# Introduction to GenStat Edition 14



# **Accessing GenStat**

#### Start $\rightarrow$ All Programs $\rightarrow$ GenStat $\rightarrow$ GenStat 14<sup>th</sup> Edition



## The menu bars

<u>File Edit</u> <u>Search Run</u> <u>Data</u> <u>Spread</u> <u>Graphics</u> <u>Stats</u> <u>Options</u> <u>Window</u> <u>Help</u>

## **Tool bars**





# Data input

#### Choose Spread $\rightarrow$ New $\rightarrow$ Create.



## 10 x 10 row by column vector

| 🔳 Sp | oreads | heet [ | New [ | Data;1 | ]  |    |    |    |    |     | X |
|------|--------|--------|-------|--------|----|----|----|----|----|-----|---|
| Row  | C1     | C2     | С3    | C4     | C5 | С6 | С7 | C8 | С9 | C10 | H |
| 1    | *      | *      | *     | *      | *  | *  | *  | *  | *  | *   |   |
| 2    | *      | *      | *     | *      | *  | *  | *  | *  | *  | *   |   |
| 3    | *      | *      | *     | *      | *  | *  | *  | *  | *  | *   |   |
| 4    | *      | *      | *     | *      | *  | *  | *  | *  | *  | *   |   |
| 5    | *      | *      | *     | *      | *  | *  | *  | *  | *  | *   |   |
| 6    | *      | *      | *     | *      | *  | *  | *  | *  | *  | *   |   |
| 7    | *      | *      | *     | *      | *  | *  | *  | *  | *  | *   |   |
| 8    | *      | *      | *     | *      | *  | *  | *  | *  | *  | *   |   |
| 9    | *      | *      | *     | *      | *  | *  | *  | *  | *  | *   |   |
| 10   | *      | *      | *     | *      | *  | *  | *  | *  | *  | *   | Ţ |
| ?    | •      |        |       |        |    |    |    |    |    | ŀ   |   |

5-Jan-12

Replace variable names (C1, C2,..) either by using **Spread**  $\rightarrow$  **Column**  $\rightarrow$  **Attributes/Formats** (pressing F9) or very easily by right clicking in each of the Cs and clicking **Rename** and proceeding.

| <b>Column Attributes/Format for C1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>?</b> ×                                            | <b>Change Sheet</b>                                                                                               | or Column                                                                                    | <b>?</b> ×                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------|
| Column:C1Type:Name:PlotsVariateDescriptionExperimental plotDecimals:*Width:6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <u>O</u> K<br>Cancel<br><u>A</u> pply<br><u>H</u> elp | <ul> <li>Sheet Type</li> <li>Vector</li> <li>Matrix</li> <li>Symmetric Matrix</li> <li>Diagonal Matrix</li> </ul> | Soils         Column Type         ○ Variate         ○ Factor         ○ Factor         ○ Text | <u>O</u> K<br>Cancel<br><u>A</u> pply |
| Restrict data entered to be in the range:         Minimum:       *         Maximum:       *         Identifying information used in output:       Default         Justification       - Numeric Format                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <u>Conv</u> ert<br><u>Fill</u><br><u>Date Type</u>    | C Scalar                                                                                                          | ○ <u>U</u> nits Vector ■ <u>R</u> ead Text as Date                                           | <u>H</u> elp<br>Date                  |
| Image: Construction of constructine on of construction of construction of const |                                                       |                                                                                                                   | Factor Options<br>▼ Sort Levels<br>Tolerance: 0                                              |                                       |

## Loading Data From a GenStat file

Select  $\underline{D}ata \rightarrow \underline{L}oad \rightarrow Data file...$ 

#### OR Select <u>File</u> $\rightarrow$ <u>Open</u>... OR using the Open Tool Bar

| Data Spread Graphics Stats To                                                                                              | ools Wind | low Help                                            | Select Innut file                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Load                                                                                                                       | •         | ASCII file                                          | select input file                                                                                                                                                                                                                                                                                       |
| Save<br>Clear All Data                                                                                                     | Ctrl+D    | Resume<br>Data File                                 | Look jn: 🔁 DataAnalysis&Presentation 🛛 🚽 🖨 💼 🐨 🎫 🖛                                                                                                                                                                                                                                                      |
| Calculations<br>Transformations<br>Unit Conversions<br>Matrix Calculations<br>Set Calculations<br>Probability Calculations |           | From Clipboard<br>ODBC Data Query<br>ODBC Retrieval | ▲diet.GSH)<br>▲DRM.GSH<br>▲Herd.GSH                                                                                                                                                                                                                                                                     |
| Generate Random Sample<br>Random Permutations<br>Ranks                                                                     |           | Samples'                                            | File <u>n</u> ame: <u>Open</u>                                                                                                                                                                                                                                                                          |
| Form Groups (Factors)<br>Form Multiple-Response Factors<br>Form Similarity Matrix<br>Append<br>Subset                      |           | les'                                                | Files of type:       GenStat Spreadsheet File (*.gsh;*.gwb)       Cancel         Image: Set as Working Directory       Image: Go to Working Directory       Image: Go to Working Directory         Working Directories:       F:\genstm\GenWin Manual\Data Samples       Image: Go to Working Directory |
| Display                                                                                                                    | F5        | -                                                   |                                                                                                                                                                                                                                                                                                         |

# Loading Data From Excel Spreadsheet file

#### Select $\underline{File} \rightarrow \underline{Open...}$ OR using the **Open Tool Bar**

| GenStat                                                                                                  |                        |                                                                    | Select Input file ? 🗙                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| New                                                                                                      | Ctrl+N                 | s Stats Loois Window Help                                          | Look in: 🗀 DataAnalysis&Presentation 🛛 🔽 🖨 🖆 📰 🔻                                                                                                                                                     |
| Open<br>Close                                                                                            | Ctrl+O<br>Ctrl+F4      | - <b>⊠   ‱ ≡ ≡ ≡ </b> ‡3: 13:   <b>⊞ ⊞ ⊡</b>                       | ▲diet.GSH<br>▲DRM GSH                                                                                                                                                                                |
| Insert<br>Save<br>Save As<br>Save Selection                                                              | Ctrl+S<br>Ctrl+Shift+S | - (PC/Windows) 09 February 2009<br>International Ltd.              | INTERCISES.doc<br>INTERCISES.doc<br>INTERCISES.doc<br>INTERCISES.doc<br>INTERCISES.doc                                                                                                               |
| Save All<br>Save Session                                                                                 |                        | enStat Eleventh Edition<br>enStat Procedure Library Release PL19.1 |                                                                                                                                                                                                      |
| Page Setup<br>Print<br>Printer Setup                                                                     | Ctrl+P                 | m/GenWin Manual/Data Samples'                                      | File name:     Open       Files of type:     All Files (*.*)     Cancel       All Files (*.*)     Image: Cancel                                                                                      |
| Send To (as Attachment)                                                                                  |                        |                                                                    | Set as Wo GenStat Files (*.gen,*.gpi)<br>GenStat Spreadsheet Files (*.gsh,*.gwb)                                                                                                                     |
| Exit                                                                                                     | Alt+F4                 |                                                                    | Working Directe Other Spreadsheet Files (*.xls*,*.wq1,*.wb*,* ■ :<br>Database Files (*.db*;*.gdb)                                                                                                    |
| 1 F:\genstm\\SURVEY.GEN<br>2 C:\Program Files\\Pig.gsh<br>3 F:\Laptop\\wool.xls<br>4 F:\Laptop\\wool.gsh | 1                      | Win Manual/Data Samples'                                           | Other Stats Files (*.s*,*.mt?,*.dta,*.rec,*.wor,*<br>Other Matrix Files (*.d?t,*.fmt,*.mat,*.sdd)<br>Text Files (*.dat,*.txt,*.prn,*.out)<br>GenStat Save Files (*.gsv)<br>GenStat Metafiles (*.gmf) |

# Loading Data From a text file

#### Select $\underline{D}ata \rightarrow \underline{L}oad \rightarrow \underline{A}SCII file...$

| Data Spread Graphics Stats                                                                                                 | Tools Wi | indow Help                                          |
|----------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------|
| Load                                                                                                                       |          | <ul> <li>ASCII file</li> </ul>                      |
| Save<br>Clear All Data                                                                                                     | Ctrl+D   | Resume<br>Data File                                 |
| Calculations<br>Transformations<br>Unit Conversions<br>Matrix Calculations<br>Set Calculations<br>Probability Calculations |          | From Clipboard<br>ODBC Data Query<br>ODBC Retrieval |
| Generate Random Sample<br>Random Permutations<br>Ranks                                                                     | Samples' |                                                     |
| Form Groups (Factors)<br>Form Multiple-Response Factor<br>Form Similarity Matrix<br>Append<br>Subset                       | S        | les'                                                |
| Display                                                                                                                    | F5       |                                                     |



#### 5-Jan-12

| Da   | ita S   | Str       | uct   | ure          | es   | & S    | prea   | adst   | neet   |                      |         | •                                       | .Data Disp                                                              | lay        |                                                            | ?                                                              |   |
|------|---------|-----------|-------|--------------|------|--------|--------|--------|--------|----------------------|---------|-----------------------------------------|-------------------------------------------------------------------------|------------|------------------------------------------------------------|----------------------------------------------------------------|---|
|      |         |           |       |              |      |        |        |        |        | Data<br>Disp<br>Monu | lay<br> | ••••••••••••••••••••••••••••••••••••••• | Data<br>All Data<br>Control<br>Matrices<br>Control<br>Scalars<br>Tables |            | Name<br>Block<br>Bleed<br>Breed<br>Sex<br>Bl Supp<br>V FEC | Type<br>Factor<br>Factor<br>Factor<br>Factor<br>Variate        |   |
|      |         | Fa        | ctors | <b>; (!)</b> |      |        | Var    | iables | 5      |                      |         | ÷                                       | Other Types                                                             |            | V PCVprc<br>V Record<br>V Wtat3m<br>V Wtat6m<br>V Wtgain   | Variate<br>Variate<br>Variate<br>Variate<br>Variate<br>Variate |   |
| 🔳 Sp | oreadsh | eet       | [DRM. | <u>gsh</u> ] |      |        |        |        |        |                      |         | X                                       |                                                                         |            |                                                            |                                                                |   |
| Row  | Record  | II        | Breed | Sex          | supp | Block  | Wtat3m | Wtat6m | PCVprc | FEC                  | Wtgain  | E .                                     |                                                                         |            | <                                                          |                                                                | > |
| 1    | 1       | 349       | /     | - 2          | 1    | 1      | 8      | 8.9    |        | 6500                 | 0.9     | L L                                     | [                                                                       | Options >> | <u>C</u> lose                                              |                                                                | P |
| 2    | 2       | 326       | 1     | 2            | 1    | 1      | 9      | 10.1   | 11     | 2650                 | 1.1     |                                         |                                                                         |            |                                                            |                                                                |   |
| 3    | 3       | 393       | 1     | 1            | 1    | 2      | 12     | 12.6   | 22     | 750                  | 0.6     |                                         |                                                                         |            |                                                            |                                                                |   |
| 4    | 4       | 71        | 1     | 1            | 1    | 2      | 12.3   | 14.6   | 15     | 5200                 | 2.3     |                                         |                                                                         |            |                                                            |                                                                |   |
| 5    | 5       | 271       | 1     | 1            | 1    | 3      | 13     | 13.7   | 19     | 4800                 | 0.7     |                                         |                                                                         |            |                                                            |                                                                |   |
| 6    | 6       | 382       | 1     | 2            | 1    | 3      | 15.5   | 16.8   | 24     | 2450                 | 1.3     |                                         |                                                                         |            |                                                            |                                                                |   |
| 7    | 7       | 85        | 1     | 2            | 1    | 4      | 16.3   | 18.2   | 27     | 200                  | 1.9     |                                         |                                                                         |            |                                                            |                                                                |   |
| 8    | 8       | 176       | 1     | 2            | 1    | 4      | 15.9   | 17.7   | 21     | 3000                 | 1.8     |                                         |                                                                         |            |                                                            |                                                                |   |
| 9    | 9       | 286       | 1     | 2            | 2    | 1      |        | 13.6   | 21     | 1600                 | 2.6     |                                         |                                                                         |            |                                                            |                                                                |   |
|      | 10      | 183       | 1     | 1            | 2    | 1      | 9.9    | 11.7   | 21     | 450                  | 1.8     |                                         |                                                                         |            |                                                            |                                                                |   |
|      | 11      | 21        | 1     | 2            | 2    | 2      | 11.6   | 13.1   | 23     | 2900                 | 1.5     |                                         |                                                                         |            |                                                            |                                                                |   |
| 12   | 12      | 122       |       | L<br>-       | 2    | 2      | 12.3   | 17.0   | 23     | 300                  | 2.3     |                                         |                                                                         |            |                                                            |                                                                |   |
| 13   | 1.3     | 3/4<br>20 |       | L 1          | 2    |        | 14.0   | 16 0   | 19     | 2230                 | J.J     |                                         |                                                                         |            |                                                            |                                                                |   |
| 14   | 14      | ےد<br>مەر | L<br> | 2            | 2    | ت<br>م | 14.2   | 10.9   | 22     | 2000                 | 2.1     |                                         |                                                                         |            |                                                            |                                                                |   |
| 15   | I3      | 202       |       | 2            | 2    | 4      | 10.3   | 20.2   | 20     | 100                  | 3.9     |                                         |                                                                         |            |                                                            |                                                                |   |

# **Exploring data**

#### $\textbf{Graphics} \rightarrow \textbf{Histogram}$

| Graphics                      | Stats                            | Tools   | Wine | dow          |
|-------------------------------|----------------------------------|---------|------|--------------|
| Create                        | Graph                            |         | pc   | <b>₽</b> > % |
| 2D Scat<br>2D Line<br>3D Scat | tter Plot<br>e Plot<br>tter Plot | · · · · | 8    | +.0<br>.00   |
| Histogr                       | am                               |         |      |              |
| Bar Cha                       | art                              |         |      |              |
| Boxplot                       | t                                |         |      |              |
| Dot His                       | togram                           |         | k    | Wtai         |
| Dot-plo                       | ot                               |         | 1    |              |
| Rug Plo                       | ot                               |         | 2    |              |
| Pie Cha                       | art                              |         | 2    |              |
| Stem a                        | nd Leat.                         |         | 3    |              |
| Contou                        | r Plot                           |         | 3    |              |
| Surface                       | Plot                             |         | 4    |              |
| Shade I                       | Plot                             |         | 4    |              |
| Image                         | Plot                             |         | 1    |              |
| 3D Hist                       | ogram.                           |         | 1    |              |
| Scatter                       | Plot Ma                          | trix    | 2    |              |
| Trellis (                     | Plot                             |         | 2    |              |
| Repeate                       | ed Meas                          | ures    | 3    |              |
| Multiva                       | riato                            |         | ▶ 4  |              |
|                               |                                  |         | 4    |              |
| Probab                        | ility Plot                       | t       | 1    |              |
| Lorenz                        | Curve                            |         | 1    |              |
| Ecology                       | /                                |         | · –  |              |
| Windro                        | se Diagi                         | ram     |      |              |
| Circular                      | PIOT                             |         | 21   | Ar           |



## **Boxplot**

#### **Graphics** $\rightarrow$ **Boxplot** ...

| Graphics                      | Stats                        | Tools | ₩Vir     | ndow                    |
|-------------------------------|------------------------------|-------|----------|-------------------------|
| Create (                      | Graph                        |       | P        | <b>e</b> 2              |
| 2D Scat<br>2D Line<br>3D Scat | ter Plot<br>Plot<br>ter Plot | <br>  | 8        | <b>t</b> -8   <b>  </b> |
| Histogra<br>Bar Cha           | am<br>rt                     |       |          |                         |
| Boxplot                       |                              |       |          |                         |
| Dot His<br>Dot-plo            | togram<br>t                  |       | k<br>1   | Wtat3                   |
| Rug Plc                       | .t                           |       | 2        |                         |
| Pie Cha                       | rt                           |       | 2        | 12                      |
| Stem ar                       | nd Leaf.                     | ••    | 3        |                         |
| Contour                       | - Plot                       |       | 3        | 15                      |
| Surface                       | Plot                         |       | 4        | 16                      |
| Shade F                       | lot                          |       | 4        | 15                      |
| Image F                       | Plot                         |       | 1        |                         |
| 3D Hist                       | ogram.                       |       | 1        | 9                       |
| Scatter                       | Plot Ma                      | trix  | 2        | 11                      |
| Trellis F                     | lot                          |       | 2        | 12                      |
| Repeate                       | ed Meas                      | ures  | 3        | 14                      |
| Ndultiszor                    | -iata                        |       | - 3      | 14                      |
| - Indicival                   | late                         |       | - 4      | 16                      |
| Probabi                       | lity Plot                    |       | 1        | 7                       |
| Lorenz i                      | Curve                        |       | 1        | 8                       |
| Ecology                       |                              |       |          | •                       |
| Windros                       | se Diagr                     | ram   |          |                         |
| Circular                      | Plot                         |       | <b>_</b> | 107 -                   |

## **Boxplot - Data**



-How are the data organized?

C List of <u>variates</u>

Single variate with groups

Select a single data set to be plotted (or enter name and press return) <u>S</u>elect Data:



Data currently selected for plotting

| <u>D</u> ata:<br>FEC | <u>G</u> roups:<br>Breed      | <b>•</b>                      |
|----------------------|-------------------------------|-------------------------------|
|                      | <u>L</u> abels:               | -                             |
| P 🗙 🛛 🕻              | ancel < <u>B</u> ack <u>I</u> | <u>V</u> ext > <u>F</u> inish |

## Scatterplot

#### Graphics $\rightarrow$ Graphics Wizard ... then select desired graph here scatterplot

| Graphics Stats Tools W                                                                                                           |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Create Graph                                                                                                                     | Graphics Wizard - Graph Type 🛛 🔀                                                                                                    | Graphics Wizard - Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2D Scatter Plot<br>2D Line Plot<br>3D Scatter Plot<br>Histogram<br>Bar Chart<br>Boxplot<br>Dot Histogram<br>Dot-plot<br>Rug Plot | Graph Type:<br>2D Scatter Plot<br>2D Line Plot<br>2D Line & Scatter Plot<br>2D Histogram<br>Bar Chart<br>2-Way Bar Chart<br>Boyplot | Image: Type of plot:       Single XY         Select the data to be plotted (or enter name and press return)         Select Y:       Select X:         Select Y:       Select X:         PCV       FEC         Data currently selected for plotting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Pie Chart<br>Stem and Leaf<br>Contour Plot<br>Surface Plot<br>Shade Plot<br>Image Plot<br>3D Histogram                           | Dot Histogram<br>Rug Plot<br>Piechart<br>Dot-plot<br>Contour Plot<br>Surface Plot<br>Shade Plot                                     | Y Data: X Data: Groups:<br>PCV FEC None >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Scatter Plot Matrix<br>Trellis Plot<br>Repeated Measures                                                                         | Cancel < Back <u>N</u> ext > <u>Finish</u>                                                                                          | Image: Second state     Image: Second st |
| Multivariate •                                                                                                                   |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Probability Plot<br>Lorenz Curve<br>Ecology<br>Windrose Diagram<br>Circular Plot                                                 |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

# **Summary statistics**

#### **Choose Stats** $\rightarrow$ **Summary Statistics** $\rightarrow$ **Summarise Contents of Variates.**

| Summary Statistics       Summarize Contents of Variates         Statistical Tests       Summarize Circular Data         Distributions       Diversity         Regression Analysis       Tally         Design       Tally         Analysis of Variance       Summaries of Groups (Tabulation)         Mixed Models (REML)       Correlations         Six Sigma       Soft Test Contents of Variance         Six Sigma       Soft Test Contents of Groups (Tabulation)         Multivariate Analysis       Correlations         Six Sigma       Soft Test Contents of Groups (Tabulation)         Survey Analysis       Dit 11 2650 1.1         Spatial Analysis       Soft 15 5200 2.3         Survival Analysis       Soft 15 5200 2.3         Microarrays       Z Z Z 200 1.9         Microarrays       Z Z Z 200 1.9         Microarrays       Z Z Z 200 1.9         Microarrays       Z Z Z 200 1.8         Surver Analysis       Soft 24 2450 1.3         Base 24 2450 1.3       Soft 1.1         Soft 24 2450 1.3       Soft 24 2450 1.3         Distribution       Soft 24 2450 1.3         Base 24 2450 1.3       Soft 24 2450 1.3         Base 24 2450 1.3       Soft 24 2450 1.3 | Stats Tools Window                                                                                           | Help                                                                                                                                                                                                                                                                                                 | A Summarize C                                                                                                                                                 | ontents of Va                                                                              | ria 🔲 🗖                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Regression Analysis       Tally         Design       Frequency Tables         Analysis of Variance       Summaries of Groups (Tabulation)         Mixed Models (REML)       Correlations         Multivariate Analysis       Correlations         Six Sigma       59 10 6500 0.9         Survey Analysis       1 11 2650 1.1         Time Series       2.6 22 750 0.6         Spatial Analysis       2.6 15 5200 2.3         Survival Analysis       3.7 19 4800 0.7         Set Analysis       3.7 19 4800 0.7         Meta Analysis       8.2 21 200 1.9         Microarrays       7. 21 3000 1.8         No. of Concentration       Boxplot         Stem and Leaf         Normal Plot                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Summary Statistics<br>Statistical Tests<br>Distributions                                                     | <ul> <li>Summarize Contents of Variates</li> <li>Summarize Circular Data</li> <li>Diversity</li> </ul>                                                                                                                                                                                               | Available Data:<br>Block<br>Breed                                                                                                                             | Variates:                                                                                  | By Groups:                                                                                                                           |
| Six Sigma       5m       PCV       PEC       Witgain       T         Six Sigma       5m       PCV       PEC       Witgain       T         Survey Analysis       0.1       11       2650       1.1         Time Series       0.1       11       2650       1.1         Spatial Analysis       2.6       22       750       0.6         Survival Analysis       4.6       15       5200       2.3         Survival Analysis       3.7       19       4800       0.7         Keta Analysis       6.8       2.4       2450       1.3         Microarrays       7.7       21       3000       1.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Regression Analysis<br>Design<br>Analysis of Variance<br>Mixed Models (REML)                                 | Tally<br>Frequency Tables<br>Summaries of Groups (Tabulation)                                                                                                                                                                                                                                        | Sex<br>Supp                                                                                                                                                   |                                                                                            |                                                                                                                                      |
| Meta Analysis <sup>6.8</sup> <sup>24</sup> <sup>2450</sup> <sup>1.3</sup> Microarrays <sup>8.2</sup> <sup>27</sup> <sup>200</sup> <sup>1.9</sup> Microarrays <sup>7.7</sup> <sup>21</sup> <sup>3000</sup> <sup>1.8</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Six Sigma<br>Survey Analysis<br>Time Series<br>Spatial Analysis<br>Survival Analysis<br>Repeated Measurement | 6m       PCV       FEC       Utgain       T         8.9       10       6500       0.9       •         0.1       11       2650       1.1       •         2.6       22       750       0.6       •         4.6       15       5200       2.3       •         3.7       19       4800       0.7       • | <ul> <li>Uptions</li> <li>No. of Values</li> <li>No. of Non-missing Values</li> <li>No. of Missing Values</li> <li>Arithmetic Mean</li> <li>Median</li> </ul> | <ul> <li>Minimum</li> <li>Maximum</li> <li>Variance</li> <li>Standard Deviation</li> </ul> | <ul> <li>Range (max-min)</li> <li>Lower Quartile</li> <li>Upper Quartile</li> <li>Sum of Values</li> <li>More statistics.</li> </ul> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Meta Analysis<br>Microarrays                                                                                 | 6.8     24     2450     1.3       8.2     27     200     1.9       7.7     21     3000     1.8                                                                                                                                                                                                       | Graphics<br>Histogram<br>Normal Plot                                                                                                                          | C Boxplot                                                                                  | 🔲 Stem and Leaf                                                                                                                      |

# **Calculating columns**

Spread  $\rightarrow$  Calculate  $\rightarrow$  Column

# Group is the combined factor of breed and dietary supplement

| Gpread Graphics Stats Tools                                  | Window Help                                                                                             |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| New 🕨                                                        | 🕫 🗣 🔂 📶 🔯                                                                                               |
| Column 🕨                                                     | +93 號 🔡 🧱 😹 😻 🖼 😭                                                                                       |
| Factor 🕨                                                     |                                                                                                         |
| Calculate 🕨 🕨                                                | Fill F3                                                                                                 |
| Delete  Insert Select                                        | List Fill Ctrl+F11<br>Fill by Groups Ctrl+Shift+G<br>Date Fill Ctrl+Alt+F11                             |
| Restrict/Filter                                              | Column Shift+F3                                                                                         |
| Sort CtrI+F9<br>Manipulate<br>Sheet<br>Book<br>Add<br>Export | FactorCtrl+Alt+FRecalculateAlt+F11StandardizeCtrl+Shift+F3Random SampleShift+F11Random SubsetCtrl+Alt+S |
| Update   Set <i>a</i> s Active Sheet                         | Summary Stats F11<br>Cell Selection Stats Alt+F5                                                        |
| 9 9 286 1 2 2                                                | Row Summaries                                                                                           |
| 10 10 183 1 1 2                                              | Text Split Ctrl+Shift+T                                                                                 |
| 11 11 21 1 2 2<br>12 12 12 1 1 2 2                           | Combine Text Alt+Shift+T                                                                                |
| 13 13 374 1 1 2                                              | Recode Alt+Shift+F11                                                                                    |
| 14 14 32 1 2 2                                               | Code to Groups Ctrl+Alt+F8                                                                              |
| 15 15 282 1 2 2                                              | Rebase Dates Ctrl+Alt+B                                                                                 |

| 🔼 Calculate              |                |        |       |         |            |          | × |
|--------------------------|----------------|--------|-------|---------|------------|----------|---|
| Breed*10+Supp            |                |        |       |         |            |          |   |
| Available Data           | Block<br>Breed | + -    | ×     |         | and        | eqs      | ] |
| Factors                  | Sex<br>Supp    | ** *+  |       | )       | or         | nes      |   |
| Texts                    |                | < <=   | >     | >=      | not        | is       |   |
| Scalars                  |                | == /=  | in    | ni      | eor        | isnt     | i |
| Tables                   |                | Func   | tions |         |            |          |   |
| Save Result I            | n: Group       |        |       |         | Print in O | lutput   |   |
| 🔽 Display In Spreadsheel | t [DRM.GSH]DRM |        |       | ·       | ]          |          |   |
| P 🛛 🗙 🗹                  | Run            | Cancel | 0     | otions. |            | Defaults |   |

| 🔳 Sp   | oreadsh     | eet                 | [DRM. | gsh] | *    |       |        |            |            |        |             | . F                 | × |
|--------|-------------|---------------------|-------|------|------|-------|--------|------------|------------|--------|-------------|---------------------|---|
| Row    | Record      | ID                  | Breed | Sex  | Supp | Block | Wtat3m | Wtat6m     | PCVprc     | FEC    | Wtgain      | <mark>Grou</mark> p |   |
| 1      | 1           | 349                 | 1     | 2    | 1    | 1     | 8      | 8.9        | 10         | 6500   | 0.9         | 11                  |   |
| 2      | 2           | 326                 | 1     | 2    | 1    | 1     | 9      | 10.1       | 11         | 2650   | 1.1         | 11                  |   |
| 3      | 3           | 393                 | 1     | 1    | 1    | 2     | 12     | 12.6       | 22         | 750    | 0.6         | 11                  |   |
| 4      | 4           | 71                  | 1     | 1    | 1    | 2     | 12.3   | 14.6       | 15         | 5200   | 2.3         | 11                  |   |
| 5      | 5           | 271                 | 1     | 1    | 1    | 3     | 13     | 13.7       | 19         | 4800   | 0.7         | 11                  |   |
| 6      | 6           | 382                 | 1     | 2    | 1    | 3     | 15.5   | 16.8       | 24         | 2450   | 1.3         | 11                  |   |
| 7      | 7           | 85                  | 1     | 2    | 1    | 4     | 16.3   | 18.2       | 27         | 200    | 1.9         | 11                  | I |
| 8      | 8           | 176                 | 1     | 2    | 1    | 4     | 15.9   | 17.7       | 21         | 3000   | 1.8         | 11                  |   |
| 9      | 9           | 286                 | 1     | 2    | 2    | 1     | 11     | 13.6       | 21         | 1600   | 2.6         | 12                  |   |
| 10     | 10          | 183                 | 1     | 1    | 2    | 1     | 9.9    | 11.7       | 21         | 450    | 1.8         | 12                  |   |
| 11     | 11          | 21                  | 1     | 2    | 2    | 2     | 11.6   | 13.1       | 25         | 2900   | 1.5         | 12                  |   |
| 12     | 12          | 122                 | 1     | 1    | 2    | 2     | 12.5   | 14.8       | 25         | 300    | 2.3         | 12                  |   |
| 13     | 13          | 374                 | 1     | 1    | 2    | 3     | 14.6   | 17.9       | 19         | 2250   | 3.3         | 12                  |   |
| 14     | 14          | 32                  | 1     | 2    | 2    | 3     | 14.2   | 16.9       | 22         | 2800   | 2.7         | 12                  |   |
| 15     | 15          | 282                 | 1     | 2    | 2    | 4     | 16.3   | 20.2       | 20         | 750    | 3.9         | 12                  |   |
| 16     | 16          | 94                  | 1     | 1    | 2    | 4     | 16.7   | 17.7       | 13         | 5600   | 1           | 12                  |   |
| 212    | 4           |                     | -     | -    |      | -     |        | ]          | 1          |        |             | ſ,                  | ľ |
| Spread | Isheet [DRN | 4.qsh] <sup>*</sup> | *     |      |      |       | Se     | rver Ready | . [32, 12] | Row: 1 | L Column: 1 | 12 <c></c>          |   |

# **Hypothesis Testing**

#### Stat $\rightarrow$ Statistical Tests $\rightarrow$ One and two sample t-tests ...

| Stats Tools Window Help                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Summary Statistics 🔹 🕨 🌆 🛛 😰                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Statistical TestsOne- and two-sample t-testsDistributionsImage: One- and two-sample Binomial testsRegression AnalysisImage: One- and two-sample Poisson tests                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| DesignImage: Constraint of Constr |
| Sample Size 🕨 Gamma Statistic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1 1 2 1 9.9 McNemar's Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 1     2     2     11.6       1     2     2     11.6   Cochran-Armitage Trend Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1 1 2 2 14.6 Contingency Tables                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| I     I     I     I       1     2     3     14.0       1     2     3     14.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1 2 2 4 16 3 MANTEL Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1 1 2 4 16.7 W-test for Normality                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2 2 1 1 7.5 Test for Homogeneity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| T-Tests                                            |                                                                                 | < |
|----------------------------------------------------|---------------------------------------------------------------------------------|---|
| Available Data:<br>Block<br>Breed<br>Sex<br>Supp   | Test:<br>Two-sample (unpaired)<br>Data Set: Wtgain<br>Groups: Breed             | - |
| Data Arrangement<br>Two Sets<br>One set with Group | Confidence Limit (%):       95         Type of Test       O One-sided (y1 < y2) |   |
| P × 2                                              | RunOptionsSaveCancelDefaults                                                    |   |

## Result

#### Two-sample t-test

Variate: Wtgain Group factor: Breed

#### Test for equality of sample variances

Test statistic F = 1.43 on 15 and 15 d.f.

Probability (under null hypothesis of equal variances) = 0.49

#### Summary

|                   |                |        |          | Standard  | Standard error |
|-------------------|----------------|--------|----------|-----------|----------------|
| Sample            | Size           | Mean   | Variance | deviation | of mean        |
| 1                 | 16             | 1.856  | 0.900    | 0.949     | 0.2372         |
| 2                 | 16             | 2.481  | 1.290    | 1.136     | 0.2839         |
| Difference of me  | eans:          | -0.625 | 5        |           |                |
| Standard error of | of difference: | 0.370  | )        |           |                |

95% confidence interval for difference in means: (-1.381, 0.1305)

#### Test of null hypothesis that mean of Wtgain with Breed = 1 is equal to mean with Breed = 2

Test statistic t = -1.69 on 30 d.f.

Probability = 0.101

\*

## **Chi-square Tests for Two-way Tables**

r Pi

#### Select Stats $\rightarrow$ Summary Statistics $\rightarrow$ Summaries of Groups [Tabulation] ... a **Summary by Groups**

| Stats Tools Window Help                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Summary Statistics                                                                                                                                                            | 2                                                                                                                                                                                                                                                                                                                                                                                |
| Statistical TestsDistributionsRegression AnalysisDesign                                                                                                                       | One- and two-sample t-tests<br>One- and two-sample Binomial tests<br>One- and two-sample Poisson tests                                                                                                                                                                                                                                                                           |
| Analysis of VarianceMixed Models (REML)Multivariate AnalysisSix SigmaSurvey AnalysisTime SeriesSpatial AnalysisSurvival AnalysisRepeated MeasurementsMeta AnalysisMicroarrays | Two-sample nonparametric tests<br>Two-sample nonparametric tests<br>Kendall's Coefficient of Concordance<br>Lin's Concordance Coefficient<br>Nonparametric Correlations<br>Gini Coefficient of Inequality<br>Kruskal-Wallis One-way ANOVA<br>Friedman's Nonparametric ANOVA<br>Steel's Many-one Rank Test<br>Cochran's Q Test<br>Cochran-Mantel-Haenszel Test<br>Kappa Statistic |
| Sample Size                                                                                                                                                                   | Gamma Statistic                                                                                                                                                                                                                                                                                                                                                                  |
| -0.625<br>0.370                                                                                                                                                               | McNemar's Test<br>Cochran-Armitage Trend Test                                                                                                                                                                                                                                                                                                                                    |
| nce in means: (-1.381, 0.1305)                                                                                                                                                | Contingency Tables<br>Chi-square Goodness of fit<br>MANTEL Test                                                                                                                                                                                                                                                                                                                  |
| that mean of VVtgain with E                                                                                                                                                   | W-test for Normality<br>Test for Homogeneity                                                                                                                                                                                                                                                                                                                                     |

#### Create Table using S... Form of table • Two-way table One-way table table Name of table: 2 Number of rows: 2 Number of columns: OK. Cancel **Create Tables** Contingency Tables Available Data: Tesh Chi-square test Ŧ Table: Create Table... Data Arrangement Method 🖲 Table. Pearson Maximum Likelihood Row and Column Factors Single variate with grouping factors. Run Options... Save... 2 Defaults Cancel

5-Jan-12

## **Correlation statistics**

#### Select Stats $\rightarrow$ Correlations ...

| Stats Tools Window H                 | lelp                                                                       |                                                                               |                      |
|--------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------|
| Summary Statistics                   | Summarize Contents of Variates                                             | Correlations                                                                  |                      |
| Statistical Tests                    | Summarize Circular Data                                                    | Available Dista:                                                              | Data:                |
| Distributions                        | Diversity                                                                  |                                                                               |                      |
| Regression Analysis                  | Tally                                                                      | FEC                                                                           | FEC 🔺                |
| Design                               | Frequency Tables                                                           | Group                                                                         | Wtgain               |
| Mixed Medele (REML)                  | Summaries of Groups (Tabulation)                                           | ID                                                                            | _                    |
| Multivariato Apalvois                | Correlations                                                               | PCV ->                                                                        |                      |
| Multival late Allalysis<br>Six Siama |                                                                            | Record                                                                        |                      |
| Survey Analysis                      | 2430 1.3 11                                                                | Wtat3m                                                                        |                      |
| Time Series                          | → <u>200</u> 1.5 11<br>→ 3000 1.8 11                                       | Wtat6m                                                                        |                      |
| Spatial Apalysis                     | ▶ 1600 2.6 12                                                              | Wtgain                                                                        | -                    |
| Survival Analysis                    | ▶ 450 1.8 12                                                               |                                                                               |                      |
| Repeated Measurements                | ▶ 2900 1.5 12                                                              | Weights:                                                                      |                      |
| Meta Analysis                        | ▶ 300 2.3 12                                                               | - Display                                                                     |                      |
| Microarrays                          | ▶ 2250 3.3 12                                                              |                                                                               |                      |
| Sample Size                          | 2800         2.7         12           ▼         750         3.9         12 | Correlations                                                                  | 'artial Correlations |
| Corre                                | lations                                                                    | <ul> <li>Test correlations against 0</li> <li>One-sided (y &lt; 0)</li> </ul> |                      |
|                                      | FEC                                                                        | $\bigcirc$ One-sided ( $u > 0$ )                                              |                      |
|                                      | Wtgain -0.3500                                                             |                                                                               |                      |
|                                      | FEC Wtgain                                                                 | I wo-sided                                                                    |                      |
| Number o                             | of observations: 32                                                        |                                                                               | Due Defaulte         |
|                                      |                                                                            |                                                                               |                      |
| Two-sideo                            | d test of correlations different from zero<br>probabilities                | 🔁 🗠 🗙 🙎                                                                       | Cancel Save          |
|                                      | FEC<br>VVtgain 0.0496<br>FEC VVtgain                                       |                                                                               |                      |

## **Regression Analysis**

#### Select Stats $\rightarrow$ Regression Analysis $\rightarrow$ Linear Models ...

| Stats Tools Window H  | elp                                           |
|-----------------------|-----------------------------------------------|
| Summary Statistics    | • 2                                           |
| Statistical Tests     |                                               |
| Distributions         | ► 136 0.2839                                  |
| Regression Analysis   | Linear Models                                 |
| Design                | <ul> <li>Generalized Linear Models</li> </ul> |
| Analysis of Variance  | Logistic Regression                           |
| Mixed Models (REML)   | <ul> <li>Log-linear Models</li> </ul>         |
| Multivariate Analysis | Probit Analysis                               |
| Six Sigma             | <ul> <li>Multinomial Regression</li> </ul>    |
| Survey Analysis       | <ul> <li>Ordinal Regression</li> </ul>        |
| Time Series           | <ul> <li>All-subsets Regression</li> </ul>    |
| Spatial Analysis      | Screening Tests                               |
| Survival Analysis     | <ul> <li>Split-line Regression</li> </ul>     |
| Repeated Measurements | Standard Curvec                               |
| Meta Analysis         | Noplinger Models                              |
| Microarrays           |                                               |
| Samplo Sizo           | Mixed Models                                  |
| Jampie Size           | Regression Trees                              |
| vvrgam                |                                               |

| 🔼 Linear F                           | Regression               |                 |         |                |
|--------------------------------------|--------------------------|-----------------|---------|----------------|
| Available Data:                      | Regression:              |                 |         |                |
| FEC<br>Group                         | Simple Linear Regression |                 |         | •              |
| ID<br>PCV                            | Response Variate:        | Wtgain          |         |                |
| Record<br>Wtat3m<br>Wtat6m<br>Wtgain | Explanatory Variate:     | FEC             |         |                |
|                                      |                          | Run Options     | Save    | Change Model   |
|                                      | 🚹 🗠 🗙 😰 🛛                | Cancel Defaults | Predict | Further Output |

### **Regression Analysis**

64 FIT [PRINT=model,summary,estimates; CONSTANT=estimate; FPROB=yes; TPROB=yes] FEC

#### Regression analysis

Response variate: VVtgain Fitted terms: Constant, FEC

#### Summary of analysis

| Source     | d.f. | S.S.  | m.s.  | v. r. | Fpr.  |
|------------|------|-------|-------|-------|-------|
| Regression | 1    | 4.41  | 4.405 | 4.19  | 0.050 |
| Residual   | 30   | 31.56 | 1.052 |       |       |
| Total      | 31   | 35.97 | 1.160 |       |       |

Percentage variance accounted for 9.3 Standard error of observations is estimated to be 1.03.

#### Message: the following units have high leverage.

| Unit | Response | Leverage |
|------|----------|----------|
| 1    | 0.90     | 0.285    |
| 4    | 2.30     | 0.165    |
| 5    | 0.70     | 0.135    |
| 16   | 1.00     | 0.198    |

#### Estimates of parameters

| Parameter | estimate  | s.e.     | t(30) | t pr. |
|-----------|-----------|----------|-------|-------|
| Constant  | 2.565     | 0.265    | 9.67  | < 001 |
| FEC       | -0.000224 | 0.000109 | -2.05 | 0.050 |

### **Analysis of Variance**

Select Stats  $\rightarrow$  Analysis of Variance ...

| Stats | Tools      | Window    | Help     |                             |
|-------|------------|-----------|----------|-----------------------------|
| Sun   | nmary S    | tatistics | •        |                             |
| Stat  | istical Te | ests      | •        |                             |
| Dist  | ribution   | 6         | •        | stimate; FPROB=yes; TPROB=y |
| Reg   | ression ,  | Analysis  | •        |                             |
| Des   | ign        |           | <u> </u> |                             |
| Ana   | lysis of ' | Variance  | ►        | One- and Two-way            |
| Mix   | ed Mode    | ls (REML) | •        | General                     |
| Mul   | tivariate  | Analysis  | •        | Unbalanced Designs          |
| Six   | Sigma      |           | •        | Parallel ANOVA              |
| Sur   | vey Anal   | ysis      | - + `    |                             |
| Tim   | ie Series  |           | •        | F pr.                       |
| Spa   | tial Anal  | ysis      | •        | 0.000                       |
| Sur   | vival Ana  | alysis    | •        |                             |
| Rep   | eated M    | easuremen | ts 🕨     |                             |
| Met   | a Analys   | is        | •        |                             |
| Micr  | roarrays   |           | •        | Analysis of vari            |
| San   | nple Size  |           | •        |                             |

| One- and                                          | two-way A                 | .n 🔳 🗆 🔀               |
|---------------------------------------------------|---------------------------|------------------------|
| Available data:<br>FEC<br>Group                   | Design<br>© One-way       | C Two-way              |
| ID<br>PCV<br>Record<br>Wtat3m<br>Wtat6m<br>Wtgain | Y-variate:<br>Treatments: | Wtgain<br>Supp         |
| r 🗠 🗙 😰                                           | Run Op<br>Cancel D        | efaults Further Output |

lance

Variate: Wtgain

| Source of variation | d.f. | S.S.    | m.s.    | V. <b>r</b> . | F pr. |
|---------------------|------|---------|---------|---------------|-------|
| Supp                | 1    | 18.6050 | 18.6050 | 32.14         | < 001 |
| Residual            | 30   | 17.3637 | 0.5788  |               |       |
| Total               | 31   | 35.9687 |         |               |       |

5-Jan-12

### **Analysis of Variance**

#### Select Stats $\rightarrow$ Analysis of Variance $\rightarrow$ General ...

| 🛆 Analysis              | of Varia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | nce         |                   |          |                |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------|----------|----------------|
| Available Data:         | Design:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | One-way ANC | IVA (no Blocking) |          | •              |
| Block<br>Breed<br>Group | Y-Variate:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Wtgain      |                   |          | Contrasts      |
| Supp                    | Treatments:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Group       |                   |          |                |
|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                   |          |                |
|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                   |          |                |
|                         | Covariates                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                   |          |                |
|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             | Run               | Options  | Save           |
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