**OPTIONS OS=64 LS=78 NODATE PAGENO=1;**

**DATA** CONJUNTA;input LOCAL RESP BLOCO CULTIVAR;

cards;

1 883 1 1

1 901 2 1

1 989 3 1

1 700 1 2

1 730 2 2

1 750 3 2

1 785 1 3

1 696 2 3

1 899 3 3

1 627 1 4

1 735 2 4

1 757 3 4

2 844 4 1

2 1087 5 1

2 940 6 1

2 790 4 2

2 710 5 2

2 750 6 2

2 715 4 3

2 885 5 3

2 832 6 3

2 608 4 4

2 711 5 4

2 766 6 4

3 719 7 1

3 953 8 1

3 897 9 1

3 580 7 2

3 650 8 2

3 670 9 2

3 778 7 3

3 634 8 3

3 766 9 3

3 472 7 4

3 644 8 4

3 706 9 4

4 992 10 1

4 892 11 1

4 799 12 1

4 805 10 2

4 700 11 2

4 750 12 2

4 780 10 3

4 723 11 3

4 635 12 3

4 981 10 4

4 986 11 4

4 995 12 4

;

\*A) MÉDIAS FENOTÍPICAS;

PROC GLM;CLASS LOCAL BLOCO CULTIVAR;

MODEL RESP = LOCAL CULTIVAR LOCAL\*CULTIVAR BLOCO(LOCAL)/SS1;

LSmeans local\*cultivar/ADJUST=T LINES ;

MEANS CULTIVAR/ T LINES;run;

\*A) PREDIÇOES DE MODELO MISTO;

PROC MIXED;CLASS LOCAL BLOCO CULTIVAR;

MODEL RESP = LOCAL CULTIVAR ;

RANDOM local\*cultivar BLOCO(LOCAL)/ SOLUTION;run;

Dependent Variable: RESP

Sum of

Source DF Squares Mean Square F Value Pr > F

Model 23 671730.3125 29205.6658 6.27 <.0001

Error 24 111833.1667 4659.7153

Corrected Total 47 783563.4792

R-Square Coeff Var Root MSE RESP Mean

0.857276 8.715007 68.26211 783.2708

Source DF Type I SS Mean Square F Value Pr > F

LOCAL 3 111095.8958 37031.9653 7.95 0.0007

CULTIVAR 3 262163.8958 87387.9653 18.75 <.0001

LOCAL\*CULTIVAR 9 199643.6875 22182.6319 4.76 0.0011

BLOCO(LOCAL) 8 98826.8333 12353.3542 2.65 0.0308

T Comparison Lines for Least Squares Means of LOCAL\*CULTIVAR

LS-means with the same letter are not significantly different.

RESP LSMEAN

LSMEAN LOCAL CULTIVAR Number

A 987.333 4 4 16

A

B A 957.000 2 1 5

B A

B A C 924.333 1 1 1

B A C

B D A C 894.333 4 1 13

B D C

B D E C 856.333 3 1 9

D E C

F D E C 810.667 2 3 7

F D E

F D E G 793.333 1 3 3

F E G

F E G 751.667 4 2 14

F E G

F E G 750.000 2 2 6

F G

F H G 726.667 1 2 2

F H G

F H G 726.000 3 3 11

F H G

F I H G 712.667 4 3 15

F I H G

F I H G 706.333 1 4 4

I H G

I H G 695.000 2 4 8

I H

I H 633.333 3 2 10

I

I 607.333 3 4 12

t Tests (LSD) for RESP

NOTE: This test controls the Type I comparisonwise error rate, not the

experimentwise error rate.

Alpha 0.05

Error Degrees of Freedom 24

Error Mean Square 4659.715

Critical Value of t 2.06390

Least Significant Difference 57.516

Means with the same letter are not significantly different.

t Grouping Mean N CULTIVAR

A 908.00 12 1

B 760.67 12 3

B

B 749.00 12 4

B

B 715.42 12 2

28

The Mixed Procedure

Type 3 Tests of Fixed Effects

Num Den

Effect DF DF F Value Pr > F

LOCAL 3 8 1.24 0.3576

CULTIVAR 3 9 3.94 0.0477

Modelo misto

The SAS System 29

The Mixed Procedure

Model Information

Data Set WORK.CONJUNTA

Dependent Variable RESP

Covariance Structure Variance Components

Estimation Method REML

Residual Variance Method Profile

Fixed Effects SE Method Model-Based

Degrees of Freedom Method Containment

Class Level Information

Class Levels Values

LOCAL 4 1 2 3 4

BLOCO 12 1 2 3 4 5 6 7 8 9 10 11 12

CULTIVAR 4 1 2 3 4

Dimensions

Covariance Parameters 3

Columns in X 9

Columns in Z 28

Subjects 1

Max Obs per Subject 48

Number of Observations

Number of Observations Read 48

Number of Observations Used 48

Number of Observations Not Used 0

Iteration History

Iteration Evaluations -2 Res Log Like Criterion

0 1 510.01532467

1 1 500.51909037 0.00000000

Convergence criteria met.

The SAS System 30

The Mixed Procedure

Covariance Parameter

Estimates

Cov Parm Estimate

LOCAL\*CULTIVAR 5840.97

BLOCO(LOCAL) 1923.41

Residual 4659.72

Fit Statistics

-2 Res Log Likelihood 500.5

AIC (Smaller is Better) 506.5

AICC (Smaller is Better) 507.2

BIC (Smaller is Better) 508.8

Solution for Random Effects

Std Err

Effect LOCAL BLOCO CULTIVAR Estimate Pred DF t Value

LOCAL\*CULTIVAR 1 1 9.4299 56.9701 24 0.17

LOCAL\*CULTIVAR 1 2 5.4144 56.9701 24 0.10

LOCAL\*CULTIVAR 1 3 22.3322 56.9701 24 0.39

LOCAL\*CULTIVAR 1 4 -37.1765 56.9701 24 -0.65

LOCAL\*CULTIVAR 2 1 22.9905 56.9701 24 0.40

LOCAL\*CULTIVAR 2 2 11.6022 56.9701 24 0.20

LOCAL\*CULTIVAR 2 3 23.7804 56.9701 24 0.42

LOCAL\*CULTIVAR 2 4 -58.3732 56.9701 24 -1.02

LOCAL\*CULTIVAR 3 1 20.4232 56.9701 24 0.36

LOCAL\*CULTIVAR 3 2 -3.6041 56.9701 24 -0.06

LOCAL\*CULTIVAR 3 3 33.8522 56.9701 24 0.59

Solution for Random Effects

Effect LOCAL BLOCO CULTIVAR Pr > |t|

LOCAL\*CULTIVAR 1 1 0.8699

LOCAL\*CULTIVAR 1 2 0.9251

LOCAL\*CULTIVAR 1 3 0.6985

LOCAL\*CULTIVAR 1 4 0.5202

LOCAL\*CULTIVAR 2 1 0.6901

LOCAL\*CULTIVAR 2 2 0.8403

LOCAL\*CULTIVAR 2 3 0.6801

LOCAL\*CULTIVAR 2 4 0.3158

LOCAL\*CULTIVAR 3 1 0.7231

LOCAL\*CULTIVAR 3 2 0.9501

LOCAL\*CULTIVAR 3 3 0.5579

The SAS System 31

The Mixed Procedure

Solution for Random Effects

Std Err

Effect LOCAL BLOCO CULTIVAR Estimate Pred DF t Value

LOCAL\*CULTIVAR 3 4 -50.6713 56.9701 24 -0.89

LOCAL\*CULTIVAR 4 1 -52.8436 56.9701 24 -0.93

LOCAL\*CULTIVAR 4 2 -13.4125 56.9701 24 -0.24

LOCAL\*CULTIVAR 4 3 -79.9648 56.9701 24 -1.40

LOCAL\*CULTIVAR 4 4 146.22 56.9701 24 2.57

BLOCO(LOCAL) 1 1 -24.2372 33.5382 24 -0.72

BLOCO(LOCAL) 1 2 -13.8053 33.5382 24 -0.41

BLOCO(LOCAL) 1 3 38.0426 33.5382 24 1.13

BLOCO(LOCAL) 2 4 -39.8071 33.5382 24 -1.19

BLOCO(LOCAL) 2 5 28.0778 33.5382 24 0.84

BLOCO(LOCAL) 2 6 11.7294 33.5382 24 0.35

BLOCO(LOCAL) 3 7 -42.6616 33.5382 24 -1.27

BLOCO(LOCAL) 3 8 9.0306 33.5382 24 0.27

BLOCO(LOCAL) 3 9 33.6311 33.5382 24 1.00

BLOCO(LOCAL) 4 10 33.0083 33.5382 24 0.98

BLOCO(LOCAL) 4 11 -7.0065 33.5382 24 -0.21

BLOCO(LOCAL) 4 12 -26.0018 33.5382 24 -0.78

Solution for Random Effects

Effect LOCAL BLOCO CULTIVAR Pr > |t|

LOCAL\*CULTIVAR 3 4 0.3826

LOCAL\*CULTIVAR 4 1 0.3629

LOCAL\*CULTIVAR 4 2 0.8159

LOCAL\*CULTIVAR 4 3 0.1732

LOCAL\*CULTIVAR 4 4 0.0169

BLOCO(LOCAL) 1 1 0.4769

BLOCO(LOCAL) 1 2 0.6843

BLOCO(LOCAL) 1 3 0.2679

BLOCO(LOCAL) 2 4 0.2469

BLOCO(LOCAL) 2 5 0.4107

BLOCO(LOCAL) 2 6 0.7296

BLOCO(LOCAL) 3 7 0.2156

BLOCO(LOCAL) 3 8 0.7900

BLOCO(LOCAL) 3 9 0.3260

BLOCO(LOCAL) 4 10 0.3348

BLOCO(LOCAL) 4 11 0.8363

BLOCO(LOCAL) 4 12 0.4457

The SAS System 32

The Mixed Procedure

Type 3 Tests of Fixed Effects

Num Den

Effect DF DF F Value Pr > F

LOCAL 3 8 1.24 0.3576

CULTIVAR 3 9 3.94 0.0477