-B	19.54	7.44

Standard errors of differences

Average:	1.811
Maximum:	1.833
Minimum:	1.767

Average variance of differences: 3.282

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	1.767	1.833

Maximum:	1.767	1.833
Minimum:	1.767	1.833

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	14.79	13.13
- UV-B	15.14	11.84

Standard errors of differences

Average:	1.811
Maximum:	1.833
Minimum:	1.767

Average variance of differences: 3.282

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	1.767	1.833
Maximum:	1.767	1.833
Minimum:	1.767	1.833

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	21.72	19.36
- Fe	8.22	5.62

Standard error of differences: 1.767

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	23.10	19.97
	- Fe	6.48	6.30
- UV-B	+ Fe	20.33	18.75

	- Fe	9.95	4.94

Standard errors of differences

Average:	2.526
Maximum:	2.546
Minimum:	2.499

Average variance of differences: 6.381

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	2.499	2.531	2.531
Maximum:	2.499	2.546	2.546
Minimum:	2.499	2.499	2.499

Average variance of differences:

6.244	6.404	6.404

```
90  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	2.990	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	2.552	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	2.552	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	3.937	*		
UV_B - UV-B.Iron + Fe	3	4.085	4.085	*	
UV_B - UV-B.Iron - Fe	4	4.085	4.085	3.937	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	3.937	*		
UV_B - UV-B.Salt + NaCl	3	4.085	4.085	*	
UV_B - UV-B.Salt - NaCl	4	4.085	4.085	3.937	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	3.609	*		
Iron - Fe.Salt + NaCl	3	3.609	3.609	*	
Iron - Fe.Salt - NaCl	4	3.609	3.609	3.609	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	5.568	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	5.568	5.568	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	5.568	5.568	5.568

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	5.674	5.674	5.674
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	5.674	5.674	5.674
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	5.674	5.674	5.674
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	5.674	5.674	5.674
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	5.674	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	5.674	5.568	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	5.674	5.568	5.568
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	5.674	5.568	5.568
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	5.568	*
		7	8

Transpiration

Data imported from Clipboard
on: 30-Oct-2008 20:38:56

```
 138  DELETE [REDEFINE=yes] Transpiration
 139  UNITS [NVALUES=*]
 140  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 141  ; REFERENCE=1] UV_B
 142  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 145  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 146  ; REFERENCE=1] Iron
 147  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 150  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 151  ; REFERENCE=1] Salt
 152  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 155  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 156  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
159  VARIATE [NVALUES=48] Transpiration
160  READ Transpiration
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Transpiration	1.510	6.057	9.650	48	0

```
165
166  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
167  reml [pr=wa,me,co] Transpiration
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.961	0.752

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	2.698	0.697

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	2.26	1	2.26	10.0	0.164
Iron	8.69	1	8.69	30.0	0.006
Salt	0.22	1	0.22	30.0	0.644
UV_B.Iron	2.86	1	2.86	30.0	0.101
UV_B.Salt	0.46	1	0.46	30.0	0.502
Iron.Salt	1.31	1	1.31	30.0	0.261
UV_B.Iron.Salt	4.18	1	4.18	30.0	0.050

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	4.18	1	4.18	30.0	0.050

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

6.057 Standard error: 0.3691

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	6.612	5.503

Standard error of differences: 0.7383

Table of predicted means for Iron

Iron	+ Fe	- Fe
	6.756	5.358

Standard error of differences: 0.4742

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	5.947	6.168

Standard error of differences: 0.4742

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	7.712	5.512
- UV-B	5.801	5.205

Standard errors of differences

Average:	0.8085
Maximum:	0.8774
Minimum:	0.6706

Average variance of differences: 0.6631

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.6706	0.8774
Maximum:	0.6706	0.8774
Minimum:	0.6706	0.8774

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	6.340	6.883
- UV-B	5.553	5.452

Standard errors of differences

Average:	0.8085
Maximum:	0.8774
Minimum:	0.6706

Average variance of differences: 0.6631

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.6706	0.8774
Maximum:	0.6706	0.8774
Minimum:	0.6706	0.8774

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	6.918	6.595
- Fe	4.976	5.741

Standard error of differences: 0.6706

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B + UV-B	+ Fe	8.197	7.227
	- Fe	4.483	6.540
- UV-B	+ Fe	5.638	5.963
	- Fe	5.468	4.942

Standard errors of differences

Average:	1.037
Maximum:	1.104
Minimum:	0.9484

Average variance of differences: 1.082

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	0.9484	1.052	1.052
Maximum:	0.9484	1.104	1.104
Minimum:	0.9484	0.9484	0.9484

Average variance of differences:

0.8994	1.113	1.113

```
 168  vplot
 169   VCOMPONENTS [FIXED=Iron*Salt*UV_B; FACTORIAL=9] RANDOM=UV_B.Block;
INITIAL=1; CONSTRAINTS=none
 170  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 171   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20] Transpiration
```

REML variance components analysis

Response variate: Transpiration
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.961	0.752

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	2.698	0.697

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	2.26	1	2.26	10.0	0.164
Iron	8.69	1	8.69	30.0	0.006
Salt	0.22	1	0.22	30.0	0.644
UV_B.Iron	2.86	1	2.86	30.0	0.101
UV_B.Salt	0.46	1	0.46	30.0	0.502
Iron.Salt	1.31	1	1.31	30.0	0.261
UV_B.Iron.Salt	4.18	1	4.18	30.0	0.050

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	4.18	1	4.18	30.0	0.050

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

6.057 Standard error: 0.3691

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	6.612	5.503

Standard error of differences: 0.7383

Table of predicted means for Iron

Iron	+ Fe	- Fe
	6.756	5.358

Standard error of differences: 0.4742

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	5.947	6.168

Standard error of differences: 0.4742

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	7.712	5.512
- UV-B	5.801	5.205

Standard errors of differences

Average:	0.8085
Maximum:	0.8774
Minimum:	0.6706

Average variance of differences: 0.6631

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.6706	0.8774

Maximum:	0.6706	0.8774
Minimum:	0.6706	0.8774

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	6.340	6.883
- UV-B	5.553	5.452

Standard errors of differences

Average:	0.8085
Maximum:	0.8774
Minimum:	0.6706

Average variance of differences: 0.6631

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.6706	0.8774
Maximum:	0.6706	0.8774
Minimum:	0.6706	0.8774

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	6.918	6.595
- Fe	4.976	5.741

Standard error of differences: 0.6706

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	8.197	7.227
	- Fe	4.483	6.540
- UV-B	+ Fe	5.638	5.963

	- Fe	5.468	4.942

Standard errors of differences

Average:	1.037
Maximum:	1.104
Minimum:	0.9484

Average variance of differences: 1.082

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.9484	1.052	1.052
Maximum:	0.9484	1.104	1.104
Minimum:	0.9484	0.9484	0.9484

Average variance of differences:

0.8994	1.113	1.113

```
172  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	1.645	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	0.9684	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	0.9684	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	1.494	*		
UV_B - UV-B.Iron + Fe	3	1.955	1.955	*	
UV_B - UV-B.Iron - Fe	4	1.955	1.955	1.494	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	1.494	*		
UV_B - UV-B.Salt + NaCl	3	1.955	1.955	*	
UV_B - UV-B.Salt - NaCl	4	1.955	1.955	1.494	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	1.370	*		
Iron - Fe.Salt + NaCl	3	1.370	1.370	*	
Iron - Fe.Salt - NaCl	4	1.370	1.370	1.370	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	2.113	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	2.113	2.113	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	2.113	2.113	2.113

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	2.461	2.461	2.461
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	2.461	2.461	2.461
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	2.461	2.461	2.461
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	2.461	2.461	2.461
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	2.461	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	2.461	2.113	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	2.461	2.113	2.113
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	2.461	2.113	2.113
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	2.113	*
		7	8

WUE

Data imported from Clipboard
on: 30-Oct-2008 20:40:58

```
 179  DELETE [REDEFINE=yes] WUE
 180  UNITS [NVALUES=*]
 181  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 182  ; REFERENCE=1] UV_B
 183  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 186  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 187  ; REFERENCE=1] Iron
 188  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 191  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 192  ; REFERENCE=1] Salt
 193  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 196  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 197  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
200  VARIATE [NVALUES=48] WUE
201  READ WUE
```

Identifier	Minimum	Mean	Maximum	Values	Missing
WUE	0.07750	2.283	7.214	48	0

```
217  vplot
218  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
219  reml [pr=wa,me,co] sqrt(WUE)
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.01091	0.01567

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.0872	0.02252

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.97	1	0.97	10.0	0.348
Iron	68.85	1	68.85	30.0	<0.001
Salt	11.62	1	11.62	30.0	0.002
UV_B.Iron	1.54	1	1.54	30.0	0.224
UV_B.Salt	1.27	1	1.27	30.0	0.269
Iron.Salt	4.76	1	4.76	30.0	0.037
UV_B.Iron.Salt	0.00	1	0.00	30.0	0.967

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.00	1	0.00	30.0	0.967

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

1.428 Standard error: 0.0522

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	1.377	1.479

Standard error of differences: 0.1044

Table of predicted means for Iron

Iron	+ Fe	- Fe
	1.782	1.074

Standard error of differences: 0.08525

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	1.573	1.283

Standard error of differences: 0.08525

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	1.677	1.076
- UV-B	1.886	1.073

Standard errors of differences

Average:	0.1301
Maximum:	0.1348
Minimum:	0.1206

Average variance of differences: 0.01696

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.1206	0.1348
Maximum:	0.1206	0.1348
Minimum:	0.1206	0.1348

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	1.474	1.279
- UV-B	1.673	1.286

Standard errors of differences

Average:	0.1301
Maximum:	0.1348
Minimum:	0.1206

Average variance of differences: 0.01696

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.1206	0.1348
Maximum:	0.1206	0.1348
Minimum:	0.1206	0.1348

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	1.834	1.729
- Fe	1.313	0.836

Standard error of differences: 0.1206

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B + UV-B	+ Fe	1.680	1.675
	- Fe	1.268	0.884
- UV-B	+ Fe	1.988	1.784
	- Fe	1.357	0.788

Standard errors of differences

Average:	0.1764
Maximum:	0.1808
Minimum:	0.1705

Average variance of differences: 0.03115

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	0.1705	0.1774	0.1774
Maximum:	0.1705	0.1808	0.1808
Minimum:	0.1705	0.1705	0.1705

Average variance of differences:

0.02907	0.03149	0.03149

```
223  vplot
 224   VCOMPONENTS [FIXED=Iron*Salt*UV_B; FACTORIAL=9] RANDOM=UV_B.Block;
INITIAL=1; CONSTRAINTS=none
 225  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 226   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20] sqrt(WUE)
```

REML variance components analysis

Response variate: SQRT(WUE)
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.01091	0.01567

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.0872	0.02252

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.97	1	0.97	10.0	0.348
Iron	68.85	1	68.85	30.0	<0.001
Salt	11.62	1	11.62	30.0	0.002
UV_B.Iron	1.54	1	1.54	30.0	0.224
UV_B.Salt	1.27	1	1.27	30.0	0.269
Iron.Salt	4.76	1	4.76	30.0	0.037
UV_B.Iron.Salt	0.00	1	0.00	30.0	0.967

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.00	1	0.00	30.0	0.967

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

1.428 Standard error: 0.0522

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	1.377	1.479

Standard error of differences: 0.1044

Table of predicted means for Iron

Iron	+ Fe	- Fe
	1.782	1.074

Standard error of differences: 0.08525

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	1.573	1.283

Standard error of differences: 0.08525

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	1.677	1.076
- UV-B	1.886	1.073

Standard errors of differences

Average:	0.1301
Maximum:	0.1348
Minimum:	0.1206

Average variance of differences: 0.01696

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.1206	0.1348

Maximum:	0.1206	0.1348
Minimum:	0.1206	0.1348

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	1.474	1.279
- UV-B	1.673	1.286

Standard errors of differences

Average:	0.1301
Maximum:	0.1348
Minimum:	0.1206

Average variance of differences: 0.01696

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.1206	0.1348
Maximum:	0.1206	0.1348
Minimum:	0.1206	0.1348

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	1.834	1.729
- Fe	1.313	0.836

Standard error of differences: 0.1206

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	1.680	1.675
	- Fe	1.268	0.884
- UV-B	+ Fe	1.988	1.784

	- Fe	1.357	0.788

Standard errors of differences

Average:	0.1764
Maximum:	0.1808
Minimum:	0.1705

Average variance of differences: 0.03115

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.1705	0.1774	0.1774
Maximum:	0.1705	0.1808	0.1808
Minimum:	0.1705	0.1705	0.1705

Average variance of differences:

0.02907	0.03149	0.03149

```
227  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	0.2327	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	0.1741	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	0.1741	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	0.2686	*		
UV_B - UV-B.Iron + Fe	3	0.3003	0.3003	*	
UV_B - UV-B.Iron - Fe	4	0.3003	0.3003	0.2686	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	0.2686	*		
UV_B - UV-B.Salt + NaCl	3	0.3003	0.3003	*	
UV_B - UV-B.Salt - NaCl	4	0.3003	0.3003	0.2686	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	0.2462	*		
Iron - Fe.Salt + NaCl	3	0.2462	0.2462	*	
Iron - Fe.Salt - NaCl	4	0.2462	0.2462	0.2462	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	0.3799	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	0.3799	0.3799	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	0.3799	0.3799	0.3799

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.4030	0.4030	0.4030
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.4030	0.4030	0.4030
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.4030	0.4030	0.4030
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.4030	0.4030	0.4030
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.4030	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.4030	0.3799	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.4030	0.3799	0.3799
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.4030	0.3799	0.3799
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.3799	*
		7	8

Leaf area

Data imported from Excel file: G:\All Data\Morphotoly data.xls
on: 31-Oct-2008 20:35:07
taken from sheet ""Leaf area"", cells A2:P49

```
 107  DELETE [REDEFINE=yes] Leaf_area_cm2_plant
 108  UNITS [NVALUES=*]
 109  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 110  ; REFERENCE=1] UV_B
 111  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 114  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 115  ; REFERENCE=1] Iron
 116  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 119  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 120  ; REFERENCE=1] Salt
 121  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 124  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 125  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
128  VARIATE [NVALUES=48] Leaf_area_cm2_plant
129  READ Leaf_area_cm2_plant
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Leaf_area_cm2_plant	2.444	9.916	26.23	48	0

```
141
142  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
143  reml [pr=wa,me,co] Leaf_area_cm2_plant
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.651	0.778

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	3.965	1.024

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.57	1	0.57	10.0	0.469
Iron	273.08	1	273.08	30.0	<0.001
Salt	209.00	1	209.00	30.0	<0.001
UV_B.Iron	0.74	1	0.74	30.0	0.398
UV_B.Salt	1.70	1	1.70	30.0	0.202
Iron.Salt	100.36	1	100.36	30.0	<0.001
UV_B.Iron.Salt	0.60	1	0.60	30.0	0.445

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.60	1	0.60	30.0	0.445

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

9.916 Standard error: 0.3699

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	10.195	9.638

Standard error of differences: 0.7399

Table of predicted means for Iron

Iron	+ Fe	- Fe
	14.666	5.167

Standard error of differences: 0.5748

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	5.761	14.071

Standard error of differences: 0.5748

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	15.191	5.198
- UV-B	14.141	5.135

Standard errors of differences

Average:	0.8956
Maximum:	0.9370
Minimum:	0.8129

Average variance of differences: 0.8056

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.8129	0.9370
Maximum:	0.8129	0.9370
Minimum:	0.8129	0.9370

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	5.665	14.724
- UV-B	5.858	13.419

Standard errors of differences

Average:	0.8956
Maximum:	0.9370
Minimum:	0.8129

Average variance of differences: 0.8056

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.8129	0.9370
Maximum:	0.8129	0.9370
Minimum:	0.8129	0.9370

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	7.631	21.700
- Fe	3.891	6.442

Standard error of differences: 0.8129

Table of predicted means for UV_B.Iron.Salt

	Salt	+ NaCl	- NaCl
UV_B	Iron		
+ UV-B	+ Fe	7.559	22.822
	- Fe	3.771	6.626
- UV-B	+ Fe	7.704	20.579
	- Fe	4.011	6.259

Standard errors of differences

Average:	1.202
Maximum:	1.240
Minimum:	1.150

Average variance of differences: 1.446

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	1.150	1.210	1.210
Maximum:	1.150	1.240	1.240
Minimum:	1.150	1.150	1.150

Average variance of differences:

1.322	1.466	1.466

```
 144  vplot
 145  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 146   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20;rmethod=all]
Leaf_area_cm2_plant
```

REML variance components analysis

Response variate: Leaf_area_cm2_plant
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.651	0.778

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	3.965	1.024

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.57	1	0.57	10.0	0.469
Iron	273.08	1	273.08	30.0	<0.001
Salt	209.00	1	209.00	30.0	<0.001
UV_B.Iron	0.74	1	0.74	30.0	0.398
UV_B.Salt	1.70	1	1.70	30.0	0.202
Iron.Salt	100.36	1	100.36	30.0	<0.001
UV_B.Iron.Salt	0.60	1	0.60	30.0	0.445

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.60	1	0.60	30.0	0.445

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

9.916 Standard error: 0.3699

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	10.195	9.638

Standard error of differences: 0.7399

Table of predicted means for Iron

Iron	+ Fe	- Fe
	14.666	5.167

Standard error of differences: 0.5748

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	5.761	14.071

Standard error of differences: 0.5748

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	15.191	5.198
- UV-B	14.141	5.135

Standard errors of differences

Average:	0.8956
Maximum:	0.9370
Minimum:	0.8129

Average variance of differences: 0.8056

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.8129	0.9370

Maximum:	0.8129	0.9370
Minimum:	0.8129	0.9370

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	5.665	14.724
- UV-B	5.858	13.419

Standard errors of differences

Average:	0.8956
Maximum:	0.9370
Minimum:	0.8129

Average variance of differences: 0.8056

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.8129	0.9370
Maximum:	0.8129	0.9370
Minimum:	0.8129	0.9370

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	7.631	21.700
- Fe	3.891	6.442

Standard error of differences: 0.8129

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	7.559	22.822
	- Fe	3.771	6.626
- UV-B	+ Fe	7.704	20.579

- Fe 4.011 6.259

Standard errors of differences

Average:	1.202
Maximum:	1.240
Minimum:	1.150

Average variance of differences: 1.446

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	1.150	1.210	1.210
Maximum:	1.150	1.240	1.240
Minimum:	1.150	1.150	1.150

Average variance of differences:

1.322	1.466	1.466

```
147  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	1.649	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	1.174	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	1.174	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	1.811	*		
UV_B - UV-B.Iron + Fe	3	2.088	2.088	*	
UV_B - UV-B.Iron - Fe	4	2.088	2.088	1.811	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	1.811	*		
UV_B - UV-B.Salt + NaCl	3	2.088	2.088	*	
UV_B - UV-B.Salt - NaCl	4	2.088	2.088	1.811	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	1.660	*		
Iron - Fe.Salt + NaCl	3	1.660	1.660	*	
Iron - Fe.Salt - NaCl	4	1.660	1.660	1.660	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	2.562	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	2.562	2.562	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	2.562	2.562	2.562

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	2.764	2.764	2.764
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	2.764	2.764	2.764
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	2.764	2.764	2.764
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	2.764	2.764	2.764
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	2.764	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	2.764	2.562	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	2.764	2.562	2.562
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	2.764	2.562	2.562
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	2.562	*
		7	8

Root to shoot ratio

Data imported from Excel file: G:\All Data\Morphotoly data.xls
on: 31-Oct-2008 20:25:16
taken from sheet ""Shoot to Root ratio"", cells A2:P49

```
  58  DELETE [REDEFINE=yes] Root_Shoot
  59  UNITS [NVALUES=*]
  60  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
  61  ; REFERENCE=1] UV_B
  62  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
  65  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
  66  ; REFERENCE=1] Iron
  67  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
  70  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
  71  ; REFERENCE=1] Salt
  72  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
  75  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
  76  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
79  VARIATE [NVALUES=48] Root_Shoot
80  READ Root_Shoot
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Root_Shoot	0.2586	0.3857	0.5334	48	0

```
93
94  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
95  reml [pr=wa,me,co] Root_Shoot
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	-0.0000095	0.0001102

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.000882	0.0002278

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	5.19	1	5.19	10.0	0.046
Iron	42.12	1	42.12	30.0	<0.001
Salt	171.34	1	171.34	30.0	<0.001
UV_B.Iron	0.51	1	0.51	30.0	0.481
UV_B.Salt	0.52	1	0.52	30.0	0.478
Iron.Salt	0.01	1	0.01	30.0	0.944
UV_B.Iron.Salt	0.54	1	0.54	30.0	0.470

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.54	1	0.54	30.0	0.470

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

0.3857 Standard error: 0.00419

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	0.3762	0.3953

Standard error of differences: 0.008387

Table of predicted means for Iron

Iron	+ Fe	- Fe
	0.3579	0.4136

Standard error of differences: 0.008575

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	0.4419	0.3296

Standard error of differences: 0.008575

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	0.3514	0.4009
- UV-B	0.3644	0.4262

Standard errors of differences

Average:	0.01204
Maximum:	0.01213
Minimum:	0.01199

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.01213	0.01199
Maximum:	0.01213	0.01199
Minimum:	0.01213	0.01199

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	0.4292	0.3231
- UV-B	0.4545	0.3361

Standard errors of differences

Average:	0.01204
Maximum:	0.01213
Minimum:	0.01199

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.01213	0.01199
Maximum:	0.01213	0.01199
Minimum:	0.01213	0.01199

Table of predicted means for Iron.Salt

Salt	+ NaCl	- NaCl
Iron		
+ Fe	0.4137	0.3021
- Fe	0.4700	0.3571

Standard error of differences: 0.01213

Table of predicted means for UV_B.Iron.Salt

	Salt	+ NaCl	- NaCl
UV_B	Iron		
+ UV-B	+ Fe	0.4073	0.2955
	- Fe	0.4512	0.3507
- UV-B	+ Fe	0.4202	0.3086
	- Fe	0.4888	0.3635

Standard errors of differences

Average:	0.01710
Maximum:	0.01715
Minimum:	0.01706

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.01715	0.01709	0.01709
Maximum:	0.01715	0.01715	0.01715
Minimum:	0.01715	0.01706	0.01706

```
  96  vplot
```
Message: negative variance components present. REML option RMETHOD=all should be used to calculate residuals.
Fault 1, code UF 1, statement 11 in procedure VPLOT

Residuals are all missing.

```
  97  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
  98   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20;rmethod=all] Root_Shoot
```

REML variance components analysis

Response variate: Root_Shoot
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	-0.0000095	0.0001102

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.000882	0.0002278

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	5.19	1	5.19	10.0	0.046
Iron	42.12	1	42.12	30.0	<0.001
Salt	171.34	1	171.34	30.0	<0.001
UV_B.Iron	0.51	1	0.51	30.0	0.481
UV_B.Salt	0.52	1	0.52	30.0	0.478
Iron.Salt	0.01	1	0.01	30.0	0.944
UV_B.Iron.Salt	0.54	1	0.54	30.0	0.470

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.54	1	0.54	30.0	0.470

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

0.3857 Standard error: 0.00419

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	0.3762	0.3953

Standard error of differences: 0.008387

Table of predicted means for Iron

Iron	+ Fe	- Fe
	0.3579	0.4136

Standard error of differences: 0.008575

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	0.4419	0.3296

Standard error of differences: 0.008575

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	0.3514	0.4009
- UV-B	0.3644	0.4262

Standard errors of differences

Average:	0.01204
Maximum:	0.01213
Minimum:	0.01199

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.01213	0.01199
Maximum:	0.01213	0.01199

Minimum:	0.01213	0.01199

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	0.4292	0.3231
- UV-B	0.4545	0.3361

Standard errors of differences

Average:	0.01204
Maximum:	0.01213
Minimum:	0.01199

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.01213	0.01199
Maximum:	0.01213	0.01199
Minimum:	0.01213	0.01199

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	0.4137	0.3021
- Fe	0.4700	0.3571

Standard error of differences: 0.01213

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	0.4073	0.2955
	- Fe	0.4512	0.3507
- UV-B	+ Fe	0.4202	0.3086
	- Fe	0.4888	0.3635

Standard errors of differences

Average:	0.01710
Maximum:	0.01715
Minimum:	0.01706

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.01715	0.01709	0.01709
Maximum:	0.01715	0.01715	0.01715
Minimum:	0.01715	0.01706	0.01706

```
99  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

UV_B + UV-B	1	*	
UV_B - UV-B	2	0.01869	*
		1	2

Iron

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Iron + Fe	1	*	
Iron - Fe	2	0.01751	*
		1	2

Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Salt + NaCl	1	*	
Salt - NaCl	2	0.01751	*
		1	2

UV_B.Iron

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	0.02702	*		
UV_B - UV-B.Iron + Fe	3	0.02673	0.02673	*	
UV_B - UV-B.Iron - Fe	4	0.02673	0.02673	0.02702	*
		1	2	3	4

UV_B.Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	0.02702	*		
UV_B - UV-B.Salt + NaCl	3	0.02673	0.02673	*	
UV_B - UV-B.Salt - NaCl	4	0.02673	0.02673	0.02702	*
		1	2	3	4

Iron.Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	0.02477	*		
Iron - Fe.Salt + NaCl	3	0.02477	0.02477	*	
Iron - Fe.Salt - NaCl	4	0.02477	0.02477	0.02477	*
		1	2	3	4

UV_B.Iron.Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	0.03821	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	0.03821	0.03821	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	0.03821	0.03821	0.03821
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.03800	0.03800	0.03800
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.03800	0.03800	0.03800
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.03800	0.03800	0.03800
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.03800	0.03800	0.03800
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.03800	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.03800	0.03821	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.03800	0.03821	0.03821
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.03800	0.03821	0.03821
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*		
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.03821	*	
		7	8	

Root DM

GenStat Release 11.1 (PC/Windows) 30 October 2008 19:56:18

Registered to: Lincoln University

GenStat Eleventh Edition
GenStat Procedure Library Release PL19.1

```
  1  %CD 'H:/My Documents'
  2  "Data taken from unsaved spreadsheet: New Data;1"
  3  DELETE [REDEFINE=yes] _stitle_: TEXT _stitle_
  4  READ [PRINT=*; SETNVALUES=yes] _stitle_
  7  PRINT [IPRINT=*] _stitle_; JUST=left
```

Data imported from Clipboard
on: 30-Oct-2008 19:56:49

```
  8  DELETE [REDEFINE=yes] UV_B,Iron,Salt,Block,Root_g_DW_plant
  9  UNITS [NVALUES=*]
 10  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 11  ; REFERENCE=1] UV_B
 12  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 15  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 16  ; REFERENCE=1] Iron
 17  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 20  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 21  ; REFERENCE=1] Salt
 22  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 25  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 26  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
 29  VARIATE [NVALUES=48] Root_g_DW_plant
 30  READ Root_g_DW_plant
```

Identifier	Minimum	Mean	Maximum	Values	Missing

Root_g_DW_plant	0.02337	0.05208	0.1051	48	0

```
43
44  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
45  reml [pr=wa,me,co] Root_g_DW_plant
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.00000442	0.00000661

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.0000374	0.00000964

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	5.09	1	5.09	10.0	0.048
Iron	597.37	1	597.37	30.0	<0.001
Salt	123.54	1	123.54	30.0	<0.001
UV_B.Iron	0.28	1	0.28	30.0	0.600
UV_B.Salt	0.77	1	0.77	30.0	0.389
Iron.Salt	86.17	1	86.17	30.0	<0.001
UV_B.Iron.Salt	0.06	1	0.06	30.0	0.805

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.06	1	0.06	30.0	0.805

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

0.05208 Standard error: 0.001071

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	0.04966	0.05449

Standard error of differences: 0.002141

Table of predicted means for Iron

Iron	+ Fe	- Fe
	0.07364	0.03052

Standard error of differences: 0.001764

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	0.04227	0.06188

Standard error of differences: 0.001764

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	0.07076	0.02857
- UV-B	0.07652	0.03247

Standard errors of differences

Average:	0.002681
Maximum:	0.002775
Minimum:	0.002495

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.002495	0.002775
Maximum:	0.002495	0.002775
Minimum:	0.002495	0.002775

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	0.04063	0.05870
- UV-B	0.04392	0.06507

Standard errors of differences

Average:	0.002681
Maximum:	0.002775
Minimum:	0.002495

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.002495	0.002775
Maximum:	0.002495	0.002775
Minimum:	0.002495	0.002775

Table of predicted means for Iron.Salt

Salt	+ NaCl	- NaCl
Iron		
+ Fe	0.05565	0.09163
- Fe	0.02890	0.03214

Standard error of differences: 0.002495

Table of predicted means for UV_B.Iron.Salt

	Salt	+ NaCl	- NaCl
UV_B	Iron		
+ UV-B	+ Fe	0.05331	0.08820
	- Fe	0.02795	0.02920
- UV-B	+ Fe	0.05798	0.09507
	- Fe	0.02986	0.03507

Standard errors of differences

Average:	0.003644
Maximum:	0.003731
Minimum:	0.003528

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.003528	0.003664	0.003664
Maximum:	0.003528	0.003731	0.003731
Minimum:	0.003528	0.003528	0.003528

```
  46  vplot
  47   VCOMPONENTS [FIXED=Iron*Salt*UV_B; FACTORIAL=9] RANDOM=UV_B.Block;
INITIAL=1; CONSTRAINTS=none
  48  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
  49   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20] Root_g_DW_plant
```

REML variance components analysis

Response variate: Root_g_DW_plant
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.00000442	0.00000661

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.0000374	0.00000964

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	5.09	1	5.09	10.0	0.048
Iron	597.37	1	597.37	30.0	<0.001
Salt	123.54	1	123.54	30.0	<0.001
UV_B.Iron	0.28	1	0.28	30.0	0.600
UV_B.Salt	0.77	1	0.77	30.0	0.389
Iron.Salt	86.17	1	86.17	30.0	<0.001
UV_B.Iron.Salt	0.06	1	0.06	30.0	0.805

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.06	1	0.06	30.0	0.805

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

0.05208 Standard error: 0.001071

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	0.04966	0.05449

Standard error of differences: 0.002141

Table of predicted means for Iron

Iron	+ Fe	- Fe
	0.07364	0.03052

Standard error of differences: 0.001764

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	0.04227	0.06188

Standard error of differences: 0.001764

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	0.07076	0.02857
- UV-B	0.07652	0.03247

Standard errors of differences

Average:	0.002681
Maximum:	0.002775
Minimum:	0.002495

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.002495	0.002775
Maximum:	0.002495	0.002775

Minimum:	0.002495	0.002775

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	0.04063	0.05870
- UV-B	0.04392	0.06507

Standard errors of differences

Average:	0.002681
Maximum:	0.002775
Minimum:	0.002495

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.002495	0.002775
Maximum:	0.002495	0.002775
Minimum:	0.002495	0.002775

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	0.05565	0.09163
- Fe	0.02890	0.03214

Standard error of differences: 0.002495

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	0.05331	0.08820
	- Fe	0.02795	0.02920
- UV-B	+ Fe	0.05798	0.09507
	- Fe	0.02986	0.03507

Standard errors of differences

Average:	0.003644
Maximum:	0.003731
Minimum:	0.003528

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.003528	0.003664	0.003664
Maximum:	0.003528	0.003731	0.003731
Minimum:	0.003528	0.003528	0.003528

```
50  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	0.004771	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	0.003603	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	0.003603	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	0.005559	*		
UV_B - UV-B.Iron + Fe	3	0.006182	0.006182	*	
UV_B - UV-B.Iron - Fe	4	0.006182	0.006182	0.005559	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	0.005559	*		
UV_B - UV-B.Salt + NaCl	3	0.006182	0.006182	*	
UV_B - UV-B.Salt - NaCl	4	0.006182	0.006182	0.005559	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	0.005095	*		
Iron - Fe.Salt + NaCl	3	0.005095	0.005095	*	
Iron - Fe.Salt - NaCl	4	0.005095	0.005095	0.005095	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	0.007862	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	0.007862	0.007862	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	0.007862	0.007862	0.007862
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.008314	0.008314	0.008314
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.008314	0.008314	0.008314
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.008314	0.008314	0.008314
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.008314	0.008314	0.008314
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.008314	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.008314	0.007862	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.008314	0.007862	0.007862

UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.008314 4	0.007862 5	0.007862 6
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*		
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.007862 7	* 8	

RWC%

Data imported from Clipboard
on: 30-Oct-2008 20:28:09

```
  8  DELETE [REDEFINE=yes] UV_B,Iron,Salt,Block,RWC%
  9  UNITS [NVALUES=*]
 10  FACTOR [MODIFY=yes; NVALUES=24; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 11  ; REFERENCE=1] UV_B
 12  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	24	0	2

```
 14  FACTOR [MODIFY=yes; NVALUES=24; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 15  ; REFERENCE=1] Iron
 16  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	24	0	2

```
 18  FACTOR [MODIFY=yes; NVALUES=24; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 19  ; REFERENCE=1] Salt
 20  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	24	0	2

```
 22  FACTOR [MODIFY=yes; NVALUES=24; LEVELS=3; REFERENCE=1] Block
 23  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	24	0	3

```
 25  VARIATE [NVALUES=24] RWC%
 26  READ RWC%
```

Identifier	Minimum	Mean	Maximum	Values	Missing
RWC%	79.21	91.75	98.25	24	0

```
 33
 34  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
 35  reml [pr=wa,me,co] RWC%
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	5.38	5.97

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	11.61	4.74

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.00	1	0.00	4.0	1.000
Iron	0.10	1	0.10	12.0	0.759
Salt	11.33	1	11.33	12.0	0.006
UV_B.Iron	0.42	1	0.42	12.0	0.528
UV_B.Salt	0.56	1	0.56	12.0	0.469
Iron.Salt	2.48	1	2.48	12.0	0.141
UV_B.Iron.Salt	0.86	1	0.86	12.0	0.373

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.86	1	0.86	12.0	0.373

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

91.75 Standard error: 1.175

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	91.75	91.75

Standard error of differences: 2.350

Table of predicted means for Iron

Iron	+ Fe	- Fe
	91.97	91.53

Standard error of differences: 1.391

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	89.41	94.09

Standard error of differences: 1.391

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	92.42	91.08
- UV-B	91.52	91.99

Standard errors of differences

Average:	2.476
Maximum:	2.730
Minimum:	1.967

Average variance of differences: 6.261

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	1.967	2.730
Maximum:	1.967	2.730
Minimum:	1.967	2.730

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	88.89	94.61
- UV-B	89.93	93.57

Standard errors of differences

Average:	2.476
Maximum:	2.730
Minimum:	1.967

Average variance of differences: 6.261

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	1.967	2.730
Maximum:	1.967	2.730
Minimum:	1.967	2.730

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	90.73	93.22
- Fe	88.10	94.97

Standard error of differences: 1.967

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B + UV-B	+ Fe	91.30	93.55
	- Fe	86.48	95.68
- UV-B	+ Fe	90.15	92.89
	- Fe	89.71	94.26

Standard errors of differences

Average:	3.115
Maximum:	3.365
Minimum:	2.782

Average variance of differences: 9.790

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	2.782	3.171	3.171
Maximum:	2.782	3.365	3.365
Minimum:	2.782	2.782	2.782

Average variance of differences:

7.741 10.13 10.13

```
46  VCOMPONENTS [FIXED=Iron*Salt*UV_B; FACTORIAL=9] RANDOM=UV_B.Block;
INITIAL=1; CONSTRAINTS=none
  47  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
  48   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20] RWC%
```

REML variance components analysis

Response variate: RWC%
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 24

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	5.38	5.97

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	11.61	4.74

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.00	1	0.00	4.0	1.000
Iron	0.10	1	0.10	12.0	0.759
Salt	11.33	1	11.33	12.0	0.006
UV_B.Iron	0.42	1	0.42	12.0	0.528
UV_B.Salt	0.56	1	0.56	12.0	0.469
Iron.Salt	2.48	1	2.48	12.0	0.141
UV_B.Iron.Salt	0.86	1	0.86	12.0	0.373

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.86	1	0.86	12.0	0.373

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

91.75 Standard error: 1.175

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	91.75	91.75

Standard error of differences: 2.350

Table of predicted means for Iron

Iron	+ Fe	- Fe
	91.97	91.53

Standard error of differences: 1.391

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	89.41	94.09

Standard error of differences: 1.391

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	92.42	91.08
- UV-B	91.52	91.99

Standard errors of differences

Average:	2.476
Maximum:	2.730
Minimum:	1.967

Average variance of differences: 6.261

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	1.967	2.730

Maximum:	1.967	2.730
Minimum:	1.967	2.730

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	88.89	94.61
- UV-B	89.93	93.57

Standard errors of differences

Average:	2.476
Maximum:	2.730
Minimum:	1.967

Average variance of differences: 6.261

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	1.967	2.730
Maximum:	1.967	2.730
Minimum:	1.967	2.730

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	90.73	93.22
- Fe	88.10	94.97

Standard error of differences: 1.967

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	91.30	93.55
	- Fe	86.48	95.68
- UV-B	+ Fe	90.15	92.89

- Fe	89.71	94.26	

Standard errors of differences

Average:	3.115
Maximum:	3.365
Minimum:	2.782

Average variance of differences: 9.790

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	2.782	3.171	3.171
Maximum:	2.782	3.365	3.365
Minimum:	2.782	2.782	2.782

Average variance of differences:

7.741	10.13	10.13

```
49  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	6.523	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	3.031	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	3.031	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 21.52%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	5.462	*		
UV_B - UV-B.Iron + Fe	3	7.581	7.581	*	
UV_B - UV-B.Iron - Fe	4	7.581	7.581	5.462	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 21.52%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	5.462	*		
UV_B - UV-B.Salt + NaCl	3	7.581	7.581	*	
UV_B - UV-B.Salt - NaCl	4	7.581	7.581	5.462	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	4.287	*		
Iron - Fe.Salt + NaCl	3	4.287	4.287	*	
Iron - Fe.Salt - NaCl	4	4.287	4.287	4.287	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 21.52%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	7.725	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	7.725	7.725	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	7.725	7.725	7.725

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	9.344	9.344	9.344
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	9.344	9.344	9.344
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	9.344	9.344	9.344
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	9.344	9.344	9.344
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	9.344	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	9.344	7.725	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	9.344	7.725	7.725
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	9.344	7.725	7.725
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	7.725	*
		7	8

Shoot DM

Data imported from Excel file: G:\All Data\Morphotoly data.xls
on: 31-Oct-2008 20:01:49
taken from sheet ""Shoot DW"", cells A2:P49

```
   9  DELETE [REDEFINE=yes] UV_B,Iron,Salt,Block,Shoot_g_DW_plant
  10  UNITS [NVALUES=*]
  11  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
  12  ; REFERENCE=1] UV_B
  13  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
  16  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
  17  ; REFERENCE=1] Iron
  18  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
  21  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
  22  ; REFERENCE=1] Salt
  23  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
  26  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
  27  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
30  VARIATE [NVALUES=48] Shoot_g_DW_plant
31  READ Shoot_g_DW_plant
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Shoot_g_DW_plant	0.05464	0.1478	0.3419	48	0

```
44
45  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
46  reml [pr=wa,me,co] Shoot_g_DW_plant
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.0000629	0.0000731

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.000367	0.0000947

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.91	1	0.91	10.0	0.362
Iron	672.83	1	672.83	30.0	<0.001
Salt	321.70	1	321.70	30.0	<0.001
UV_B.Iron	0.01	1	0.01	30.0	0.941
UV_B.Salt	0.59	1	0.59	30.0	0.449
Iron.Salt	160.14	1	160.14	30.0	<0.001
UV_B.Iron.Salt	0.35	1	0.35	30.0	0.557

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.35	1	0.35	30.0	0.557

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

0.1478 Standard error: 0.00359

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	0.1444	0.1513

Standard error of differences: 0.007178

Table of predicted means for Iron

Iron	+ Fe	- Fe
	0.2195	0.0762

Standard error of differences: 0.005527

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	0.0983	0.1974

Standard error of differences: 0.005527

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	0.2159	0.0729
- UV-B	0.2232	0.0794

Standard errors of differences

Average:	0.008645
Maximum:	0.009059
Minimum:	0.007817

Average variance of differences: 0.00007508

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.007817	0.009059
Maximum:	0.007817	0.009059
Minimum:	0.007817	0.009059

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	0.0970	0.1919
- UV-B	0.0996	0.2030

Standard errors of differences

Average:	0.008645
Maximum:	0.009059
Minimum:	0.007817

Average variance of differences: 0.00007508

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.007817	0.009059
Maximum:	0.007817	0.009059
Minimum:	0.007817	0.009059

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	0.1350	0.3041
- Fe	0.0616	0.0908

Standard error of differences: 0.007817

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	0.1318	0.3000
	- Fe	0.0621	0.0838
- UV-B	+ Fe	0.1381	0.3082
	- Fe	0.0610	0.0977

Standard errors of differences

Average:	0.01157
Maximum:	0.01197
Minimum:	0.01105

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.01105	0.01166	0.01166

Maximum:	0.01105	0.01197	0.01197
Minimum:	0.01105	0.01105	0.01105

```
  47  vplot
  48  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
  49   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20;rmethod=all]
Shoot_g_DW_plant
```

REML variance components analysis

Response variate: Shoot_g_DW_plant
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.0000629	0.0000731

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.000367	0.0000947

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.91	1	0.91	10.0	0.362
Iron	672.83	1	672.83	30.0	<0.001
Salt	321.70	1	321.70	30.0	<0.001
UV_B.Iron	0.01	1	0.01	30.0	0.941
UV_B.Salt	0.59	1	0.59	30.0	0.449
Iron.Salt	160.14	1	160.14	30.0	<0.001
UV_B.Iron.Salt	0.35	1	0.35	30.0	0.557

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.35	1	0.35	30.0	0.557

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

0.1478 Standard error: 0.00359

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	0.1444	0.1513

Standard error of differences: 0.007178

Table of predicted means for Iron

Iron	+ Fe	- Fe
	0.2195	0.0762

Standard error of differences: 0.005527

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	0.0983	0.1974

Standard error of differences: 0.005527

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	0.2159	0.0729
- UV-B	0.2232	0.0794

Standard errors of differences

Average:	0.008645
Maximum:	0.009059
Minimum:	0.007817

Average variance of differences: 0.00007508

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.007817	0.009059

Maximum:	0.007817	0.009059
Minimum:	0.007817	0.009059

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	0.0970	0.1919
- UV-B	0.0996	0.2030

Standard errors of differences

Average:	0.008645
Maximum:	0.009059
Minimum:	0.007817

Average variance of differences: 0.00007508

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.007817	0.009059
Maximum:	0.007817	0.009059
Minimum:	0.007817	0.009059

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	0.1350	0.3041
- Fe	0.0616	0.0908

Standard error of differences: 0.007817

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	0.1318	0.3000
	- Fe	0.0621	0.0838
- UV-B	+ Fe	0.1381	0.3082

- Fe	0.0610	0.0977

Standard errors of differences

Average:	0.01157
Maximum:	0.01197
Minimum:	0.01105

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.01105	0.01166	0.01166
Maximum:	0.01105	0.01197	0.01197
Minimum:	0.01105	0.01105	0.01105

```
50  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	0.01599	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	0.01129	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	0.01129	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	0.01742	*		
UV_B - UV-B.Iron + Fe	3	0.02019	0.02019	*	
UV_B - UV-B.Iron - Fe	4	0.02019	0.02019	0.01742	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	0.01742	*		
UV_B - UV-B.Salt + NaCl	3	0.02019	0.02019	*	
UV_B - UV-B.Salt - NaCl	4	0.02019	0.02019	0.01742	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	0.01596	*		
Iron - Fe.Salt + NaCl	3	0.01596	0.01596	*	
Iron - Fe.Salt - NaCl	4	0.01596	0.01596	0.01596	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	0.02463	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	0.02463	0.02463	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	0.02463	0.02463	0.02463
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.02666	0.02666	0.02666
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.02666	0.02666	0.02666
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.02666	0.02666	0.02666
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.02666	0.02666	0.02666
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.02666	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.02666	0.02463	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.02666	0.02463	0.02463
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.02666	0.02463	0.02463
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.02463	*
		7	8

Chl a

Data imported from Clipboard
on: 30-Oct-2008 20:49:30

```
 292  DELETE [REDEFINE=yes] Chl_a_mg_g_DM
 293  UNITS [NVALUES=*]
 294  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 295  ; REFERENCE=1] UV_B
 296  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 299  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 300  ; REFERENCE=1] Iron
 301  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 304  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 305  ; REFERENCE=1] Salt
 306  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 309  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 310  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
 313  VARIATE [NVALUES=48] Chl_a_mg_g_DM
 314  READ Chl_a_mg_g_DM
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Chl_a_mg_g_DM	2.321	6.505	11.22	48	0

```
326
327  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
328  reml [pr=wa,me,co] Chl_a_mg_g_DM
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.0296	0.0596

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.370	0.0956

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	1.56	1	1.56	10.0	0.241
Iron	1249.65	1	1249.65	30.0	<0.001
Salt	32.49	1	32.49	30.0	<0.001
UV_B.Iron	1.81	1	1.81	30.0	0.188
UV_B.Salt	0.19	1	0.19	30.0	0.664
Iron.Salt	1.30	1	1.30	30.0	0.263
UV_B.Iron.Salt	0.07	1	0.07	30.0	0.792

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.07	1	0.07	30.0	0.792

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

6.505 Standard error: 0.1009

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	6.379	6.630

Standard error of differences: 0.2018

Table of predicted means for Iron

Iron	+ Fe	- Fe
	9.609	3.400

Standard error of differences: 0.1756

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	6.004	7.005

Standard error of differences: 0.1756

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	9.365	3.393
- UV-B	9.853	3.408

Standard errors of differences

Average:	0.2611
Maximum:	0.2675
Minimum:	0.2484

Average variance of differences: 0.06826

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.2484	0.2675
Maximum:	0.2484	0.2675
Minimum:	0.2484	0.2675

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	5.840	6.918
- UV-B	6.168	7.093

Standard errors of differences

Average:	0.2611
Maximum:	0.2675
Minimum:	0.2484

Average variance of differences: 0.06826

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.2484	0.2675
Maximum:	0.2484	0.2675
Minimum:	0.2484	0.2675

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	9.008	10.210
- Fe	3.000	3.801

Standard error of differences: 0.2484

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B + UV-B	+ Fe	8.702	10.027
	- Fe	2.977	3.808
- UV-B	+ Fe	9.314	10.392
	- Fe	3.023	3.793

Standard errors of differences

Average:	0.3591
Maximum:	0.3650
Minimum:	0.3513

Average variance of differences: 0.1290

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	0.3513	0.3604	0.3604
Maximum:	0.3513	0.3650	0.3650
Minimum:	0.3513	0.3513	0.3513

Average variance of differences:

0.1234	0.1300	0.1300

```
335  vplot
 336   VCOMPONENTS [FIXED=Iron*Salt*UV_B; FACTORIAL=9] RANDOM=UV_B.Block;
INITIAL=1; CONSTRAINTS=none
 337  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 338   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20] Chl_a_mg_g_DM
```

REML variance components analysis

Response variate: Chl_a_mg_g_DM
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.0296	0.0596

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.370	0.0956

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	1.56	1	1.56	10.0	0.241
Iron	1249.65	1	1249.65	30.0	<0.001
Salt	32.49	1	32.49	30.0	<0.001
UV_B.Iron	1.81	1	1.81	30.0	0.188
UV_B.Salt	0.19	1	0.19	30.0	0.664
Iron.Salt	1.30	1	1.30	30.0	0.263
UV_B.Iron.Salt	0.07	1	0.07	30.0	0.792

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.07	1	0.07	30.0	0.792

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

6.505 Standard error: 0.1009

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	6.379	6.630

Standard error of differences: 0.2018

Table of predicted means for Iron

Iron	+ Fe	- Fe
	9.609	3.400

Standard error of differences: 0.1756

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	6.004	7.005

Standard error of differences: 0.1756

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	9.365	3.393
- UV-B	9.853	3.408

Standard errors of differences

Average:	0.2611
Maximum:	0.2675
Minimum:	0.2484

Average variance of differences: 0.06826

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.2484	0.2675

Maximum:	0.2484	0.2675
Minimum:	0.2484	0.2675

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	5.840	6.918
- UV-B	6.168	7.093

Standard errors of differences

Average:	0.2611
Maximum:	0.2675
Minimum:	0.2484

Average variance of differences: 0.06826

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.2484	0.2675
Maximum:	0.2484	0.2675
Minimum:	0.2484	0.2675

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	9.008	10.210
- Fe	3.000	3.801

Standard error of differences: 0.2484

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	8.702	10.027
	- Fe	2.977	3.808
- UV-B	+ Fe	9.314	10.392

- Fe	3.023	3.793	

Standard errors of differences

Average:	0.3591
Maximum:	0.3650
Minimum:	0.3513

Average variance of differences: 0.1290

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.3513	0.3604	0.3604
Maximum:	0.3513	0.3650	0.3650
Minimum:	0.3513	0.3513	0.3513

Average variance of differences:

0.1234	0.1300	0.1300

```
339  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	0.4495	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	0.3587	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	0.3587	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	0.5534	*		
UV_B - UV-B.Iron + Fe	3	0.5960	0.5960	*	
UV_B - UV-B.Iron - Fe	4	0.5960	0.5960	0.5534	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	0.5534	*		
UV_B - UV-B.Salt + NaCl	3	0.5960	0.5960	*	
UV_B - UV-B.Salt - NaCl	4	0.5960	0.5960	0.5534	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	0.5072	*		
Iron - Fe.Salt + NaCl	3	0.5072	0.5072	*	
Iron - Fe.Salt - NaCl	4	0.5072	0.5072	0.5072	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	0.7826	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	0.7826	0.7826	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	0.7826	0.7826	0.7826

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.8133	0.8133	0.8133
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.8133	0.8133	0.8133
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.8133	0.8133	0.8133
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.8133	0.8133	0.8133
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.8133	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.8133	0.7826	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.8133	0.7826	0.7826
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.8133	0.7826	0.7826
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*		
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.7826	*	
		7	8	

Chl b

Data imported from Clipboard
on: 30-Oct-2008 20:53:13

```
 346  DELETE [REDEFINE=yes] Chl_b_mg_g_DM
 347  UNITS [NVALUES=*]
 348  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 349  ; REFERENCE=1] UV_B
 350  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 353  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 354  ; REFERENCE=1] Iron
 355  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 358  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 359  ; REFERENCE=1] Salt
 360  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 363  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 364  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
 367  VARIATE [NVALUES=48] Chl_b_mg_g_DM
 368  READ Chl_b_mg_g_DM
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Chl_b_mg_g_DM	1.711	3.120	4.881	48	0

```
383  vplot
 384  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
 385  reml [pr=wa,me,co] sqrt(Chl_b_mg_g_DM)
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.000639	0.000831

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.00443	0.001143

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	1.06	1	1.06	10.0	0.328
Iron	1132.79	1	1132.79	30.0	<0.001
Salt	24.00	1	24.00	30.0	<0.001
UV_B.Iron	1.39	1	1.39	30.0	0.248
UV_B.Salt	0.28	1	0.28	30.0	0.599
Iron.Salt	0.79	1	0.79	30.0	0.381
UV_B.Iron.Salt	1.07	1	1.07	30.0	0.309

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	1.07	1	1.07	30.0	0.309

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

1.734 Standard error: 0.0121

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	1.722	1.747

Standard error of differences: 0.02412

Table of predicted means for Iron

Iron	+ Fe	- Fe
	2.058	1.411

Standard error of differences: 0.01920

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	1.687	1.782

Standard error of differences: 0.01920

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	2.034	1.410
- UV-B	2.081	1.412

Standard errors of differences

Average:	0.02961
Maximum:	0.03083
Minimum:	0.02716

Average variance of differences: 0.0008796

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.02716	0.03083
Maximum:	0.02716	0.03083
Minimum:	0.02716	0.03083

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	1.670	1.774
- UV-B	1.705	1.789

Standard errors of differences

Average:	0.02961
Maximum:	0.03083
Minimum:	0.02716

Average variance of differences: 0.0008796

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.02716	0.03083
Maximum:	0.02716	0.03083
Minimum:	0.02716	0.03083

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	2.002	2.113
- Fe	1.373	1.450

Standard error of differences: 0.02716

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B + UV-B	+ Fe	1.963	2.105
	- Fe	1.377	1.444
- UV-B	+ Fe	2.041	2.122
	- Fe	1.369	1.456

Standard errors of differences

Average:	0.03994
Maximum:	0.04109
Minimum:	0.03841

Average variance of differences: 0.001597

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	0.03841	0.04019	0.04019
Maximum:	0.03841	0.04109	0.04109
Minimum:	0.03841	0.03841	0.03841

Average variance of differences:

0.001475	0.001617	0.001617

```
 204  vplot
 205  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 206   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20;rmethod=all]
sqrt(Chl_b_mg_g_DM)
```

REML variance components analysis

Response variate: SQRT(Chl_b_mg_g_DM)
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.000639	0.000831

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.00443	0.001143

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	1.06	1	1.06	10.0	0.328
Iron	1132.79	1	1132.79	30.0	<0.001
Salt	24.00	1	24.00	30.0	<0.001
UV_B.Iron	1.39	1	1.39	30.0	0.248
UV_B.Salt	0.28	1	0.28	30.0	0.599
Iron.Salt	0.79	1	0.79	30.0	0.381
UV_B.Iron.Salt	1.07	1	1.07	30.0	0.309

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	1.07	1	1.07	30.0	0.309

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

1.734 Standard error: 0.0121

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	1.722	1.747

Standard error of differences: 0.02412

Table of predicted means for Iron

Iron	+ Fe	- Fe
	2.058	1.411

Standard error of differences: 0.01920

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	1.687	1.782

Standard error of differences: 0.01920

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	2.034	1.410
- UV-B	2.081	1.412

Standard errors of differences

Average:	0.02961
Maximum:	0.03083
Minimum:	0.02716

Average variance of differences: 0.0008796

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.02716	0.03083

Maximum:	0.02716	0.03083
Minimum:	0.02716	0.03083

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	1.670	1.774
- UV-B	1.705	1.789

Standard errors of differences

Average:	0.02961
Maximum:	0.03083
Minimum:	0.02716

Average variance of differences: 0.0008796

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.02716	0.03083
Maximum:	0.02716	0.03083
Minimum:	0.02716	0.03083

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	2.002	2.113
- Fe	1.373	1.450

Standard error of differences: 0.02716

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	1.963	2.105
	- Fe	1.377	1.444
- UV-B	+ Fe	2.041	2.122

- Fe 1.369 1.456

Standard errors of differences

Average:	0.03994
Maximum:	0.04109
Minimum:	0.03841

Average variance of differences: 0.001597

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.03841	0.04019	0.04019
Maximum:	0.03841	0.04109	0.04109
Minimum:	0.03841	0.03841	0.03841

Average variance of differences:

0.001475	0.001617	0.001617

```
207  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	0.05374	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	0.03922	*
		1	2

Salt

Salt + NaCl	1	*		
Salt - NaCl	2	0.03922	*	
		1	2	

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	0.06051	*		
UV_B - UV-B.Iron + Fe	3	0.06870	0.06870	*	
UV_B - UV-B.Iron - Fe	4	0.06870	0.06870	0.06051	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	0.06051	*		
UV_B - UV-B.Salt + NaCl	3	0.06870	0.06870	*	
UV_B - UV-B.Salt - NaCl	4	0.06870	0.06870	0.06051	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	0.05546	*		
Iron - Fe.Salt + NaCl	3	0.05546	0.05546	*	
Iron - Fe.Salt - NaCl	4	0.05546	0.05546	0.05546	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	0.08558	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	0.08558	0.08558	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	0.08558	0.08558	0.08558

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.09155	0.09155	0.09155
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.09155	0.09155	0.09155
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.09155	0.09155	0.09155
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.09155	0.09155	0.09155
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.09155	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.09155	0.08558	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.09155	0.08558	0.08558
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.09155	0.08558	0.08558
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.08558	*
		7	8

Chl total

Data imported from Clipboard
on: 30-Oct-2008 20:46:27

```
 238  DELETE [REDEFINE=yes] Chl_Total_mg_g_DM
 239  UNITS [NVALUES=*]
 240  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 241  ; REFERENCE=1] UV_B
 242  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 245  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 246  ; REFERENCE=1] Iron
 247  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 250  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 251  ; REFERENCE=1] Salt
 252  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 255  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 256  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
259  VARIATE [NVALUES=48] Chl_Total_mg_g_DM
260  READ Chl_Total_mg_g_DM
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Chl_Total_mg_g_DM	4.031	9.622	16.03	48	0

```
272
273  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
274  reml [pr=wa,me,co] Chl_Total_mg_g_DM
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.0681	0.1123

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.657	0.1697

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	1.60	1	1.60	10.0	0.235
Iron	1304.47	1	1304.47	30.0	<0.001
Salt	32.74	1	32.74	30.0	<0.001
UV_B.Iron	1.95	1	1.95	30.0	0.172
UV_B.Salt	0.27	1	0.27	30.0	0.607
Iron.Salt	1.84	1	1.84	30.0	0.185
UV_B.Iron.Salt	0.27	1	0.27	30.0	0.608

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.27	1	0.27	30.0	0.608

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

9.622 Standard error: 0.1392

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	9.446	9.797

Standard error of differences: 0.2783

Table of predicted means for Iron

Iron	+ Fe	- Fe
	13.848	5.395

Standard error of differences: 0.2340

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	8.952	10.291

Standard error of differences: 0.2340

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	13.508	5.383
- UV-B	14.187	5.408

Standard errors of differences

Average:	0.3528
Maximum:	0.3637
Minimum:	0.3310

Average variance of differences: 0.1247

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.3310	0.3637
Maximum:	0.3310	0.3637
Minimum:	0.3310	0.3637

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	8.715	10.176
- UV-B	9.189	10.406

Standard errors of differences

Average:	0.3528
Maximum:	0.3637
Minimum:	0.3310

Average variance of differences: 0.1247

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.3310	0.3637
Maximum:	0.3310	0.3637
Minimum:	0.3310	0.3637

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	13.019	14.676
- Fe	4.885	5.906

Standard error of differences: 0.3310

Table of predicted means for UV_B.Iron.Salt

	Salt	+ NaCl	- NaCl
UV_B	Iron		
+ UV-B	+ Fe	12.559	14.458
	- Fe	4.872	5.894
- UV-B	+ Fe	13.480	14.894
	- Fe	4.897	5.918

Standard errors of differences

Average:	0.4816
Maximum:	0.4917
Minimum:	0.4680

Average variance of differences: 0.2320

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	0.4680	0.4838	0.4838
Maximum:	0.4680	0.4917	0.4917
Minimum:	0.4680	0.4680	0.4680

Average variance of differences:

0.2191	0.2342	0.2342

```
281  vplot
 282   VCOMPONENTS [FIXED=Iron*Salt*UV_B; FACTORIAL=9] RANDOM=UV_B.Block;
INITIAL=1; CONSTRAINTS=none
 283  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 284   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20] Chl_Total_mg_g_DM
```

REML variance components analysis

Response variate: Chl_Total_mg_g_DM
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.0681	0.1123

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.657	0.1697

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	1.60	1	1.60	10.0	0.235
Iron	1304.47	1	1304.47	30.0	<0.001
Salt	32.74	1	32.74	30.0	<0.001
UV_B.Iron	1.95	1	1.95	30.0	0.172
UV_B.Salt	0.27	1	0.27	30.0	0.607
Iron.Salt	1.84	1	1.84	30.0	0.185
UV_B.Iron.Salt	0.27	1	0.27	30.0	0.608

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.27	1	0.27	30.0	0.608

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

9.622 Standard error: 0.1392

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	9.446	9.797

Standard error of differences: 0.2783

Table of predicted means for Iron

Iron	+ Fe	- Fe
	13.848	5.395

Standard error of differences: 0.2340

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	8.952	10.291

Standard error of differences: 0.2340

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	13.508	5.383
- UV-B	14.187	5.408

Standard errors of differences

Average:	0.3528
Maximum:	0.3637
Minimum:	0.3310

Average variance of differences: 0.1247

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.3310	0.3637

Maximum:	0.3310	0.3637
Minimum:	0.3310	0.3637

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	8.715	10.176
- UV-B	9.189	10.406

Standard errors of differences

Average:	0.3528
Maximum:	0.3637
Minimum:	0.3310

Average variance of differences: 0.1247

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.3310	0.3637
Maximum:	0.3310	0.3637
Minimum:	0.3310	0.3637

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	13.019	14.676
- Fe	4.885	5.906

Standard error of differences: 0.3310

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	12.559	14.458
	- Fe	4.872	5.894
- UV-B	+ Fe	13.480	14.894

- Fe	4.897	5.918	

Standard errors of differences

Average:	0.4816
Maximum:	0.4917
Minimum:	0.4680

Average variance of differences: 0.2320

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.4680	0.4838	0.4838
Maximum:	0.4680	0.4917	0.4917
Minimum:	0.4680	0.4680	0.4680

Average variance of differences:

0.2191	0.2342	0.2342

```
285  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	0.6202	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	0.4779	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	0.4779	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	0.7374	*		
UV_B - UV-B.Iron + Fe	3	0.8103	0.8103	*	
UV_B - UV-B.Iron - Fe	4	0.8103	0.8103	0.7374	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	0.7374	*		
UV_B - UV-B.Salt + NaCl	3	0.8103	0.8103	*	
UV_B - UV-B.Salt - NaCl	4	0.8103	0.8103	0.7374	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	0.6759	*		
Iron - Fe.Salt + NaCl	3	0.6759	0.6759	*	
Iron - Fe.Salt - NaCl	4	0.6759	0.6759	0.6759	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	1.043	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	1.043	1.043	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	1.043	1.043	1.043

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	1.096	1.096	1.096
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	1.096	1.096	1.096
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	1.096	1.096	1.096
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	1.096	1.096	1.096
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	1.096	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	1.096	1.043	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	1.096	1.043	1.043
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	1.096	1.043	1.043
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*		
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	1.043	*	
		7	8	

UV-absorbing compounds

Data imported from Clipboard
on: 30-Oct-2008 20:58:33

```
 445  DELETE [REDEFINE=yes] UV_Abs_compounds_mg_DM_ml
 446  UNITS [NVALUES=*]
 447  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 448  ; REFERENCE=1] UV_B
 449  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 452  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 453  ; REFERENCE=1] Iron
 454  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 457  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 458  ; REFERENCE=1] Salt
 459  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 462  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 463  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
466  VARIATE [NVALUES=48] UV_Abs_compounds_mg_DM_ml
467  READ UV_Abs_compounds_mg_DM_ml
```

Identifier	Minimum	Mean	Maximum	Values	Missing
UV_Abs_compounds_mg_DM_ml	1.039	1.516	2.084	48	0

```
474
475  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
476  reml [pr=wa,me,co] UV_Abs_compounds_mg_DM_ml
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.00286	0.00306

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.0146	0.00376

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	109.66	1	109.66	10.0	<0.001
Iron	4.81	1	4.81	30.0	0.036
Salt	2.37	1	2.37	30.0	0.134
UV_B.Iron	6.23	1	6.23	30.0	0.018
UV_B.Salt	0.29	1	0.29	30.0	0.595
Iron.Salt	2.71	1	2.71	30.0	0.110
UV_B.Iron.Salt	0.81	1	0.81	30.0	0.376

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.81	1	0.81	30.0	0.376

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

1.516 Standard error: 0.0233

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	1.760	1.272

Standard error of differences: 0.04656

Table of predicted means for Iron

Iron	+ Fe	- Fe
	1.478	1.554

Standard error of differences: 0.03485

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	1.489	1.543

Standard error of differences: 0.03485

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	1.678	1.841
- UV-B	1.277	1.267

Standard errors of differences

Average:	0.05520
Maximum:	0.05816
Minimum:	0.04929

Average variance of differences: 0.003065

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.04929	0.05816
Maximum:	0.04929	0.05816
Minimum:	0.04929	0.05816

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	1.723	1.796
- UV-B	1.255	1.290

Standard errors of differences

Average:	0.05520
Maximum:	0.05816
Minimum:	0.04929

Average variance of differences: 0.003065

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.04929	0.05816
Maximum:	0.04929	0.05816
Minimum:	0.04929	0.05816

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	1.479	1.476
- Fe	1.499	1.610

Standard error of differences: 0.04929

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B + UV-B	+ Fe	1.686	1.670
	- Fe	1.761	1.922
- UV-B	+ Fe	1.273	1.282
	- Fe	1.236	1.297

Standard errors of differences

Average:	0.07344
Maximum:	0.07624
Minimum:	0.06971

Average variance of differences: 0.005404

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	0.06971	0.07406	0.07406
Maximum:	0.06971	0.07624	0.07624
Minimum:	0.06971	0.06971	0.06971

Average variance of differences:

0.004859	0.005495	0.005495

```
 477  vplot
 478   VCOMPONENTS [FIXED=Iron*Salt*UV_B; FACTORIAL=9] RANDOM=UV_B.Block;
INITIAL=1; CONSTRAINTS=none
 479  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 480   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20] UV_Abs_compounds_mg_DM_ml
```

REML variance components analysis

Response variate: UV_Abs_compounds_mg_DM_ml
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.00286	0.00306

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.0146	0.00376

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	109.66	1	109.66	10.0	<0.001
Iron	4.81	1	4.81	30.0	0.036
Salt	2.37	1	2.37	30.0	0.134
UV_B.Iron	6.23	1	6.23	30.0	0.018
UV_B.Salt	0.29	1	0.29	30.0	0.595
Iron.Salt	2.71	1	2.71	30.0	0.110
UV_B.Iron.Salt	0.81	1	0.81	30.0	0.376

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.81	1	0.81	30.0	0.376

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

1.516 Standard error: 0.0233

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	1.760	1.272

Standard error of differences: 0.04656

Table of predicted means for Iron

Iron	+ Fe	- Fe
	1.478	1.554

Standard error of differences: 0.03485

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	1.489	1.543

Standard error of differences: 0.03485

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	1.678	1.841
- UV-B	1.277	1.267

Standard errors of differences

Average:	0.05520
Maximum:	0.05816
Minimum:	0.04929

Average variance of differences: 0.003065

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.04929	0.05816

Maximum:	0.04929	0.05816
Minimum:	0.04929	0.05816

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	1.723	1.796
- UV-B	1.255	1.290

Standard errors of differences

Average:	0.05520
Maximum:	0.05816
Minimum:	0.04929

Average variance of differences: 0.003065

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.04929	0.05816
Maximum:	0.04929	0.05816
Minimum:	0.04929	0.05816

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	1.479	1.476
- Fe	1.499	1.610

Standard error of differences: 0.04929

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	1.686	1.670
	- Fe	1.761	1.922
- UV-B	+ Fe	1.273	1.282

- Fe	1.236	1.297	

Standard errors of differences

Average:	0.07344
Maximum:	0.07624
Minimum:	0.06971

Average variance of differences: 0.005404

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.06971	0.07406	0.07406
Maximum:	0.06971	0.07624	0.07624
Minimum:	0.06971	0.06971	0.06971

Average variance of differences:

0.004859	0.005495	0.005495

```
481  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	0.1037	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	0.07118	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	0.07118	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	0.1098	*		
UV_B - UV-B.Iron + Fe	3	0.1296	0.1296	*	
UV_B - UV-B.Iron - Fe	4	0.1296	0.1296	0.1098	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	0.1098	*		
UV_B - UV-B.Salt + NaCl	3	0.1296	0.1296	*	
UV_B - UV-B.Salt - NaCl	4	0.1296	0.1296	0.1098	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	0.1007	*		
Iron - Fe.Salt + NaCl	3	0.1007	0.1007	*	
Iron - Fe.Salt - NaCl	4	0.1007	0.1007	0.1007	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	0.1553	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	0.1553	0.1553	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	0.1553	0.1553	0.1553

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.1699	0.1699	0.1699
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.1699	0.1699	0.1699
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.1699	0.1699	0.1699
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.1699	0.1699	0.1699
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.1699	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.1699	0.1553	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.1699	0.1553	0.1553
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.1699	0.1553	0.1553
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.1553	*
		7	8

Phytosiderophores (PS)

Data imported from Clipboard
on: 5-Nov-2008 15:42:24

```
   8  DELETE [REDEFINE=yes] UV_B,Iron,Salt,Block,Original_data_of_PS
   9  UNITS [NVALUES=*]
  10  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
  11  ; REFERENCE=1] UV_B
  12  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
  15  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
  16  ; REFERENCE=1] Iron
  17  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
  20  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
  21  ; REFERENCE=1] Salt
  22  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
  25  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
  26  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
29  VARIATE [NVALUES=48] Original_data_of_PS
30  READ Original_data_of_PS
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Original_data_of_PS	0.3143	5.681	17.61	48	0

```
43
44  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
45  reml [pr=wa,me,co] Original_data_of_PS
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	6.041	3.426

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	6.264	1.617

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	4.77	1	4.77	10.0	0.054
Iron	40.80	1	40.80	30.0	<0.001
Salt	1.06	1	1.06	30.0	0.312
UV_B.Iron	0.27	1	0.27	30.0	0.605
UV_B.Salt	1.57	1	1.57	30.0	0.219
Iron.Salt	3.19	1	3.19	30.0	0.084
UV_B.Iron.Salt	3.04	1	3.04	30.0	0.091

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	3.04	1	3.04	30.0	0.091

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

5.681 Standard error: 0.7962

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	3.942	7.419

Standard error of differences: 1.592

Table of predicted means for Iron

Iron	+ Fe	- Fe
	3.373	7.988

Standard error of differences: 0.7225

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	6.052	5.309

Standard error of differences: 0.7225

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	1.824	6.061
- UV-B	4.923	9.915

Standard errors of differences

Average:	1.506
Maximum:	1.749
Minimum:	1.022

Average variance of differences: 2.386

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	1.022	1.749
Maximum:	1.022	1.749
Minimum:	1.022	1.749

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	4.767	3.118
- UV-B	7.337	7.501

Standard errors of differences

Average:	1.506
Maximum:	1.749
Minimum:	1.022

Average variance of differences: 2.386

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	1.022	1.749
Maximum:	1.022	1.749
Minimum:	1.022	1.749

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	4.390	2.357
- Fe	7.714	8.262

Standard error of differences: 1.022

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B + UV-B	+ Fe	2.663	0.984
	- Fe	6.870	5.251
- UV-B	+ Fe	6.116	3.729
	- Fe	8.558	11.272

Standard errors of differences

Average:	1.777
Maximum:	2.025
Minimum:	1.445

Average variance of differences: 3.239

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	1.445	1.832	1.832
Maximum:	1.445	2.025	2.025
Minimum:	1.445	1.445	1.445

Average variance of differences:

2.088	3.430	3.430

```
  46  vplot
  47  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
  48   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20;rmethod=all]
Original_data_of_PS
```

REML variance components analysis

Response variate: Original_data_of_PS
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	6.041	3.426

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	6.264	1.617

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	4.77	1	4.77	10.0	0.054
Iron	40.80	1	40.80	30.0	<0.001
Salt	1.06	1	1.06	30.0	0.312
UV_B.Iron	0.27	1	0.27	30.0	0.605
UV_B.Salt	1.57	1	1.57	30.0	0.219
Iron.Salt	3.19	1	3.19	30.0	0.084
UV_B.Iron.Salt	3.04	1	3.04	30.0	0.091

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	3.04	1	3.04	30.0	0.091

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

5.681 Standard error: 0.7962

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	3.942	7.419

Standard error of differences: 1.592

Table of predicted means for Iron

Iron	+ Fe	- Fe
	3.373	7.988

Standard error of differences: 0.7225

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	6.052	5.309

Standard error of differences: 0.7225

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	1.824	6.061
- UV-B	4.923	9.915

Standard errors of differences

Average:	1.506
Maximum:	1.749
Minimum:	1.022

Average variance of differences: 2.386

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	1.022	1.749

Maximum:	1.022	1.749
Minimum:	1.022	1.749

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	4.767	3.118
- UV-B	7.337	7.501

Standard errors of differences

Average:	1.506
Maximum:	1.749
Minimum:	1.022

Average variance of differences: 2.386

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	1.022	1.749
Maximum:	1.022	1.749
Minimum:	1.022	1.749

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	4.390	2.357
- Fe	7.714	8.262

Standard error of differences: 1.022

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	2.663	0.984
	- Fe	6.870	5.251
- UV-B	+ Fe	6.116	3.729

- Fe	8.558	11.272

Standard errors of differences

Average:	1.777
Maximum:	2.025
Minimum:	1.445

Average variance of differences: 3.239

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	1.445	1.832	1.832
Maximum:	1.445	2.025	2.025
Minimum:	1.445	1.445	1.445

Average variance of differences:

2.088	3.430	3.430

```
49  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	3.548	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	1.475	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	1.475	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	2.277	*		
UV_B - UV-B.Iron + Fe	3	3.896	3.896	*	
UV_B - UV-B.Iron - Fe	4	3.896	3.896	2.277	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	2.277	*		
UV_B - UV-B.Salt + NaCl	3	3.896	3.896	*	
UV_B - UV-B.Salt - NaCl	4	3.896	3.896	2.277	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	2.087	*		
Iron - Fe.Salt + NaCl	3	2.087	2.087	*	
Iron - Fe.Salt - NaCl	4	2.087	2.087	2.087	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	3.220	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	3.220	3.220	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	3.220	3.220	3.220

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	4.512	4.512	4.512
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	4.512	4.512	4.512
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	4.512	4.512	4.512
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	4.512	4.512	4.512
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	4.512	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	4.512	3.220	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	4.512	3.220	3.220
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	4.512	3.220	3.220
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	3.220	*
		7	8

Proline

Data imported from Clipboard
on: 3-Nov-2008 14:35:53

```
 132  DELETE [REDEFINE=yes] Original_data_of_Proline
 133  UNITS [NVALUES=*]
 134  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 135  ; REFERENCE=1] UV_B
 136  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 139  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 140  ; REFERENCE=1] Iron
 141  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 144  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 145  ; REFERENCE=1] Salt
 146  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 149  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 150  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
153  VARIATE [NVALUES=48] Original_data_of_Proline
154  READ Original_data_of_Proline
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Original_data_of_Proline	1.071	16.56	49.96	48	0

```
167
168  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
169  reml [pr=wa,me,co] Original_data_of_Proline
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	-0.14	3.65

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	28.70	7.41

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	2.40	1	2.40	10.0	0.152
Iron	0.02	1	0.02	30.0	0.889
Salt	358.43	1	358.43	30.0	<0.001
UV_B.Iron	0.17	1	0.17	30.0	0.680
UV_B.Salt	2.16	1	2.16	30.0	0.152
Iron.Salt	0.10	1	0.10	30.0	0.753
UV_B.Iron.Salt	0.26	1	0.26	30.0	0.617

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.26	1	0.26	30.0	0.617

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

16.56 Standard error: 0.766

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	17.75	15.37

Standard error of differences: 1.532

Table of predicted means for Iron

Iron	+ Fe	- Fe
	16.67	16.45

Standard error of differences: 1.547

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	31.20	1.92

Standard error of differences: 1.547

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	18.18	17.31
- UV-B	15.16	15.59

Standard errors of differences

Average:	2.180
Maximum:	2.187
Minimum:	2.177

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	2.187	2.177
Maximum:	2.187	2.177
Minimum:	2.187	2.177

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	33.52	1.97
- UV-B	28.88	1.87

Standard errors of differences

Average:	2.180
Maximum:	2.187
Minimum:	2.177

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	2.187	2.177
Maximum:	2.187	2.177
Minimum:	2.187	2.177

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	31.55	1.78
- Fe	30.84	2.06

Standard error of differences: 2.187

Table of predicted means for UV_B.Iron.Salt

	Salt	+ NaCl	- NaCl
UV_B	Iron		
+ UV-B	+ Fe	34.59	1.76
	- Fe	32.46	2.17
- UV-B	+ Fe	28.52	1.80
	- Fe	29.23	1.94

Standard errors of differences

Average:	3.089
Maximum:	3.093
Minimum:	3.086

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	3.093	3.088	3.088
Maximum:	3.093	3.093	3.093
Minimum:	3.093	3.086	3.086

```
 170  vplot
```
Message: negative variance components present. REML option RMETHOD=all should be used to calculate residuals.
Fault 1, code UF 1, statement 11 in procedure VPLOT

Residuals are all missing.

```
 171  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 172   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20;rmethod=all]
Original_data_of_Proline
```

REML variance components analysis

Response variate: Original_data_of_Proline
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	-0.14	3.65

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	28.70	7.41

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	2.40	1	2.40	10.0	0.152
Iron	0.02	1	0.02	30.0	0.889
Salt	358.43	1	358.43	30.0	<0.001
UV_B.Iron	0.17	1	0.17	30.0	0.680
UV_B.Salt	2.16	1	2.16	30.0	0.152
Iron.Salt	0.10	1	0.10	30.0	0.753
UV_B.Iron.Salt	0.26	1	0.26	30.0	0.617

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.26	1	0.26	30.0	0.617

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

16.56 Standard error: 0.766

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	17.75	15.37

Standard error of differences: 1.532

Table of predicted means for Iron

Iron	+ Fe	- Fe
	16.67	16.45

Standard error of differences: 1.547

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	31.20	1.92

Standard error of differences: 1.547

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	18.18	17.31
- UV-B	15.16	15.59

Standard errors of differences

Average:	2.180
Maximum:	2.187
Minimum:	2.177

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	2.187	2.177
Maximum:	2.187	2.177

Minimum:	2.187	2.177

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	33.52	1.97
- UV-B	28.88	1.87

Standard errors of differences

Average:	2.180
Maximum:	2.187
Minimum:	2.177

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	2.187	2.177
Maximum:	2.187	2.177
Minimum:	2.187	2.177

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	31.55	1.78
- Fe	30.84	2.06

Standard error of differences: 2.187

Table of predicted means for UV_B.Iron.Salt

	Salt	+ NaCl	- NaCl
UV_B	Iron		
+ UV-B	+ Fe	34.59	1.76
	- Fe	32.46	2.17
- UV-B	+ Fe	28.52	1.80
	- Fe	29.23	1.94

Standard errors of differences

Average:	3.089
Maximum:	3.093
Minimum:	3.086

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	3.093	3.088	3.088
Maximum:	3.093	3.093	3.093
Minimum:	3.093	3.086	3.086

```
173  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

UV_B + UV-B	1	*	
UV_B - UV-B	2	3.412	*
		1	2

Iron

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Iron + Fe	1	*	
Iron - Fe	2	3.159	*
		1	2

Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Salt + NaCl	1	*	
Salt - NaCl	2	3.159	*
		1	2

UV_B.Iron

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	4.873	*		
UV_B - UV-B.Iron + Fe	3	4.850	4.850	*	
UV_B - UV-B.Iron - Fe	4	4.850	4.850	4.873	*
		1	2	3	4

UV_B.Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	4.873	*		
UV_B - UV-B.Salt + NaCl	3	4.850	4.850	*	
UV_B - UV-B.Salt - NaCl	4	4.850	4.850	4.873	*
		1	2	3	4

Iron.Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	4.467	*		
Iron - Fe.Salt + NaCl	3	4.467	4.467	*	
Iron - Fe.Salt - NaCl	4	4.467	4.467	4.467	*
		1	2	3	4

UV_B.Iron.Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	6.892	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	6.892	6.892	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	6.892	6.892	6.892
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	6.875	6.875	6.875
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	6.875	6.875	6.875
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	6.875	6.875	6.875
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	6.875	6.875	6.875
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	6.875	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	6.875	6.892	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	6.875	6.892	6.892
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	6.875	6.892	6.892
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*		
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	6.892	*	
		7	8	

ADF%

Data imported from Clipboard
on: 30-Oct-2008 21:27:20

```
 178  DELETE [REDEFINE=yes] Ave_ADF_%
 179  UNITS [NVALUES=*]
 180  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 181  ; REFERENCE=1] UV_B
 182  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 185  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 186  ; REFERENCE=1] Iron
 187  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 190  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 191  ; REFERENCE=1] Salt
 192  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 195  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 196  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
 199  VARIATE [NVALUES=48] Ave_ADF_%
 200  READ Ave_ADF_%
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Ave_ADF_%	22.23	23.72	25.24	48	0

```
 213
 214  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
 215  reml [pr=wa,me,co] Ave_ADF_%
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.0711	0.0594

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.230	0.0593

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	2.06	1	2.06	10.0	0.182
Iron	68.94	1	68.94	30.0	<0.001
Salt	15.07	1	15.07	30.0	<0.001
UV_B.Iron	0.04	1	0.04	30.0	0.851
UV_B.Salt	0.76	1	0.76	30.0	0.391
Iron.Salt	6.17	1	6.17	30.0	0.019
UV_B.Iron.Salt	0.25	1	0.25	30.0	0.621

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.25	1	0.25	30.0	0.621

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

23.72 Standard error: 0.104

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	23.57	23.87

Standard error of differences: 0.2070

Table of predicted means for Iron

Iron	+ Fe	- Fe
	23.14	24.29

Standard error of differences: 0.1384

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	23.45	23.99

Standard error of differences: 0.1384

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	22.98	24.16
- UV-B	23.30	24.43

Standard errors of differences

Average:	0.2312
Maximum:	0.2490
Minimum:	0.1957

Average variance of differences: 0.05410

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.1957	0.2490
Maximum:	0.1957	0.2490
Minimum:	0.1957	0.2490

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	23.36	23.78
- UV-B	23.54	24.19

Standard errors of differences

Average:	0.2312
Maximum:	0.2490
Minimum:	0.1957

Average variance of differences: 0.05410

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.1957	0.2490
Maximum:	0.1957	0.2490
Minimum:	0.1957	0.2490

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	22.70	23.58
- Fe	24.19	24.39

Standard error of differences: 0.1957

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B + UV-B	+ Fe	22.57	23.40
	- Fe	24.15	24.16
- UV-B	+ Fe	22.84	23.77
	- Fe	24.24	24.62

Standard errors of differences

Average:	0.2996
Maximum:	0.3167
Minimum:	0.2768

Average variance of differences: 0.09014

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	0.2768	0.3034	0.3034
Maximum:	0.2768	0.3167	0.3167
Minimum:	0.2768	0.2768	0.2768

Average variance of differences:

0.07660	0.09240	0.09240

```
 216  vplot
 217   VCOMPONENTS [FIXED=Iron*Salt*UV_B; FACTORIAL=9] RANDOM=UV_B.Block;
INITIAL=1; CONSTRAINTS=none
 218  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 219   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20] Ave_ADF_%
```

REML variance components analysis

Response variate: Ave_ADF_%
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.0711	0.0594

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	0.230	0.0593

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	2.06	1	2.06	10.0	0.182
Iron	68.94	1	68.94	30.0	<0.001
Salt	15.07	1	15.07	30.0	<0.001
UV_B.Iron	0.04	1	0.04	30.0	0.851
UV_B.Salt	0.76	1	0.76	30.0	0.391
Iron.Salt	6.17	1	6.17	30.0	0.019
UV_B.Iron.Salt	0.25	1	0.25	30.0	0.621

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.25	1	0.25	30.0	0.621

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

23.72 Standard error: 0.104

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	23.57	23.87

Standard error of differences: 0.2070

Table of predicted means for Iron

Iron	+ Fe	- Fe
	23.14	24.29

Standard error of differences: 0.1384

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	23.45	23.99

Standard error of differences: 0.1384

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	22.98	24.16
- UV-B	23.30	24.43

Standard errors of differences

Average:	0.2312
Maximum:	0.2490
Minimum:	0.1957

Average variance of differences: 0.05410

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.1957	0.2490

Maximum:	0.1957	0.2490
Minimum:	0.1957	0.2490

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	23.36	23.78
- UV-B	23.54	24.19

Standard errors of differences

Average:	0.2312
Maximum:	0.2490
Minimum:	0.1957

Average variance of differences: 0.05410

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.1957	0.2490
Maximum:	0.1957	0.2490
Minimum:	0.1957	0.2490

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	22.70	23.58
- Fe	24.19	24.39

Standard error of differences: 0.1957

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	22.57	23.40
	- Fe	24.15	24.16
- UV-B	+ Fe	22.84	23.77

- Fe 24.24 24.62

Standard errors of differences

Average:	0.2996
Maximum:	0.3167
Minimum:	0.2768

Average variance of differences: 0.09014

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.2768	0.3034	0.3034
Maximum:	0.2768	0.3167	0.3167
Minimum:	0.2768	0.2768	0.2768

Average variance of differences:

0.07660	0.09240	0.09240

```
220  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	0.4612	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	0.2826	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	0.2826	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	0.4361	*		
UV_B - UV-B.Iron + Fe	3	0.5548	0.5548	*	
UV_B - UV-B.Iron - Fe	4	0.5548	0.5548	0.4361	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	0.4361	*		
UV_B - UV-B.Salt + NaCl	3	0.5548	0.5548	*	
UV_B - UV-B.Salt - NaCl	4	0.5548	0.5548	0.4361	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	0.3997	*		
Iron - Fe.Salt + NaCl	3	0.3997	0.3997	*	
Iron - Fe.Salt - NaCl	4	0.3997	0.3997	0.3997	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	0.6167	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	0.6167	0.6167	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	0.6167	0.6167	0.6167

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.7057	0.7057	0.7057
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.7057	0.7057	0.7057
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.7057	0.7057	0.7057
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.7057	0.7057	0.7057
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	0.7057	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	0.7057	0.6167	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	0.7057	0.6167	0.6167
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.7057	0.6167	0.6167
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	0.6167	*
		7	8

CHO%

Data imported from Clipboard
on: 30-Oct-2008 21:24:59

```
 129  DELETE [REDEFINE=yes] Ave_CHO_%
 130  UNITS [NVALUES=*]
 131  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 132  ; REFERENCE=1] UV_B
 133  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 136  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 137  ; REFERENCE=1] Iron
 138  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 141  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 142  ; REFERENCE=1] Salt
 143  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 146  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 147  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
150  VARIATE [NVALUES=48] Ave_CHO_%
151  READ Ave_CHO_%
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Ave_CHO_%	0.3408	7.748	13.45	48	0

```
164
165  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
166  reml [pr=wa,me,co] Ave_CHO_%
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.245	0.250

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	1.151	0.297

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.18	1	0.18	10.0	0.682
Iron	126.40	1	126.40	30.0	<0.001
Salt	249.23	1	249.23	30.0	<0.001
UV_B.Iron	2.32	1	2.32	30.0	0.138
UV_B.Salt	0.10	1	0.10	30.0	0.759
Iron.Salt	1.48	1	1.48	30.0	0.234
UV_B.Iron.Salt	2.29	1	2.29	30.0	0.141

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	2.29	1	2.29	30.0	0.141

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

7.748 Standard error: 0.2107

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	7.659	7.837

Standard error of differences: 0.4214

Table of predicted means for Iron

Iron	+ Fe	- Fe
	9.489	6.007

Standard error of differences: 0.3097

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	5.304	10.193

Standard error of differences: 0.3097

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	9.164	6.154
- UV-B	9.814	5.861

Standard errors of differences

Average:	0.4946
Maximum:	0.5230
Minimum:	0.4379

Average variance of differences: 0.2462

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.4379	0.5230
Maximum:	0.4379	0.5230
Minimum:	0.4379	0.5230

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	5.167	10.152
- UV-B	5.441	10.233

Standard errors of differences

Average:	0.4946
Maximum:	0.5230
Minimum:	0.4379

Average variance of differences: 0.2462

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.4379	0.5230
Maximum:	0.4379	0.5230
Minimum:	0.4379	0.5230

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	7.233	11.745
- Fe	3.375	8.640

Standard error of differences: 0.4379

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B + UV-B	+ Fe	6.626	11.702
	- Fe	3.708	8.601
- UV-B	+ Fe	7.840	11.788
	- Fe	3.042	8.679

Standard errors of differences

Average:	0.6552
Maximum:	0.6821
Minimum:	0.6193

Average variance of differences: 0.4302

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	0.6193	0.6612	0.6612
Maximum:	0.6193	0.6821	0.6821
Minimum:	0.6193	0.6193	0.6193

Average variance of differences:

0.3835	0.4380	0.4380

```
 167  vplot
 168   VCOMPONENTS [FIXED=Iron*Salt*UV_B; FACTORIAL=9] RANDOM=UV_B.Block;
INITIAL=1; CONSTRAINTS=none
 169  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 170   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20] Ave_CHO_%
```

REML variance components analysis

Response variate: Ave_CHO_%
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	0.245	0.250

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	1.151	0.297

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.18	1	0.18	10.0	0.682
Iron	126.40	1	126.40	30.0	<0.001
Salt	249.23	1	249.23	30.0	<0.001
UV_B.Iron	2.32	1	2.32	30.0	0.138
UV_B.Salt	0.10	1	0.10	30.0	0.759
Iron.Salt	1.48	1	1.48	30.0	0.234
UV_B.Iron.Salt	2.29	1	2.29	30.0	0.141

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	2.29	1	2.29	30.0	0.141

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

7.748 Standard error: 0.2107

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	7.659	7.837

Standard error of differences: 0.4214

Table of predicted means for Iron

Iron	+ Fe	- Fe
	9.489	6.007

Standard error of differences: 0.3097

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	5.304	10.193

Standard error of differences: 0.3097

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	9.164	6.154
- UV-B	9.814	5.861

Standard errors of differences

Average:	0.4946
Maximum:	0.5230
Minimum:	0.4379

Average variance of differences: 0.2462

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.4379	0.5230

Maximum:	0.4379	0.5230
Minimum:	0.4379	0.5230

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	5.167	10.152
- UV-B	5.441	10.233

Standard errors of differences

Average:	0.4946
Maximum:	0.5230
Minimum:	0.4379

Average variance of differences: 0.2462

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.4379	0.5230
Maximum:	0.4379	0.5230
Minimum:	0.4379	0.5230

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	7.233	11.745
- Fe	3.375	8.640

Standard error of differences: 0.4379

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	6.626	11.702
	- Fe	3.708	8.601
- UV-B	+ Fe	7.840	11.788

- Fe	3.042	8.679	

Standard errors of differences

Average:	0.6552
Maximum:	0.6821
Minimum:	0.6193

Average variance of differences: 0.4302

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	0.6193	0.6612	0.6612
Maximum:	0.6193	0.6821	0.6821
Minimum:	0.6193	0.6193	0.6193

Average variance of differences:

0.3835	0.4380	0.4380

```
171  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	0.9390	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	0.6324	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	0.6324	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	0.976	*		
UV_B - UV-B.Iron + Fe	3	1.165	1.165	*	
UV_B - UV-B.Iron - Fe	4	1.165	1.165	0.976	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	0.976	*		
UV_B - UV-B.Salt + NaCl	3	1.165	1.165	*	
UV_B - UV-B.Salt - NaCl	4	1.165	1.165	0.976	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	0.8944	*		
Iron - Fe.Salt + NaCl	3	0.8944	0.8944	*	
Iron - Fe.Salt - NaCl	4	0.8944	0.8944	0.8944	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	1.380	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	1.380	1.380	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	1.380	1.380	1.380

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	1.520	1.520	1.520
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	1.520	1.520	1.520
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	1.520	1.520	1.520
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	1.520	1.520	1.520
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	1.520	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	1.520	1.380	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	1.520	1.380	1.380
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	1.520	1.380	1.380
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	1.380	*
		7	8

Crude Protein

Data imported from Clipboard
on: 3-Nov-2008 14:09:00

```
 331  DELETE [REDEFINE=yes] Ave_Protein_%
 332  UNITS [NVALUES=*]
 333  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 334  ; REFERENCE=1] UV_B
 335  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 338  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 339  ; REFERENCE=1] Iron
 340  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 343  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 344  ; REFERENCE=1] Salt
 345  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 348  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 349  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
352  VARIATE [NVALUES=48] Ave_Protein_%
353  READ Ave_Protein_%
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Ave_Protein_%	16.60	24.80	29.33	48	0

```
366
367  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
368  reml [pr=wa,me,co] Ave_Protein_%
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	-0.323	0.366

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	3.747	0.968

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.88	1	0.88	10.0	0.370
Iron	35.57	1	35.57	30.0	<0.001
Salt	5.96	1	5.96	30.0	0.021
UV_B.Iron	1.08	1	1.08	30.0	0.307
UV_B.Salt	0.00	1	0.00	30.0	0.993
Iron.Salt	33.38	1	33.38	30.0	<0.001
UV_B.Iron.Salt	0.18	1	0.18	30.0	0.673

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.18	1	0.18	30.0	0.673

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

24.80 Standard error: 0.226

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	25.01	24.59

Standard error of differences: 0.4524

Table of predicted means for Iron

Iron	+ Fe	- Fe
	26.47	23.14

Standard error of differences: 0.5588

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	24.12	25.48

Standard error of differences: 0.5588

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	26.39	23.64
- UV-B	26.55	22.63

Standard errors of differences

Average:	0.7427
Maximum:	0.7903
Minimum:	0.7190

Average variance of differences: 0.5528

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.7903	0.7190
Maximum:	0.7903	0.7190
Minimum:	0.7903	0.7190

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	24.34	25.69
- UV-B	23.91	25.27

Standard errors of differences

Average:	0.7427
Maximum:	0.7903
Minimum:	0.7190

Average variance of differences: 0.5528

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.7903	0.7190
Maximum:	0.7903	0.7190
Minimum:	0.7903	0.7190

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	27.40	25.54
- Fe	20.84	25.43

Standard error of differences: 0.7903

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	27.44	25.34
	- Fe	21.23	26.05
- UV-B	+ Fe	27.36	25.74
	- Fe	20.45	24.81

Standard errors of differences

Average:	1.089
Maximum:	1.118
Minimum:	1.068

Average variance of differences: 1.188

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	1.118	1.085	1.085
Maximum:	1.118	1.118	1.118
Minimum:	1.118	1.068	1.068

Average variance of differences:

1.249	1.177	1.177

```
 369  vplot
```

Message: negative variance components present. REML option RMETHOD=all should be used to calculate residuals.
Fault 4, code UF 1, statement 11 in procedure VPLOT

Residuals are all missing.

```
 370  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 371   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20;rmethod=all] Ave_Protein_%
```

REML variance components analysis

Response variate:	Ave_Protein_%
Fixed model:	Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model:	UV_B.Block
Number of units:	48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	-0.323	0.366

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.

Residual	Identity	Sigma2	3.747	0.968

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	0.88	1	0.88	10.0	0.370
Iron	35.57	1	35.57	30.0	<0.001
Salt	5.96	1	5.96	30.0	0.021
UV_B.Iron	1.08	1	1.08	30.0	0.307
UV_B.Salt	0.00	1	0.00	30.0	0.993
Iron.Salt	33.38	1	33.38	30.0	<0.001
UV_B.Iron.Salt	0.18	1	0.18	30.0	0.673

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	0.18	1	0.18	30.0	0.673

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

24.80 Standard error: 0.226

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	25.01	24.59

Standard error of differences: 0.4524

Table of predicted means for Iron

Iron	+ Fe	- Fe
	26.47	23.14

Standard error of differences: 0.5588

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	24.12	25.48

Standard error of differences: 0.5588

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	26.39	23.64
- UV-B	26.55	22.63

Standard errors of differences

Average:	0.7427
Maximum:	0.7903
Minimum:	0.7190

Average variance of differences: 0.5528

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	0.7903	0.7190
Maximum:	0.7903	0.7190
Minimum:	0.7903	0.7190

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	24.34	25.69
- UV-B	23.91	25.27

Standard errors of differences

Average:	0.7427
Maximum:	0.7903
Minimum:	0.7190

Average variance of differences: 0.5528

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	0.7903	0.7190
Maximum:	0.7903	0.7190
Minimum:	0.7903	0.7190

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	27.40	25.54
- Fe	20.84	25.43

Standard error of differences: 0.7903

Table of predicted means for UV_B.Iron.Salt

	Salt	+ NaCl	- NaCl
UV_B	Iron		
+ UV-B	+ Fe	27.44	25.34
	- Fe	21.23	26.05
- UV-B	+ Fe	27.36	25.74
	- Fe	20.45	24.81

Standard errors of differences

Average:	1.089
Maximum:	1.118
Minimum:	1.068

Average variance of differences: 1.188

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	1.118	1.085	1.085
Maximum:	1.118	1.118	1.118
Minimum:	1.118	1.068	1.068

Average variance of differences:

1.249	1.177	1.177

```
372  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

UV_B + UV-B	1	*	
UV_B - UV-B	2	1.008	*
		1	2

Iron

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Iron + Fe	1	*	
Iron - Fe	2	1.141	*
		1	2

Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Salt + NaCl	1	*	
Salt - NaCl	2	1.141	*
		1	2

UV_B.Iron

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	1.761	*		
UV_B - UV-B.Iron + Fe	3	1.602	1.602	*	
UV_B - UV-B.Iron - Fe	4	1.602	1.602	1.761	*
		1	2	3	4

UV_B.Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	1.761	*		
UV_B - UV-B.Salt + NaCl	3	1.602	1.602	*	
UV_B - UV-B.Salt - NaCl	4	1.602	1.602	1.761	*
		1	2	3	4

Iron.Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Iron + Fe.Salt + NaCl	1	*

Iron + Fe.Salt - NaCl	2	1.614	*		
Iron - Fe.Salt + NaCl	3	1.614	1.614	*	
Iron - Fe.Salt - NaCl	4	1.614	1.614	1.614	*
		1	2	3	4

UV_B.Iron.Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	2.490	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	2.490	2.490	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	2.490	2.490	2.490
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	2.380	2.380	2.380
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	2.380	2.380	2.380
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	2.380	2.380	2.380
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	2.380	2.380	2.380
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	2.380	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	2.380	2.490	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	2.380	2.490	2.490
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	2.380	2.490	2.490
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	2.490	*
		7	8

Fe-root

Data imported from Clipboard
on: 30-Oct-2008 21:53:37

```
 579  DELETE [REDEFINE=yes] Fe_R_g_g_Root_DW
 580  UNITS [NVALUES=*]
 581  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 582  ; REFERENCE=1] UV_B
 583  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 586  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 587  ; REFERENCE=1] Iron
 588  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 591  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 592  ; REFERENCE=1] Salt
 593  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
 596  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
 597  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
 600  VARIATE [NVALUES=48] Fe_R_g_g_Root_DW
 601  READ Fe_R_g_g_Root_DW
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Fe_R_g_g_Root_DW	25.05	45.09	70.26	48	0

```
 612
 613  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
 614  reml [pr=wa,me,co]Fe_R_g_g_Root_DW
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	3.48	4.21

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	21.66	5.59

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	3.67	1	3.67	10.0	0.084
Iron	389.66	1	389.66	30.0	<0.001
Salt	4.84	1	4.84	30.0	0.036
UV_B.Iron	6.48	1	6.48	30.0	0.016
UV_B.Salt	0.04	1	0.04	30.0	0.837
Iron.Salt	15.90	1	15.90	30.0	<0.001
UV_B.Iron.Salt	9.81	1	9.81	30.0	0.004

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	9.81	1	9.81	30.0	0.004

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

45.09 Standard error: 0.861

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	43.44	46.74

Standard error of differences: 1.721

Table of predicted means for Iron

Iron	+ Fe	- Fe
	58.35	31.83

Standard error of differences: 1.343

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	43.61	46.57

Standard error of differences: 1.343

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	58.41	28.47
- UV-B	58.29	35.19

Standard errors of differences

Average:	2.089
Maximum:	2.184
Minimum:	1.900

Average variance of differences: 4.382

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	1.900	2.184
Maximum:	1.900	2.184
Minimum:	1.900	2.184

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	41.83	45.06
- UV-B	45.40	48.08

Standard errors of differences

Average:	2.089
Maximum:	2.184
Minimum:	1.900

Average variance of differences: 4.382

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	1.900	2.184
Maximum:	1.900	2.184
Minimum:	1.900	2.184

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	59.55	57.15
- Fe	27.68	35.99

Standard error of differences: 1.900

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B + UV-B	+ Fe	57.37	59.45
	- Fe	26.28	30.66
- UV-B	+ Fe	61.73	54.85
	- Fe	29.07	41.31

Standard errors of differences

Average:	2.805
Maximum:	2.894
Minimum:	2.687

Average variance of differences: 7.881

Standard error of differences for same level of factor:

UV_B	Iron	Salt

Average:	2.687	2.825	2.825
Maximum:	2.687	2.894	2.894
Minimum:	2.687	2.687	2.687

Average variance of differences:

7.219	7.991	7.991

```
 615  vplot
 616   VCOMPONENTS [FIXED=Iron*Salt*UV_B; FACTORIAL=9] RANDOM=UV_B.Block;
INITIAL=1; CONSTRAINTS=none
 617  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 618   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20] Fe_R_g_g_Root_DW
```

REML variance components analysis

Response variate: Fe_R_g_g_Root_DW
Fixed model: Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model: UV_B.Block
Number of units: 48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	3.48	4.21

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	21.66	5.59

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	3.67	1	3.67	10.0	0.084
Iron	389.66	1	389.66	30.0	<0.001
Salt	4.84	1	4.84	30.0	0.036
UV_B.Iron	6.48	1	6.48	30.0	0.016
UV_B.Salt	0.04	1	0.04	30.0	0.837
Iron.Salt	15.90	1	15.90	30.0	<0.001
UV_B.Iron.Salt	9.81	1	9.81	30.0	0.004

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	9.81	1	9.81	30.0	0.004

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

45.09 Standard error: 0.861

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	43.44	46.74

Standard error of differences: 1.721

Table of predicted means for Iron

Iron	+ Fe	- Fe
	58.35	31.83

Standard error of differences: 1.343

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	43.61	46.57

Standard error of differences: 1.343

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	58.41	28.47
- UV-B	58.29	35.19

Standard errors of differences

Average:	2.089
Maximum:	2.184
Minimum:	1.900

Average variance of differences: 4.382

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	1.900	2.184

Maximum:	1.900	2.184
Minimum:	1.900	2.184

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	41.83	45.06
- UV-B	45.40	48.08

Standard errors of differences

Average:	2.089
Maximum:	2.184
Minimum:	1.900

Average variance of differences: 4.382

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	1.900	2.184
Maximum:	1.900	2.184
Minimum:	1.900	2.184

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	59.55	57.15
- Fe	27.68	35.99

Standard error of differences: 1.900

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B			
+ UV-B	+ Fe	57.37	59.45
	- Fe	26.28	30.66
- UV-B	+ Fe	61.73	54.85

- Fe 29.07 41.31

Standard errors of differences

Average:	2.805
Maximum:	2.894
Minimum:	2.687

Average variance of differences: 7.881

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	2.687	2.825	2.825
Maximum:	2.687	2.894	2.894
Minimum:	2.687	2.687	2.687

Average variance of differences:

7.219	7.991	7.991

```
619  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

UV_B + UV-B	1	*	
UV_B - UV-B	2	3.836	*
		1	2

Iron

Iron + Fe	1	*	
Iron - Fe	2	2.744	*
		1	2

Salt

Salt + NaCl	1	*	
Salt - NaCl	2	2.744	*
		1	2

UV_B.Iron

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	4.233	*		
UV_B - UV-B.Iron + Fe	3	4.865	4.865	*	
UV_B - UV-B.Iron - Fe	4	4.865	4.865	4.233	*
		1	2	3	4

UV_B.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	4.233	*		
UV_B - UV-B.Salt + NaCl	3	4.865	4.865	*	
UV_B - UV-B.Salt - NaCl	4	4.865	4.865	4.233	*
		1	2	3	4

Iron.Salt

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	3.880	*		
Iron - Fe.Salt + NaCl	3	3.880	3.880	*	
Iron - Fe.Salt - NaCl	4	3.880	3.880	3.880	*
		1	2	3	4

UV_B.Iron.Salt

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	5.987	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	5.987	5.987	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	5.987	5.987	5.987

UV_B - UV-B.Iron + Fe.Salt + NaCl	5	6.449	6.449	6.449
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	6.449	6.449	6.449
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	6.449	6.449	6.449
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	6.449	6.449	6.449
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	6.449	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	6.449	5.987	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	6.449	5.987	5.987
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	6.449	5.987	5.987
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	5.987	*
		7	8

Fe-shoot

```
120  "Data taken from File: G:/All Data/Nutrient elements in shoot.xls"
 121  DELETE [REDEFINE=yes] _stitle_: TEXT _stitle_
 122  READ [PRINT=*; SETNVALUES=yes] _stitle_
 126  PRINT [IPRINT=*] _stitle_; JUST=left
```

Data imported from Excel file: G:\All Data\Nutrient elements in shoot.xls
on: 3-Nov-2008 13:49:07
taken from sheet ""Fe-Shoot"", cells A2:P49

```
 127  DELETE [REDEFINE=yes] Fe_S_g_g_Shoot_DW
 128  UNITS [NVALUES=*]
 129  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ UV-B','-
UV-B')\
 130  ; REFERENCE=1] UV_B
 131  READ UV_B; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
UV_B	48	0	2

```
 134  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ Fe','-
Fe')\
 135  ; REFERENCE=1] Iron
 136  READ Iron; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Iron	48	0	2

```
 139  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=2; LABELS=!t('+ NaCl','-
NaCl')\
 140  ; REFERENCE=1] Salt
 141  READ Salt; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Salt	48	0	2

```
144  FACTOR [MODIFY=yes; NVALUES=48; LEVELS=6; REFERENCE=1] Block
145  READ Block; FREPRESENTATION=ordinal
```

Identifier	Values	Missing	Levels
Block	48	0	6

```
148  VARIATE [NVALUES=48] Fe_S_g_g_Shoot_DW
149  READ Fe_S_g_g_Shoot_DW
```

Identifier	Minimum	Mean	Maximum	Values	Missing
Fe_S_g_g_Shoot_DW	28.57	57.81	104.5	48	0

```
158
159  vcomp [f=UV_B*Iron*Salt] r=UV_B.Block
160  reml [pr=wa,me,co] Fe_S_g_g_Shoot_DW
```

Estimated variance components

Random term	component	s.e.
UV_B.Block	-8.3	13.4

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	128.0	33.1

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	5.47	1	5.47	10.0	0.041
Iron	145.15	1	145.15	30.0	<0.001
Salt	11.11	1	11.11	30.0	0.002
UV_B.Iron	4.33	1	4.33	30.0	0.046
UV_B.Salt	0.01	1	0.01	30.0	0.919
Iron.Salt	13.27	1	13.27	30.0	0.001
UV_B.Iron.Salt	2.22	1	2.22	30.0	0.146

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	2.22	1	2.22	30.0	0.146

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

57.81 Standard error: 1.404

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	61.10	54.53

Standard error of differences: 2.808

Table of predicted means for Iron

Iron	+ Fe	- Fe
	77.49	38.14

Standard error of differences: 3.266

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	63.26	52.37

Standard error of differences: 3.266

Table of predicted means for UV_B.Iron

Iron	+ Fe	- Fe
UV_B		
+ UV-B	84.18	38.02
- UV-B	70.81	38.25

Standard errors of differences

Average:	4.412
Maximum:	4.619
Minimum:	4.308

Average variance of differences: 19.48

Standard error of differences for same level of factor:

	UV_B	Iron

Average:	4.619	4.308
Maximum:	4.619	4.308
Minimum:	4.619	4.308

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	66.38	55.82
- UV-B	60.14	48.92

Standard errors of differences

Average:	4.412
Maximum:	4.619
Minimum:	4.308

Average variance of differences: 19.48

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	4.619	4.308
Maximum:	4.619	4.308
Minimum:	4.619	4.308

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	88.88	66.10
- Fe	37.63	38.64

Standard error of differences: 4.619

Table of predicted means for UV_B.Iron.Salt

	Salt Iron	+ NaCl	- NaCl
UV_B + UV-B	+ Fe	92.96	75.39

	- Fe	39.79	36.26
- UV-B	+ Fe	84.80	56.81
	- Fe	35.48	41.02

Standard errors of differences

Average:	6.409
Maximum:	6.533
Minimum:	6.316

Average variance of differences: 41.09

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	6.533	6.388	6.388
Maximum:	6.533	6.533	6.533
Minimum:	6.533	6.316	6.316

Average variance of differences:

42.68	40.82	40.82

```
 161  vplot
```

Message: negative variance components present. REML option RMETHOD=all should be used to calculate residuals.
Fault 3, code UF 1, statement 11 in procedure VPLOT

Residuals are all missing.

```
 162  REML [PRINT=model,components,means,waldTests; PSE=differences;
FMETHOD=automatic;\
 163   MVINCLUDE=*; METHOD=AI; MAXCYCLE=20;rmethod=all]
Fe_S_g_g_Shoot_DW
```

REML variance components analysis

Response variate:	Fe_S_g_g_Shoot_DW
Fixed model:	Constant + UV_B + Iron + Salt + UV_B.Iron + UV_B.Salt + Iron.Salt + UV_B.Iron.Salt
Random model:	UV_B.Block
Number of units:	48

Residual term has been added to model

Sparse algorithm with AI optimisation

Estimated variance components

Random term	component	s.e.
UV_B.Block	-8.3	13.4

Residual variance model

Term	Factor	Model(order)	Parameter	Estimate	s.e.
Residual		Identity	Sigma2	128.0	33.1

Tests for fixed effects

Sequentially adding terms to fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B	5.47	1	5.47	10.0	0.041
Iron	145.15	1	145.15	30.0	<0.001
Salt	11.11	1	11.11	30.0	0.002
UV_B.Iron	4.33	1	4.33	30.0	0.046
UV_B.Salt	0.01	1	0.01	30.0	0.919
Iron.Salt	13.27	1	13.27	30.0	0.001
UV_B.Iron.Salt	2.22	1	2.22	30.0	0.146

Dropping individual terms from full fixed model

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
UV_B.Iron.Salt	2.22	1	2.22	30.0	0.146

Message: denominator degrees of freedom for approximate F-tests are calculated using algebraic derivatives ignoring fixed/boundary/singular variance parameters.

Table of predicted means for Constant

57.81 Standard error: 1.404

Table of predicted means for UV_B

UV_B	+ UV-B	- UV-B
	61.10	54.53

Standard error of differences: 2.808

Table of predicted means for Iron

Iron	+ Fe	- Fe

	77.49	38.14

Standard error of differences: 3.266

Table of predicted means for Salt

Salt	+ NaCl	- NaCl
	63.26	52.37

Standard error of differences: 3.266

Table of predicted means for UV_B.Iron

Iron UV_B	+ Fe	- Fe
+ UV-B	84.18	38.02
- UV-B	70.81	38.25

Standard errors of differences

Average:	4.412
Maximum:	4.619
Minimum:	4.308

Average variance of differences: 19.48

Standard error of differences for same level of factor:

	UV_B	Iron
Average:	4.619	4.308
Maximum:	4.619	4.308
Minimum:	4.619	4.308

Table of predicted means for UV_B.Salt

Salt UV_B	+ NaCl	- NaCl
+ UV-B	66.38	55.82
- UV-B	60.14	48.92

Standard errors of differences

Average:	4.412
Maximum:	4.619
Minimum:	4.308

Average variance of differences: 19.48

Standard error of differences for same level of factor:

	UV_B	Salt
Average:	4.619	4.308
Maximum:	4.619	4.308
Minimum:	4.619	4.308

Table of predicted means for Iron.Salt

Salt Iron	+ NaCl	- NaCl
+ Fe	88.88	66.10
- Fe	37.63	38.64

Standard error of differences: 4.619

Table of predicted means for UV_B.Iron.Salt

	Salt	+ NaCl	- NaCl
UV_B	Iron		
+ UV-B	+ Fe	92.96	75.39
	- Fe	39.79	36.26
- UV-B	+ Fe	84.80	56.81
	- Fe	35.48	41.02

Standard errors of differences

Average:	6.409
Maximum:	6.533
Minimum:	6.316

Average variance of differences: 41.09

Standard error of differences for same level of factor:

	UV_B	Iron	Salt
Average:	6.533	6.388	6.388

Maximum:	6.533	6.533	6.533
Minimum:	6.533	6.316	6.316

Average variance of differences:

42.68	40.82	40.82

```
164  VLSD [PRINT=lsd; FACTORIAL=32; LSDLEVEL=5]
```

Approximate least significant differences (5% level) of REML means

UV_B

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

UV_B + UV-B	1	*	
UV_B - UV-B	2	6.258	*
		1	2

Iron

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Iron + Fe	1	*	
Iron - Fe	2	6.671	*
		1	2

Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may

therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Salt + NaCl	1	*	
Salt - NaCl	2	6.671	*
		1	2

UV_B.Iron

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe	1	*			
UV_B + UV-B.Iron - Fe	2	10.293	*		
UV_B - UV-B.Iron + Fe	3	9.598	9.598	*	
UV_B - UV-B.Iron - Fe	4	9.598	9.598	10.293	*
		1	2	3	4

UV_B.Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Salt + NaCl	1	*			
UV_B + UV-B.Salt - NaCl	2	10.293	*		
UV_B - UV-B.Salt + NaCl	3	9.598	9.598	*	
UV_B - UV-B.Salt - NaCl	4	9.598	9.598	10.293	*
		1	2	3	4

Iron.Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Iron + Fe.Salt + NaCl	1	*			
Iron + Fe.Salt - NaCl	2	9.434	*		
Iron - Fe.Salt + NaCl	3	9.434	9.434	*	
Iron - Fe.Salt - NaCl	4	9.434	9.434	9.434	*
		1	2	3	4

UV_B.Iron.Salt

Message: negative variance components present. Fitting of fixed model terms is not sequential: effects and means for any aliased fixed model terms may therefore be misleading. Wald tests, likelihood tests and fitted values are unaffected.

Message: caution - t-values using d.d.f from contributing terms differ by 8.34%; LSD's will be calculated using the maximum value.

UV_B + UV-B.Iron + Fe.Salt + NaCl	1	*		
UV_B + UV-B.Iron + Fe.Salt - NaCl	2	14.56	*	
UV_B + UV-B.Iron - Fe.Salt + NaCl	3	14.56	14.56	*
UV_B + UV-B.Iron - Fe.Salt - NaCl	4	14.56	14.56	14.56
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	14.07	14.07	14.07
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	14.07	14.07	14.07
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	14.07	14.07	14.07
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	14.07	14.07	14.07
		1	2	3

UV_B + UV-B.Iron - Fe.Salt - NaCl	4	*		
UV_B - UV-B.Iron + Fe.Salt + NaCl	5	14.07	*	
UV_B - UV-B.Iron + Fe.Salt - NaCl	6	14.07	14.56	*
UV_B - UV-B.Iron - Fe.Salt + NaCl	7	14.07	14.56	14.56
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	14.07	14.56	14.56
		4	5	6

UV_B - UV-B.Iron - Fe.Salt + NaCl	7	*	
UV_B - UV-B.Iron - Fe.Salt - NaCl	8	14.56	*
		7	8